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Atlas Master N
GP7 tested p.62

August 2018
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Feeding the furnaces

Coal traffic keeps a steel mill hot on this layout p.42

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the woods:
Logging action
on two decks p.28

One-day
weathering p.50

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CONTENT
CODE PG. 4**

PLUS

Build a white-metal crane p.24

Change owners with decal film p.54

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28 Two decks of lumber action

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The Arcadia & Betsey River Ry. tracks timber operations from logging camp to sawmill

by Harley "Skip" Luyk

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36 Push-button staging solution

Build an automated traverser with 3-D printer parts, an Arduino microcontroller, and other low-cost electronics

by Michael Hardwick

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MREXTRA

Coal and steel industry scenes in eastern Ohio highlight the multilevel Piney Fork Branch

by Seth Gartner

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MRVP

Easy-to-follow techniques will yield realistic results on any model

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On the cover: Seth Gartner's HO scale Piney Fork Branch takes the New York Central into coal country.

Lou Sassi photo



Next issue

In September, Lou Sassi visits a Baltimore & Ohio layout in a bonus room, we share plans for a small-town depot, we show you how to build a water tank, and more!

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Link. Look. Learn more!

When you finish reading about the automated traverser on page 36 and you still don't know an Arduino from the Italian restaurant down the street, have no fear. Model Railroader Video Plus is here to help in the form of more than 50 videos covering various aspects of leading-edge technology in the hobby. Not an MRVP subscriber yet? Watch the *free video* to see what you've been missing!

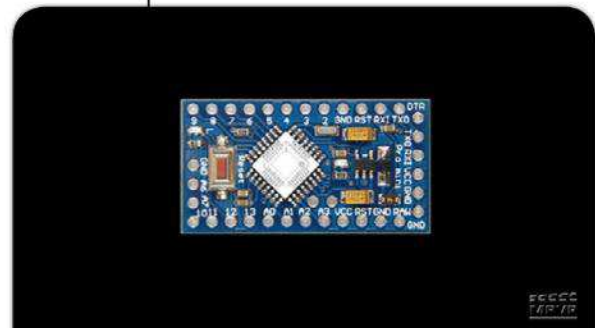
MRVPTech videos include:



Eric White uses SketchUp to design a 3-D printed slide shed.
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Gerry Leone explains basic Arduino functionality.
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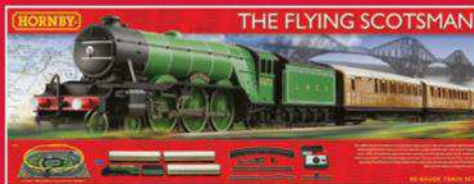
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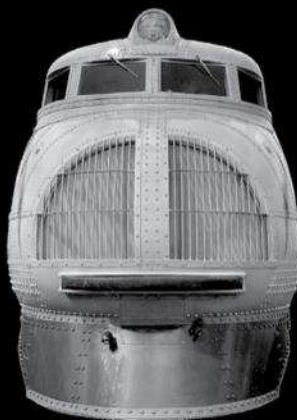
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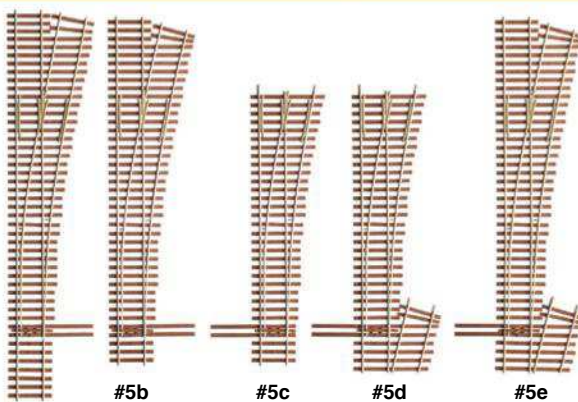
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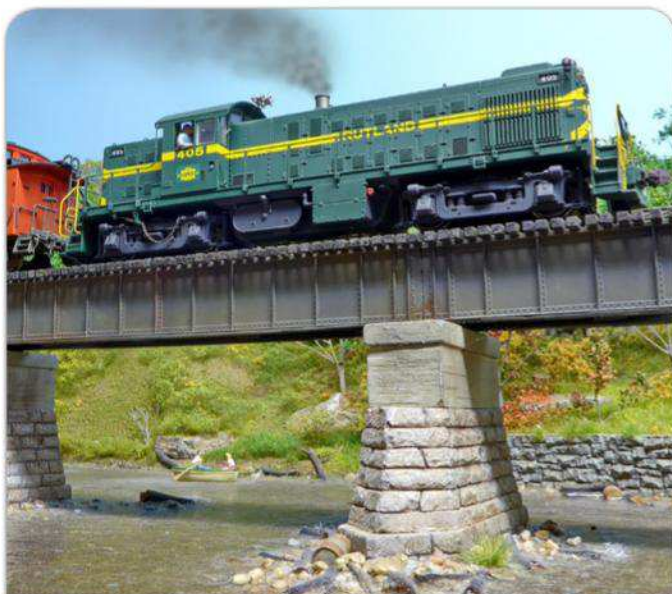
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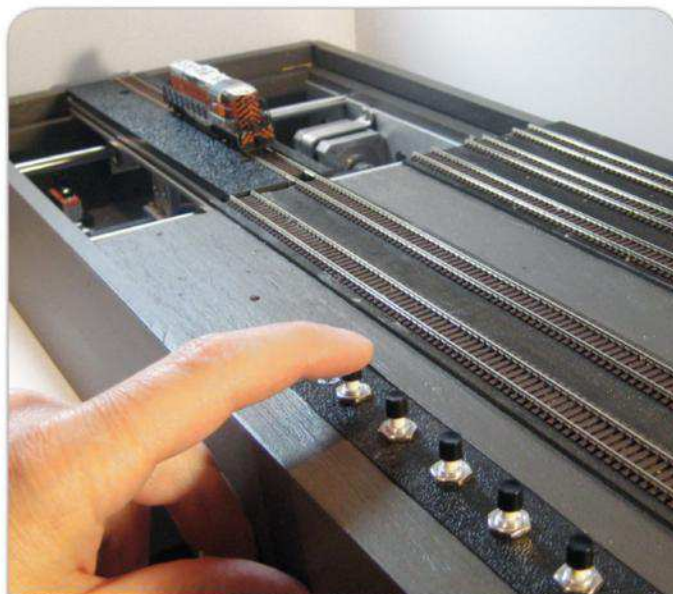
MREXTRA

Subscribers get more at ModelRailroader.com. This month be sure to check out two new layout videos, featuring Harley "Skip" Luyk's Arcadia & Betsey River logging layout and Seth Gartner's New York Central Piney Fork Branch. Click on the links under Layout Visits on the *Model Railroader* home page.



Trackside Photos

Need some extra inspiration? How about a stunning trackside photo every time you fire up your home computer? Each month we give our online community a new computer desktop wallpaper. This month's photo is from Don Janes' HO scale Green Mountain Division. Click on the link under Online Extras to download this photo sized appropriately for your computer screen.



Push-button staging solution

Turn to page 36 to read about how Michael Hardwick built a push-button controlled traverser, using 3-D printer parts and an Arduino microcontroller. Mike wrote his own computer program to run the traverser. He also shot video of it in action on his N scale Western Pacific layout. Download Mike's program and watch the video demo at www.ModelRailroader.com.

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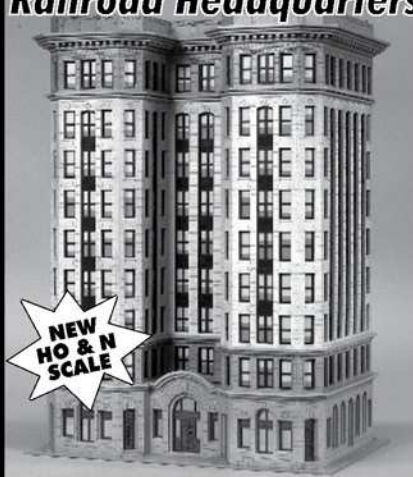
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We want to be challenged. Or do we?

One of the many factors we take into account when putting together a magazine is the experience levels of our readers. At one end of the spectrum are beginners. At the other are folks who have seen and read and done it all.

Except there's never really an "all," is there? The hobby, like the world, keeps evolving. New products and technologies are being developed as you read this. They may not initially have a model railroad application, but, given the curious and innovative nature of those in the hobby, they find their way here eventually.

I think back to when Arduino microcontrollers came onto the market in force about a decade ago, and more recently the Raspberry Pi computer. I also remember thinking to myself, "There has to be a model railroad application for this."

As it turns out, there are many uses for the Arduino, from lighting to animation. More will be found and taken advantage of. The Raspberry Pi is used primarily for train control, and I won't be surprised to see its use expand over time.

That may come with the development of Layout Command Control. If you haven't heard of LCC yet, you will over the next several years. Independent of Digital Command Control (DCC), which is used to control trains, LCC offers users control of everything else – signals, turnouts, passenger car lighting, outboard sound, even the illumination for your room.

Standards for LCC have been developed by a group of volunteers and approved by the National Model Railroad Association. At the heart of LCC is its open-source

environment, which simply means the components each manufacturer makes for it will work with ones made by others without issues.

And because the software that drives LCC can be updated, it's being touted as "future-proof." I hesitate to label anything that way, but from what I've seen, it will be protected from obsolescence for a long time.

Other technologies you've read about here over the last few years are battery-powered DCC and 3-D printing. When I go to conventions, clinics on these topics are well attended.

The funny thing is, we get letters and field comments at shows about how a reader has "moved beyond" much of the content in the magazine, even when we run articles several times a year on these topics. "It just doesn't challenge me," some readers have opined.



One of our missions is to help advance the hobby. New techniques get others interested in model railroading, and enable those already participating to enjoy it on a grander scale.

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Pictured - a scene on Lewis Junction modelled by Roger Epps
Photo: Neil Davis.



General Electric Tier 4 GEVo diesel locomotive. These six-axle road units are lettered for BNSF Ry., General Electric demonstrator, Canadian National, CSX, Norfolk Southern, and Union Pacific in six road numbers per scheme. The N scale models, part of the ScaleTrains.com Rivet Counter line, have railroad-specific details and factory-installed wire grab irons. Direct-current models with an ESU Next18 connector are priced at **\$124.99**. Versions with an ESU LokSound Next18 Select Micro Digital Command Control and sound decoder sell for **\$204.99**. ScaleTrains.com Inc., 844-987-2467, www.scaletrains.com

H0 scale locomotives



- **General Electric ES44AC diesel locomotive.** BNSF Ry., Canadian National, Canadian Pacific, CSX, Ferromex, Norfolk Southern, and Union Pacific. Two road numbers per scheme; also available undecorated. Plastic body, die-cast metal chassis, load-based smoke output, and dual-mode Paragon3 sound decoder with Rolling Thunder. \$349.99. Broadway Limited Imports, 386-673-8900, www.broadway-limited.com



- **Union Pacific Electro-Motive Division E9A and E9B diesel locomotives.** For 1960-1971 *City of Los Angeles*. Working backup light on A and B units, modified etched-metal Farr air grills, and working Western-Cullen rotary beacon on A unit. Direct-current models

(one number per unit/set): A unit, \$199.98; A-B set, \$369.98. With dual-mode ESU LokSound Select sound decoder (one number per unit/set): A unit, \$299.98; A-B set, \$569.98. October 2019. Proto series. Wm. K. Walther's Inc., 414-527-0770, www.walthers.com

H0 scale freight cars

- **Offset-cupola caboose.** Atchison, Topeka & Santa Fe (reporting marks only or red with small white circle-cross herald); Chicago Short Line (maroon and gold, two road numbers); Denver & Rio Grande Western (black); Illinois Terminal (green and yellow); Indiana Harbor Belt (orange and black, two numbers); and Rock Island (block lettering). New Barber-Bettendorf swing-motion caboose trucks, separately applied smoke jack, and body-mounted McHenry scale couplers. \$29.98. March 2019. Roundhouse line. Athearn Trains, 800-338-4639, www.athearn.com



- **70-ton nine-panel three-bay hopper.** New road numbers: Chicago, Burlington & Quincy (black with white "Burlington" billboard lettering); Central Vermont (maintenance of way);

Chesapeake & Ohio ("Woodchip Service Only" lettering); Chessie System (Chesapeake & Ohio lettering, three-pack only); Canadian National ("wet noodle" herald); Missouri-Kansas-Texas ("The Katy Serves the Southwest" slogan); and Reading & Northern ("Domestic Coal Service" lettering). Flat or peaked ends as appropriate, removable load, and Accumate couplers. Two road numbers per scheme. Single car, \$31.95 (undecorated, \$24.95); Chessie System three-pack, \$95.85. Trainman line. Atlas Model Railroad Co., 908-687-0880, www.atlasrr.com



- **Pennsylvania RR class G39a, G39, and G39b ore cars.** G39a: Conrail, Penn Central, and Pennsylvania RR. G39: Penn Central and PRR. G39b: Conrail, PC, and PRR. G39 and G39a cars in six road numbers each; G39b in three numbers each. Crown, solid-bearing, or roller-bearing trucks as appropriate; metal wheels; and separately applied details. \$25.95. Late 2018. Bowser Manufacturing Co. Inc., 800-327-5126, www.bowser-trains.com

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Conducted by Cody Grivno



- **Depressed-center flatcar.** Conrail, New York Central (six road numbers), Pittsburgh & Lake Erie, and Union Pacific (maintenance of way silver). Three numbers per scheme unless noted. Wire grab irons, American Steel Foundries 100-ton Ride-Control trucks, and Kadee no. 5 couplers. \$39.99. Produced by ExactRail, available exclusively from TrainLife.com, 801-226-1909, www.trainlife.com



- **Assorted Pullman-Standard boxcars.** Tidewater Southern 50-foot PS-1 boxcar, \$39.95. St. Louis Southwestern (Cotton Belt) 40-foot PS-1 boxcar ("Blue Streak Fast Freight" lettering), \$38.95. Detroit, Toledo & Ironton 50-foot PS-1 boxcar ("Hydroframe 60 Keeps Load Safe From Shock" lettering), \$36.95. Injection-molded plastic model with separately applied details, two-piece self-centering trucks, and scale couplers. Kadee Quality Products Co., 541-826-3883, www.kadee.com
- **General American G85 class 85-foot flatcar.** Atchison, Topeka & Santa Fe (trailer hitches); Penn Central (trailer hitches); Railway Express Agency (20- and 40-foot container loading);

Southern Pacific (trailer hitches); Trailer Train (GTTX reporting marks with trailer hitches in brown and yellow schemes; VTTX reporting marks for 20- and 40-foot container loading). Four road numbers per scheme. Die-cast metal center sill, modeler-installed trailer hitches, and 70-ton roller-bearing trucks. \$29.98. January 2019. Walther's Mainline. Wm. K. Walther's Inc., 414-527-0770, www.walthers.com

HO scale passenger equipment



- **Union Pacific 1960-1971 City of Los Angeles.** American Car & Foundry 85-foot cars: Dome-lounge, 44-seat coach, baggage, baggage-dormitory, cafe-lounge, dome-coach, and dome-diner. Budd 85-foot car: *Pacific*-series 10-roomette, 6-double-bedroom sleeper. Pullman-Standard 85-foot cars: *Ocean*-series 5-bedroom, 2-compartment, 2-drawing room sleeper; and *Placid*-series 11-double-bedroom sleeper. Each car available with decal car names and numbers or factory lettered. Models feature window tinting and black gaskets as appropriate; optional, modeler-installed extended drawbars for 22" radius curves; factory-installed stainless steel grab irons; detailed interiors; turned-metal wheelsets; trucks with built-in electrical contacts; and Proto-Max couplers. \$84.98 (dome cars, \$94.98). Two deluxe 10-car sets also available with factory-printed names and numbers, factory-installed light-emitting-diode lights (as

In Memoriam

Lewis Polk, 1939-2018

Lewis Polk, the head of Aristo-Craft Trains for many years, died on April 23, 2018.

Aristo-Craft Distinctive Miniatures (later Aristo-Craft Trains) was founded by Lewis' father, Nat Polk, and his brother, Irwin. The company initially offered O and HO scale trains. In 1988, under the Railway Express Agency name, Aristo-Craft started producing models of standard gauge trains in 1:29 proportion.

Nat ran the company until he retired in 1993, at which time Lewis and his wife, Maryann, took over. The company ceased doing business at the end of 2013. — *Marc Horowitz, Editor, Garden Railways magazine*

appropriate), and more than 150 Preiser crew figures and passengers. \$1,240 each. May through September 2019. Proto series. Wm. K. Walther's Inc., 414-527-0770, www.walthers.com

HO scale structures

- **Overlook Hotel.** Cast-Hydrocal kit with new rooftop details, weathered decals, and weathering instructions. Figures not included. Footprint is 3" x 7". \$89.95. Downtown Deco, 406-821-0181, www.downtowndeco.com

HO scale



Custom-lighted vehicle. East Coast Circuits has expanded its line of custom-lighted vehicles with this River Point Station HO scale Ford Expedition police vehicle. The model (\$80, free shipping) features 16 light-emitting diodes (red and blue on front, back, and sides), four flashing patterns, and flashing headlights and taillights. The lights requires 9-12V DC input. East Coast Circuits, www.eastcoastcircuits.com



• **Sévigné's warehouse.** Laser-cut cardboard kit. Footprint is 13.77" x 3.54". \$77.42. Price may vary based on exchange rate. Minifer, www.minifer.fr/en

HO scale details and accessories



• **HOn3 high gravity compound two-piece equalized trucks.** 3'-7" archbar, 4'-6" archbar, American Steel Foundries A-3 Ride-Control, Andrews (1898), Bettendorf T-section, and Vulcan. All trucks feature 26" RP-25 contour non-magnetic ribbed-back wheels and three styles of mounting bushings. \$11.95 per pair. Kadee Quality Products Co., 541-826-3883, www.kadee.com

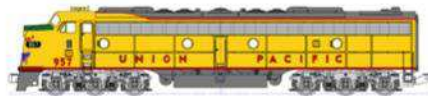
• **1964-1966 Series 50/60/80 medium/heavy-duty vehicles.** Dump truck and railroad maintenance-of-way truck. 3-D printed with rotating wheels. Frosted

Ultra Detail, \$37.99. Custom Editions. Wheels of Time, www.wheelsotime.com

N scale locomotives



• **Electro-Motive Division GP38 diesel locomotive.** New paint schemes: Kansas City Southern (*Southern Belle* scheme), Amtrak (phase 3 non-revenue), Canadian Pacific (red with "Canadian Pacific" lettering on long hood), and Norfolk Southern (Operation Lifesaver and First Responders schemes, one road number each). New numbers: Bangor & Aroostook (red, gray, and black), Burlington Northern (Cascade Green and black with white nose stripes), Chessie System (Chesapeake & Ohio reporting marks), Conrail (blue and white), and Union Pacific (Armour Yellow and Harbor Mist Gray). Two numbers per scheme unless noted; also available undecorated (with and without dynamic brakes). Directional golden-white light-emitting-diode headlights, Scale Speed motor, and Accumate couplers. Direct-current model, \$129.95; with ESU LokSound Digital Command Control sound decoder featuring Full Throttle, \$239.95. Fourth quarter 2018. Master Line. Atlas Model Railroad Co., 908-687-0880, www.atlasrr.com



• **Electro-Motive Division E9A and E9B diesel locomotives.** Union Pacific. Two numbers per body style. E9A features nose herald for *City of Los Angeles*, golden-white light-emitting-diode headlights, and illuminated number boxes. Both models have five-pole motor, all-wheel electrical pickup, and blackened wheels. Direct-current models (designed for Train Control Systems KOD8-series or Digitrax DN163K0A Digital Command Control motor decoders, sold separately): E9A, \$110; E9B, \$100. With factory-installed Train Control Systems Digital Command Control motor decoder: E9A, \$160; E9B, \$150. August-September 2018. Kato USA Inc., 847-781-9574, www.katousa.com

N scale freight cars

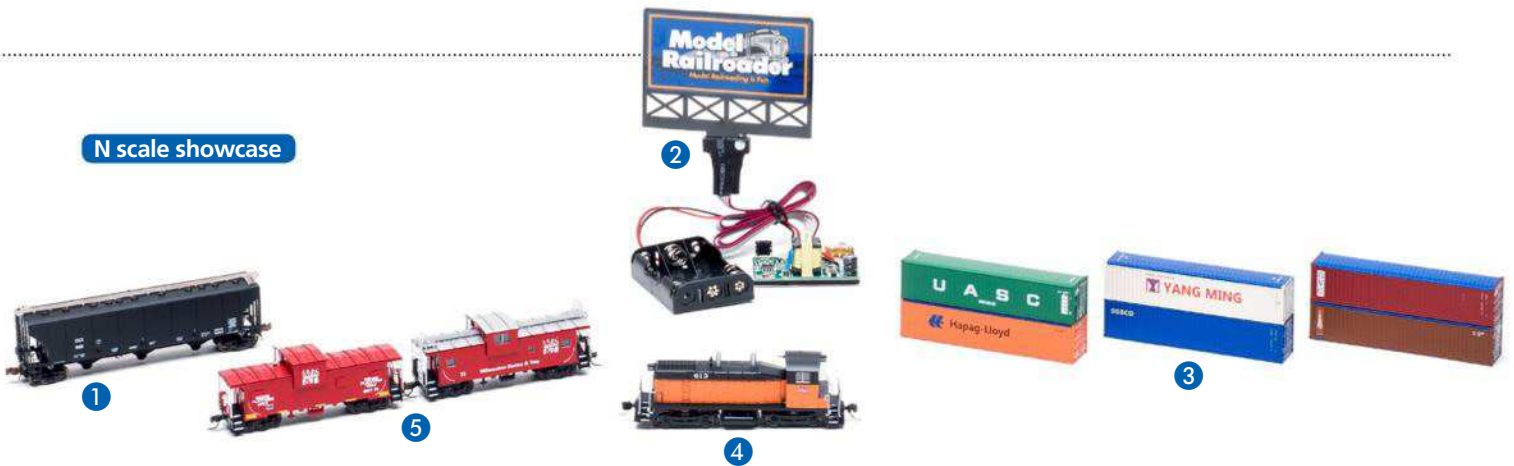
• **General American Transportation Corp. 2,600-cubic-foot-capacity Airslide covered hopper.** Baltimore & Ohio (gray with billboard "B&O"), ConAgra (white with separately applied placard), Conrail (Penn Central patchout), Erie (gray with billboard lettering and diamond herald), Great Northern (Big Sky Blue in one number and gray), and Milwaukee Road (billboard lettering). Three numbers per scheme unless noted. Prototype-specific outlets, see-through metal running boards, and body-mounted McHenry scale couplers. \$27.98. AthearnN. Athearn Trains, 800-338-4639, www.athearn.com

• **Gunderson Maxi-IV three-unit articulated well car.** TTX. Two road numbers. With six Canadian National or EMP 53-foot intermodal containers. Well cars feature steel compound plastic construction, 33" and 38" metal wheels, and Kato couplers. Each container has a magnet and metal plate. \$110. September 2018. Kato USA Inc., 847-781-9574, www.katousa.com



• **Assorted freight cars.** British Columbia Ry. 56-foot general service tank car, \$35.90. Chicago, Burlington & Quincy 40-foot single-sheathed 1½-door

N scale showcase



1 Thrall 4,727-cubic-foot-capacity carbon black covered hopper. This N scale Rivet Counter line hopper is decorated for Columbian Chemicals, Degussa, Orion, and Sid Richardson. The model sells for **\$31.99**. ScaleTrains.com, www.scalettrains.com

2 Model Railroader animated billboard. Produced exclusively for Model Railroader by Miller

Engineering, this multiple-scale sign (**\$36.95**) features 46 chase patterns. The sign requires three AAA batteries. Kalmbach Hobby Store, KalmbachHobbyStore.com

3 40-foot canvas/open-top intermodal container with corrugated sides. Jacksonville Terminal Co. offers these modern N scale containers lettered for United Arab Shipping Co., Hapag-Lloyd, Yang Ming,

Seaco, Grand View Development, and Transamerica. The containers feature magnets and steel plates for secure stacking. A two-pack retails for **\$29.95**. Jacksonville Terminal Co., www.jtcmmodeltrains.com

4 Electro-Motive Division SW1200 diesel locomotive. Milwaukee Road is one of eight paint schemes on this end-cab switcher. The N scale direct-current model sells for

\$99.98. Wm. K. Walther's Inc., www.walthers.com

5 Milwaukee, Racine & Troy wide-cupola cabooses. Atlas offers these N scale models lettered for Model Railroader's club layout. The Milwaukee, Racine & Troy (MR&T) riding platform is offered in one number, the MR&T caboose is available in two numbers (**\$28.95** each). Atlas Model Railroad Co., www.atlasrr.com

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HO scale



Amtrak Superliner II transition sleeper. Kato offers this injection-molded plastic model (\$90) with a detailed interior, trucks with rotating bearing caps, and modeler-installed trip

pins on the couplers. The transition sleeper's marker lights can be illuminated with an optional lighting circuit (sold separately). Kato USA Inc., 847-781-9500, www.katousa.com

boxcar, \$21.95. CSX 89-foot tri-level enclosed auto rack, \$47.95. Railway Express Agency 52-foot riveted-side refrigerator car, \$24.90. TTX depressed-center flatcar with six-wheel trucks (two road numbers), \$28.80. Plastic models with plastic wheelsets and Magne-Matic couplers. Micro-Trains Line Co., 541-535-1755, www.micro-trains.com



• **Pennsylvania RR class F22 heavy-duty flatcar.** Kit includes 3-D printed car parts and Crown 2F-F1 cast steel trucks, photo-etched stirrup steps and uncoupling levers, brass car weights, Fox Valley Models metal wheels, Micro-Trains brake wheels, Magne-Matic couplers, decals, and instructions. Three-pack, \$69.95; box set (includes Mark VII battleship gun load), \$89.95. The N Scale Architect, 607-746-8416, www.thenarch.com



• **Pacific Car & Foundry 50-foot insulated exterior-post boxcar.** Atchison, Topeka & Santa Fe (large circle-cross herald and "Shock Control" lettering); Burlington Northern (Cascade Green); Conrail; CSX (reporting marks only); Golden West Service (Denver & Rio Grande Western reporting marks); Missouri Pacific (Texas & Pacific marks); and Union Pacific (D&RGW marks, one

road number). Eight numbers per scheme unless noted. Landis or Keystone plug doors as appropriate, body-mounted couplers, and 33" metal wheels. \$26.95. Fourth quarter 2018. Wheels of Time, 866-737-9654 (fax), www.wheelsotime.com

N scale passenger cars



• **Union Pacific City of Los Angeles passenger train.** Eleven-car set includes storage mail; baggage-dormitory; two 44-seat coaches; dome chair; lounge; 10-roomette, 6-double-bedroom sleeper; dome diner; 5-double-bedroom-lounge sleeper; 11-double-bedroom sleeper; and dome-lounge observation. Each car features low-flange wheels and Kato couplers. Interiors can be illuminated with Kato no. 11-211 or 11-212 version 2 interior light kit with white light-emitting diodes, sold separately. \$280. Kato USA Inc., 847-781-9574, www.katousa.com

N scale structures



• **Subway restaurant.** Milled styrene kit with clear window glazing, window frames, and signs. Measures 3" x 6 1/4" x 2 1/4". \$25.95. Summit USA, www.summit-customcuts.com

N scale details and accessories



• **1973 Ford F-100 pickups.** New paint schemes: Candy Apple Red and Wimbledon White, maintenance-of-way yellow, Raven Black, Sequoia Brown, Wimbledon White and Winter Green, and Wimbledon White. Two-pack, \$28.95 (two-tone schemes, \$32.95; undecorated, \$18.95). Atlas Model Railroad Co., 908-687-0880, www.atlasrr.com



• **ST Class hi-rail rotary dump truck.**

Cast-resin cab, one-piece dump body, pewter castings, vacuum-formed windshield, and stainless steel photo-etched parts. Hi-rail wheels can be modeled in raised or lowered position. \$22.95. Showcase Miniatures, 334-750-3276, www.showcaseminatures.net

• **Assorted dump trucks.** Kenworth T800, Kenworth W900, and Peterbilt 379. Black, blue, Department of Transportation Orange (T800 only), red,

yellow, and white. Details to be announced. \$41.95. First quarter 2019. Trainworx Inc., 970-874-9747, www.train-worx.com

O scale locomotives



- **Baldwin VO-1000 diesel locomotive.** Rock Island (red and black with "Route of the Rockets" slogan); Atchison, Topeka & Santa Fe (zebra stripes); Lehigh Valley (red, gray, and yellow); Nashville, Chattanooga & St. Louis (maroon and gold); Southern Pacific (black and orange); and Western Pacific (silver and orange). Two road numbers per scheme; also available undecorated. Detailed cab interior; die-cast metal chassis, trucks, and pilots; and directional light-emitting-diode headlights. With dual-mode ESU LokSound Select sound decoder, \$479.95 (undecorated,

O scale



Lighted vehicles. Woodland Scenics has added to its Just Plug line with O scale vehicles, including a blue coupe and a police car. Each vehicle (**\$49.99**) includes a driver and light-emitting-diode headlights and taillights. The Police car features a flashing light on the roof. Woodland Scenics, 573-346-5555, www.woodlandscenics.com

\$459.95). Atlas O, 908-687-0880, www.atlasrr.com

O scale freight cars

- **17,600-gallon corn syrup tank cars.** New paint schemes: Minnesota Corn Processors Bulk Products Division (SYRX reporting marks) and Union

Tank Car Co. ("Corn Products" lettering). New road numbers: Archer Daniels Midland (molecule logo), Cargill Foods ("Corn sweeteners" lettering), and General American Transportation. Four numbers per scheme unless noted; also available undecorated. Separately applied brake detail, 100-ton roller-bearing trucks with rotating bearing caps, and



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N scale



Northern Pacific class Z-8 4-6-6-4 Challenger steam locomotive. Northern Pacific (coal or oil tender, one number each) and Spokane, Portland & Seattle (oil tender, one number) are the two road names on Athearn's new N scale locomotive. The model has a cast pilot with a fold-down

coupler, detailed boiler backhead with printed manual controls, and illuminated number boxes. The class Z-8 Challenger features a dual-mode SoundTraxx Tsunami sound decoder and is priced at **\$479.98**. Athearn Trains, 800-338-4639, www.athearn.com

see-through platforms. \$94.95 (undecorated, \$84.95). Atlas O, 908-687-0880, www.atlasrr.com

O scale details and accessories



- **40-foot intermodal container.** New paint schemes. Hapag-Lloyd, Mediterranean, Ocean Network Express (pink), and UASC. Eight container numbers per scheme; also available undecorated. \$24.95 (undecorated, \$17.95). Fourth quarter 2018. Master Line. Atlas O, 908-687-0880, www.atlasrr.com

S scale freight cars



- **Thrall 2,743 gondola.** Dakota, Minnesota & Eastern; Canadian Pacific; CSX; Gondola Connection; and David J. Joseph. Three road numbers per scheme. Wire grab irons, separately applied steps and ladders, and 100-ton trucks. Cars include American Flyer-compatible trucks and couplers. Can be modified to accept Kadee couplers. \$59.95. Des Plaines Hobbies/S Scale America, 847-297-2118, www.desplaineshobbies.com

Z scale locomotives

- **Budd Rail Diesel Car.** New paint scheme: Canadian National. Two road numbers. Directional light-emitting-diode headlights and AutoLatch

couplers. American Z Line, 614-764-1703, www.americanzline.com



- **General Electric ES44AC diesel locomotive.** New paint schemes: Citirail (two road numbers), Iowa Interstate (Rock Island heritage scheme, one number), and Norfolk Southern (Lehigh Valley heritage unit, one number). Prototype-specific details, directional light-emitting-diode headlights, working ditch lights, traction tires, and can motor with dual flywheels. American Z Line, 614-764-1703, www.americanzline.com

Z scale freight cars



- **40-foot single-sheathed boxcar.** New paint scheme: Nickel Plate Road. Seven road numbers (single car, two-pack, and four-pack). Etched-metal running boards, positionable doors, blackened metal wheels, and AutoLatch couplers. American Z Line, 614-764-1703, www.americanzline.com

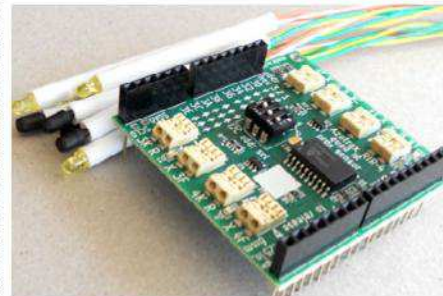
Scenery

- **Crinkle Rock.** Rock formations printed on paper with water-resistant

(not waterproof) pigments. Sheets can be creased, folded, crumpled, and creased. Paper can be cut with scissors or knife and attached to a metal frame, cardboard, or polystyrene with water-based or hot glue. Fifteen rock styles available. For use in N through O scales. Sheets measure 27⁹/₁₆" x 19¹¹/₁₆". \$12.36 each. Price may vary based on exchange rate. Crinkle Rock, www.crinklerock.com

- **Background kits.** Assorted skylines, structures, storefronts, horizons, and skies. Custom backgrounds can be created by cutting and mounting the buildings to foam board or wood. For Z, N, HO, and O scales. Prices range from \$19.99 to \$39.99. ScenerySheets, www.scenerysheets.com

Electronics/controls



- **RIR4 quad infrared proximity sensor Arduino-compatible shield.** Shield is a plug-in expansion circuit that allows users to add infrared detection to their Arduino or compatible microcontrollers. No IR sensors, \$35; four sensor sets with 2-foot wire length, \$42; two sensor sets with 2-foot wire length and two sensor sets with 6-foot wire length, \$45; and four sensor sets with 6-foot wire length, \$48. Azatrax LLC, www.azatrax.com

Tools



- **Model 2175 Maxi-Shear flush cutter.** High-carbon steel with non-glare black finish, soft rubber hand grips, and Light Touch return springs. Designed for cutting plastic, soft wire, and lead up to 2mm thick. \$17.75. Xuron Corp., 207-283-1401, www.xuron.com

Software

- **RailModeller Pro 6.0.** Updated version of app for planning model railroad layouts. Now features Community Layouts, allowing users to share and present layouts in the cloud without leaving the app. Browse layouts created by the community for inspiration and discuss designs with fellow model railroaders while protecting user privacy. Requires OS X 10.10 or later, 64-bit processor, and 50 MB disk space. \$39.99; free upgrade for all users of the app. Isle of the Kakapo, www.railmodeller.com

Games

- **Tracks: The Train Set Game.** Construct a wood railroad, add houses and trees, and ride the trains in first-person view. Requires Windows 7/8/10 (64 bit) operating system, 4 GB RAM memory, and 2GB available hard drive space. PC download version, \$9.89. Excalibur Games, +44 1869 338833, www.excalibur-publishing.com

Downloads

- **Assorted paper model railroad products.** Downloadable buildings (warehouse, concrete loading dock, and depot, among others), vehicles (trailers and intermodal containers), and texture sheets (shingles, brick, block, concrete, corrugated metal, and tar paper, among others). Includes Z, N (US and UK), OO,

HO scale



Chesapeake & Ohio 1954 to 1971 George Washington passenger equipment.


The first three cars from Walther's next name train are in hobby shops now, including a Pullman-Standard 85-foot 52-seat fluted-side coach without skirts (\$74.98), a Pullman-Standard 85-foot 10-roomette, 6-double-bedroom fluted-side sleeper without skirts (\$74.98), and an American Car & Foundry heavyweight arched-roof baggage car (\$69.98). The Walther'sProto cars have factory-installed and painted wire grab irons and car name and number decals. Wm. K. Walther's Inc., 414-527-0770, www.walthers.com

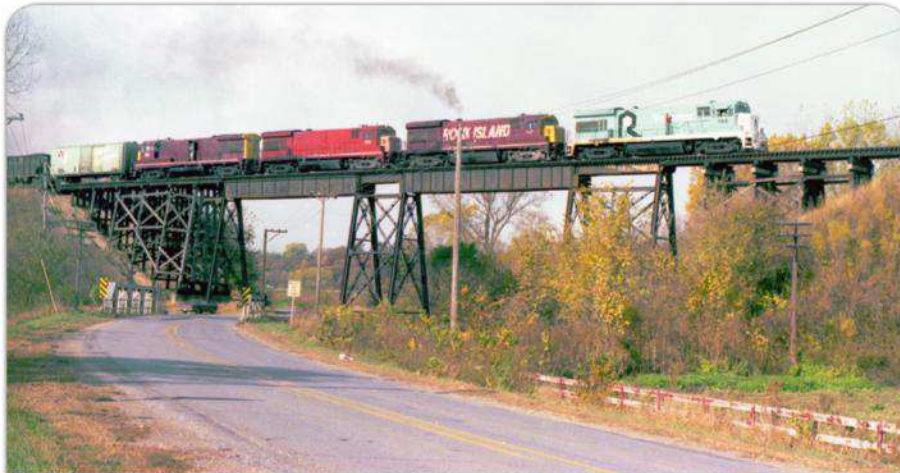
and HO scales. Prices vary based on product. Team Track Models, www.teamtrackmodels.com

Books

- **Great Railroad Series: Our First Locomotive.** By Isaac ben Levi. Children's book about the beginning of a small railroad. The first locomotive, saved from the scrap pile, embraces his new role and discovers adventures that wait in his new home. Paperback, 28 pages. \$11.95. Available at www.amazon.com and www.greatrailroadseries.com
- **Railway Prototype Cyclopedia Vol. 20.** By Patrick Wider and Ed Hawkins. Covers flatcar loading (Association of American Railroads rules, various commodities, and loaded cars) and General American 2,600-cubic-foot capacity Airslide covered hoppers (part 2, original leased cars [1954-1959]). Softcover, 112 pages. \$45. Free shipping in the United States; Connecticut and New York customers add appropriate sales tax. Reprinted by Silverlake

Images LLC, available from Ron's Books, 914-967-7541, www.ronsbooks.com

- **Paper Structures and Scenery for Model Trains.** By Dominic Villari. First half of the book describes the tools, skills, and strategies involved in using paper on model railroad and toy train layouts. Second half walks readers through applying tools and skills to five practical projects. Materials and instructions are included for N, HO, and O scale. Paperback, 94 pages. \$19.99. ScenerySheets, www.scenerysheets.com
- **3-D Printing & Laser Cutting: A Railway Modelling Companion.** By Jeff Geary and Dave Renshaw. Covers the principles of 3-D drawing and a review of some of the 3-D software packages available free online. Includes instructions for constructing lineside structures, rolling stock, and locomotives. Also includes information on how to use a 3-D printer. More than 300 color photos and diagrams. Hardcover, 160 pages. \$24.95. Produced by Crécy Publishing, available from Specialty Press, 800-895-4585, www.specialtypress.com 



A 114-car Chicago, Rock Island & Pacific freight crosses a trestle just east of Council Bluffs, Iowa, on Oct. 21, 1978. Four U33Bs in almost consecutive order (196, 197, 199, and 198) lead the train, but none share the same paint scheme. Six weeks later, a westbound train derailed here with seven cars either hitting the ground or dangling from the trestle. Joseph Holman photo

Lots of love for the '70s

I read "Some love for the '70s" [From the Editor, May] and loved it. I've been modeling the Burlington Northern RR in 1973 for more than 30 years now, and I can't stop. All those different colorful paint schemes on the locos, weathered equipment from recently bankrupt roads back East – all those things Hal mentioned are true! And he didn't mention the transition from 40- to 50-foot boxcars (and covered hoppers) that was in full swing, which means you can run practically anything!

Thanks for shedding light on this delightful period for model railroaders.
Burr Stewart, Seattle

Your editorial on modeling the '70s resonated with me. I started railfanning when I was 13 or 14 in the early

'70s, and that is my favorite era. I don't have a layout, but I've been collecting diesels (Penn Central Alcos) and rolling stock for the day I have the time to build.

My biggest problem is finding accurate '70s boxcars. A defining characteristic of many boxcars of the era was that the running boards were removed, but the brake wheel was still up at the rooftop. Very occasionally I see a model available like that, but usually either the car still has the running boards or has all short ladders and a low brake wheel.

I think you're doing a great job with *Model Railroader*. I don't think the magazine takes itself as seriously as it used to, yet the content is better than it's probably ever been.

Chris Williams, via email

Brings back memories

Nice to see a layout based on British rails ["A spot of England in Georgia," May]. When I read it, memories of my 1950s childhood in England came back to me. We used to stand on a bridge and wait for the engines to come by, and see who could stand there the longest. My maternal grandfather was an engine driver for British Railways for 45 years, and my father worked for Westinghouse Brake & Signal in Chippenham, where they made parts for British Railways.

Steve Whines, Brantford, Ont.

Choosing a scale

In the May Ask MR, Reb Orrell sought advice on which scale to model. Associate editor Steve Otte replied that he would need to consider available space, decide whether he would be modeling urban or rural scenery, and assess his eyesight and dexterity capabilities, among other things.

I would add one more consideration from an aesthetic point of view. If his interest is more in the models themselves, then O scale offers more opportunities for detailing and admiring the cars and locomotives up close. If his interest is more in reproducing "vignettes" of nostalgic scenes, then HO scale offers a good possibility for viewing a coal mine here, a small village there. If his interest is more in seeing a vast sweep of landscape, such as a long train snaking along a mountainside riverbank, then N scale would be the best choice.

Hope this might be of help to Reb and other new modelers, as well.

John Hammond, Virginia Beach, Va.

Great inspiration

Pelle Søbørg's article, "How to weather a modern bulkhead flatcar" [May], was very inspirational. I am an open loads guy, so I was more interested in the H-beam load he created than in how to weather the flatcar. Pelle did such a nice job modeling that load, I knew I was going to copy it and build one for my industrial-themed layout.

Here's a big thank-you for his article.

Bob Frankrone, Louisville, Ky.

Kudos to MR

I want to thank you so much for the recent changes in MR. I'm very happy to see the tagline "Model Railroading is Fun" again on the cover. One of my favorite new things is the panoramic shots you've started doing on feature

layouts. I love the up-close and detailed photos, and being able to see a large part of the layout to put it all in context. It also allows you to see how lighting and fascias are handled.

Thanks so much, and keep up the great work.

Dennis Briggs, Land O' Lakes, Fla.



Artwork by General Motors Electro-Motive Division

Where can I find drawings of an EMD GA-8?

Q Can you tell me if you've ever published scale drawings for the Electro-Motive Division GA-8 export diesel locomotive, and if so, when? Can I get a copy?

John Frink, Carson City, Nev.

A We haven't, and as far as our hobby magazine index can tell, nobody else has, either. (There was an article in the August 1980 issue of *Prototype Modeler*, but it didn't include drawings.) But we have now! I found a copy of EMD's original specs booklet in our library. There's a scan of the builder's diagram above. I hope you find it helpful.

Some background: The GA-8 was a narrow gauge diesel with a unique drive system. It carried its traction motors under the frame, where one would normally expect to find the fuel tank on a diesel locomotive. These motors drove both axles of their respective trucks via longitudinal drive-shafts. (The fuel tanks were carried under the side sills.) Between 1961 and 1967, EMD built 22 of the 800-horsepower locomotives for three Mexican railroads: 17 for the National Railways of Mexico, three for the Coahuila & Zacatecas, and two for United Railways of Yucatan.

you may have inherited or picked up at a swap meet on particularly small-code rail. Older rolling stock might have deeper wheel flanges that might bump against the spike heads or over frogs of code 70 track. But those cars are rare these days. For the most part, you don't have to worry about buying rolling stock to fit a particular code of rail. Today's products should all work together.

Q My area sustained a large amount of rain that flooded my basement train room. While I'm not necessarily concerned about cars and unbuilt structures, I'm concerned about my locomotives and DCC system. Can they be salvaged by drying them out or simply remotoring them? Or is the entire mechanism now scrap?

Jeff Reeves, Spring, Texas

A Your locomotives and DCC components are a total loss if you do nothing, so it can't hurt to try. Disassemble them and rinse them thoroughly in distilled water to remove any grit and mineral deposits. Clean out any lubrication that may have picked up grit. Then, let the parts air-dry with the help of a hair dryer set on low heat. (You don't want to cause more damage by overheating electronics.) Let the parts sit for several days to make sure everything is absolutely dry before lubricating gears and axles and reassembling them. Good luck.

Q What is the maximum grade for a model layout?

Robert Schmall, Appleton, Wis.

A Most model locomotives pull much shorter trains than the prototype, but they also have much less weight and traction going for them. So the practical limits on track grades is not much more than on the prototype. The upper limit for sustained grades is about 2 percent. Shorter trains can handle brief grades of 3 percent or even 4 percent, though traction tires might be necessary. Geared locomotives like Shays and Heislers can handle 6 or even 8 percent if hauling only a few cars.

Q I'm modeling late steam on the New York Central in late winter to early spring. I've noticed many steam

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

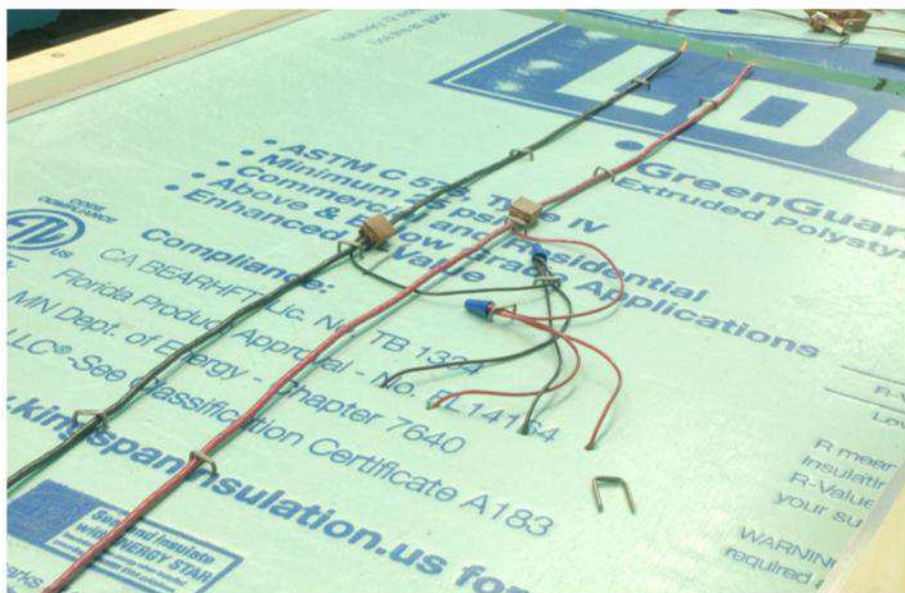
Q I have code 100 Atlas track. Where can I find steam locomotives that don't have code 83 wheels? Or how may I tell the difference between them?

Curtis Gamble, Hoover, Ala.

A The code of a track is the height of the rail, in 1/100ths of an inch. So code 100 rail is 0.1" high, from base to rail-head; code 83 rail is 0.083" high. There is no equivalent code number for rolling

stock wheels, because practically all wheels are made to the National Model Railroad Association's Recommended Practice (RP) 25, governing wheel shape and contour. Rolling stock with RP-25 wheels will roll just fine on any code track of the proper scale. You'll have no trouble with your code 100 rail, since that's the largest rail used in HO.

The only way you might run into trouble is running vintage rolling stock



Model Railroader contributing editor Tony Koester uses wire nuts to gather several feeder wires into a single "pigtail" before connecting it to the power bus with a 3M Scotchlok insulation displacement connector. Tony Koester photo

locomotives in wintertime photos have shades or curtains around the cab. Do you have any suggestions as how to model the curtains?

Tom Ross, Toledo, Ohio

A Some modelers use aluminum foil, crumpled into natural-looking folds and painted to look like canvas. I've also seen one modeler who used paper towel, soaked in tea to make it fold easily and give it that soot-stained appearance.

Q I was reading Tony Koester's article "7 Things Not to Do" in *Model Railroad Planning 2018*. In item no. 7, Tony mentions his "pigtail" method of grouping track feeder wires before connecting them to the main power bus. I was very interested in this method and was wondering if there is a diagram, photos, or video showing this method. It sounds like a simpler way to wire up power districts in Digital Command Control. Thanks.

Darrin Bear, Young, NSW, Australia

A Check out Tony's photo above. While grouping your feeders into "pigtails" may be a handy way to organize your DCC power districts, there are other good reasons to do so. Tony mentions in that he uses 3-M Scotchlok insulation displacement (or "suitcase") connectors to connect his feeders to his power bus. He also says that he uses 10 AWG solid wire for the bus and 18 AWG feeders.

See, most suitcase connectors are made to reliably connect wires of relatively similar gauges – 10 AWG to no smaller than 14 AWG, for instance. So Tony twists together several feeders along with a pigtail wire of a large enough gauge to work in the Scotchlok. (Another good reason: IDCs are expensive compared to wire nuts. By consolidating feeders, Tony needs fewer Scotchloks.)

Q I'm hoping you can answer a question I've had for a long time now. The "answers" I've found are often contradictory and uninformed. I'm aware of at least two reprints of the first volume of *The Model Railroader*, but can't find any dates or other info, other than it's a facsimile of the original. I've seen what was purported to be an original copy of Vol. 1, No. 1, on eBay, but only once, years ago.

One individual stated that any issues claiming to be from the first volume are reprints, done at various times through the years. Every reprint I've seen was not only identified as such, but were done in black and white, including the cover, which was color on the original issues. Can you shed some light on this?

Randy Volskay, Holden, Mo.

A Thanks for giving me the opportunity to delve into MR's history, a topic I always find fascinating. In the library of Kalmbach Media, we have a number of copies of Vol. 1 of *The Model Rail-*

roader (as it was called at the time). The majority of them are reproductions. Some are identified as such by a stamp inside the front cover that mentions only 107 copies of the original bound volume were ever published. But if you see a copy of Vol. 1 that doesn't have this stamp, that doesn't necessarily indicate it's a true first edition.

An original can be identified by the covers of the May 1934 and subsequent issues, which is when a thicker, glossier paper was introduced, and spot color printing was incorporated in the masthead. (May's bore an orange-red steam engine; June's, a gray-green boxcab electric.) If the covers from May 1934 and later are black and white and printed on the same paper as the rest of the bound volume, it's a reproduction.

The issues in our online All-Time Archive were scanned from originals, so if you go to www.ModelRailroader.com/Archive, you can sign up to read every issue from Vol. 1, No. 1 to today, in glorious full color.

Q I'm planning the construction of what will be my first layout. The platform will be a 3 x 7-foot plywood base on top of a grid of 1 x 4s. I've noticed that many modelers who use flextrack will set the track on a cork roadbed in order to reduce noise. Would I be wise to also use cork roadbed under my sectional E-Z Track?

Bill Lightfoot, Huntsville, Ala.

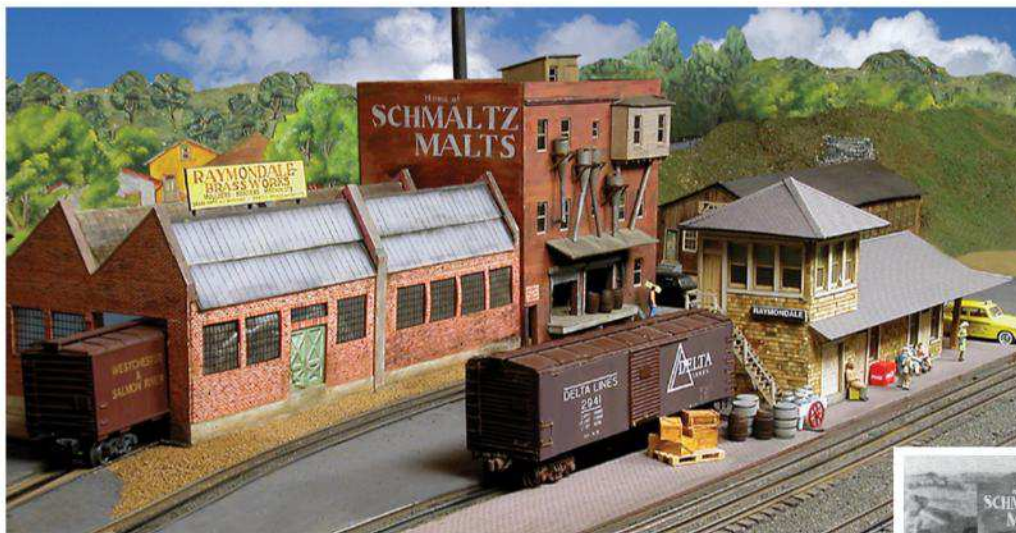
A Cork roadbed not only reduces noise, it also raises flextrack above the layout surface to give it a more realistic main-line ballast profile. If you put sectional track with built-in plastic roadbed, like Bachmann E-Z Track, on top of cork roadbed, it would help to reduce noise (though it would still be noisier than flextrack on cork). But the potential drawback is that the combination would make the track's ballast profile higher. Surrounding terrain would have to be built up to track level for such features as grade crossings or loading docks.

Q How do I access your annual index?

John Barone, no city given

A Head to www.modelrailroader.com, and in the black menu bar at the top, hover over **The Magazine**, then click on **Annual Index**. Indexes for the last 13 years are there for the downloading.

Saving Frank Ellison's Raymondale



Frank Ellison's O scale Delta Lines is long gone, but structures from the layout were saved and gently restored for Fred M. Dole's O gauge layout, shared in the October 2008 *Classic Toy Trains* magazine. The inset black-and-white photo shows Ellison's original layout in the April 1948 *Model Builder* magazine. Fred M. Dole photo



When I was growing up in the 1940s, I had a hi-rail layout. Frank Ellison's O scale Delta Lines, featured in *Model Builder* articles, was something to dream about, it was so real. By today's standards the Delta Lines lacks scenery refinements we take for granted, a few of the locomotives seem coarse, and some of the scratchbuilt buildings are visually "thin," but it's still mind-boggling considering its nascence in the late 1920s and early 1930s.

In addition to writing articles about standard gauge modeling for Lionel's *Model Builder* magazine, both with and without his byline, Ellison wrote similar stories about his O scale Delta Lines.

For *Model Railroader* he built Fillmore Station. The *Model Railroader* article reprised a story in the January and March 1938 *Model Builder* about a standard gauge Lionel no. 116 station, which was a street-level

terminal flanked by two scratchbuilt wings with detailed interiors, and umbrella sheds along the tracks below.

As a boy, it seemed to me the world was black and white. Color was reserved for MGM musicals and Errol Flynn swashbucklers. Ellison's printed world was likewise black and white. In October 2008, *Classic Toy Trains* ran a stunning article by Fred M. Dole about his 8 x 20-foot re-creation of Ellison's town of Raymondale, which had been my favorite 1946-to-1948 *Model Builder* series.



I'VE HAD THE DEEPEST RESPECT FOR ELLISON SINCE CHILDHOOD, THE FIRST MASTER MODELER UPON WHOSE SHOULDERS ALL OTHERS STAND.
- KEITH

Seeing it in color was akin to Michelangelo's Sistine Chapel ceiling being revealed after its restoration, its colors muddled by centuries of candle smoke but now suddenly brought to life. I'd no idea how Ellison, who'd worked in the theater, would've presented his stage settings; only those who operated the layout

while he was alive would have known. To see them assembled, and in color, as Ellison conceived Raymondale was an eye opener.

Mr. Dole had managed to obtain most of Raymondale, though a Delta Lines boxcar was a creative homage with computer-printed sides glued to a wooden boxcar model. Ellison's layout suffered irreparable damage during a move after it was dismantled and stored, and much material was given away, sold, or auctioned off.

Mr. Dole's Raymondale followed Ellison's plan with originals placed in identical relationships: Raymondale Station; Sanky Wanky Coffee Co.; Bill's Oil Yard; Schmaltz Malts, to which he restored missing exterior parts; Raymondale Brass Works; Richmond Packing House; and Chick Sales Mfg. Co., a duplicate of which was on Lionel's first postwar 1949 showroom layout. The lost Ellis Belle's Gum Factory and El Ropo Cigar Co. were remade by a friend of Mr. Dole's.

Mr. Dole did minimal restoration on the building's cardboard fragility, letting wear and tear of 60-plus years stand as they would on prototype structures. I've had the deepest respect for Ellison since childhood, the first master modeler upon whose shoulders all others stand, and greater still having seen Mr. Dole's re-creation and the deserved respect shown to Ellison.

Ellison was introduced to readers in a June 1939 MR double-page photo spread, revealing the Delta Lines had been well underway while he wrote standard gauge pieces even as Lionel was preparing to cease its manufacture. Several models were copied in HO scale, including John Allen's Gorre & Daphetid water tower and Bruce Chubb's own Fillmore station.

I recommend readers see the October 2008 CTT for more pictures and the story of a ground-breaking layout's remnants in a modern setting mirroring its original. **MR**



Associate editor Cody Grivno shares how he built this Durango Press HO scale tie crane kit. His techniques can be adapted for metal kits in any scale. Bill Zuback photos

How to build a white-metal kit

Naturally, we populate our model railroads with locomotives and freight cars. But what about maintenance-of-way (MOW) equipment? On full-size railroads, these machines are critical in building and maintaining everything from the busiest main lines to the quietest branch lines. I thought it was time we started adding some MOW machines to our HO scale Milwaukee, Racine & Troy.

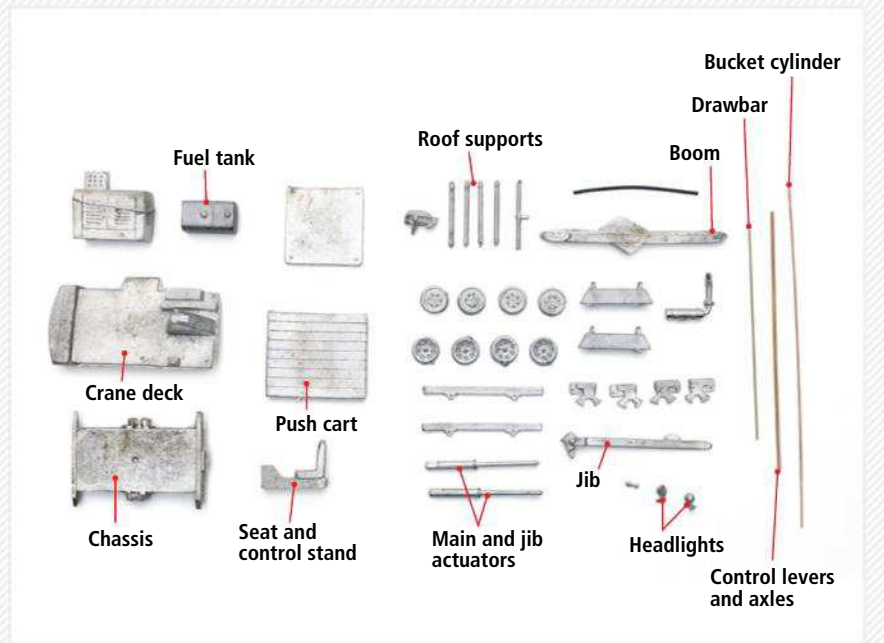
For this project, I built a Durango Press (www.jlinnovative.com) Kershaw tie crane and push cart, no. DP-99. The white-metal kit features two dozen parts, making it an enjoyable project for an experienced modeler, but not too overwhelming for a first-time builder.

Though some people might be intimidated by white-metal kits, there is no reason to be. Many of the tools used for metal kits, such as sanding sticks, files, and cyanoacrylate adhesive, are the same as used on plastic and wood.

One tip former MR senior editor Jim Hediger shared with me is to have a set of files for use on metal kits. Metal shavings caught in files may damage plastic.

Cast-metal kits have been a part of model railroading for decades, and new models continue to be made. In some cases, metal kits are the only way you can get certain cars, trucks, and pieces of track equipment. Best of all, the kits give you a reason to spend some quality time at the workbench.

STEP 1 TAKING INVENTORY AND PREPPING PARTS

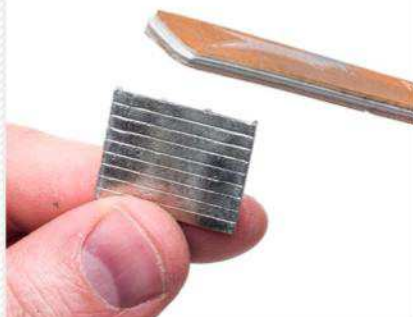


Before I did any work on the Durango Press tie crane, I first took an inventory of the parts. I made sure everything listed in the instructions was included, which it was. I also made sure the parts were in good condition. On rare occasions, white-metal kits will contain parts that are damaged or misshapen.

You'll also notice that there are a few parts that aren't white metal. The lengths of brass are for the axles, drawbar, bucket cylinder, and control levers. The short length of insulated wire runs from the exhaust stack to the top of the engine compartment hood.

STEP 1 TAKING INVENTORY AND PREPPING PARTS (CONT'D)

Smooth seams with sanding stick



Remove excess metal with triangular needle file



Clean parts in white vinegar



I then turned my attention to prepping the parts. Because of how white-metal parts are manufactured, there is usually a seam on each part. I used a sanding stick to smooth seams that were easy to reach, such as on the sides and ends of the push cart.

The casting for the diesel fuel and hydraulic fluid tank is one piece with a recessed seam. Some of the seam was filled with metal. I used a triangular jeweler's file to clean the metal from the seam. A fine razor saw would also work.

With the metal parts prepped, I soaked them in white vinegar for 10 minutes, scrubbed them with a soft toothbrush, and rinsed the parts under tap water. The vinegar serves a twofold purpose. First, it removes residue from the manufacturing process. Second, it slightly etches the metal, making it easier for paint and glue to adhere to the parts.

Once the parts are clean, handle them only while wearing nitrile or latex gloves. Skin oils will prevent paint from adhering to the metal.

STEP 2 CALLING A FEW AUDIBLES



.033" brass rod

Flash



Louvers, AR88056

Treadplate, AR88043

.6mm tube, Connecto SFT1 with plus-shaped connector from set C-04



When I was working on the supports for the crane's roof, I snapped one of the castings. To remedy this, I made new supports from .033" brass rod.

The hood for the engine compartment had flash that went through the louvers on the side and screens on the ends. I tried to clean the flash with a no. 11 blade. Realizing this approach would yield mixed results, I used a file to remove the details. After cleaning and priming the casting, I applied Archer Fine Transfer treadplate and louver raised surface decals.

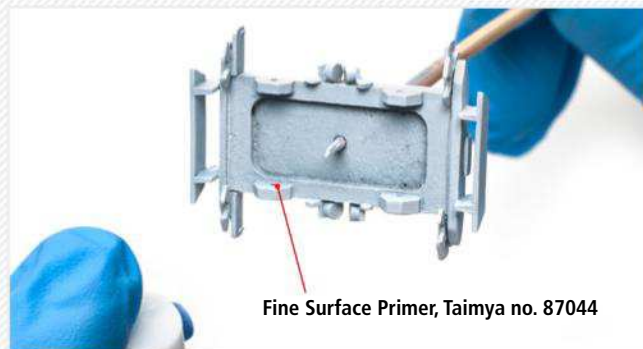
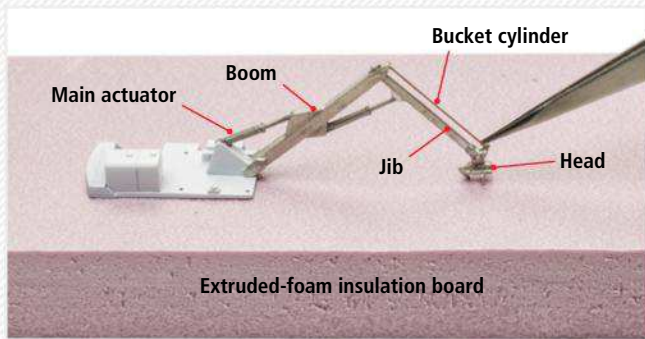
Though the push cart includes a T-shaped connector for the drawbar, I made my own using .6mm tube from Connecto (www.albionhobbies.com/connecto/). The brass tube can be secured with cyanoacrylate adhesive (CA), but I used solder for a stronger joint.

WATCH THIS ON MRVP



Cody Grivno shares more modeling tips on "Cody's Workshop." MRVP subscribers watch episodes at MRVidéoPlus.com.

STEP 3 ASSEMBLY, PRIMING, AND PAINTING



Assembling the boom and jib initially proved challenging. The crane deck has a pin in the bottom that fits into the chassis. In order for this part to lay flat, I cut a notch in a piece of extruded-foam insulation board, as shown in the upper left photo. This made it easier to attach the boom, jib, and related parts.

I built the crane in subassemblies, attaching the parts with medium-viscosity CA. I left the axles and wheels off to ensure even primer and paint coverage.

I then primed all of the parts with Tamiya Fine Surface Primer (no. 87044), as seen in the upper right image. The primer is designed for metal and plastic. The white primer also proved an ideal base coat for the yellow paint. Because yellow doesn't cover well, a white or silver base coat is a must.

Next, I airbrushed the model Reefer Yellow (Model Master no. 4879). I built up the color in light layers. Trying to apply the color in one or two heavy coats will cause the paint to run, pull away in corners, and fill in fine details.

I let the paint dry for 24 hours, then airbrushed the crane with Model Master Clear Gloss Acryl (no. 4638). A smooth, glossy surface is necessary for decals. After the gloss dried thoroughly (24 hours, or until there is no discernible odor), I applied an assortment of Microscale decals. Though the model is lettered for the freelanced Milwaukee, Racine & Troy, I used prototype photos of similar cranes as a guide for placing the letters and stripes.

I carefully wiped the model with a cotton swab dipped in distilled water to remove any residue from the decals and setting solutions. Then I applied a coat of Clear Gloss Acryl to seal the decals.



I brush-painted the piston rod on the main and jib actuators and the wheel treads Vallejo Model Color Oily Steel (no. 70.865). Model Color paints are well-suited for brush-painting and level well while leaving few, if any, brush strokes. I used the same company's Aluminum from its Model Air line (no. 71.062) to paint the muffler and exhaust. I painted the air horn and spotlight with Model Air Dark Gray Blue (no. 71.054).

I weathered the model with thinned Model Master Grimy Black (no. 4887) and Railroad Tie Brown (no. 4885). I put in enough paint to cover the bottom of a 1-ounce paint jar. Then I filled the rest of the jar with 70 percent isopropyl alcohol. I sealed the weathering with Model Master Clear Flat Acryl (no. 4636).

I put a seated Preiser figure at the controls, and our crane was ready to be put on the layout. White-metal kits may require patience and some extra modeling work, but in the end you'll be rewarded with a good-looking model. **MR**

Give Us 10 Minutes And We'll Show You How to Airbrush Like a Pro!



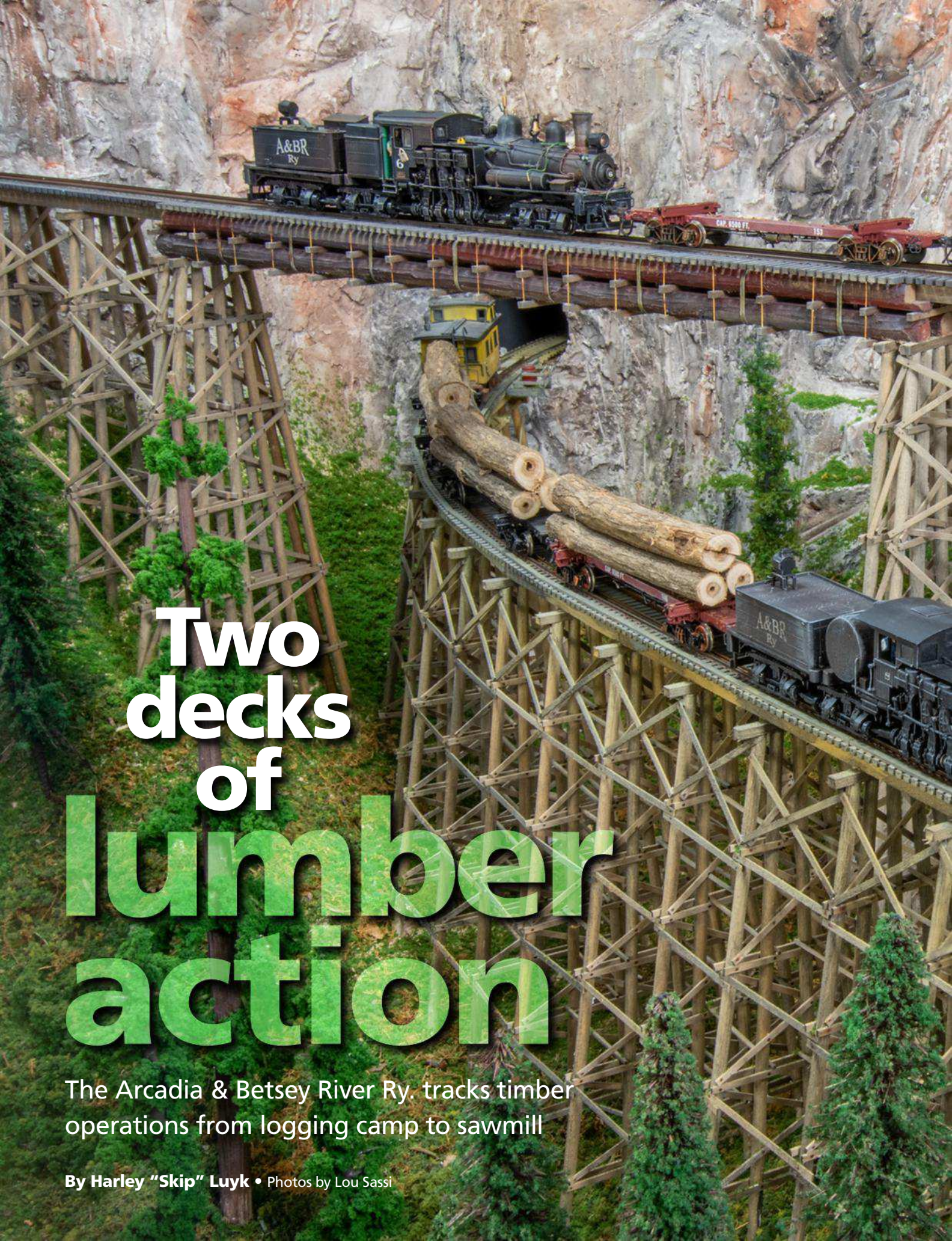
Not sure where to begin when it comes to airbrushing? Our experts Cody Grivno and Aaron Skinner will show you how to get started and advance your skills!

You'll be introduced to a wide array of airbrush options and equipment and learn about care and maintenance so your investment lasts for years. You'll also learn basic techniques like prepping surfaces and getting an even coat as well as weathering, shading, and masking razor sharp edges. If you're ready to take on airbrushing or need to brush up on your skills, take 10 minutes and watch one of the more than 30 videos on MR Video Plus!



Get Started with MR Video Plus for Just \$27 a Year!

MRVideoPlus.com/27join



Two decks of lumber action

The Arcadia & Betsey River Ry. tracks timber operations from logging camp to sawmill

By Harley "Skip" Luyk • Photos by Lou Sassi



① Shay no. 8 crosses Red Mountain Trestle while, overhead, Shay no. 6 hauls empties toward Hill Camp. The two trestles are part of a single-turn helix that links the two decks of Harley "Skip" Luyk's HO scale Arcadia & Betsey River Ry.



② Its day's work done, Heisler no. 4 spots its bobber caboose next to the Arcadia & Betsey River Ry.'s car shop on the outskirts of Arcadia. The scratchbuilt car shop has won awards at two National Model Railroad Association national conventions.

Though I've been a model railroader for more than 55 years, prior to 2003 I'd only built a couple of small HO and N scale layouts. That was because my wife, Eloise, and I never lived in a home with a basement.

But in 2003, we built our current home, and that layout I had dreamed about for so long could become a reality. A basement room with finished walls, multiple 20A electrical circuits, carpeted floor, and drop ceiling was set aside for the layout. While construction was underway on the house, planning began for my layout.

The result, the Arcadia & Betsey River Ry., is a freelanced railroad, but it's based on prototype practices described in many books and articles about logging operations. I was also inspired by the photography of modeling giants like John Allen, Jack Work, and Lyle Speirs.

It was difficult for me to decide on a locale for the railroad, since there was a real A&BR near my home in Michigan. It started operations in the late 1800s as a narrow gauge line about 17 miles long but was soon standard-gauged and extended another 3 miles. The railroad



③ Shay no. 15 couples up to a string of loaded skeleton log cars at McKenny's Landing. Skip's layout depicts five log-loading scenes from different eras; this one is modeled after a 1911 photo in Hank Johnston's book *They Felled the Redwoods*.

interchanged with the Chicago & West Michigan (which became the Pere Marquette), the Manistee & Northeastern, and the Ann Arbor. In its heyday, the railroad used a couple of 4-6-0 locomotives to haul logs on 30-foot flat cars. Operations ended in 1937.

The prototype Arcadia & Betsey River was interesting, but I love the power and beauty of Shays and other geared locomotives, none of which were used by the A&BR. I also enjoy the big trees and mountains of the American West, so I was torn between modeling the A&BR

as it existed in Michigan or freelancing in the Pacific Northwest. It wasn't until I discovered several significant connections between loggers from Michigan and several major logging operations on the West Coast that I was able to, without guilt, locate my A&BR somewhere out west.

Layout design

The operational purpose of my railroad is to serve the lumber industry, from the woods to the finished product. I model two connections to the outside world, one via an interchange with the Great Northern Ry. at Arcadia and the other with a yet-to-be-named railroad via a car ferry at Eagle Harbor. This car ferry, originally an afterthought, has created bridge traffic between Arcadia and Eagle Harbor, adding operating interest.

While planning the layout, I went through every book I have to find scenes and equipment I might like to include. Of course, I found much more than I could possibly fit into my 14 x 28-foot space. So I approached the task from the other direction.

I identified five locations on the layout that would provide the space needed to model a loading site. I then searched for operations that would best fit these areas. At first I wanted to set my railroad in the mid-1950s, but I found that some of the loading techniques I wanted to model were obsolete by that time. Unwilling to give up on my desired operations, I selected one loading and yarding system from each of four different eras.

McKenny's Landing is modeled after a scene in a photograph from 1911 published in Hank Johnston's book *They Felled the Redwoods* (Stauffer Publishing, 10th edition, 1996). Don McKenny produced the drawings I used to build two "A" frame loaders in the scene in an article for the *Narrow Gauge & Short Line Gazette*, which is why I named the site for him.

Representing the 1920s and '30s is a scene that includes a North Bend System with a head spar tree, tail tree, and 600-foot skyline (short by prototype standards). Steam donkeys are used here, one for yarding and one for loading using a hayrack boom on the head spar tree.

From the 1940s, I've modeled a scene illustrating the use of logging tractors and arches to drag logs from the woods to a loading area where a diesel-powered donkey and another tractor swing a crotch line from a spar tree to load each log onto log cars.



The switch stands along Skip's main line are made from double-pole double-throw (DPDT) slide switches that also control the frog polarity.

Homemade switch stands

Because most of the A&BR runs close to the aisle, most turnouts can be reached without endangering scenery or other details. This lets me line my turnouts with a simple ground throw made from a double-pole double-throw (DPDT) slide switch.

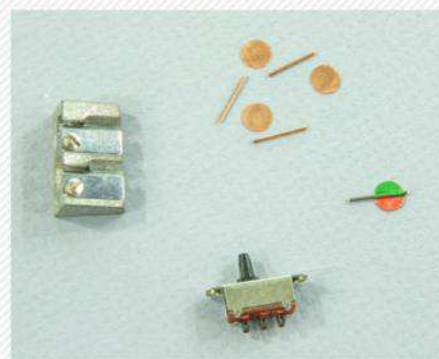
I mount the switch on a pad of cork roadbed in line with and connected to the turnout's switch rod. Pulling or pushing the switch moves the points in the proper direction, and the contacts of the switch control the frog's polarity.

To build the ground throw, I first drill a .030" hole at the base of the switch's slider, parallel to the direction of the throw of the switch. Then, using a small aluminum pencil sharpener I shortened, I reshape the switch slider to look like a cone-shaped switch stand base.

I put an "L" bend in the end of a length of .032" piano wire and press-fit the other end into the .030" hole. To install it on the layout, I insert the bent end of the wire into the hole in the turnout's switch rod. I cut a hole in the roadbed next to the headblock ties to fit the base of the switch.

To make it look more like a switch stand, I cut a short piece of .032" brass or bronze wire and punch out a circle of .008" brass with a paper punch. I solder the round disk to the wire to form a target, then paint it half red and half green. Finally I drill a hole in the top of the cone-shaped switch slider and insert the wire.

I know, it's not exactly prototypical, but we loggers have been known to do our own thing to get the job done. — Skip Luyk



A few bits of brass, some paint, and a cut-down pencil sharpener are all Skip needs to transform an electrical switch into a ground throw.

For a '50s scene, I chose to model a truck-to-rail reload operation patterned after a Schafer Bros. Logging Co. photo published by *Timber Times*. My fifth scene is also from a photo published in *Timber Times*, but from the late 1800s. This operation lifts logs from a body of water and places them on log cars. It was very crude, so I updated it to fit better with this area of my layout.

Layout construction

My benchwork design was inspired by an article in the February 1977 issue of *Model Railroader* by Robert J. Lutz about bookshelf benchwork, but because I'm double-decking, I expanded his "C" shaped support into "E" shaped brackets to support upper and lower levels plus provide a lighting valance. This allowed



Arcadia & Betsey River Ry.

HO scale (1:87.1)
Size: 14x28 feet

Scale of plan: $\frac{5}{16}" = 1'-0"$, 24" grid
Numbered arrows indicate photo locations
Illustration by Rick Johnson

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

me to provide consistent lighting for both levels.

To form the base for the scenery I used 2" extruded-foam insulation board glued to $\frac{1}{4}"$ tempered hard-board panels with 1 x 2 stiffeners glued and nailed to the underside. I then glued 1 x 1 strips of foam board following lines drawn for the track on the 2" foam in the same manner as one would lay cork to support my code 70 and code 55 flextrack.

For the backdrop I used drywall panels fastened to the vertical member of the "E" between levels. The space behind the drywall material created a cavity that I used to duct wiring for the upper level and the lighting valance.

Even though the layout has two decks, by judicious use of grades and a couple of switchbacks, I was able to limit my helix between levels to just one turn. In fact, the one-turn helix turned out to be a great opportunity for a key scenic feature, and one of the switch-back locations provided a perfect operational separation between the upper and lower levels.

Terrain and ground cover

Scenery for the layout is made from a diverse mixture of methods. The mountains at the end of a central peninsula

The layout at a glance

Name: Arcadia & Betsey River Ry.

Scale: HO (1:87.1)

Size: 14 x 28 feet

Prototype: freelanced logging line

Locale: Pacific Northwest

Era: 1910 to 1957

Style: walk-in

Mainline run: 74 feet (main), 87 feet (branch line)

Minimum radius: 22"

Minimum turnout: no. 5

Maximum grade: 4 percent

Benchwork: mix of open frame, modified L girder, and composite panels

Height: 35" to 54"

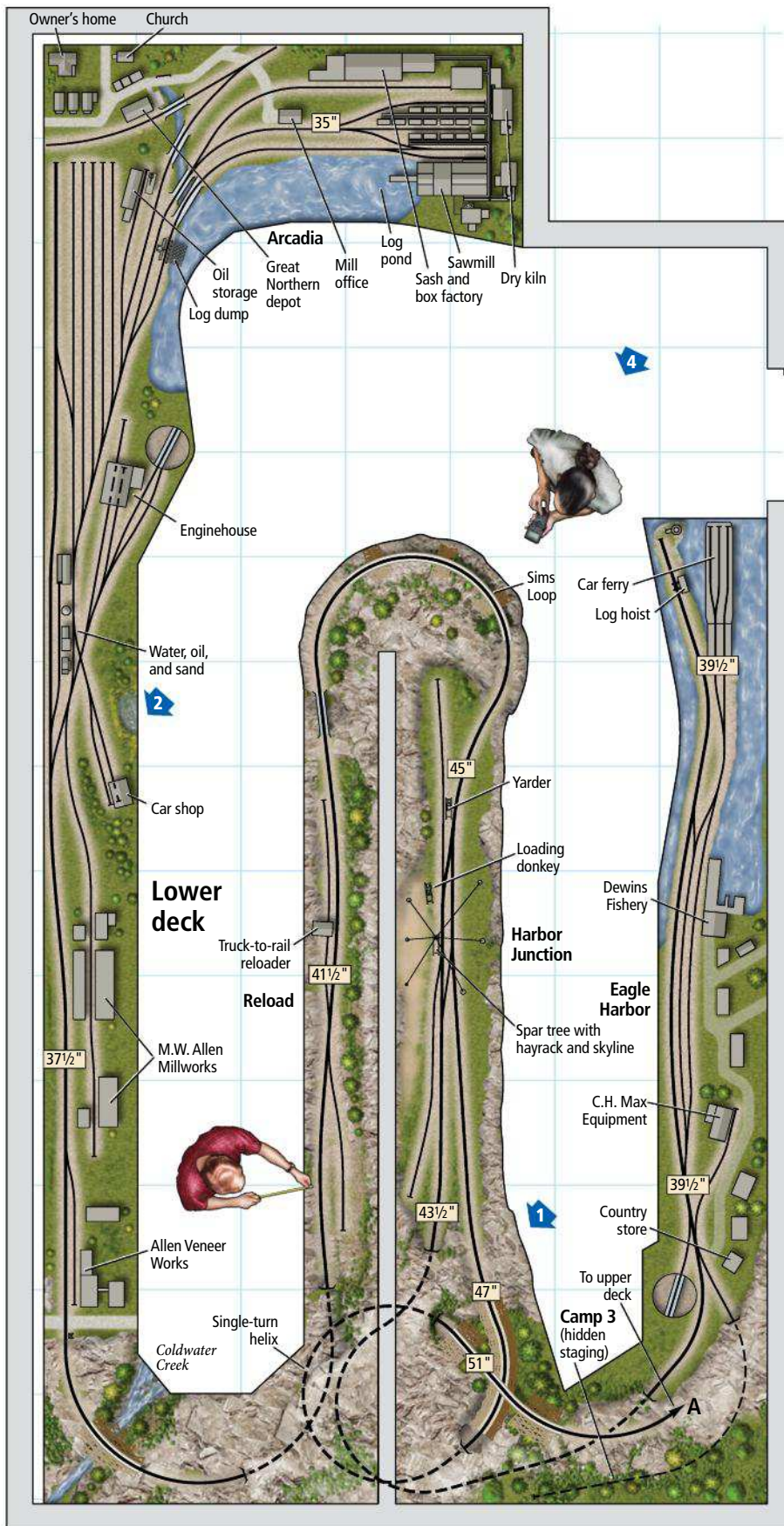
Roadbed: extruded-foam insulation board

Track: code 70 and 55 Micro Engineering flextrack with handlaid turnouts

Scenery: Homasote over plaster cloth

Backdrop: hand-painted on drywall

Control: NCE Digital Command Control with wireless throttles



between Sims Loop and Eagle Harbor/Hill Camp were formed with interlaced strips of corrugated cardboard covered with a mesh material left over from our house construction. The original purpose of this mesh was to help stucco adhere to our foundation wall. I hot-glued this material to the cardboard strips to keep the plaster cloth I applied next from drooping between the strips. Next came a thick coating of Hydrocal, which I carved into the rock formations.

The mountain that forms Sims Loop, my tribute to John Allen, has 2" extruded-foam insulation board and plywood formers supporting heavy brown paper, which I first wadded up then stretched back out. The creases this formed gave an irregular shape to the surface of the paper.



These plastic cup holders give operators somewhere to put their beverages other than on the scenery. They fold flat against the fascia when not needed.

Keep drinks off the layout

Running log trains pulled by Shay locomotives can take a while, since their top speed is only around 8 scale mph. During a typical run, the engineer may want to sip on a beverage. But when the train has to stop for some work, he may have to use both hands, so he needs a place to safely put his beverage down.

I found these fairly inexpensive folding cup holders online and fastened them to the fascia in key locations. They fold up against the fascia when not in use to stay out of the way of passing operators, but open when needed. – Skip Luyk



4 The view from the layout's entrance is dominated by the floor-to-ceiling scenery of Sims Loop. At left are Eagle Harbor (lower deck) and Hill Camp (upper deck); in the background are Arcadia's engine terminal (lower) and Camp 2 (upper).



5 Shay no. 15 rolls through Camp 2 with loaded cars from McKenny's Landing. The structures here, including the camp office, cook house, and dormitory, are laser-cut wood kits from B.T.S.



Meet Harley "Skip" Luyk

Harley "Skip" Luyk has been a member of the National Model Railroad Association for more than 25 years and served as chairman of the NMRA's 2012 national convention. He gets his interest in logging from his grandfather and great-grandfather, as well as his own more than 30 years in furniture design, manufacturing, and consulting. Skip has spent most of his life in Grand Rapids, Mich., where he and his wife, Eloise, raised their daughter, Sheryl. They have two grown grandchildren and a great-grandchild on the way.

I painted the paper with latex paint to seal it, then brushed it with thinned Hydrocal to give it "tooth" for the final coat. The final step was to apply a coat of thick Hydrocal, into which I carved the rock strata. This mountain uses more than 150 pounds of Hydrocal.

The remainder of the scenery was made using materials from Woodland Scenics, Scenic Express, and my backyard. I used a variety of materials and techniques to make trees in addition to using commercial trees from Woodland Scenics and Timberline Scenery.

I recently roughed in the scenery on the last 30 square feet of the layout. It and the rest of the layout is awaiting only final details. My approach has been to build the benchwork and lay the track first. Then, after test-running and fixing any defects, I began roughing in the

scenery and adding detail only in areas that would be difficult to get to later.

Now trains can be run through plausible scenes during operating sessions, and I have a lifetime to finish the details.

MORE ON THE WEB

Model Railroader magazine subscribers can watch video of Skip Luyk's Arcadia & Betsey River Ry. at ModelRailroader.com



6 Trackwork on rural logging roads often used the materials closest to hand, such as this span bridge made from felled tree trunks. Skip modeled it by roughing up two 5/8" wood dowels to look like tree bark. Nickle Creek is Woodland Scenics Realistic Water poured over a bed of sand and stones from Skip's backyard.

Operations

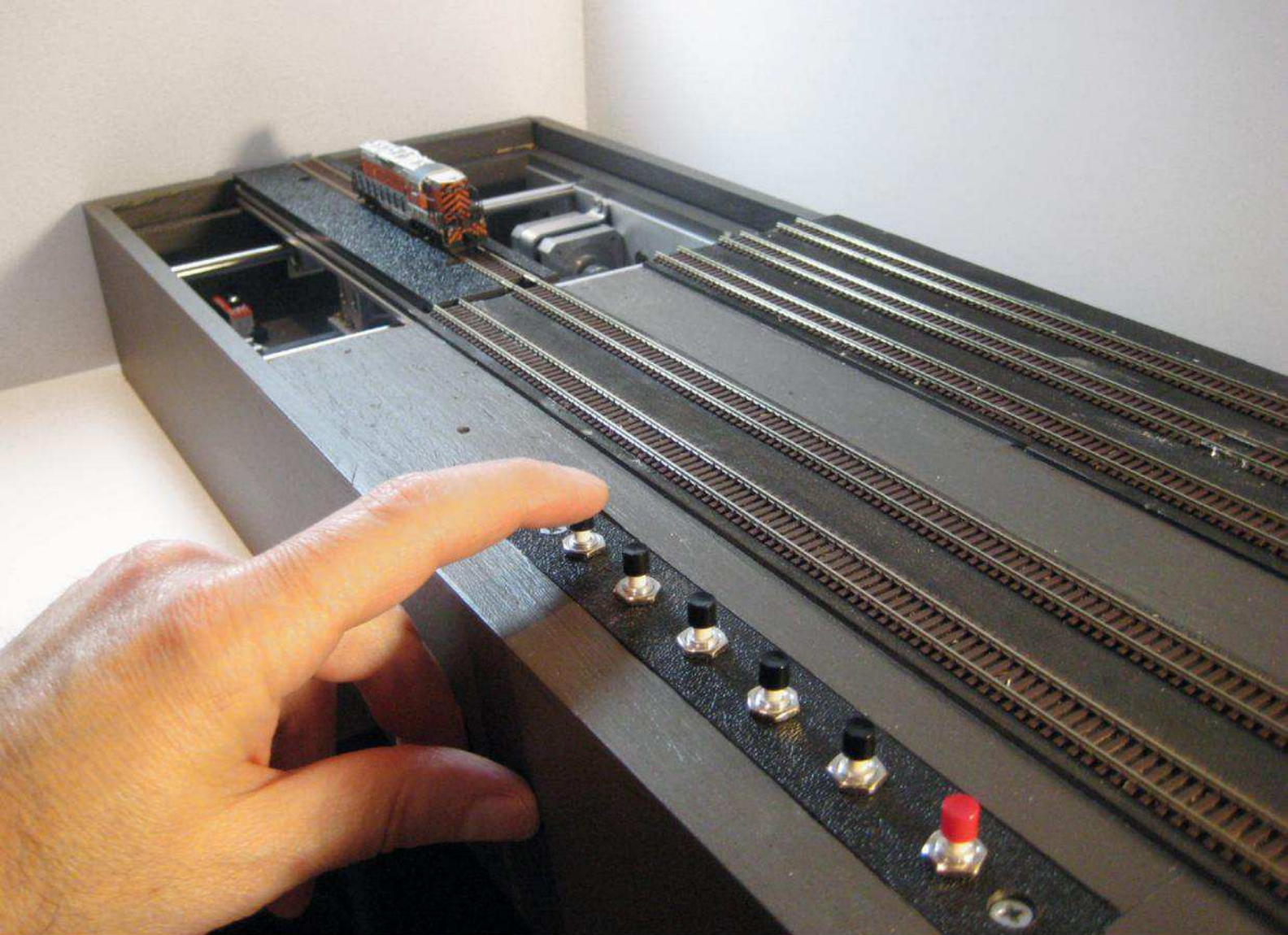
Logging operations on the A&BR concentrate on bringing logs in from the woods. However, because the railroad has connections to the outside world at both ends of the line, the A&BR does handle some general freight.

Most operating sessions involve six operators – two to work the yard and local industries and four road crews. The

road engineers may run more than one train. A typical operating session will last about 2½ hours.

For the log trains I use train orders, but I use car cards and waybills for the general freights. All trains are run in a sequence rather than a timetable.

From the research to the operations and all of the construction in between, the Arcadia & Betsey River Ry. has been a very rewarding endeavor. **MR**



PUSH-BUTTON STAGING SOLUTION

Build an automated traverser with 3-D printer parts,
an Arduino microcontroller, and other low-cost electronics

By Michael Hardwick • Photos by the author

1 Setting the stage. With the push of a button, Michael Hardwick moves his Western Pacific GP9 between staging tracks on his N scale layout. Learn how Michael used 3-D printer components and microcontrollers to make this push-button-controlled traverser.

When I built my current 18" x 10'-0" N scale switching layout, I planned for a compact three-track staging yard. Two tracks would hold trains, while the third would allow a locomotive to run around its train for a return trip. The problem was that I didn't allow enough room on the far end of the staging yard for another turnout ladder.

My solution was to add a single-track traverser **1**, which let me move a locomotive between staging tracks. The arrangement was also compact enough that I added two additional storage tracks near the fascia.

A traverser is a horizontally sliding platform with a track or tracks laid on it. Similar to a transfer table found at some prototype locomotive shops, a traverser moves a locomotive or, if the traverser is long enough, an entire train between staging and entrance and exit tracks.

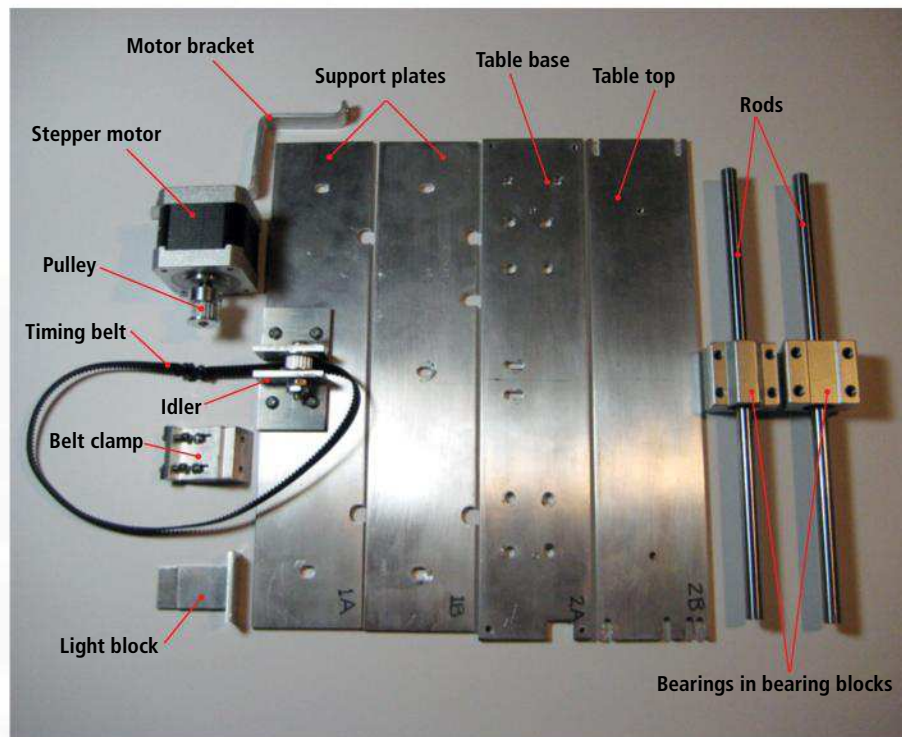
Although I built the traverser for my N scale layout, the design can be easily modified for a larger scale or space. Follow along as I show you how I built a traverser from 3-D printer parts and automated it with push-button control using an Arduino microcontroller and other readily available electronics.

The mechanism

Unlike my situation, I recommend building the traverser before laying the staging tracks. I almost learned this lesson the hard way, as all my staging tracks were laid beforehand and crowd one side of the benchwork. At the staging end, the benchwork is 10" wide. I cut a pocket in the tabletop to house the traverser mechanism, which is inspired by a 3-D printer's motion stage.

Thanks to the growth of the 3-D printing hobby, low-cost 3-D printer components are readily available. The parts I used are shown in **2**.

I started with a kit that included two 300mm (11.8") long rods, four linear bearings assembled in blocks tapped with M4 threads, and four rod supports. I needed only two of the bearing/block assemblies. Because my staging yard was



2 The mechanism parts. A 3-D printer motion stage inspired the project. Michael fabricated other parts from aluminum stock readily available at home centers.

Materials list

Adafruit Industries

www.adafruit.com

1609 1/2 size Perma-Proto Breadboard PCB

Oddwires

www.oddwires.com

CMP-000NANO Arduino Nano3

CWJ-0000015 Terminal connector strip (10A, 380V, 12 position)

CCE-0000100 100 µF capacitors

CCR-0010000 10KΩ resistors

Pololu Robotics & Electronics

www.pololu.com

1200 NEMA 17 stepper motor: Uni-/Bipolar,

200 steps/rev, 42 x 48mm, 4V, 1.2A/Phase

A4988 Stepper controller board

SainSmart

www.sainsmart.com

101-91-105 Optical end stop switch for 3-D printer

ZYLtech Engineering LLC

www.zyltech.com

8-foot 2GT GT2 timing belt kit with 2X pulley, 2X idler, 4X tensioner

8mm hardened steel shafts rod kit (includes bearings, bearing blocks, and supports)

Miscellaneous

Aluminum bar, 8" x 36"

8-pin stackable headers for Arduino

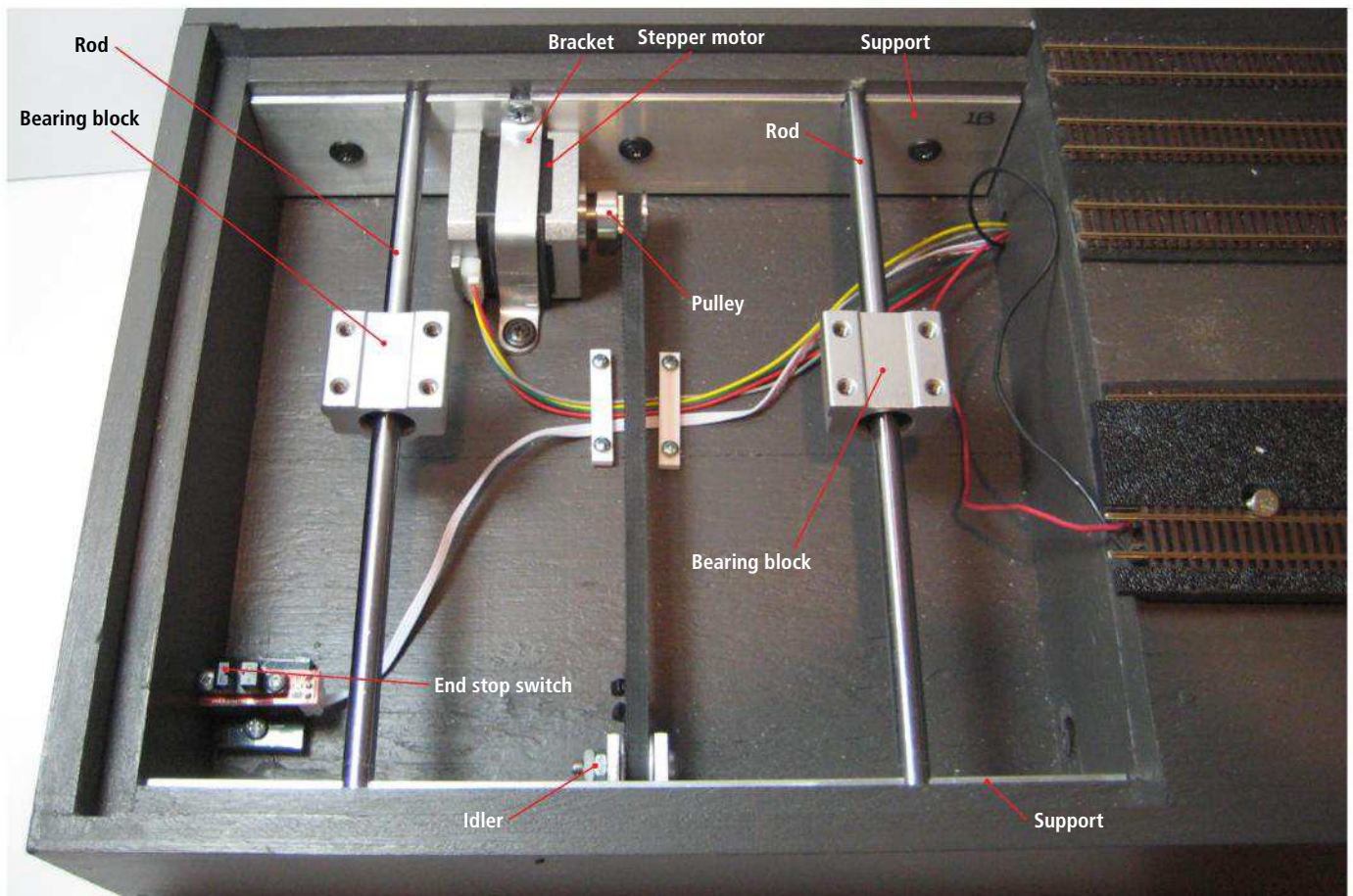
so narrow and I wanted to maximize the traverser's range of travel, I used 1/8" thick aluminum plates to support the rods instead of the 1/2" supports included with the kit.

I had to cut the rods to fit the 8 1/2" inside width of the benchwork pocket. The rods are hardened steel, so I couldn't just use a hacksaw. Instead, I used a chop saw with an abrasive cut-off disc. It's important to use eye protection and a face shield when cutting metal.

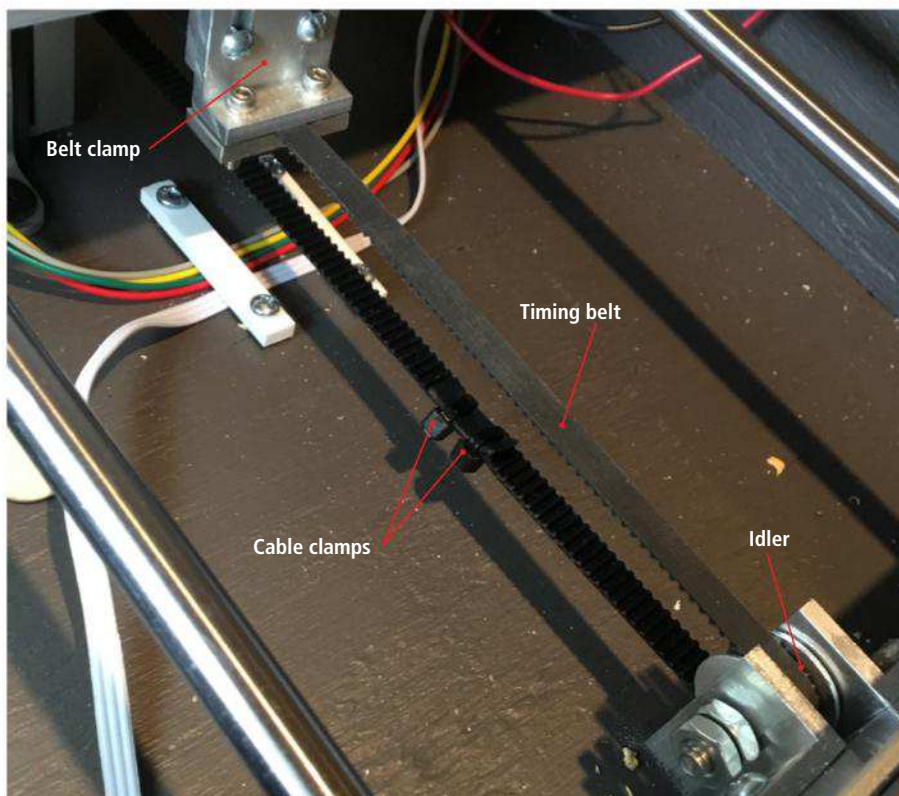
Next I fabricated the aluminum supports, using 1/8" thick, 2" wide bar stock

that's commonly available at home centers. These are parts 1A and 1B shown in **2**. I cut two pieces to fit the 9 3/4" inside length of the benchwork pocket. I like the strength of aluminum and find it easy to cut, drill, and tap. For those more comfortable working with plastic, I'd recommend using ABS.

I laid out the support plate holes into which the rod ends would fit so that the rod axis would be about an inch lower than the top of the roadbed. For my application, this meant that the rod holes would be open at the top because



3 Installing the mechanism. After drilling the supports, Michael assembled the mechanism in the benchwork pocket. Match drilling the supports ensured that the rods would be parallel, which is important for the traverser to work correctly.



4 Timing belt. Michael made the bracket for the idler out of aluminum angle. After cutting the belt to length, he attached the ends with a scrap of belt and cable ties. The clamp at the top of the photo connects the traverser table to the belt.

I needed the traverser to slide past the support to reach the last staging track.

I match-drilled the 8mm rod holes in the supports by clamping the pieces together, then drilling the holes through both plates in a single operation. Match drilling ensured that the rod hole spacing was identical on each support so the rods would be parallel when installed. Since I didn't have an 8mm bit, I used a $\frac{5}{16}$ " bit, and then widened the holes as needed with a round file.

Instead of screw holes, I drilled mounting slots into the supports to allow for some vertical adjustment. Support 1A also includes four holes that I drilled and tapped for 4-40 screws to hold the idler pulley supports. Support 1B includes a slot that allows clearance for a motor support screw. With the support plates complete, I test-fit the assembly into the benchwork pocket, including sliding the bearings over the rods prior to inserting them into the supports.

A NEMA 17 bipolar stepper motor, another 3-D printer component, positions the traverser table. The number "17" designates that the motor measures 1.7" x 1.7" in cross section. The motors are produced in different lengths

depending upon the current rating. The motor that I used is rated at 1.2A. I clamped the motor in place using a $\frac{1}{8}$ " aluminum strap screwed to the benchwork. Photo 3 shows the mechanism installed in the benchwork pocket.

A GT2 timing belt engages a 20-tooth pulley gear on the motor shaft and the idler gear attached to support 1B opposite the motor. I bought the belt, pulley, and idler as part of a kit. After cutting the timing belt to length and threading it through the gears, I attached the ends together with a short length of belt secured with two cable ties 4.

The traverser table

The traverser table is made of two more aluminum plates, cut from the same stock as the supports but sized to fit the opening's length. A base plate (part 2A) is mounted to the bearing blocks, and a top plate (part 2B) is attached to the base 5.

In addition to the eight holes for the screws that connect it to the bearing blocks, the base has holes for mounting two other parts. One is a clamp that I made out of two small angles and a length of aluminum bar that holds on to the timing belt shown in 4. The two angles are screwed together through slots that provide for some vertical adjustment so that the clamp doesn't pull the timing belt out of position. The other part is a light block, shown in 2 on page 37. This piece of angle triggers the optical end stop sensor at one end of the traverser's range of travel.

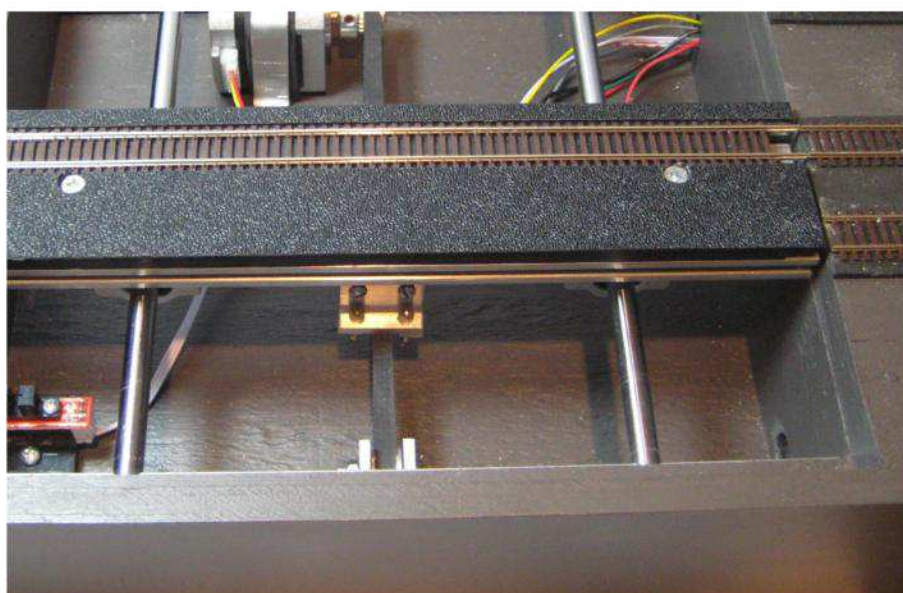
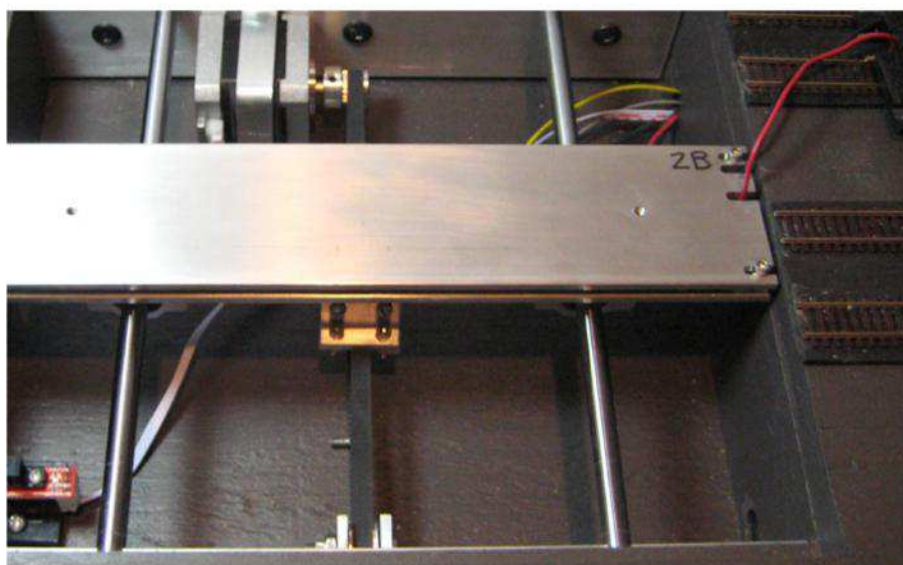
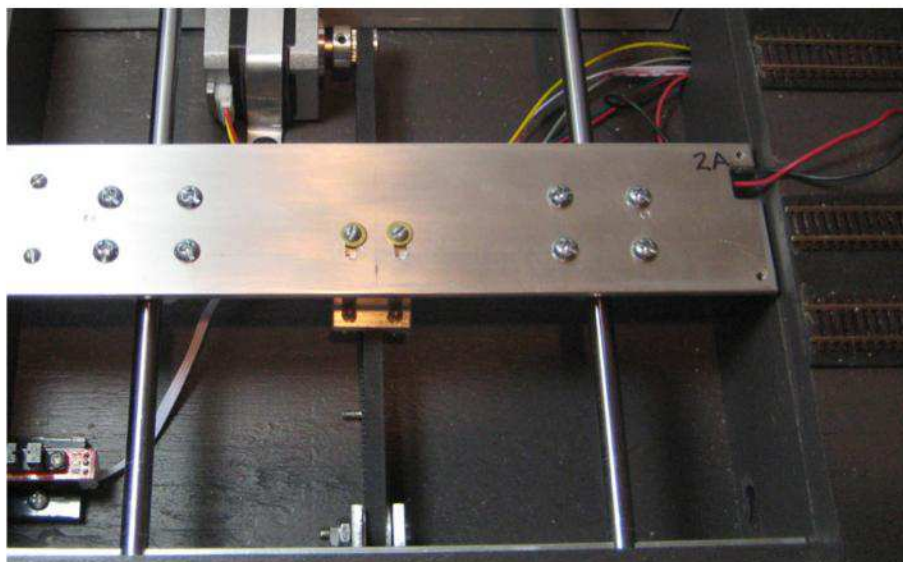
I cut the traverser top to the same dimensions as the base. I added slots in the four corners to allow for lateral adjustment as needed for track alignment. Two more slots accommodate feeder wires with rail joiners soldered to the ends. These will power the track.

After placing three strips of closed-cell foam next to the threaded holes at each end of the base, I mounted the top to the base using $\frac{3}{4}$ " long 4-40 socket-head cap screws. The foam serves as a stiff spring and allows adjustment of the staging track height via the cap screws.

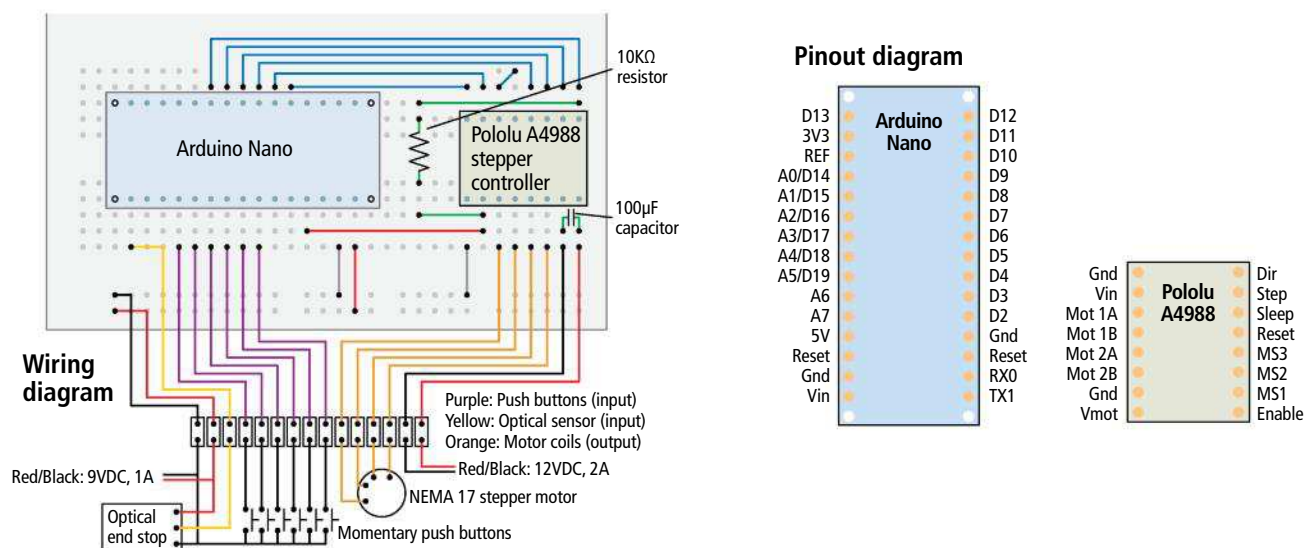
I made the staging track assembly, shown in 5, out of a rectangle of ABS with a channel cut into it for the track section. I screwed this assembly to the traverser top with two flathead screws.

The control system

Commonly used in robotics, stepper motors allow for more precise movement



5 Traverser table assembly. Michael connected the traverser table base to the bearing blocks and the timing belt clamp (top photo). Then he attached the top to the base (middle photo) with screws in four corners. The staging track base (bottom photo) is made of ABS with a channel cut for the track.



6 Wiring and pinout diagrams. The Arduino Nano microcontroller and the Pololu A4988 stepper controller are the brains of the traverser. Michael assembled the system on perforated project board. The wiring diagram for the entire system is shown on the left, and the pinout diagrams for each component is shown on the right.

than regular electric motors. Instead of spinning continuously when power is applied like a regular electric motor, stepper motors respond to electrical inputs by rotating in specific increments.

For most motors, the full-step increment is 1.8 degrees, or 200 steps per revolution. My traverser requires about 3½ motor rotations to move its 6" of available travel, so each full motor step moves the table .009", which is about ⅓ the width of a code 55 railhead. Many stepper motors also allow even finer resolution by "micro-stepping," which reduces the step increment to ½, ¼, ⅛, 1/16, or 1/32 of a full step.

The brains of my traverser are an Arduino Nano microcontroller and a Pololu A4988 stepper motor controller, which enables micro-stepping down to 1/16 of a step. After the microcontroller boots and the code begins running, the traverser moves toward the optical end-point sensor. When the traverser reaches

the sensor, it's considered to be in its "home" position. For coding purposes, this position is considered "0," and every other position is defined as relative to it. I used normally open momentary push buttons to send the traverser to each of the five staging tracks, as well as a separate button that resets the traverser to a home position.

The microcontroller calculates the direction to turn the motor and the number of steps needed to move it to the desired location. The A4988 stepper controller then operates the motor accordingly. If the A4988's DIR pin is set high (+5V), the motor moves one way; and if it's set low (ground), the motor moves the opposite way. Each time the STEP pin detects an input change from LOW to HIGH, the motor moves one step, as dictated by the microstepping mode selected using the MS1, MS2, and MS3 pins.

Building the circuits

The Arduino and A4988 pinout and wiring diagrams are shown in 6. I built the circuit on an Adafruit Industries Perma-Proto board. First I soldered stackable 8-pin headers to the board as sockets for the Arduino and A4988. That way the components would be easy to replace if needed. I ran all the wires to a terminal strip for easier connection to the layout.

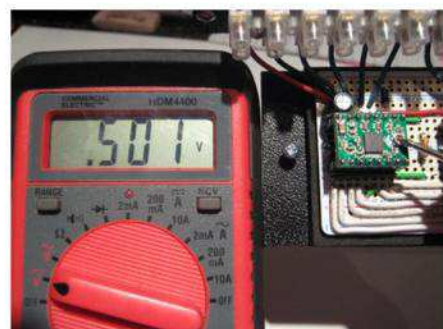
Placed between the motor's power supply leads, a 100 µF, 25V (or greater) electrolytic capacitor protects the

electronics from voltage spikes that could be generated by the motor. A 10KΩ resistor on the A4988 connects the ENABLE pin to the +5V power supply. This resistor "pulls up" the enable pin voltage and disables the motor outputs until the microcontroller tells it otherwise. Without this pull-up resistor, the pin voltage will "float" and the motor will behave erratically while the microcontroller boots up.

It's important to remember that the bipolar stepper motor has two coils with two wires each. I made sure that the 1A and 1B pinout were connected to one coil and that 2A and 2B pinout were connected to the other. To determine the wires attached to each coil, I used an ohmmeter. If the meter showed an open circuit, then the wires were connected to different coils. If the meter read a few ohms resistance, then the wires are connected to the same coil.

Another important step is to properly adjust the current limit on the A4988. Failure to do so could damage the board and the motor. Before connecting the A4988 to the motor, I powered it up and adjusted its current limit via a potentiometer (a small Phillips head screw) on the board. With a multimeter connected to the A4988 7, I used a small screwdriver to turn the potentiometer until the reference voltage between the screw head and ground read .5V. Pololu.com has an online video that demonstrates this process.

I powered the Arduino microcontroller with a 9VDC, 1A "wall wart"



7 Set the current limit. Michael used a small screwdriver and multimeter to set the stepper controller's current limit.

transformer and the motor with a 12VDC, 2A power supply. I used separate power supplies to keep electrical noise off of the microcontroller.

The finished circuit is shown in 8. Photo 9 shows how easily the entire electronics assembly fits under the staging yard benchwork.

The software

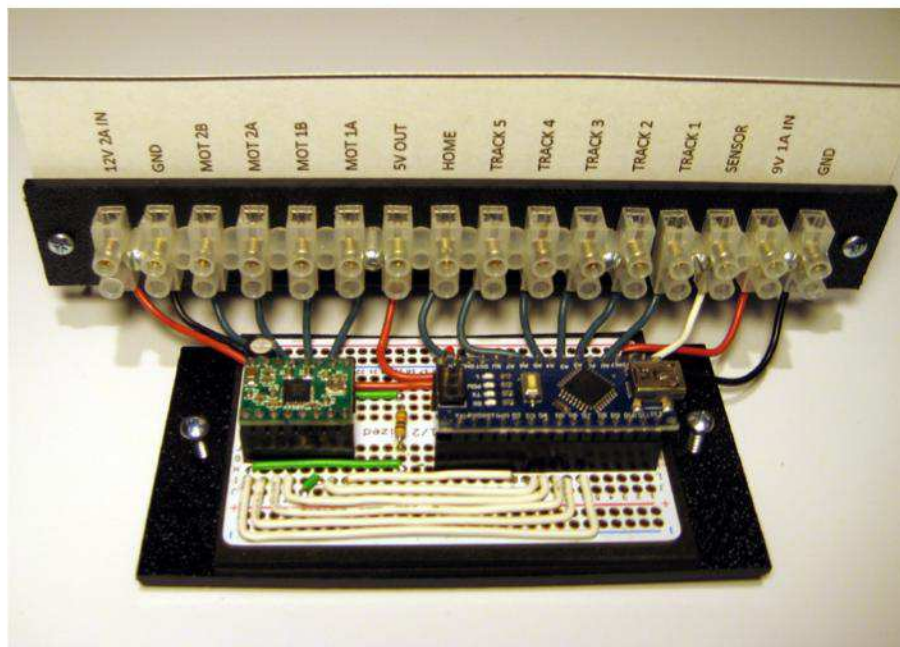
The Arduino Integrated Development Environment (IDE) is available for download at www.arduino.cc and runs on Windows, Mac OSX, and Linux. This software suite helps edit the code and upload it into the Arduino. For those familiar with computer code, the Arduino language is similar to C. For those less familiar, a great way to get started is to inspect code written by others. My traverser code is available at www.ModelRailroader.com.

The first part of the code defines the constants and variables used throughout the program. I assigned names to the Arduino pin numbers so they're easier to remember. I also set up an array of constants called `trackPos16[]` that stores the number of motor steps from the home position to each one of the five staging tracks. I determined these values by trial and error. The software automatically adjusts the values if a different micro-stepping mode is selected, instead of the $\frac{1}{16}$ mode that I used. I used a constant called `SpeedFactor` to set the speed of the traverser, which should be between 1 (slower) and 10 (faster).

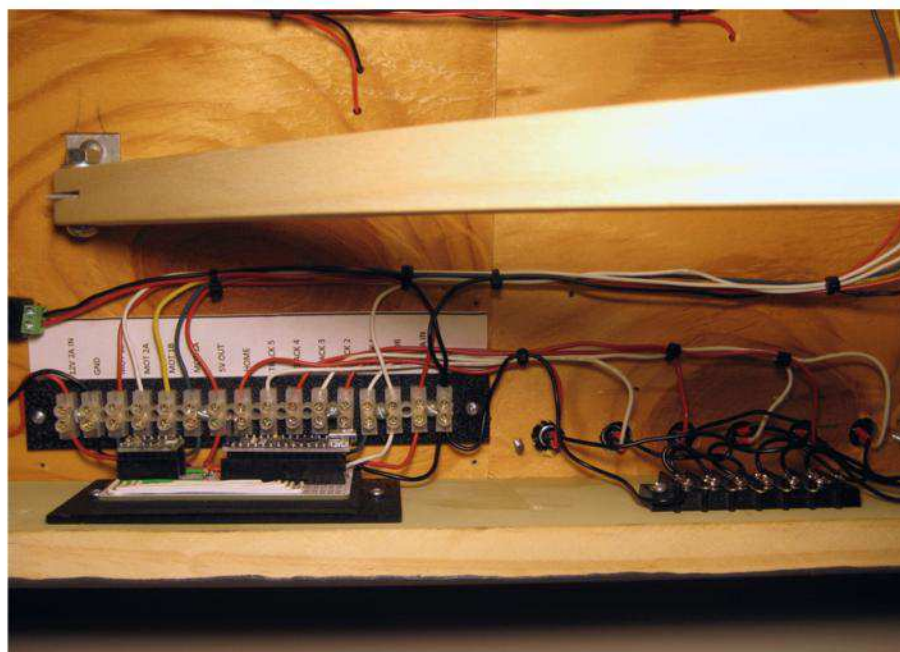
All Arduino programs have a minimum of two routines, `setup()` and `loop()`, though it's good practice to break a program into more simple routines to increase readability and aid in debugging. My `setup()` routine sets the Arduino pins as either inputs or outputs, sets the traverser micro-stepping mode and speed, and then instructs the traverser to move to the home position.

My `loop()` routine, which repeats until the program quits, calls on other routines to operate the traverser. The `pollButtons()` routine inspects each button to determine if it was pressed. If it detects a pressed button, it returns the button number to the `loop()` routine. The `moveToPosition` routine coordinates the traverser's move to one of the staging tracks while the `moveXSteps()` routine sends the appropriate number of pulses to the A4988 motor controller and keeps track of the traverser's position.

The `moveToHome` routine moves the traverser to the home position when that



8 Finished circuit. The electronics fit on a breadboard the size of a credit card. The terminal strip makes it easy to connect the circuit to the layout.



9 Under the layout. The completed electronics assembly neatly fits under the compact benchwork. The push buttons and their terminal strip are on the right.

button is pressed. This move is done in two phases. First the traverser moves toward home at normal speed until the optical sensor trips. Then the traverser moves slightly away from the sensor and approaches again at slow speed until the sensor trips. I've found this slow re-approach is more likely to produce a repeatable home position.

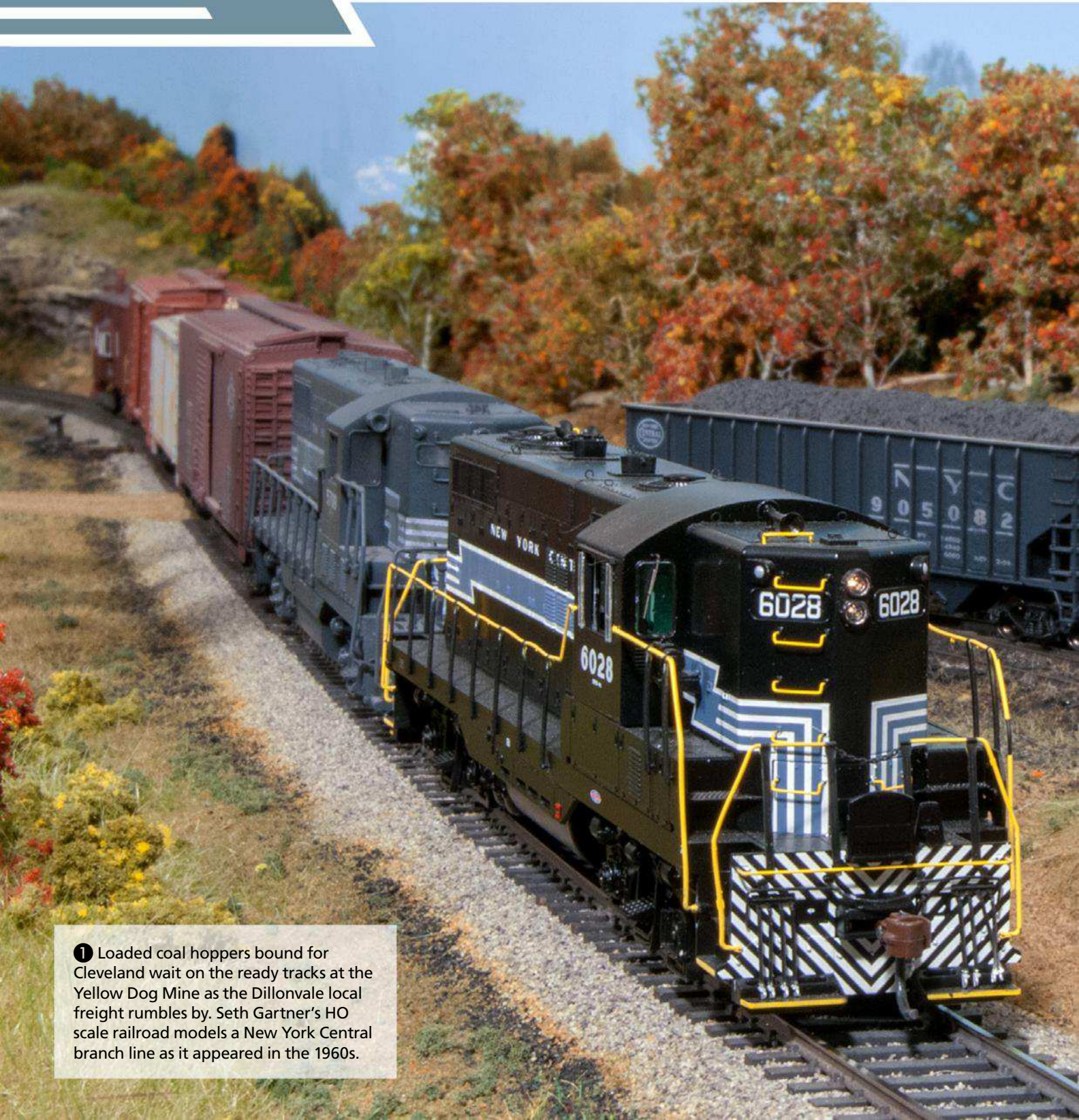
The last routine, `SetSteppingMode()`, provides simple utility functions. I use this routine to select the micro-stepping mode and easily adjust the speed and position values.

My traverser project was a great exercise for building my mechanical, electrical, and software engineering skills. The concepts that I used could be modified for other projects, such as a turntable. The availability of inexpensive microcontrollers and other electronics make it easier than ever to add animation and automation to a model railroad. [MR](http://www.ModelRailroader.com)

Michael Hardwick models the last 1½ miles of the Western Pacific's branch from Niles to San Jose, Calif., in the 1960s. This is his first article for Model Railroader.

LIGHTNING STRIPES A

Coal and steel industry scenes in eastern Ohio highlight the



① Loaded coal hoppers bound for Cleveland wait on the ready tracks at the Yellow Dog Mine as the Dillonvale local freight rumbles by. Seth Gartner's HO scale railroad models a New York Central branch line as it appeared in the 1960s.

ND BLACK DIAMONDS

multilevel Piney Fork Branch

By Seth Gartner • Photos by Lou Sassi





② The sprawling Lauren Steel Co. complex occupies a large section of the upper deck. Minerva Yard, on the lower deck below the steel mill, is the major terminal on the layout. A corner of the Witch Hazel tipple is visible on the left.

The New York Central may not be thought of as a coal-hauling railroad in the same way as the Norfolk & Western, Chesapeake & Ohio, or other Appalachian roads. However, coal was king on the Piney Fork Branch of the NYC Cleveland Division, a branch line that ran through my hometown of Minerva, Ohio. My HO scale model railroad celebrates the Piney Fork Branch in the 1960s, as well as the coal and steel industries in eastern Ohio.

My hometown railroad

Minerva, Ohio, about 50 miles southwest of Youngstown, has an interesting railroad history. In the early 20th century, the Wheeling & Lake Erie terminated there, and the Pennsylvania RR and the Lake Erie, Alliance & Wheeling passed through town.

Eventually the LEA&W was purchased by the Lake Shore & Michigan Southern Ry., which became part of the New York Central RR in 1914. The

former LEA&W line through Minerva became known as the Piney Fork Branch on the NYC Cleveland Division.

The NYC acquired trackage in eastern Ohio primarily to gain access to the region's coal fields. Most of the on-line mines loaded coal from strip pits that was brought in by truck. Multiple mines came and went, and the last two mines closed in the 1970s during the Penn Central era.

A modest amount of other freight traffic passed through Minerva, as the branch line served local and area industries. One such train was the Newton Falls switch run that traveled north to a manufacturer of stamped steel bumpers for General Motors automobiles.

There were two timetable passenger trains in the early 1900s. However, this service ceased before World War II.

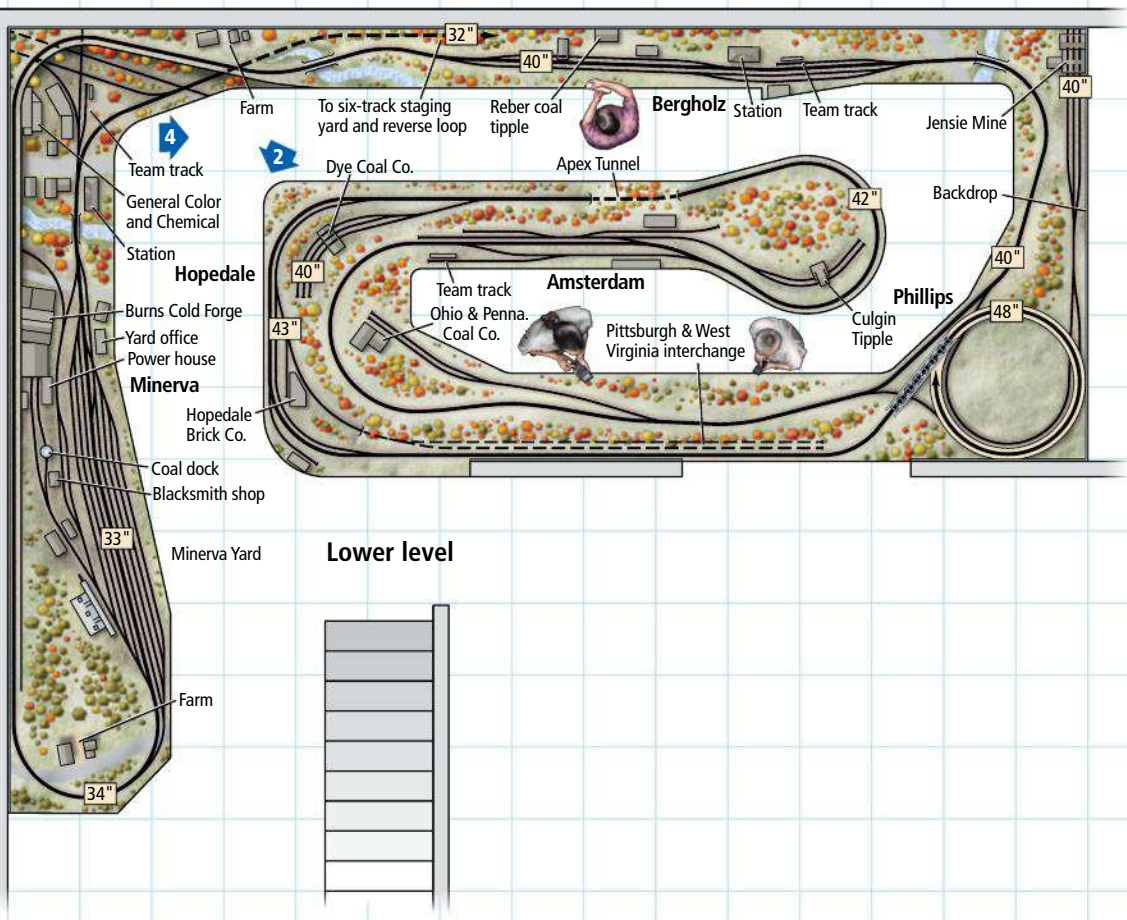
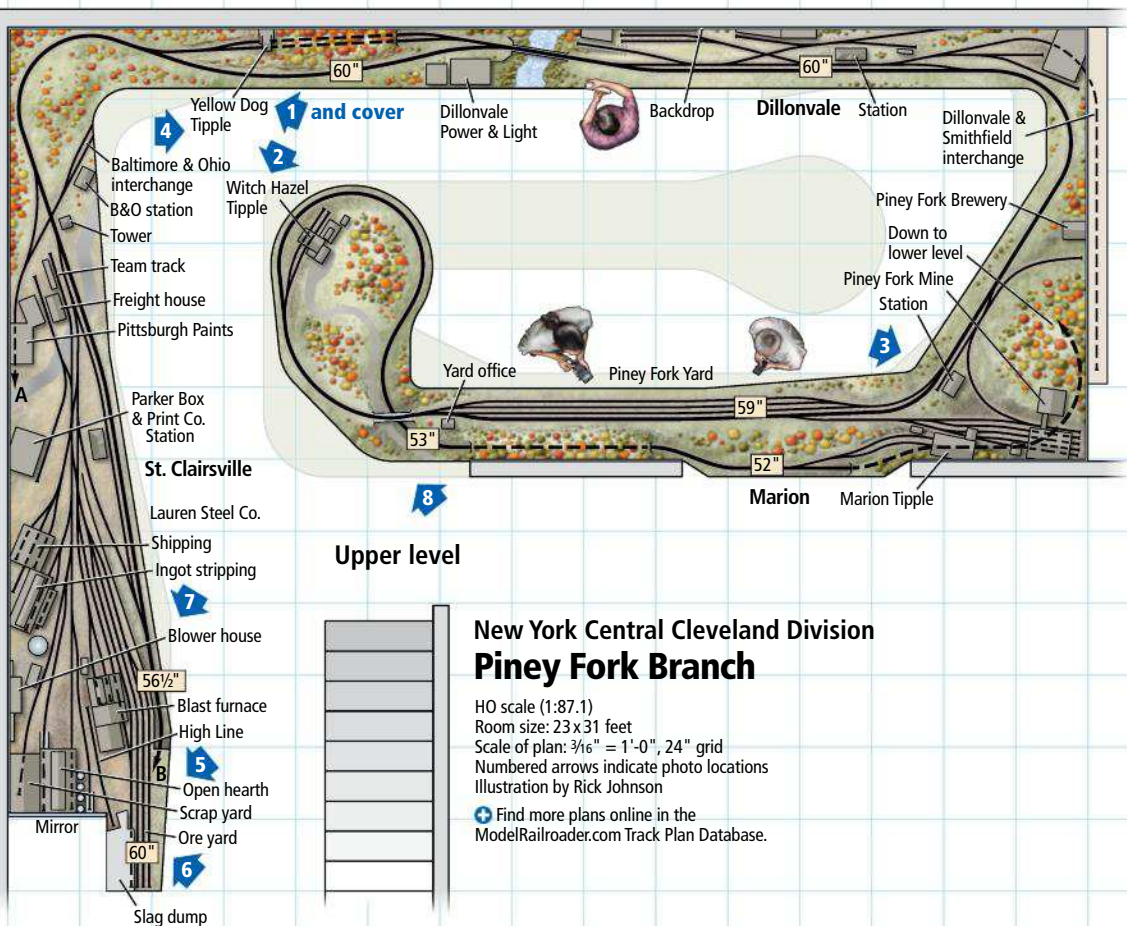
Layout planning

It's been my good fortune to have a friend and mentor in the hobby like Chip Syme. I thank him for his patience and guidance. Chip also took many

The layout at a glance

Name: Piney Fork RR
Scale: HO scale (1:87.1)
Size: 23 x 31 feet
Prototype: New York Central
Locale: eastern Ohio (Minerva to Dillonvale)
Era: early 1960s
Style: multilevel, walk in
Mainline run: 260 feet
Minimum radius: 24"
Minimum turnout: no. 4 (industries), no. 5 (yards), no. 6 (main line)
Maximum grade: 2.5 percent
Benchwork: open grid
Height: 32" to 60"
Roadbed: 1/4" cork and 1/8" Vinylbed
Track: flextrack, code 83 (main line) and code 70 (sidings)
Scenery: Sculptamold over masking tape applied to a web of cardboard strips
Backdrop: painted 1/8" tempered hardboard
Control: Digitrax Digital Command Control

Four-track staging yard under Lauren Steel Co.





③ Decked out in the New York Central's lightning-stripe livery, a pair of F units picks up loaded coal hoppers at the Piney Fork Mine. Seth modeled the scene after historical photos and coated Scenic Express SuperTrees with autumn foliage.

photos along the line when he used to work for the railroad. His photos were invaluable research tools. The hardest part about the design process was balancing what I wanted to model with the confines of my basement layout space.

My layout design goal is to re-create the Piney Fork Branch from Minerva south to Dillonvale, Ohio, during the mid-1960s in HO scale. Although many of the coal mines and tipples had closed by then, I used modeler's license to keep most of them open. In addition to coal, I'd add other local industries, including my family's business when I was growing up, General Color & Chemical.

I would also model New York Central's Minerva Yard. The roundhouse was closed after the steam era. However, in the 1960s, the structure still stood and housed a forging shop that made automobile transmission covers.

To justify running more through freight, I also used modeler's license to extend the line south to a connection with the Toledo & Ohio Central RR at Corning, Ohio, represented by staging tracks. This would allow freight to move across my railroad both north and south.

After living in Pittsburgh for a few years, I had an interest in the steel industry. I indulged this interest by adding a steel mill complex.

Building the railroad

After building a new house, I spent two years finishing the basement so it would be a comfortable space to work on and operate a model railroad. Then I used CADRail to finalize my track plan as well as the benchwork plans.

A double-deck layout appealed to me because it would extend the distances between the operational areas. However, I didn't want to use a helix to connect the two decks, because I thought the train would be hidden from an operator's view for too long. Instead, I "unwound" the helix into a long grade between the two decks on the layout's peninsula, as shown in the track plan on the previous page. The grade would run twice along the wall in full view and help support the upper deck on the peninsula.

Layout construction began in 2000. First I attached 2 x 4 pilasters to the basement wall studs. Then I attached plywood arms to the pilasters to support the open-grid benchwork.

For subroadbed, I topped the benchwork with extruded-foam insulation board. The mainline roadbed is cork. For sidings, I used Hobby Innovations Vinylbed, which is half the thickness of the mainline cork roadbed. [Vinylbed has been replaced by Flexxbed in the Hobby Innovations product line. – Ed.]

I used code 83 flextrack for the main line and code 70 flextrack for the sidings. The track is from a variety of manufacturers, while the turnouts are from Micro Engineering, Shinohara, and Walthers. I also handlaid a few turnouts and crossings. Most of the turnout points are controlled by manual ground throws.

After painting the rails Roof Brown and the ties a weathered black, I ballasted the track with Smith & Sons natural stone ballast. [Smith & Sons ballast is available

MORE ON THE WEB

Subscribers can watch a video of trains running along the HO scale Piney Fork Branch at ModelRailroader.com

from Scenic Express – Ed.] I used fine gray ballast for main lines; black cinders for yards, mines, and passing sidings; and brown cinders for the steel mill.

I wired the layout for Digital Command Control (DCC) using a Digitrax Chief system with one power booster. The layout is divided into several power districts, each protected by a circuit breaker.

Scenery techniques

This layout progressed further than my previous efforts, so I had a chance to experiment with different scenery methods. I didn't like shaving down stacks of foam, as it created quite a mess. Instead I built up the landforms atop a web of cardboard strips hot-glued together. I covered the cardboard web with masking tape followed by a thin layer of Hydrocal. Once the landforms had dried, I began scenery work.

The exposed rock faces are a mix of Hydrocal plaster castings and Cripplebush Valley Models Rubber Rocks. I also carved rock faces into the Sculptamold scenery base to visually blend products together.

After applying a basecoat of black, I painted the rocks with acrylics in various colors to match prototype locations. I finished the rocks by adding dry-brushed highlights.

For ground cover I used various colors of fine ground foam turf from Woodland Scenics and Scenic Express. I also applied static grass flocking using an applicator that I made from an electric fly swatter. Mixing the color and the length of the flocking gave the ground cover a realistic appearance.

For the forested areas I installed darker shades of coarse ground foam before installing Scenic Express SuperTrees armatures. I'm modeling autumn, so I chose muted rusty oranges for the foliage colors.

I modeled a body of water, such as a pond, by first painting its bottom an appropriate dark color. This adds the illusion of depth. After adding rocks and scenic details around the water's edge, I poured on a layer of Enviro-Tex Lite resin. For moving water, such as a river, I painted on a layer of acrylic gloss medium over the cured resin to add ripples and other texture.

Scratchbuilding showcase

Following prototype photos, I drew up plans to help me scratchbuild many of



4 At the end of the peninsula, Hopedale on the lower level marks the beginning of the grade that eventually climbs out and back to Witch Hazel Tipple on the upper level. Both locations are visible on the right. Across from the peninsula are the towns of Dillonvale (upper level) and Bergholz (lower level).



5 A mirror placed against the wall at the end of the Lauren Steel Co. doubles the apparent size of the open-hearth furnace.

Doubling a scene with mirrors

One of my most effective mirror applications is across the back wall of the Lauren Steel Co., shown above. The open-hearth furnace is doubled in size, as the four stacks have become eight.

Most household mirrors are second-surface mirrors, where the reflective surface is behind a protective layer of transparent glass or acrylic. When an object is butted against this type of mirror, there's a gap between the object and the reflected image due to the thickness of this layer. This upper layer can also cause a faint secondary reflection, called ghosting, to occur.

One solution is a first surface-mirror, where the reflective surface is above the mirror backing. However, these mirrors can be expensive.

I've made my own first-surface mirrors by removing the backing from conventional mirrors to reveal the reflective surface. I prefer acrylic mirrors, since I find them easy to cut. Videos showing how to remove mirror backing are available on YouTube. [Search "First surface mirror hack" on YouTube. – Ed.]

When an object is placed in front of this modified mirror, there's a true reflection without any gap or ghosting. – Seth Gartner



6 The ore transfer car trundles across the high line above the slag dump at Lauren Steel Co. During operating sessions, a steel mill operator handles intraplant movements as well as arriving and departing traffic.

the layout structures. I built most of the structures from styrene with commercially available window and door castings. For some of the larger steel mill structures, I laminated styrene over foam core to add stability. Whenever I had to use a kit, I'd modify it in some way to make it unique to my layout.

The blast furnace is the centerpiece of my steel mill complex. I spent months detailing it and added interior and exterior illumination with light-emitting diodes (LEDs). I simulated molten iron in the runners of the casting house floor using electroluminescent wire.

I used a mirror on one end of the mill, as I describe in "Doubling a scene with mirrors" on the previous page.

Accurately modeling the industries and railroad in Minerva was especially important to me. My work in this regard helped me get my first certificate for Master Builder – Prototype Modeler as part of the National Model Railroad Association Achievement Program.

Minerva Yard is compressed in size but still follows the prototype track arrangement. The yard's engine terminal features the enginehouse, coal dock, shop, and a steam locomotive tender that's been repurposed for diesel fuel storage. Other notable structures in Minerva include General Color & Chemical and Burn's Forge. The latter structure is housed inside the old Minerva roundhouse.

I also scratchbuilt a model of the Piney Fork Mine, which was the largest mine on the branch, using historical photos as reference. This mine received coal from strip pits 5 miles away via an electric narrow gauge line. This line crossed a long steel trestle that I've depicted along the backdrop of my Piney Fork Mine scene. I also included the prototype's warming shack and sand box. Workers used the sand to dust the rails for increased adhesion for the hoppers.

Freight cars and diesels

Narrowing my modeling focus to a specific locale and era helped curb my previous desire to buy one of everything in every road name. During layout construction, I built up my fleet, mostly from eBay purchases. I have nearly 200 coal hoppers and about the same number of other types of freight cars. I've upgraded all my cars with metal wheels and Kadee knuckle couplers.

Most of my motive power consists of four-axle diesels. These locomotives can easily handle my layout's 24" radius curves. All the locomotives are equipped with DCC decoders and some have sound. One of my future projects is to weather more of my engines.

Piney Fork operations

During a typical operating session, a crew of nine can keep busy for five hours. In addition to road crews, available jobs include the dispatcher and yardmasters at Minerva Yard, Piney Fork Mine, and Lauren Steel Co. The road crews alternate between taking out freights or mine turns.

I've created a timetable based on a 3:1 fast clock. At the beginning of a session, the dispatcher refers to a train sequence. He also oversees the movement of extras by issuing Form 19 train orders to crews as needed. I designed these forms using NYC heralds and printed them on carbon-less paper, which makes it easier to make multiple copies.

Dispatcher-controlled train order signals let crews know when they need to stop and get new orders. The orders will either be waiting on the fascia or handed to the crews at that location.

The train room is small enough that the crews and dispatcher don't need to use radios or phones to communicate with one another. I also like the added camaraderie when everyone is aware of each other's business.



7 The blast furnace casting house features many scratchbuilt details and is heavily influenced by the work of noted steel-industry modeler Dean Freytag. Seth modeled the molten iron with electroluminescent wire.



8 The Piney Fork Yard job drills coal hoppers while a northbound freight glides under the scratchbuilt concrete overpass. Seth modeled the exposed rock faces with carved Sculptamold, Hydrocal castings, and Cripplebush Valley Models Rubber Rocks.

Each crew is issued a train instruction card outlining their job and a stack of car cards for their train. Each card has six destinations listed. Once a movement is complete, that destination is checked off on the card. During the next session, the car will be moved to the next listed destination. Coal movements are handled in blocks of hoppers that move between staging and the mines.

There's staging at both ends of the railroad. Points north are staged in a six-track yard with a reversing loop under the lower level. Points south are staged in a four-track yard hidden under Lauren Steel Co. I also have three interchanges where cars can be added or removed.

The Lauren Steel Co. yardmaster has an especially interesting job. This operator handles the arriving and departing traffic at the steel mill as well as all intra-plant movements. The instructions for the intraplant movements come from a slowly advancing slideshow on a laptop computer. Every 15 minutes the next task is displayed, taking the operator on a tour by rail of the mill until the finished rolled steel coils are loaded onto gondolas.

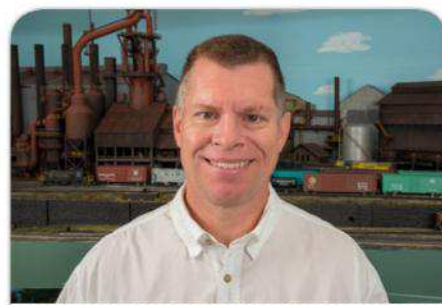
A social hobby

Although I've built my model railroad alone, I find that this hobby can be very social. In addition to operating sessions, another social aspect of the hobby that I enjoy are various podcasts and Facebook groups. These allow me to share my projects and see what other model railroaders are creating.

One of my favorite podcasts is *A Modeler's Life*. It explores the lives of various people in the hobby. I have also developed many friendships across the world after listening to fellow modelers on *Model Rail Radio*. I met one of the gentlemen featured on that show while on a family vacation in Australia.

I've also enjoyed participating in the Operations Special Interest Group (OPSIG). I invite anyone interested in model railroad operation to join OPSIG (www.opsig.org) to learn about various events and operating weekends. One such weekend is the North Carolina RailRun, where I host visitors to my Piney Fork Branch.

For more than 18 years I've enjoyed re-creating my hometown railroad in



Meet Seth Gartner

After graduating from medical school in North Carolina, Seth Gartner lived in Pittsburgh before returning to the South. An emergency physician, Seth lives in Charlotte with his wife and three children. His other hobbies include homebrewing his Piney Fork Ale.

HO scale. Back when I was growing up in Minerva, Ohio, I had no idea that I'd ever build my own Piney Fork Branch or that my interest in trains and model railroading would foster so many friendships later in life. **MR**



Union Pacific SD40-2 no. 2964 and a modern road unit switch cars at the grain elevator in Daneburg, Iowa. Contributing editor Pelle Søbørg explains how he detailed and weathered the SD40-2 in one day.

Easy-to-follow techniques will yield realistic results on any model

By Pelle K. Søbørg

Photos by the author

Though I model the modern era, I still have a soft spot for older locomotives like Electro-Motive Division's (EMD) SD40-2. Recently, Union Pacific started upgrading some of its veteran workhorses with mechanical improvements and new paint. Other UP SD40-2s look worn, providing a nice weathering challenge. I wanted to capture the look of a unit that hasn't been upgraded on an InterMountain HO scale SD40-2 decorated in UP's current scheme.

I've noticed the paint on older UP SD40-2s have a speckled appearance from faded or peeling paint. I thought this would be a challenge to re-create, but it turned out to be easier than I expected. [Read "How to weather with acrylics" in the May 2016 *Model Railroader* to see another approach for weathering a Union Pacific EMD SD40-2. – Ed.]

For the rest of the model, I followed my well-proven techniques, including thinned paint, full-strength paint, and powdered pastels. To keep the weathering from wearing off during normal handling, I added a clear flat varnish.

Although the weathering looks complicated, it can be done in a day. The most time-consuming part of the process is the masking. The actual weathering doesn't take long at all.

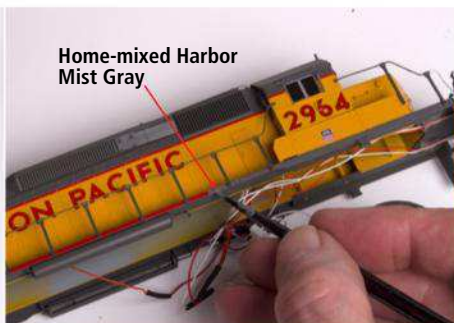
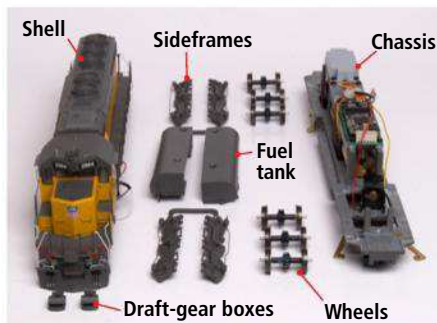
STEP 1 QUICK DETAIL ADDITIONS



Before I started weathering the model, I added a few details based on prototype photos I found online. I used .015" brass wire and eyebolts to model the air pipe for the three-chime air horn on the cab.

I also installed a firecracker antenna on the cab above the number board on the engineer's side of the cab. I added a drop-style grab iron above the number board on the brakeman's side.

STEP 2 DETAILS, DISASSEMBLY, MODIFICATION, AND MASKING



In preparation for weathering, I partially disassembled the locomotive, as shown in the left-hand photo. I wiped the parts with a cloth dipped in rubbing alcohol to remove impurities that would affect paint adhesion.

The model came with a red sill stripe, but I wanted it to have a yellow stripe. To remedy this, I brush-painted the sill

with a Harbor Mist Gray color that I mixed by eye. I also painted the new rooftop details the same color.

Before I could start weathering, I had to mask the number boards and window glazing with Tamiya masking tape. While I was at it, I carefully removed the wind deflectors and reattached them at a 90-degree angle.

STEP 3 MICRO MASK, FADE COAT, AND WASHES



I used **Microscale Micro Mask** on the headlights and ditch lights. Then it dawned on me: Why not use the same material to re-create the peeling paint look of the prototype?

I started by applying the Micro Mask to the UNION PACIFIC lettering on the long hood, the road numbers on the cab side, and heralds with a paintbrush.

Next, I brush-painted Micro Mask on the parts of the shell and fuel tank that I didn't want to be faded. I covered the red color-separation stripe with masking tape.

When the masking was completed, I airbrushed the shell, fuel tank, and trucks with Model Master enamel Flat White (no. 1768) thinned to a wash with the same company's airbrush thinner (no. 1789). I applied the color in several light coats instead of one heavy coat. It's easier to control the intensity of the fading by building up the effect slowly.

I let the paint dry for 30 minutes before I removed the Micro Mask. To remove the liquid masking material, I carefully stuck the tip of a scalpel blade under the edge of the mask and lifted it up. It can be difficult to see the Micro Mask after the model is airbrushed with thinned white. Take your time and make sure all of the masking material is removed before proceeding.

Next I applied Vallejo Model Air Black (no. 057), thinned to a 1:2 ratio with acrylic thinner (no. 71.161), to the inertial filter, dynamic brake, and radiator grills on both sides of the long hood. The wash settled into the recesses, helping the raised detail stand out.

Once the thinned black dried, I drybrushed the top of the grills gray. I used my homemade Harbor Mist Gray with white added to match the faded paint on the rest of the shell.

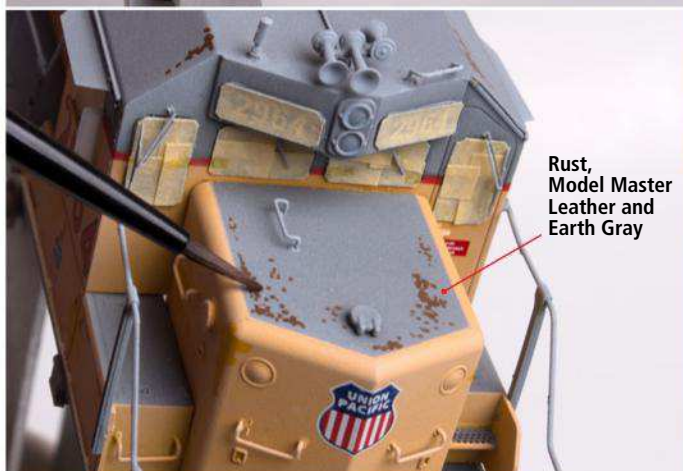
STEP 4 POWDERED PASTELS, STRIPES, AND RUST



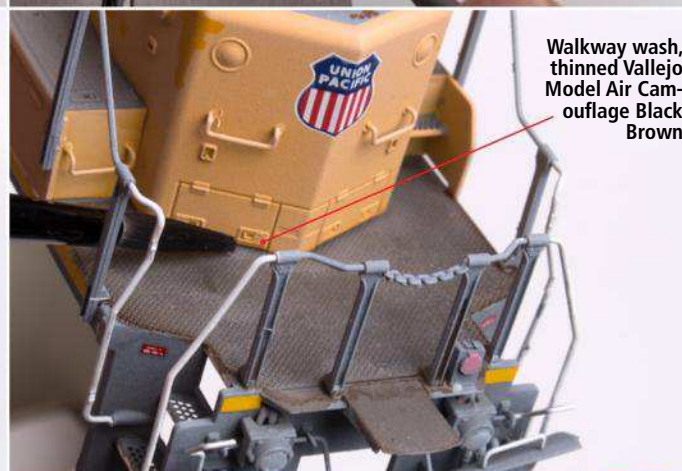
Matte Varnish, Vallejo no. 520



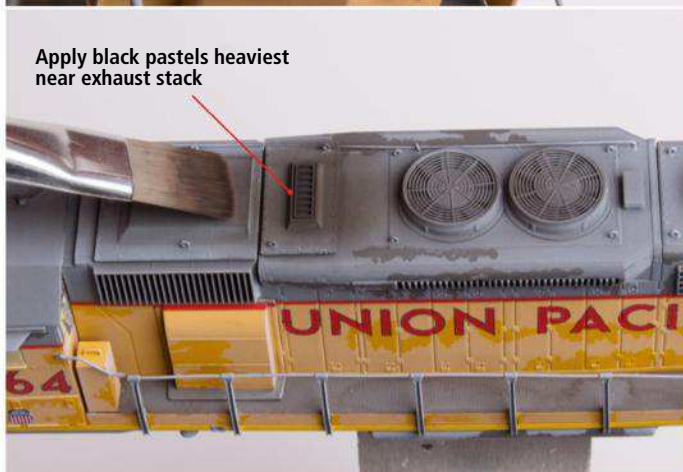
Yellow stripe, Microscale no. 91106



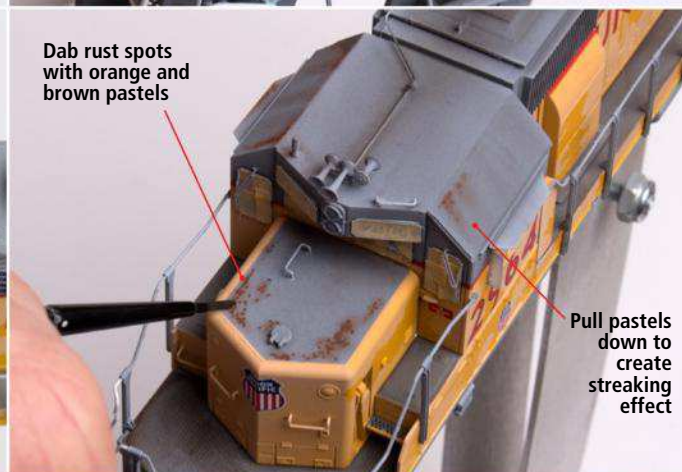
Rust,
Model Master
Leather and
Earth Gray



Walkway wash,
thinned Vallejo
Model Air Cam-
ouflage Black
Brown



Apply black pastels heaviest
near exhaust stack



Dab rust spots
with orange and
brown pastels

Pull pastels
down to
create
streaking
effect

To give the model's surface some "tooth" for the pastels to grab onto, I sprayed all of the parts with Vallejo Matte Varnish (no. 520).

I wanted the sill stripes to look cleaner, suggesting they were recently applied. To capture that look, I used Microscale 4¾"-wide yellow stripes. I trimmed close to the stripes so there was no clear film on the edges. I applied Walther's Solvaset to the decals to give them a painted-on look.

I brush-painted small rust spots on the short hood, cab roof, fuel tank, and snow plow. The rust color is a mix of Model Master Leather (no. 1736) with a little of the same company's Earth Gray (no. 2125) added.

Next, I applied a wash to the walkways. The wash is Vallejo Model Air Camouflage Black Brown (no. 042) thinned with plenty of acrylic thinner (no. 71.161).

Then I turned to the roof, where I applied the powdered pastels. I started by using a soft wide brush to add black pastels to the areas closest to the exhaust stack to simulate soot. I also worked black powder into the fan grills.

Next, I dabbed the painted rust spots lightly with orange and brown pastels. I applied dark gray and brown pastels to the cab roof and top of the long hood. I dragged the brush toward the roof edges on the cab to create streaks of dirt and grime. The fuel tank received the same treatment.

STEP 4 POWDERED PASTELS, STRIPES, AND RUST (CONT'D)



To re-create the look of oil and grease on the truck sideframes, I first brushed them randomly with dark brown and black washes made from Vallejo Model Air Camouflage Black Brown and Black thinned with acrylic thinner. I then used a paintbrush to smudge the sideframes with brown and orange pastels to simulate grime and rust.

I brush-painted the chemically blackened wheels Model Master Earth Gray (no. 2125). Don't paint the tip of the axle or the center of the wheel, as those surfaces are used for electrical pickup.

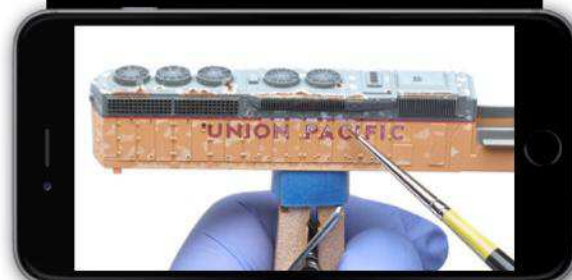
With the weathering completed, I gave all parts a final coat of Vallejo Matte Varnish (no. 520). Once the clear finish had dried, I removed the masking tape and remaining liquid masking on the headlights and ditch lights.

Finally, I reassembled the locomotive. I equipped the SD40-2 with Sergeant couplers painted Model Master Leather (no. 1736). Since the couplers don't have trip pins, I installed MagnaLock Brake Lines from North American Railcar Corp.

Using these techniques, you can easily turn a factory fresh model into a worn workhorse in one day. Having a few

weathered veteran locomotives mixed in with cleaner modern diesels will give your model railroad a sense of history. [MR](#)

WATCH THIS ON MRVP



Watch Cody Grivno demonstrate a different approach for weathering a Union Pacific SD40-2 online at MRVideoPlus.com.



Patch out a modern **BOXCAR**

Paint, weathering, and decal trim film turn a factory-decorated kit into a model of a unique prototype

By **M.R. Snell** • Photos by the author

The modern rail scene is permeated with secondhand cars transferred between owners as they continually adapt to the changing marketplace. Even a small downturn in a carried commodity can often render rolling stock surplus, leading to all sorts of patched-out paint variations. The priority is on keeping the equipment moving rather than image projection, so they often carry old paint schemes for years. For modern-era modelers, multiple methods can be employed to replicate one of these unique cars. However, the fastest and easiest may be applying decal film to factory-decorated models, the method I used to model CSXT 141175, a former Railbox car.

The first step in my project was to choose a suitable model as a starting point. Bearing in mind my goal of quick completion, I chose from the multiple ready-to-run and quick-build kit offerings already decorated in the Railbox scheme. Soon



M.R. Snell turned a factory-decorated Roundhouse Railbox model into a secondhand CSX boxcar using decal trim film to patch out the reporting marks and number. With a few hours, he turned it into a realistic representation of the prototype.

I had in hand a Roundhouse kit that, although not perfect, had the correct graphics and door configuration.

Follow along and I'll show you how I changed that brand-new car kit into a patched-out, weather-battered veteran of the rails.

M.R. Snell frequently shares his rolling-stock modeling techniques with Model Railroader readers. His most recent article was "How to model repaired hoppers" in September 2017.

1 Fading the logo



As I was modeling a car that had seen years of service prior to being given its CSXT markings, my first step was to age the model. I started with the red and blue intertwined arrows of the Railbox logo, which on the prototype I was duplicating had faded dramatically. To simulate this, I carefully traced the logo with a cotton swab dipped in 91 percent isopropyl alcohol. This softened the ink. After this treatment,



I dragged the flat edge of a hobby screwdriver over the logo with moderate pressure ①. This chipped the ink away, leaving only small, thin portions of the logo visible on the car sides while preserving the yellow paint around it ②. Finally I weathered the car using a combination of chalks and inks to reflect years of dirt, grime, and rust, then sealed everything in place with an overspray of Testor's Dullcote.

2 New door

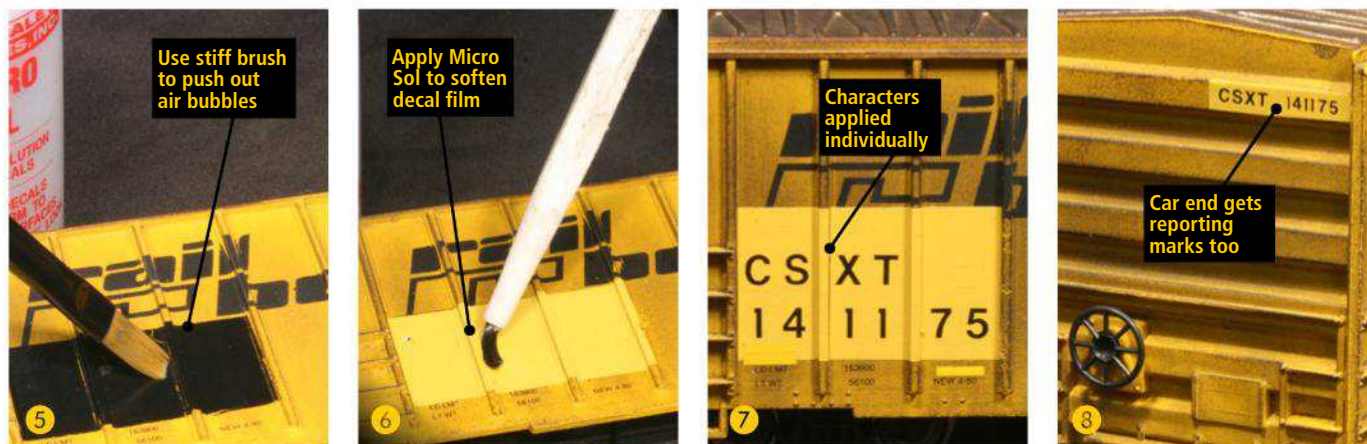


Having achieved the overall well-worn look I was after, my focus now turned to the doors. It's common for boxcar doors to be replaced as they wear out or are damaged, and my prototype was no exception. As these doors no longer matched the Railbox yellow-and-black scheme, but were CSX's standard freight car blue, they had likely come from a stock of parts on hand at a CSX shop.

Replicating this change was fairly easy and required only masking off the area around the doors with blue painters tape ③. I then applied several thin layers of Chesapeake & Ohio Enchantment Blue paint with an airbrush ④. Since CSX Blue is a slightly darker shade than C&O Enchantment Blue, this gave the effect of faded paint, reinforcing the illusion of age.



3 Patching the reporting marks



Now it was on to patching the car in preparation for its new reporting marks, using decal trim film. Manufactured in solid-color sheets, trim film is available in multiple colors, including several railroad-specific hues.

Trim film's one drawback is its thinness and translucency. Light-colored trim film isn't good at covering factory-printed graphics. However, you can obscure dark printing with a dark patch, then apply a second patch of the desired color on top.

To prepare the patches for my boxcar, I first cut a patch from black trim film. I then cut a second patch from a sheet of yellow film. I made it slightly larger to ensure no black would show around the edges once both were applied.

After soaking the black film in water and sliding it onto the boxcar side, I applied Micro Sol to soften it. I then used a stiff, flat brush to force air out from underneath the patch and make it conform to the exterior posts of the car side ⑤.

Once the film was almost dry, I used the point of a hobby knife to pierce any air pockets that remained along the posts. I reapplied Micro Sol and let the model dry overnight.

With the black graphics successfully obscured, I could now add the outer layer of yellow film. Following the same procedure, I placed the yellow film atop the black, once again using a liberal coating of Micro Sol ⑥. I then punctured any air bubbles and pushed the air out with the stiff brush.

Now I could complete the transfer of ownership by applying the CSXT lettering and new road number using a black Gothic alphanumeric decal set. Starting at the left side of the fresh yellow patch, I added the first character and number, then applied a small dab of Micro Sol atop each. I was careful not to apply too much so the patch film wouldn't lift or wrinkle. Once the first characters had dried, I moved on to the next, until the new lettering was complete ⑦ ⑧.

4 Modern markings

Finally, it was time to complete the modernization of the boxcar. When the car was delivered, its Clean, Oil, Test & Stencil (COTS) panel was in the two-part style of the late 1970s. These were replaced in 1982 with a three-part style that remains the standard today. The prototype's answer was to simply paint the new COTS over the lower portion of the old one, leaving the top intact. Replicating this required little more than applying a decal from a freight car set atop the factory printed stencil, as the prototype did ⑨.

The second update required by the Federal Railroad Administration was the addition of reflective striping along the lower portion of the side of the carbody. Once again I turned to a decal, this time Microscale no. MC4389, Yellow 4 x 18 Reflector Stripes. I placed the stripes using the prototype photo as a guide ⑨.

Both these additions violated the primary rule of decal application – that decals must be applied to a smooth, glossy surface. Instead, I applied them to a rough, weathered surface, increasing the chances of “silvering,” where air is trapped between a decal and the surface underneath. While applying decals to a non-glossy surface is somewhat unconventional, it's not impossible to do successfully. To counter the silvering effect, before each decal was applied I brushed a thin layer of Micro Sol on the area. After sliding the decal



into place, I applied more Micro Sol on top. As the decals softened, I was then able to work it into the car side with a stiff, flat brush.

Now my unique, secondhand boxcar was almost ready for service. A second light coat of weathering blended the new and old together, then the entire car was given another spray of Testor's Dullcote, sealing both the weathering and decals. Using a factory-decorated model and decal trim film enabled me to easily create this unique car in a fraction of the time it would have taken using paint alone. **MR**



Sandy River & Rangeley Lakes no. 16 passes Winter Mill as it rounds the curve out of Strong. Lou Sassi explains how he refurbished the cut at right, adding a plaster rock casting and trees to give the scene color and texture.

How to paint and install a PLASTER ROCK CASTING

Add color and texture to a hillside with this quick project

By Lou Sassi • Photos by the author

Several years ago Craig Vreeland, joint proprietor of Sterling Models (www.sterlingmodels.com), gave me a few unpainted plaster rock castings. I described how to paint and install one of them in my scenery book *How to Build and Detail Model Railroad Scenes Volume 2* (Kalmbach Books, 2009, out of print). Since then I've expanded my On30 Sandy River & Rangeley Lakes to fill the bonus room in our house.

While working on the area opposite Winter Mill, I installed another of Craig's castings to add some scenic interest to a cut next to the main line. Previously, I stained the rock casting with India ink and isopropyl alcohol and called it good. This time I wanted to add more color.

Cutting and coloring

I use Styrofoam for the scenery base on my layout. I removed a portion of Styrofoam hillside using a Woodland Scenics foam knife **1**. I would periodically test fit the casting to make sure I'd removed enough foam **2**.

Once I had enough of the hillside carved away, I took the casting to my desk and used a multi-step process to color it. First, I used a brush

to apply an India ink wash **3**. My mixing ratio is two teaspoons India ink to one pint 70 percent isopropyl alcohol.

Using a stiff-bristled paintbrush, I immediately dabbed on the following five tube acrylic colors (not in any particular order): Gold Ochre, Mars Black, Raw Sienna, Raw Umber, and Titanium White **4**.

I mixed the black and white acrylics to achieve



1 Carving foam. Before Lou could install the plaster casting, he first had to remove the Styrofoam hillside. A Woodland Scenics foam knife easily cut through the material.



2 Testing the fit. To make sure enough Styrofoam was removed, Lou would periodically test fit the rock casting. He wanted a minimal gap between the foam and casting.



3 India ink wash. Lou first stained the plaster casting with an India ink wash. He made the wash by adding two teaspoons of ink to one pint 70 percent isopropyl alcohol.



4 Adding color. Lou used five colors of acrylic paint to color the casting. He applied the dark colors in the recesses and highlighted the raised surfaces with brighter colors.



5 Watered down. After Lou applied each color, he applied water on the paint with a brush. He gently blotted off excess water with a paper towel.



6 Refilling the hill. Next, Lou set the weathered rock casting into the hillside. He filled the gap close to, but not on, the casting with lightweight spackle.

+ Watch a video of Lou Sassi mixing a batch of "ground goop" online at ModelRailroader.com



7 Needs more spackle. To keep the casting clean, Lou removed it and filled the rest of the void with a second layer of DAP Fast'N Final spackle.



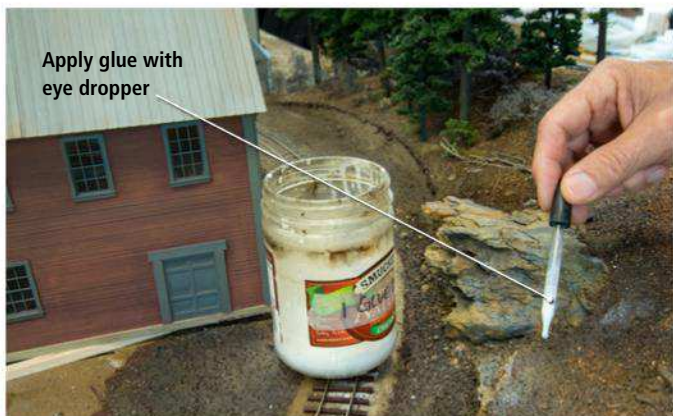
8 A clean edge. Once the second layer of spackle dried, Lou cut away the excess with a foam knife. The trimmed spackle resulted in a small gap between the hillside and casting.



9 Ground goop. Lou painted the spackled hillside with earth-toned latex paint. Then he covered the area with his favorite scenic material, "ground goop."



10 Dirt-covered hills. Lou covered the ground goop with real dirt. Then he pressed the rock casting into place, put goop up to and on the casting, and added more dirt.



11 Sealing the deal. After spraying the dirt with wet water (water with a few drops of liquid dish soap added), he applied diluted white glue with an eye dropper. Lou mixes his scenery glue one part glue to two parts water.

various shades of dark and medium gray.

I dipped the brush in water and slopped the water on the casting after I'd applied each color, dabbing off any excess with a paper towel **5** (previous page). This removed much of the acrylic paint, giving the

casting a stained (versus painted) look. Diluting the paint also exposed some of the India ink.

Ready to install

Once the casting was painted, I set it in the hillside

and filled the gaps with lightweight spackle **6** (previous page). After getting spackle as close to the casting as possible without getting any on its surface, I removed the casting and applied a second coat of spackle to fill the remaining void **7**. Once the spackle dried, I trimmed the excess with a foam knife so the casting would fit tightly against the hillside **8**.

After painting the spackle with earth-toned latex paint, I applied "ground goop" over the entire area with an artist's spatula **9**. Ground goop is a concoction I've been using as a scenery base for many years. It's a mix of 1 part Vermiculite, 1 part Cellucel, ¾ part earth colored latex paint, and ¾ part white glue. An article on ground goop appeared in the March 2015 issue of *Model Railroader* magazine.

Dirt and trees

I covered the goop with dirt and pressed the rock casting into hillside. I carefully applied additional goop up to and slightly over the rock casting and added more dirt **10**.

I sprayed the dirt with wet water (tap water with a drop of dishwashing soap added), followed by an application of thinned Elmer's glue (two parts water to one part glue) **11**.

Finally, I installed some Sterling Models white pines, spruce trees, and underbrush on the hillside, as shown in the photo on page 57.

You may not think one rock casting and some trees could transform a scene, but the textures and colors have turned a plain hillside into an area with more visual interest. **MR**



1 Introductory systems. Introductory systems like the Bachmann E-Z Command, left, and NCE PowerCab are inexpensive ways to get into Digital Command Control. Larry Puckett offers DCC shopping tips.

Selecting the right DCC system

I can't even begin to remember how many times folks have asked me "which Digital Command Control system should I buy?" or "Which one is best for me?" The answer isn't as quite as simple as you might think, as there are a number of things to consider when selecting a DCC system.

One thing you don't have to worry about, though, is compatibility with accessory and mobile decoders made by other manufacturers. Thanks to the National Model Railroad Association (NMRA)'s DCC standards and recommended practices, that compatibility is guaranteed. Let's take a look, then, at what does matter.

First, most systems available today work well, have a good track record, and are available at a basic level with a similar array of features. Accordingly, I suggest finding out what the majority of your friends and the local club(s) use(s).

This is important since it means you will have a local

support system of experienced users when you need help understanding how some features work. While most DCC equipment is highly reliable (I have only had to send one throttle back for repair in 24 years), the manuals can leave you scratching your head. This is especially true when you're new to the technology and its jargon. Having someone to translate can relieve a lot of frustration.

Most manufacturers offer an introductory system to help ease you into the technology. Some can be added onto, some may be used as components of larger systems, and some are only suited for solo use. Introductory systems typically are low powered, have fewer features, and allow you to operate fewer locomotives.

For example, the Bachmann E-Z Command DCC system **1** comes with a 1 amp power supply that can power two HO or four N scale locomotives

(assuming .5 amps per locomotive for HO and .25 amps for N scale). The NCE PowerCab, on the other hand, is rated at 2 amps and therefore can power four HO and eight N scale locomotives.

The Bachmann system supports 10 simultaneous trains while the NCE system supports 12. However, you're still limited by the available amperage, so these are just theoretical values unless you add more power.

Both offer booster units to provide that additional power, which also allows these systems to be used with the larger O and G scales. One advantage of the PowerCab, for anyone needing future expansion capacity, is the ability to use it with NCE's more powerful and advanced Power Pro system.

Many manufacturers also offer more advanced systems **2** that allow users to operate more locomotives, control accessories, set up routes, and communicate with computers. With four-digit address capabilities you can enter addresses up to 9999, and large internal memories allow you to store the addresses of hundreds of locomotives and consists. While you may never need that many locomotive addresses, large clubs and big operators might.

However, it also means even the average modeler will not run into memory issues when attempting to use the full system capabilities on a model railroad. These advanced systems typically have more power, with 5 amps being the norm.

Throttles are another important consideration. Your throttle is the interface



2 More power. Digitrax offers the DCS210, left, as part of an intermediate-level introductory system that probably will fit the needs of most model railroads as far as power and memory, while the DCS240 offers advanced capabilities such as a built-in USB computer interface.

for your DCC system just like a computer keyboard allows you to interact with your computer. Because you'll be using the throttle to program decoders, modify system settings, and control locomotives, it needs to be something you're comfortable with. For this reason I recommend visiting a local club or DCC system owner to get a little hands-on time to see how different throttles feel and operate.

There are two basic types of throttles: programming throttles with either vertical knobs or horizontal thumbwheels for speed control **3**, and small throttles about the size of your palm with a speed control knob **4**.

The large programming throttles have a variety of push buttons designed for data entry as well as function control. The three throttles shown in **3**, although similar in the number of push buttons and functionality, each have their own approach to locomotive control.

The Digitrax DT500 has two small speed control knobs, making it simple to control two trains at the same time. The Model Rectifier Corp. (MRC) throttle has a single medium-sized control knob, while the NCE throttle has a horizontal thumbwheel for speed control.

The NCE approach makes it easy to hold the throttle in your hand and use your thumb to control locomotive speed while freeing your other hand for holding a schedule or other operating aids. All of these throttles have an address recall capability allowing you to easily switch from one locomotive to another.

The smaller utility throttles **4** have fewer buttons, since they're not used for programming and accessing other advanced features. Most of the operators I know like

the feel of a large diameter control knob, and a unit that fits comfortably in your hand can be an important factor during a three-hour operating session.

The other great thing about utility throttles is they're less expensive than the larger throttles, making them ideal to keep on hand for visitors and operators who don't already own a throttle. Also, because utility throttles don't have the advanced push buttons and capabilities, you can feel relatively safe to just hand off a train to children or drop-in visitors without fear they'll reset your system or reprogram a locomotive.

Wireless throttles may not be an important item on your checklist at first, but once you've operated on a walk-around layout with one, you're going to want your own. Fortunately, most manufacturers offer some type of wireless throttle capability. These technologies include infrared, radio, and WiFi-based systems. With some systems you can even use an iPhone, iPad, or Android phone or tablet to control your locomotives.

A final consideration is the availability of devices like accessory decoders, block occupancy detectors, computer interfaces, and other accessories. While many of these can be used with any brand of DCC system, some of the extended capabilities are system dependent.

For example, many Digitrax accessories make use of the company's LocoNet communication network to provide feedback to the main unit (command station) and the computer interface. Although you may not plan on using these features now, if at some time in the future you should decide



3 Programming throttles. More advanced throttles, from left, like the Model Rectifier Corp. (MRC) Prodigy series, Digitrax DT500, and NCE PowerCab provide full programming capabilities. Note that the MRC has one mid-size locomotive control knob, the Digitrax throttle has two small knobs, and the NCE has a horizontal thumbwheel. In addition, the throttles have individual push buttons to increase and decrease speed.



4 Basic utility. Utility throttles like the Digitrax UT4D, left, and NCE Cab-06 have a single large locomotive control knob. These give you the ability to control functions, but can't be used for programming decoders.

to use some of them, having this communication capability may be an important consideration.

Selecting a DCC system, especially when you're new to model railroading or are just

beginning to build a model railroad, may seem a bit challenging. Taking a little time to plan out what you might want in the future can save you some expense and frustration down the road. **MR**



Atlas Master Line N scale EMD GP7

A tried-and-true N scale model of one of the most popular early diesel-electric locomotives has been upgraded with the addition of an NCE Digital Command Control (DCC) decoder. Atlas Model RR Co. is also issuing its N scale Electro-Motive Division GP7 road switcher in new road names.

History. In 1949, EMD put its proven 567 diesel engine into a hood-type body that allowed good visibility front and rear and easy access to the engine. The design was designated GP7 with the “GP” standing for general purpose.

The versatile GP7 was an immediate hit. Railroads assigned them to every conceivable duty from peddler freights to mainline passenger trains.

Over the course of 4½ years, from October 1949 to May 1954, EMD produced 2,724 GP7s for North American

railroads, as well as five cabless GP7B boosters for the Atchison, Topeka & Santa Fe Ry. Some were rebuilt by EMD or their owners to upgrade their diesel engines, add turbochargers, or lower their short hoods for improved visibility. A few of the venerable GP7s are still running today, in the service of museums, tourist railroads, and short lines.

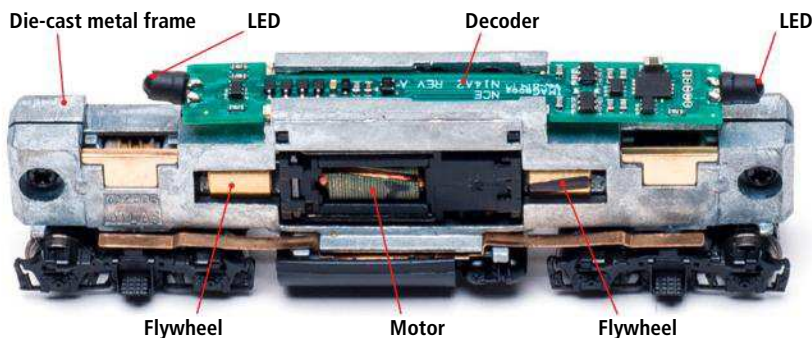
Under the shell. The N scale model’s injection-molded plastic shell is made of several separate parts, including the sill, walkways, hood, cab, and pilots. The frame and shell are the same as those used in previous releases of the model. All the dimensions I checked matched up with measurements on a drawing published in *Model Railroader Cyclopedia: Vol. 2, Diesel Locomotives* (Kalmbach Books, out of print). The blackened metal wheels were in gauge.

Atlas’ model represents an early production version, known to railfans as a phase 1. This version is identifiable by a solid skirt hanging from the side sill alongside the fuel tanks; later versions have access holes cut in the skirts, or the skirts have been removed altogether.

Our sample is painted for the Chicago, Burlington & Quincy. The separation between the colors is crisp, with only a few tiny voids where white printing crosses indented panel lines or door latches. The “Burlington Route” heralds on the cab are sharp and legible, as are the “GP7” and “F” labels on the front of the side sills.

Accumate magnetic knuckle couplers are attached to the pilots, at the correct height. They don’t need to be removed to take off the shell. The shell is friction-fit onto the split die-cast metal frame; the shell can be removed by holding onto it and gently tapping the pilot against the side of your hand. The frame will eventually drop right out.

Inside the shell, twin phosphor-bronze wipers pick up current from contacts on top of the trucks and conduct it to the two halves of the frame. The DCC decoder (or the lighting board, in direct-current models) is held in by clips on top of the frame; contacts on the bottom of the decoder provide current to the five-pole, skew-wound motor nestled in the center of the frame. Dual flywheels surround the driveshafts that transmit motive power to the trucks.



A split die-cast metal frame provides most of the N scale locomotive’s weight. The NCE decoder features a light-emitting diode (LED) on each end.

The GP7 features working knuckle couplers and LED lighting.



Digital Command Control. The model is equipped with an NCE N12A2 board-replacement decoder. This is a motor-and-lighting decoder, so there are no sound effects. I didn't see any room under the hood to add a speaker.

When I tested the locomotive under DCC, it didn't respond at first to the lower speed steps. The engine didn't move until I turned the throttle up to speed step 8 (out of 28). I could then dial it back to speed step 6, at which it rolled 6.4 scale mph. The model stalled at speed step 5. To fix this, I programmed the decoder's configuration variables (CV) 2, or Vstart; CV116, the torque compensation kick rate; and CV117, the torque compensation kick strength.

Vstart stands for starting voltage, the voltage the decoder sends to the motor in speed step 1. To start I set it to a value of 48, which is fairly high. This worked, but I was unhappy with how fast this setting made the engine move in speed step 1. So I lowered the value to 42, and compensated with CV116 and CV117.

These two CVs tell the decoder to "kick" the motor, or send intermittent spikes of higher voltage, to overcome inertia at low speed. Configuration Variable 116 tells it how often to send the kicks; it defaults to a setting of 0 (off). A setting of 1 sends kicks continually. The NCE decoder manual recommends a setting of 2 to 4, and no higher than 8. I set it to 2. The other setting, CV117, is the strength of the kick. The manual says a typical setting is between 4 and 25; after some experimentation, I settled on a minimal setting of 6. After I programmed these CVs, the model

responded in step 1 with a speed of 8 scale mph. These are the settings shown in the speed charts below.

At speed step 28, the locomotive reached a top speed of 99 scale mph, much higher than the prototype's 65 mph. The top speed can be lowered using CV5 (Vmax). The decoder also supports 3-point and 28-step speed curves.

To make the diminutive locomotive behave as if it had some real heft, I entered a value of 24 into both CV3, acceleration, and CV4, deceleration. This made the engine respond to speed changes gradually, as if it were actually a massive machine. On a small layout, a less ambitious setting of 12 to 16 would be sufficient to give the same effect.

I also wanted to make the headlight operation more prototypical. As it comes programmed from the factory, the front and rear headlights illuminate directionally, based on the throttle's FWD/REV setting. I wanted to be able to manually dim those lights, so I programmed CV120, which governs output 1 (the headlight), to a value of 33. This illuminates the headlight if the throttle is set to FWD and function key F0 is activated, but dims the light if F4 is also pressed. A value of 34 programmed into CV121 does the same thing in reverse for the rear headlight. The NCE manual explains light settings to use for other effects, like having both lights always on but dimmed in the reverse direction rather than off. The manual can be downloaded at www.ncedcc.com.

I put the locomotive through its paces on our N scale Canadian Canyons layout. The model rolled through the 11" curves, Peco medium-radius turnouts, and five-turn helix without a hiccup.

Using a digital force meter I tested the model's drawbar pull. The GP7 measured 0.48 ounce, which is equivalent to 12 free-rolling N scale freight cars on straight and level track.

Direct-current (DC) operation. Those who don't use DCC to control their layouts will note that there's a DC version available for \$119.95. However, since our review sample's decoder is dual-mode, meaning it will run on either DC or DCC layouts, I also ran our GP7 on our DC test track. The model responded at 6V, but I could then back it down to 5V where it rolled steadily at 9 scale mph. At 12V, it reached 92 scale mph.

Facts & features

Price: \$154.95 (DCC), \$119.95 (DC)

Manufacturer

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

Era: 1949 to present (1959 to 1970, as decorated)

Road names: Chicago, Burlington & Quincy; Denver & Rio Grande Western (black and Aspen Gold); Lackawanna (black and gold); and Southern Ry. (black, silver, and gold). Two road numbers each; also available undecorated, with or without dynamic brakes.

Features

- Accurate magnetic knuckle couplers, at correct height
- All-wheel drive and electrical pickup
- Blackened metal wheels, in gauge
- Directional golden-white light-emitting-diode (LED) lighting
- Five-pole skew-wound motor with dual flywheels
- NCE decoder (DCC version)
- Weight: 2.3 ounces

PERFORMANCE TESTS

DRAWBAR PULL .48 ounce
12 N scale freight cars

SCALE SPEED (DC)

VOLTS	SCALE MPH
5 (start)	9
6	16
9	52
12	92

SCALE SPEED (DCC)

SPEED STEP	SCALE MPH
1	8
7	20
14	41
28	99

The headlights and illuminated number boxes switched from front to rear with the power pack's direction switch, but they illuminated on the wrong end in both directions. The rear headlight shone when moving forward, and the headlight lit in reverse.

Transition-era star. Most railroads of note in North American rostered EMD GP7s. The convenience of factory-installed DCC and accurate detailing make the Atlas GP7 an excellent choice for N scale modelers looking to expand their transition-era fleets. — *Steven Otte, associate editor*



Athearn Genesis HO scale GE ES44DC

Athearn Trains has added an ES44DC version of its HO scale GEVO locomotive to its top-of-the-line Genesis series. In addition to capturing the subtle external differences between the DC and AC versions, Athearn loaded the models with roadname-specific detail. The biggest upgrade since I reviewed the firm's HO ES44AC in the July 2014 issue is that this latest ES44DC release is available with a factory-installed SoundTraxx Tsunami2 dual-mode decoder.

The prototype. When General Electric began producing its new Evolution Series (GEVO) locomotives in 2004, most of the units were built with alternating-current (AC) traction motors and designated ES44AC. Recognizing that some railroads wanted a lower-cost

direct-current (DC) traction motor option, GE also developed the ES44DC. Both versions use the same 4,400 hp GEVO-12 diesel engine.

In North America, BNSF Ry., Canadian National, and CSX purchased ES44DCs. Norfolk Southern ordered its DC GEVOs with 4,000 hp prime movers. These units were designated ES40DC but were externally identical to an ES44DC. In 2009, CSX began derating its ES44DCs to 4,000 hp.

The model. As did the earlier Athearn ES44AC release, the ES44DC's dimensions match the prototype. The main detail difference between the AC and DC versions is the arrangement of the electrical cabinet hatches and panels behind the cab on the conductor's side.

The model's plastic body shell features well-defined access doors, grills, and other molded detail. The end of the long hood also correctly features an end access door and low-mounted sand filler. In addition to the horn, handrails, and grab irons, the model bristles with superdetail parts. These include lift rings, m.u. hoses, and windshield wipers.

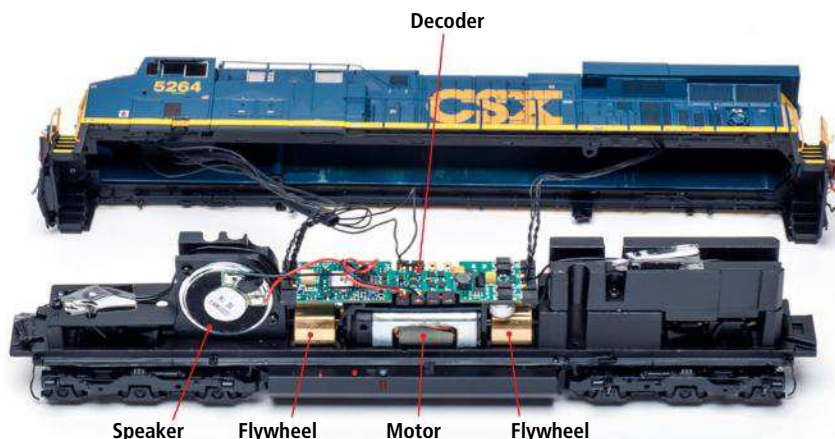
Although crew figures aren't included, the cab interior is fully detailed, including a cab camera and three crew seats.

The position of the headlights and number boxes on the Athearn ES44DCs are roadname-specific. Our CSX sample correctly features nose-mounted headlights and number boxes.

On our CSX sample, the paint is smoothly applied and matches prototype photos. All lettering is properly placed. Especially impressive are the numerous small warning and maintenance stencils. Athearn even included the American flags on the corners of the cab sides.

To remove the shell and reveal the Genesis-series mechanism, I removed the couplers and two additional screws, one on each end of the fuel tank. The only change from the earlier release is the SoundTraxx Tsunami2 dual-mode decoder mounted above the motor.

DCC operation. On our DCC test track, the ES44DC accelerated smoothly but quickly from 4 scale mph to a top speed of 67 scale mph. The prototype has a top speed of 75 mph.



On our sound-equipped sample, the Tsunami2 decoder is mounted above the motor and flywheels. Lighting leads run from decoder to bulbs in the body shell.

Unlike earlier Tsunami decoders, the Tsunami2 supports configuration variable (CV) 6 (Vmid), so I could set up a simple three-point speed curve using CVs 2, 5, and 6. This kept the locomotive from accelerating so quickly. I also added a lot of momentum, using CVs 3 (acceleration) and 4 (deceleration), for more realistic starts and stops.

Speaking of stops, the braking functions are my favorite features of the Tsunami2. After setting up the function button-controlled brake, I programmed different deceleration rates for the independent and train brakes. That way the locomotive stopped more quickly when it ran light and had increased stopping distance when it ran with a train. I set up the dynamic brake function to slow the locomotive when it traveled downgrade.

The Flex Map function mapping feature made it easy for me to move the brake button from the factory default of F11 to F9, which is more convenient for our NCE throttles. I also easily set up manual, independent headlight control. Extensive and easy-to-understand programming guides are available as free downloads at www.soundtraxx.com.

All the locomotive's sounds were loud, clear, and realistic. In addition to overall volume, the level of each individual sound effect can be adjusted independently via CVs. I appreciated that when I sounded the horn, the ditch lights on our CSX sample flashed, just like on the prototype.

PERFORMANCE TESTS	
DRAWBAR PULL	3.4 ounces 48 HO scale freight cars
SCALE SPEED (DC)	
VOLTS	SCALE MPH
8.5V(start)	1
10	5
11	20
12	35
SCALE SPEED (DCC)	
SPEED STEP	SCALE MPH
1	4
7	30
14	52
28	67

DC operation. The locomotive's effects are more limited on a DC layout. The engine rpm sounds followed the throttle setting. When I decreased the throttle quickly I heard a brake squeal. The headlights and ditch lights operate according to the locomotive's direction.

Out of the box, the model has a narrow speed range for DC operation. It took 8.5V to get the locomotive moving, and it reached only 35 scale mph at 12V. However, after I programmed the analog starting voltage (CV219) to a value of 0 and the analog engine start voltage (CV218) to a value of 1, I greatly increased the speed range. The model started moving at 1 scale mph after I applied 6.5V to the track and reached 48 scale mph at 12V.

Note that to adjust these settings or any other CVs requires either a DCC system or an analog sound controller/programmer, such as the Model Rectifier

Facts & features

Price: \$299.98 (DCC sound), \$199.98 (DC, no sound)

Manufacturer

Athearn Trains
1600 Forbes Way, Ste. 120
Long Beach, CA 90810
www.athearn.com

Era: 2004 to present day

Road names (multiple road numbers):

CSX, BNSF Ry., Norfolk Southern

Features

- All-wheel drive and electrical pickup
- Five-pole skew-wound motor with dual brass flywheels
- Incandescent headlights and ditch lights
- McHenry plastic knuckle couplers, mounted at correct height
- Minimum radius: 18" (22" recommended)
- RP-25 contour metal wheels, in gauge
- SoundTraxx Tsunami2 dual-mode sound decoder (DCC version only)
- Weight: 1 pound 4.1 ounces

Corp. Tech 6. The decoder also has CVs that can be programmed to trigger sound effects, including grade-crossing or other whistle signals, with a DC power pack.

Although the ES44DC is sold out at Athearn, it's still available on hobby shop shelves and at online dealers. If you're a modern diesel fan, it's worth seeking them out. – *Dana Kawala, senior editor*

No Cams. No Fuss!

Tsunami2 Steam Digital Sound Decoders do not require the use of a cam for synchronized exhaust! The Exhaust Chuff rate is automatically calculated in response to the demand on the motor, no wheel disassembly, no soldering wires or cams.

The faster the motor spins, the faster the wheels spin and the faster the chuff rate, matched perfectly to the movement of the model!

Check out our YouTube video to see for yourself!



SOUNDTRAXX™

www.soundtraxx.com



ScaleTrains.com HO scale covered hopper

A Greenbrier (Gunderson) 5,188-cubic-foot-capacity covered hopper has been added to the ScaleTrains.com HO scale Rivet Counter line. The modern three-bay hopper is offered in four body styles. It features see-through stainless steel running boards and crossover platforms, prototype-specific hatch covers and outlet gates, and American Steel Foundries Ride-Control trucks with rotating bearing caps.

The ScaleTrains.com model is based on a prototype built by The Greenbrier Companies. The full-size car, first produced in 2007, features all-steel construction and trough-style roof hatches. A technical bulletin for the prototype covered hopper states, "Greenbrier designed and built this car for high-mileage grain services."

The prototype cars are typically operated in unit trains. Railfans have dubbed BNSF Ry. trains "earthworms" or "worms" because of the cars' color. Kansas City Southern trains have been dubbed "snakes," as the *Southern Belle* color scheme is similar to the colors of the Texas coral snake. Individual KCS cars are called "Belle Hops."

The Rivet Counter line covered hopper has a one-piece plastic body with separate roof and hatch cover castings. The end frames are individual parts with wire grab irons and handrails. The center sills are two separate triangle-shaped pieces; the end sill casting features the bolster, draft-gear box, and separate screw-mounted cover. The outlet gates are multi-piece assemblies, too.

Our sample is decorated as BNSF Ry. no. 487209, part of the railroad's 487000

through 487999 series built in Mexico by Gunderson Concarril between January and July 2008. The model's dimensions closely follow data published on The Greenbrier Companies website.

BNSF Ry. no. 487209 represents a version 3 carbody with 10 intermediate body panels of the same width and roping eyes attached to the car's sill. ScaleTrains.com offers Rivet Counter line BNSF models based on version 1 and 2 carbodies. Those cars have different features, such as two horizontal stiffening ribs and roping eyes on the underside of the bolster.

The BNSF Mineral Brown paint is smooth and evenly applied, and the lettering is opaque. Except for one stencil, all of the small lettering is legible under magnification. The lettering placement matches prototype photos of other cars in the series.

Test time. The model weighs 4.4 ounces, which is .3 ounce too light based on National Model Railroad Association Recommended Practice 20.1. The 36" metal wheels are correctly gauged. The die-cast metal semi-scale Type E lower-shelf couplers are 1/32" low on both ends. However, the couplers performed flawlessly when I operated the car on our Wisconsin & Southern project layout. The covered hopper will negotiate 18" radius curves, but it will look better on curves 22" or broader.

ScaleTrains.com also offers the Greenbrier 5188 covered hopper in its Operator line for \$25.99. The model is available in one body style and has simplified detailing and printing, molded end frames, one outlet gate and roof hatch style, and

Facts & features

Price: \$39.99 (Rivet Counter), \$25.99 (Operator)

Manufacturer

ScaleTrains.com
7598 Highway 411
Benton, TN 37307
www.scaletrains.com

Era: 2008 to present (as decorated)

Road names: BNSF Ry., Arkansas-Oklahoma, Kansas City Southern (*Southern Belle* scheme), Union Pacific (gray with UP reporting marks or tan with CMO reporting marks). Up to 21 road numbers per scheme.

Features (Rivet Counter version)

- 36" metal wheels, correctly gauged
- Die-cast metal semi-scale Type E lower shelf couplers, 1/32" low on both ends
- Etched stainless steel running boards and crossover platforms
- Factory-installed and painted wire grab irons
- Trainline hoses and brake plumbing
- Uncoupling levers
- Weight: 4.4 ounces, .3 ounce too light based on National Model Railroad Association Recommended Practice 20.1

drill starter points for wire grab irons. A detail kit for the covered hopper is \$7.99.

The Greenbrier 5,188-cubic-foot-capacity covered hopper is a popular prototype with today's Class 1 railroads. Whether you're running earthworms, snakes, or a few Belle Hops, the ScaleTrains.com Rivet Counter line covered hopper will look great on your modern-era railroad. — *Cody Grivno*, associate editor

QUICKLOOK

Walthers HO scale 50-foot refrigerator car

Price: \$27.98

Manufacturer

Wm. K. Walthers Inc.
5601 W. Florist Ave.
Milwaukee, WI 53218
www.walthers.com

Era: 1963 to 1974 (as decorated)

Road names: Chicago, Burlington & Quincy; Canadian Pacific; Erie Lackawanna; Milwaukee Road; Pacific Fruit Express (Southern Pacific and Union Pacific heralds); and Santa Fe Refrigerated Despatch. Two road numbers per scheme; also available undecorated.

Comments: A 50-foot HO scale mechanical refrigerator car is the latest addition to the WalthersMainline series. The model is based on a prototype built by the Chicago, Burlington & Quincy at its shops in Havelock, Neb., in 1963. The 100-car series was split into

two equal groups. Cars 5100 through 5149 had BRMX reporting marks and were equipped with meat rails. Cars 5150 through 5199 had BRCX marks and had Equipco load dividers. Except for reporting marks and road numbers, the cars were identical on the exterior.

The Walthers model has a one-piece injection-molded plastic body with a separately applied diagonal-panel roof, see-through plastic running boards with molded corner grab irons, and a separate exhaust stack.

I compared the model to prototype drawings published in the 1966 Simmons-Boardman *Car and Locomotive Cyclopedia of American Practice*. The major dimensions were spot on. The distance over the running boards was a scale 1'-8" short.

The lettering placement matches a prototype photo of another car from the 5150 through 5199 series in Michael

J. Spoor's *CB&Q Color Guide to Freight and Passenger Equipment* (Morning Sun Books Inc, 1995).

A steel weight is secured to the interior floor with two screws. The car weighs 4.6 ounces, which is correct per National Model Railroad Association Recommended Practice 20.1. The Proto-Max metal couplers are at the correct height. The 33" metal wheels, attached to plastic axles, are correctly gauged. The refrigerator car operated without incident on our Wisconsin & Southern project layout.

Though the WalthersMainline mechanical refrigerator car is based on a CB&Q prototype, other roads used similar cars. As a fan of the early 1970s Burlington Northern, I welcome this HO scale car with open arms. — *Cody Grivno*



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QUICKLOOK

Kato N scale Johnstown America BethGon protein gondola

Price: Eight-pack, \$155

Manufacturer

Kato USA Inc.
100 Remington Rd.
Schaumburg, IL 60173
www.katousa.com

Road names: Wells Fargo Rail Corp. (SBTX reporting marks) and Burlington Northern. Two eight-packs per name.

Era: April/May 2009 to present

Comments: Bring the modern era to your N scale layout with protein gondolas from Kato USA Inc. What are protein gondolas? They're coal-style gondolas with a roll-up tarp used to transport wet corn gluten feed, called Sweet Bran by Cargill, from plants in the Midwest to distribution centers in Texas. These unit trains are handled by BNSF Ry., Canadian National, and Iowa Interstate.

The Kato model is based on the FreightCar America BethGon II coal

gondola, which I reviewed in the May 2013 issue of *Model Railroader*. What makes this model different is the removable one-piece plastic cover. Kato's tarp casting is molded in one color, but would look better with metal parts appropriately painted.

Our eight-pack features cars lettered Wells Fargo Rail Corp. The full-size cars, which have SBTX reporting marks, are numbered 33001 through 33245 and were built by FreightCar America in April and May 2009.

I compared models to prototype photos I found online. The lettering placement is accurate, though some small data was omitted. The model is lettered as having 4,400-cubic-foot capacity, but it should be 4,860.

The model's dimensions follow data in the January 2018 *Official Railway Equipment Register* (R.E.R. Publishing Corp.) The interior width and length

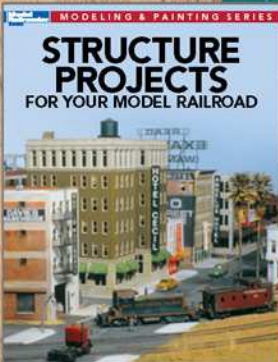
are a scale 6" too short, which is typical of open cars.

The gondola weighs 1 ounce, which is correct per National Model Railroad Association Recommended Practice 20.1. The metal wheelsets are in gauge.

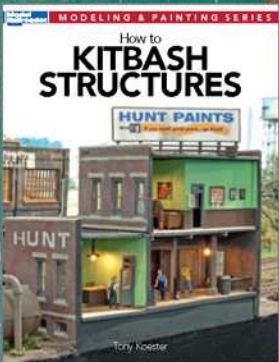
Since the cars are designed to run as a unit train, they feature rigid-jaw couplers, which are at the correct height. If the cars are operated on 11" radius and smaller curves, the manufacturer recommends the locomotive be equipped with a long-shank coupler. I tested the eight-car train on our Salt Lake Route project layout. The gondolas ran well while being pulled and pushed.

Kudos to Kato for keeping with the times and offering equipment for a modern-era train. Though protein trains are only found on three railroads, they reflect the ever-changing traffic base on today's railroads. – *Cody Grivno*

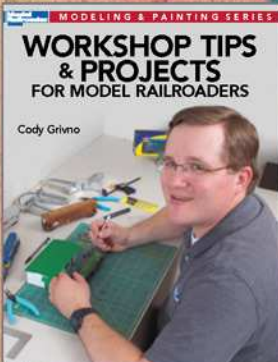
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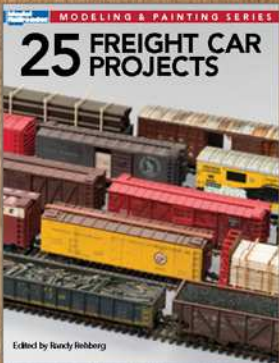
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Manual block signal systems

I remember when Rich Taylor projected the slide seen at right, 30 or 40 years ago. My eyes took in the train, then the station, and finally settled on the classic two-arm semaphore signal. A member of the audience blurted out “Look at the train-order signal!”

Regular readers know of my strong interest in train orders, but I don’t think I was the miserable wretch who uttered those words. If I were, the retort someone else shouted might have put me in therapy: “THAT’S NOT A TRAIN-ORDER SIGNAL!”

The grunts, snickers, and sniping asides that then rattled around helped me find safe ground. It was a manual block signal. I decided that innocently asking “What’s a manual block signal?” would only call in another thundering salvo, so the incident went into the must-research-this-very-discreetly file.

The more I learned about timetable-and-train-order operation (TTTO), the more the manual block signal system (MBS) intrigued me. I discovered that my hometown railroad designated certain segments of its track as MBS territory. I collected some interesting titles like *Rules Manual Block System* and *Train Dispatchers’ Block System Rules*. Recently, a friend handed me a reproduction of a 1971 Penn Central document, *A Guide to Operation on the Danbury Branch*, which helped me put it all together.

The Danbury Branch hosted commuter service



The semaphore arm on the left, facing away from the photographer, indicates a clear block to an approaching Erie-Lackawanna train in Newark, N.J., on May 6, 1966. Rich Taylor photo

between Danbury, Conn., and New York City’s Grand Central Terminal. It was an MBS operation, like some other commuter branches in the New York metropolitan area, including Erie-Lackawanna’s Newark Branch where Rich’s photo was shot.

A “manual” block signal is just what the term describes, a block signal controlled by hand. Contrast this with an automatic block signal, which operates electrically without a person’s action.

Manual Block Signaling required operators to determine whether the blocks between their stations were clear or occupied. They used telegraph signals, bell codes, or the telephone to communicate with one another. The normal position of a manual block signal was “stop.” When a train approached, operators arranged among themselves or acted on a dispatcher’s instructions to display a less restrictive signal, allowing a train to proceed.

However, TTTO continued

to govern actual movement. Block signals only indicated the condition of the track ahead as either clear or occupied by another train. Some redundancy is intended. If a block operator signaled a clear block to a train waiting for an opposing superior train or holding train orders that dictated other action, the train’s crew would certainly confer with the operator.

The fictitious North River & Hudson gives an example. Extra 517 West waits at a stop signal at Dutchess while the operator rings the next station, Mad River, three times to ask if the block between them is clear. Mad River replies with two rings, acknowledging that the block is clear and that the stop signal there is protecting the block against an opposing train. The Dutchess operator then clears his own signal. The conductor waves a highball and the extra, headed by a handsome Alco RS-3, whistles briskly out of Dutchess.

When a block station operator had a train order to deliver, E-L and PC rules demanded the block signal remain at stop. Rules further required the display of a flag or lamp in addition to the stop block signal.

Operation like this begs to be modeled. Steve King used a simple method on his Virginia Midland to control MBS territory between Cedar Springs and Tazewell on the Hazard Subdivision. His employee timetable made an operator responsible for authorizing train movements.

I dream about a way to employ MBS on a branch on my own layout. This requires manning at least two stations, a challenge when my crew is short-handed. It may be possible to simulate the system electronically, using block detection, a simple bell code, and a phantom operator. A crew moving along the branch, reaching any block station, would use the code to ring the phantom at the next station. The crew’s query and the phantom’s automated answer, in proper sequence, would unlock the block signal so the crew could manually change the signal to display a proceed indication.

More years than I could have imagined have passed since I first saw that photo, but the possibility that technology could automate manual block signaling on a layout is closer than ever. Remarkable irony in this, isn’t there? **MR**



**I DREAM ABOUT
A WAY TO
EMPLOY
MANUAL BLOCK
SIGNALING ON
A BRANCH ON
MY OWN
LAYOUT.
— JERRY**

Trackside Photos

Rutland RS-1 no. 405 has finished its day's work on the local and is hustling back to North Bennington with only its caboose in tow. Don Janes of Sarnia, Ont., photographed the scene on his HO scale Green Mountain Division layout. The Alco is a custom-painted and detailed Atlas model; the bridge is made of Micro Engineering girders on New England Brownstone piers.



MORE ON THE WEB

❖ The photo of Don Janes' HO scale Green Mountain Division is this month's wallpaper. Get it at ModelRailroader.com



Seaboard Coast Line Electro-Motive Division GP9 no. 1036 shoves a cut of cars past AmeriSave Corp. in the industrial park in Sarasota, Fla. Mark Mead of Sarasota shot the photo on his HO scale layout, inspired by the SCL's Palmetto Sub. The locomotive and cars are Athearn models. The background industries were kitbashed with Pikestuff and Micro Engineering components.





While a motorist waits impatiently, the crew of Baltimore & Ohio SW1200 no. 9512 spots a carload of lumber at Wayland Lumber in Heckton. Dale Ridgeway of Bishopville, Md., staged and photographed the scene on his HO scale B&O Ridgley Division. The locomotive is a Proto 2000 model. The background structure was kitbashed from a Walthers enginehouse.

Colorado & Southern no. 350 pulls a passenger train past scenic Callyer Bluffs. The action takes place on Don Meeker's HO scale Rocky Mountain Line, which was featured in *Great Model Railroads 2014*. Don, from Castle Rock, Colo., photographed the scene with his iPhone and used Helicon Focus image-stacking software to increase the depth of field.

Send us your photos

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

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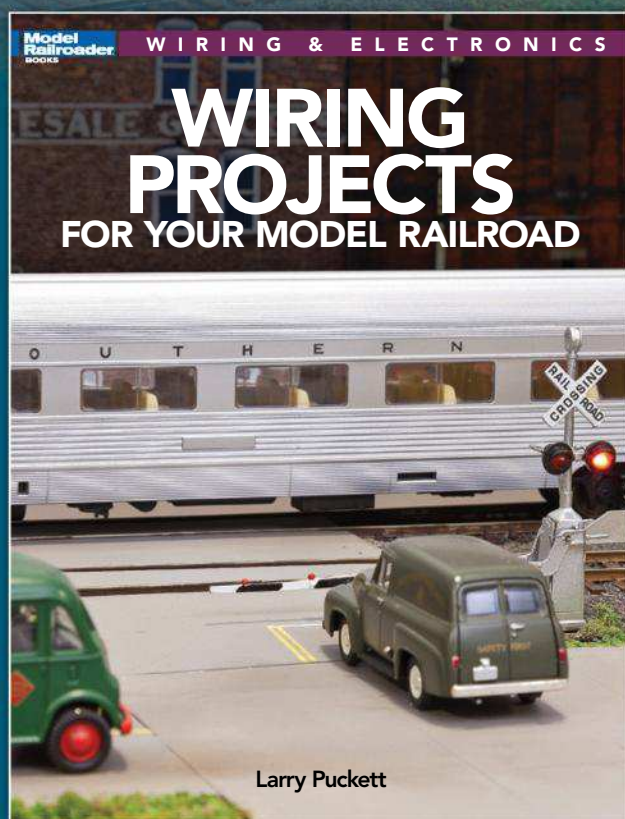
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Schedule of Events

AR, JACKSONVILLE: Train Show, Jacksonville Community Center, Municipal Drive. August 25-26, 10:00am - 4:00pm. Vendors, Clinics, Contests. Admission \$7.00, 12 and under free w/adult. Contact Rail & Sprue Hobbies, 1200 John Harden Drive, Jacksonville, AR, 72076. 501-982-6836, or raillandsprue@aol.com

AZ, PRESCOTT AREA: Beat the Heat Model Trains Swap Meet. Liberty Traditional School, 3300 N. Lake Valley Rd., Prescott Valley. Saturday, August 18, 2018, 9:00am-1:00pm. Adults \$5.00, children 12 and under free. Presented by: The Central Arizona Model Railroad Club. Contact: Dick Gage, 802-272-1352

AZ, TUCSON: Tucson Toy Train Show & Swap Meet. Tucson Expo Center, 3750 E. Irvington. November 9-10, 2018 Friday, 1:00pm-6:00pm and Saturday 9:00am-2:00pm. Admission \$6.00, kids under 12 are free-proceeds support the Gadsden Pacific Toy Train Operating Museum. www.gpdtoytrainmuseum.com or call Jeff, 520-310-1392.

CA, SAN CARLOS: European Train Enthusiasts (<http://www.ete.org>) EUROWEST at Hiller Aviation Museum, San Carlos Airport, 601 Skyway Road, Zip: 94070. July 21-22, 2018, Saturday 10:00am-5:00pm and Sunday 10:00am-4:00pm. Layouts, clinics, vendors, raffle. Admission (<http://www.hiller.org>) includes Air Museum, free parking. Contact Dave Cowl: eurowest@ete.org

CA, SAN DIEGO: 2018 NMRA/PSR Convention hosted by San Diego Division, at PSR at the Marriott Courtyard, 575 Hotel Circle South. Convention dates: September 12th thru September 16th, 2018, from 8:00am-10:00pm. Includes clinics, layouts, tours, prototype tours, actions, swap-meet and banquet. Information: sandiegodivision.org or email: registrar2018@sandiegodivision.org

CO, PUEBLO: Colorado Rail Fair, Pueblo Union Station. August 11-12, 2018, 9:00am-4:00pm. Admission: \$5.00, children free w/adult. Operating layouts, sales tables, railroad museum and more. Train rides conducted by Pueblo Railway Foundation. Contact: Dale Fish 719-647-1642, dfish23@msn.com

FL, PINELLAS PARK: Regal Railways Presents a Toy Train, Collectible and Hobby Show/Sale. Lopez Hall, 7177 58th St. North, Saturday, August 25, 2018, 9:00am-2:00pm. Adults \$5.00. Vendors, videos & operating layout. Serving lunch items. Contact Joe: 727-244-1341 or visit www.regalrailways.com for more information.

IA, ELKADER: 6th Annual Elkader Model Train Show-Swap Meet. Sunday August 19, 2018, 10:00am-4:00pm. Johnson's Reception Hall, 910 High Street and CJ Lanes at 821 High Street. Adults \$3.00, children 6-12 \$1.00, under 5 FREE. Free parking, lunch-stand and door prizes. Information: Larry Lerch 563-880-2066

IL, KANKAKEE: Kankakee Model Railroad Club Train Show. Gov. Small Memorial Park Civic Center, 803 South 8th Ave. Sunday, October 21, 2018 9:30am-3:00pm. Admission: \$3.00, under 5 free. 8' tables \$15.00 and 6' tables \$12.00. Operating layout. Contact lrv at 815-465-2420 or daswoodwerkhaus@yahoo.com for more information.

IN, INDIANAPOLIS: The Indianapolis Model Railroad Show and Open House. Manual High School Gymnasium, Saturday, September 15, 2018, 10:00am-3:00pm. Admission \$5.00, children 12 and under free. Boy Scouts in uniform free. Free parking. Naptown & White River Model Railroad Club. Contact: Michael Roderick 317-833-3556, E-mail: naptownmrr@gmail.com

MN, TWIN CITIES: 38th-National Narrow Gauge Convention, DoubleTree by Hilton Hotel, Bloomington, Minneapolis South. September 5-8, 2018. Register before June 1st for \$99.00, after \$125.00. Incredible value: 100 clinics, model and photography contest, 55 layouts on display, huge vendor show, live auction. Information: www.nngc-2018.

OH, PAINESVILLE: Railroad Memorabilia Show, Painesville Railroad Museum (Painesville Depot), 475 Railroad Street, Zip Code: 44077. Sunday, August 26, 2018, 10:00am-5:00pm. 216-470-5780 Email: prmm@att.net: www.painesvilleraillroadmuseum.org

WI, LA CROSSE: Rail Fair, Copeland Park, Rose & Clinton Streets. July 28, 2018, 10:00am-4:00pm. Admission \$5.00, under 12 free. Railroad Show, Sale & Exhibition. Model Toy & Antique Trains & Memorabilia, Railroad Exhibits & Displays. Information: 4000 Foundation, PO Box 3411, La Crosse, WI 54602, 608-781-9383

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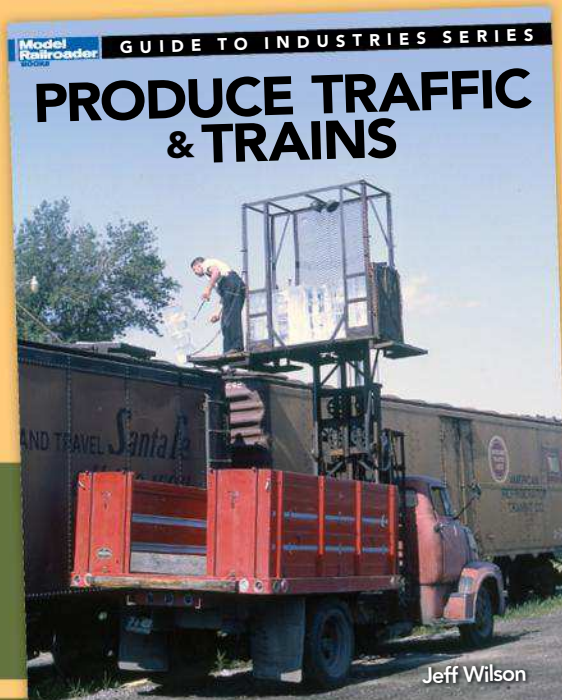
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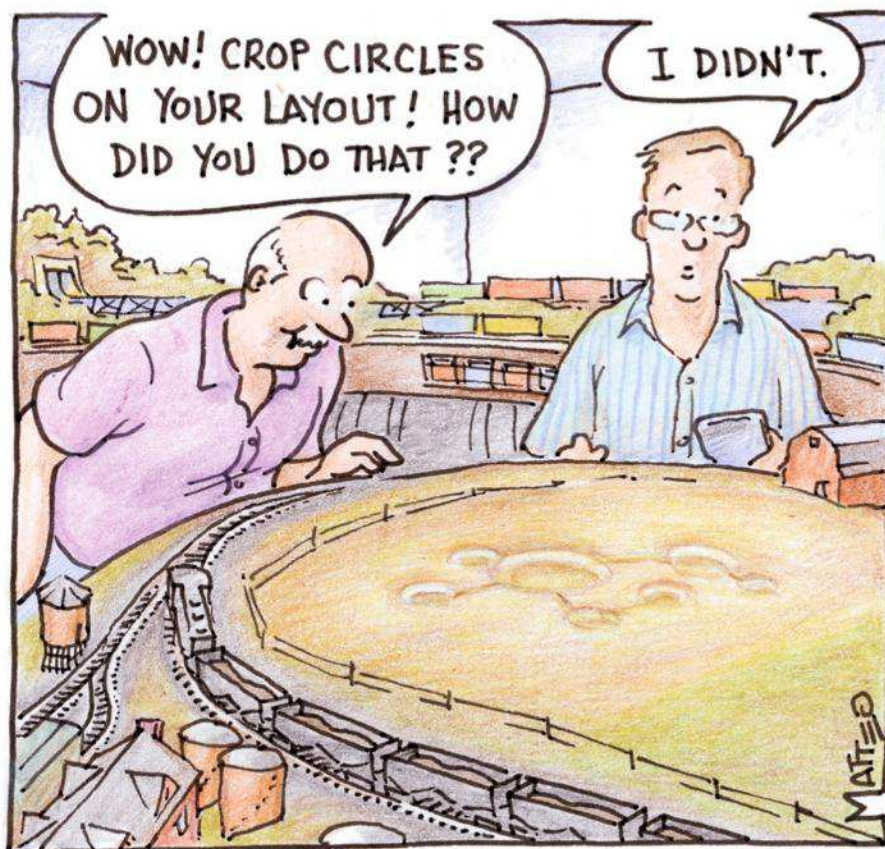
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The dog-chasing-car syndrome

Tom Klimoski and I were chatting about some recent additions to his room-size HO railroad, the prototype-based Georgia Northeastern RR (GNRR). I asked Tom, whose work has graced the pages of *Model Railroader* and *Model Railroad Planning*, what he had planned for the time after the railroad was largely complete. Would realistic operation sustain his interest?

"I figure that I have enough 'small' projects on the layout to keep me busy for a year or two," Tom replied. "After that, I'm not sure what direction I'm going to take. I agree with the premise that operating the layout should keep my interest up, but I'll miss the creative part of the hobby that includes building structures and scenery.

"Completing a layout," he continued, "is kind of like the dog chasing the car: Once he catches it, what is he going to do then? With a small layout that can reasonably be completed in a few years, what does the layout owner do once the layout is finished?

"I always wondered why some modelers build spectacular layouts, only to tear them down and then build others. I suspect they're not that interested in operations. So once their layouts are done, they move on. They enjoy the research, planning, and creative building process; that's what drives them in the hobby. Now that I've reached that point, I'm considering my options."

One option that Tom has in mind is moving up in size to On30. "My plan is to build a test layout under the current HO railroad. Starting with the area under the peninsula, I would build a small ¼" scale narrow-gauge switching layout set in the early 1900s. This



Tom Klimoski is considering building a "test" On30 layout under his HO Georgia Northeastern to see whether a new scale and gauge keep his hobby fires burning. Tom Klimoski photo

would allow me to improve my skills in a new scale. I could also work on the new layout while still being able to operate on my GNRR layout.

"My current layout is at 54" above the floor, which gives me space to set the height of the new layout at 42" and operate it from a chair with casters. If I like the move up to O scale," Tom concluded, "then I could remove the Georgia Northeastern and extend the O scale layout in the same footprint as the current layout at the 54" height."

I try to keep an ear to the ground to pick up on what modelers are chatting about. An increasingly frequent topic of discussion is moving to a larger scale. On30 (also called On2½) is often part of that discussion, as it offers a lot of advantages for the former HO scale modeler, starting with the same track gauge. That means one can salvage some of the track and maybe even locomotive mechanisms he or she has on hand, if only temporarily.

On30 is also relatively inexpensive and comfortable in

roughly the same footprint as an HO standard-gauge railroad. Narrow-gauge curves tend to be sharp, and trains are usually fairly short. So the footprint, yard and passing-track lengths, and so on can mirror what we're used to in a smaller scale.

There are always some rude awakenings when moving up to a larger scale, however. Humans don't get smaller just because they work in and around narrow-gauge equipment, so many structures are quite large. Even a common house or store occupies about four times the footprint of its HO counterpart.

But let's keep the discussion more general: What's your Plan B? I can think of a whole host of reasons we might want – or be forced – to start anew, among

them a relocation due to a job change, medical or family concerns, or downsizing; joining a modular group or club that models in a different scale or gauge; or perhaps, like Tom, the siren-song appeal of doing something completely different.

Remember when Bachmann rolled out its 1:29 Big Hauler sets featuring a loop of plastic track, an

East Tennessee & Western North Carolina 4-6-0, and a few cars? I still have my set stashed in an upstairs closet. I postulated a 1:29 or 1:32 railroad called the Appalachian Ry. set down in the central Appalachians.

The project was bumped by an expansion of the HO Allegheny Midland, but the temptation remains. This old dog is still chasing cars. **MR**



I TRY TO KEEP AN EAR TO THE GROUND TO PICK UP ON WHAT MODELERS ARE CHATTING ABOUT. AN INCREASINGLY FREQUENT TOPIC OF DISCUSSION IS MOVING TO A LARGER SCALE.
– TONY

N Scale



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#176-2301	N FP7A Milwaukee Road #95C	\$110
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