

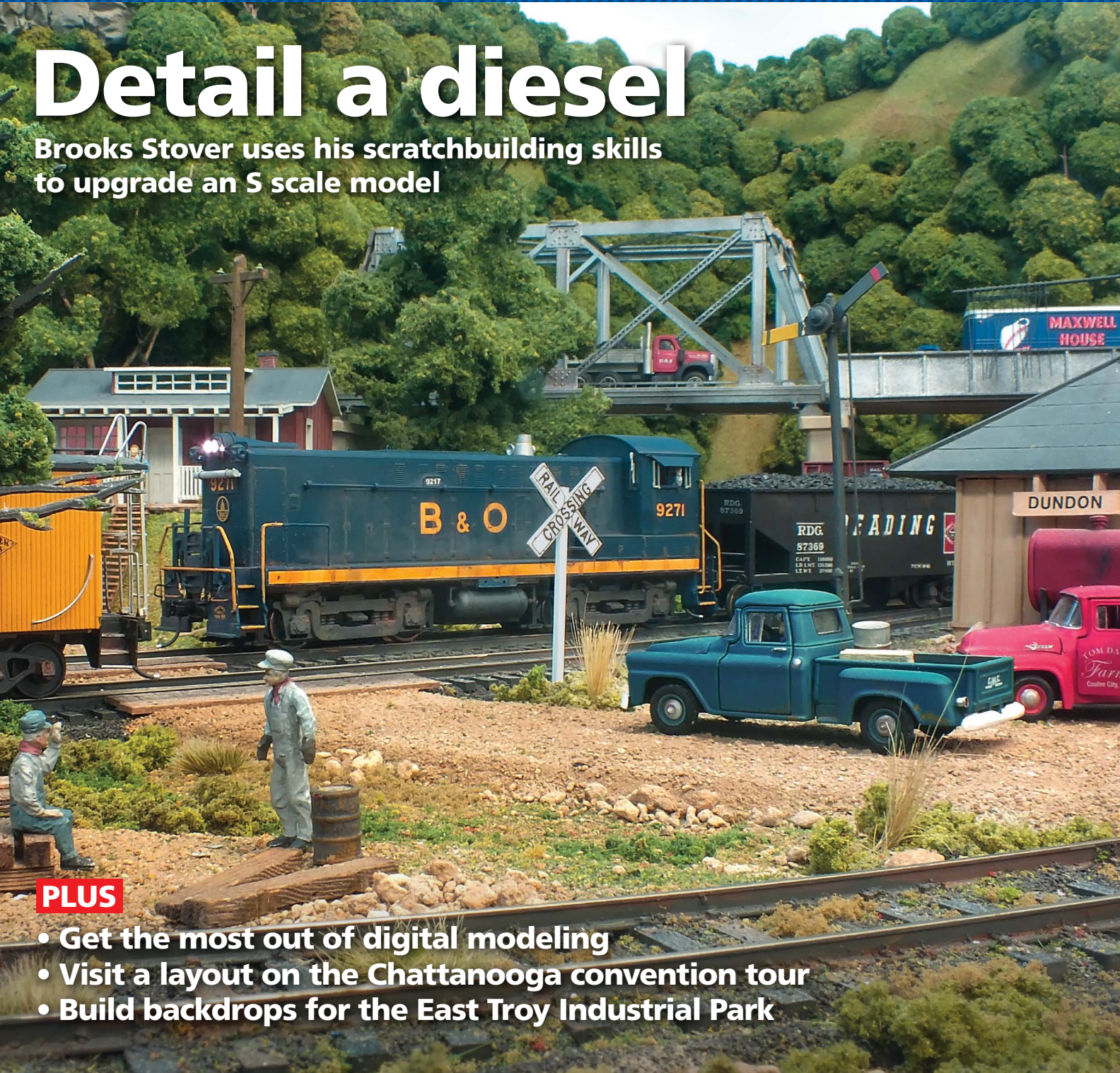
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# Model Railroader

May 2026

## Detail a diesel

Brooks Stover uses his scratchbuilding skills to upgrade an S scale model



**PLUS**

- Get the most out of digital modeling
- Visit a layout on the Chattanooga convention tour
- Build backdrops for the East Troy Industrial Park



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Legends inspire us. Tales of giants - machines built to conquer distance, time, and terrain - ignite our imagination and challenge us to push beyond the ordinary. That spirit is what drove Union Pacific's pursuit of "big power," and it's what inspired our **Museum Quality™ HO Scale GE U50C**.

Born from a bold 1962 motive power study, the U50C represented Union Pacific's vision of the future: fewer locomotives, more horsepower, and unprecedented efficiency. General Electric answered with a double-diesel titan - two prime movers on a single frame, riding on span-bolster trucks reclaimed from the mighty Big Blow turbines. Delivered between 1969 and 1971, the 5,000-horsepower U50Cs were unlike anything that had come before, roaming system-wide in their early years and standing as rolling symbols of UP's "bigger is better" philosophy.

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# SUPER SWITCHERS



This SW1 hauls a string of new WalthersMainline 50' AAR boxcars (910-46600 series).

## HO EMD SW1 Winter 2026 Delivery

Electro-Motive Division SW1 diesels return to HO rails with factory-installed ESU Sound & DCC and updated tooling, including separate handrails. Built between 1938 and 1953, the prototype SW1 served for decades in freight yards and along branchlines across the country.

The WalthersMainline SW1 captures the classic lines of this 600 hp cab-end switcher. An ultra-smooth flywheel equipped motor, LED headlights and Proto MAX™ metal knuckle couplers ensure years of trouble-free operation. An optional factory installed ESU Sound & DCC decoder adds the realistic growl of the diesel engine and other effects.

Sound & DCC and Standard DC versions are available in two roadnumbers each of the following roadnames:

**Amtrak<sup>1</sup>, Boston & Maine, Chicago, Burlington & Quincy, Chicago & North Western<sup>1</sup>, Milwaukee Road, New York Central, and Southern.** A painted yellow unlettered version and an undecorated kit are also available.



The SW1 features a die-cast metal chassis, all-wheel drive and a pre-installed speaker on Sound & DCC and Standard DC versions.

See them all at

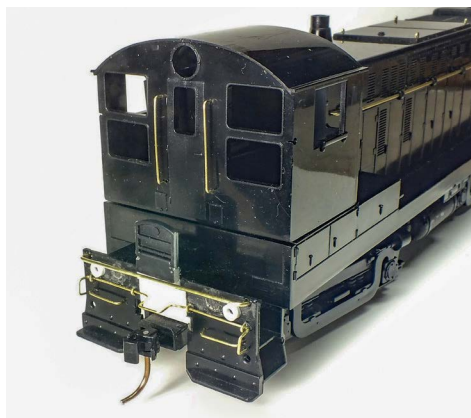
[www.walthers.com/SW1](http://www.walthers.com/SW1)

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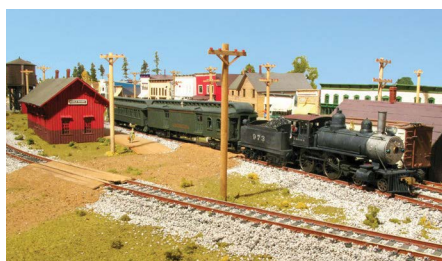
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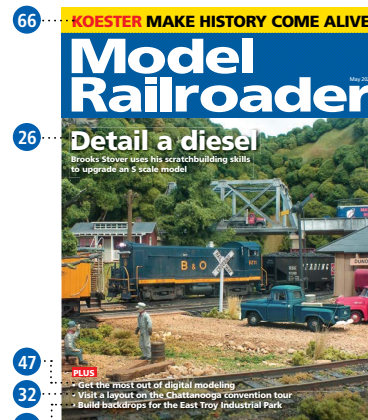
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Action at Locust Summit



**On the cover:** Brooks Stover detailed this Baldwin diesel for his S scale Buffalo Creek & Gauley model railroad.  
Brooks Stover photo



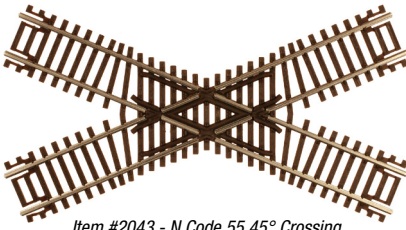
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*Model Railroader* (ISSN 0026-7341, USPS 529-810) is published monthly by Firecrow Media Inc., 405 Cherry Street, Chattanooga, TN 37402. Periodicals postage paid at Chattanooga, TN and additional mailing offices. POSTMASTER: Send address changes to *Model Railroader*, PO Box 850, Lincolnshire, IL 60069.

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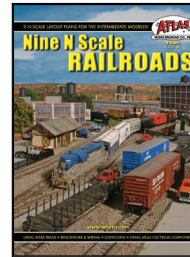
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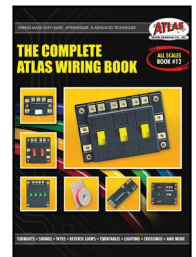
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Item #7:  
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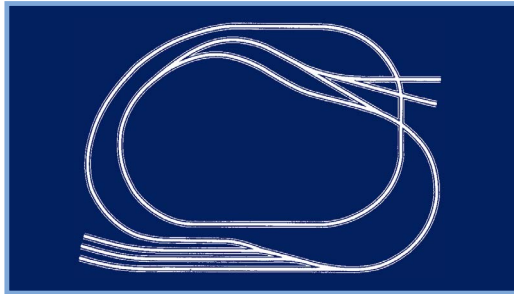


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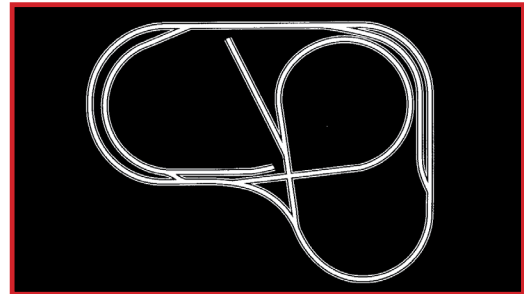
#### N CODE 80: N-7 TWICE AROUND VIA "UP & OVER"

**From Book #6:** Introduction to N Scale Model Railroad

**Minimum Table Size Required:** 32" x 45"

**Products Required:** Straight sections, radius sections, turnouts, a crossing, bumpers, insulated joiners and terminal joiners, necessary electrical components

If you enjoy watching a long train work its way up and down the grades of a long winding main line, the N7 is the layout for you. On this layout, yard tracks are available for breaking up and storing long trains, and a passing track with two industry spurs is available to provide additional operating diversions.



#### HO CODE 83/100: HO-7 THE JUNIOR PRETZEL

**From Book #9:** Beginner's Guide to HO Model Railroad

**Minimum Table Size Required:** 6' x 8'

**Products Required:** Straight sections, radius sections, Snap-Switches, rerailers, terminal sections, a crossing, bumpers, rail joiners and the necessary electrical components

Since it is built on an extended platform, there are many possibilities with the HO-7; such as longer runs, longer trains and more realistic operations.

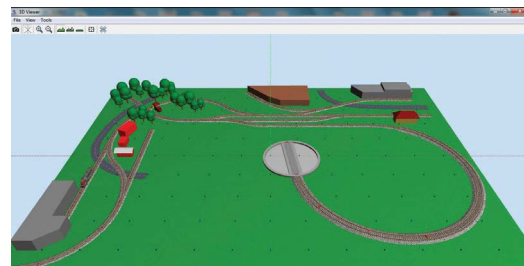
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Layout Packages, Books & Instructional Guides,  
Track Planning Software & MORE at [shop.atlasrr.com!](http://shop.atlasrr.com)





## Catching up with Rapido's Jason Shron

**Our series of interviews with industry leaders** continues with a conversation with Jason Shron, founder and President of Rapido Trains. He and David Popp got together for a video interview recently. Topics included the current status of tariffs on imported trains, the company's U.K. branch, the new U.S. warehouse in Buffalo, and more.

You can watch the video and read the interview with David and Jason at [Trains.com](https://www.Trains.com)!



## Getting started in model railroading

**We often get questions** from readers asking "Where should I start?" Although we run a new project layout story every year, some folks didn't start their subscriptions in January, so they might have missed a few things.

Back in 2023, Associate Digital Editor Mitch Horner compiled a story for [Trains.com](https://www.Trains.com) designed to answer some of the basic beginner questions, such as how to choose the scale and era to model, how to plan a model railroad layout, how to pick the right supplies for your layout, and more. And this is just one of the Beginners stories on our website. Check them all out at [Trains.com](https://www.Trains.com).



## Hobbyshop Window is back on Trains.com

**Longtime readers** might recall this monthly department in *Model Railroader* magazine that featured photos of the newest products to arrive at our offices.

We've revived this feature on [Trains.com](https://www.Trains.com) as an occasional update on what's new. When we get something new and exciting, we'll post photos and descriptions of these products that you can find in hobby shops right now, such as Athearn's N scale mill gondolas.



## Check out Cody's Office!

**Cody Grivno** looks at new products that have arrived at the *Model Railroader* offices in this monthly video program.

A recent episode featured the HO scale Greenbrier five-trough coil gondola from Rapido Trains and Athearn's HO scale Genesis series GE Dash 9-44CW locomotive. He also reviewed the new Firecrown Media book, *Tales of the Rails*. Then Cody demonstrated how to model a prototypical gravel-and-tar roof using ballasting techniques.

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# It's time to get ready for the convention

**Summer's on its way**, so does that mean it's time to ignore the trains? Well, if you live in the Deep South with summer humidity you can cut from the air, it may be the ideal time to retreat to the air conditioning, and I hope that would include your modeling spaces.

But if summer means it's time to get out an about, why not consider spending time in Chattanooga, Tenn., especially at the end of July. Why, you ask? Because that's where the National Model Railroad Association is holding its annual convention.

If you've never been to an NMRA convention, Chattanooga will be a great place to find out what it's all about. Besides the convention, with its clinics and model railroading-related activities, Chattanooga is a perfectly sized city in the eastern Tennessee mountains, with plenty to do for family members who may not be

interested in the immediate effects of Recommended Practice 25 (that's the one about the shape of model railroad wheels).

But I'm not here to encourage you to visit just the city. The folks at [visitchattanooga.com](http://visitchattanooga.com) can do that. I'm here to tell you why the NMRA convention is something you don't want to miss.

You'll find clinics from *Model Railroader* contributors including Pelle Søbørg, visiting from Denmark courtesy of [ScaleTrains.com](http://ScaleTrains.com); Tony Koester; and Bernard Kempinski. Speaking of [ScaleTrains.com](http://ScaleTrains.com), former MR staffer Bryson Sleppy, now the manufacturer's brand marketer, will be sharing his experiences as a younger person in the hobby. These folks will be joined by NMRA staff and officers including President Gordy Robinson, plus other excellent modelers from across the country and around the world.

These clinics are great ways to learn about the latest techniques from the people presenting them, and have a chance to talk to them before and after the clinics.

Outside the clinic rooms, and in the area surrounding Chattanooga, you'll find many more activities. Every convention offers industry tours and Chattanooga is no different. You'll have a chance to check out several events at the Tennessee Valley Railroad Museum, including multiple train excursions and a tour of the backshop.

Local layout owners have also opened their homes for layout visits, which like last year will be self-guided, meaning you won't be constrained by a tour bus picking you up and dropping you off before you're ready.

One of those layouts is featured in this month's issue on page 32, Bill Orman's Norfolk Southern New Holland Division. This HO scale layout



features present-day modeling set in eastern Tennessee. Next month, we'll feature the Eagle Point RR, a 7½" gauge railroad in Dunlap, Tenn.

Then on the weekend to close the convention, the National Train Show sets up, with manufacturers and modular layouts galore.

If you haven't signed up yet, head over to [nmra2026.org](http://nmra2026.org). I hope to see you at the convention!

## Model Railroader

Model railroading is fun!

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## HO scale



### HO scale Electro-Motive Division F-series diesel locomotives.

Athearn has added a colorful assortment of cab units to its Genesis series. Road names on the HO scale diesels include Wabash (F7A); Atchison, Topeka & Santa Fe (F7A and F7B); Atlantic Coast Line (F7A and F3B); Charleston & Western Carolina (F7A); Chicago & North Western (F3A and F3B); Monon (F3A); Pennsylvania RR (F3A, F5A, and F5B); and

Southern Pacific (F3A and F3B). Product features include prototype-specific details, light-emitting-diode lighting, and wire grab irons. Direct-current models with a 21-pin NEM connector are priced at **\$219.99** (single) and **\$439.99** (two-pack). Models with a SoundTraxx Tsunami2 sound decoder list for **\$319.99** (single) and **\$619.99** (two-pack). Athearn Trains, 800-338-4639, [athearn.com](http://athearn.com)

## HO scale locomotives



- **Alco S4 diesel locomotive.** New paint schemes — Monongahela Connecting RR, Bessemer & Lake Erie, Canadian National, Erie Lackawanna, Green Mountain, and U.S. Steel. New road numbers — Atchison, Topeka & Santa Fe and National Railways of Mexico. Back by popular demand — Morristown & Erie. One to two road numbers per paint scheme. Die-cast metal mainframe and gear cases; five-pole, skewed-armature motor with dual flywheels; and metal couplers. Direct-current model with factory-installed speaker, \$199.95; with ESU LokSound V5 sound decoder, \$319.95. Master Line. Atlas Model Railroad Co., 908-687-0880, [shop.atlasrr.com](http://shop.atlasrr.com)



- **Electro-Motive Division GP35.** Soo Line; BNSF Ry. (GP39-2); Conrail; Denver & Rio Grande Western; Gulf, Mobile & Ohio; Savannah & Atlanta

(high short hood); Union Pacific; and fictional Christmas scheme. One to two road numbers per scheme. ABS body (low short hood unless noted), die-cast metal chassis, and metal Kadee-compatible couplers. Stealth Series without sound, \$279.99; with dual-mode Paragon4 sound decoder, \$379.99. Broadway Limited Imports, 386-673-8900, [broadway-limited.com](http://broadway-limited.com)

## Rapido celebrates 60 years of GO Transit

Rapido Trains has announced several HO scale GO Transit models to commemorate the 60th anniversary of the Toronto-area transit service in 2027. Offerings will include a General Motors Diesel Division (GMDD) GP40TC, FP7 Auxiliary Power Control Unit (APCU), and Hawker Siddeley RTC-85 single-level commuter cars.

In addition to single locomotives and cars, Rapido Trains will be offering GO Transit 60th anniversary box sets containing a GMDD GP40TC, two RTC-85 coaches, and one RTC-85 cab car.

To see the various paint schemes being offered on the HO scale GO Transit 60th anniversary models, and for pricing information, visit [rapidotrains.com](http://rapidotrains.com).



- **Electro-Motive Division GP40TC diesel locomotive.** Amtrak. Metal side handrails with plastic stanchions, under-frame details, and MoPower capacitor for uninterrupted DCC running. Suggested minimum radius, 22". Direct-current model, \$249.95; with DCC and sound, \$359.95. Rapido Trains Inc., 905-474-3314, [rapidotrains.com](http://rapidotrains.com)

## HO scale freight cars



- **40-foot steel boxcar with Murphy ends.** New York, Susquehanna & Western; Delaware, Lackawanna & Western; Missouri Pacific; New York Central (Michigan Central); Nickel Plate Road; Northampton & Bath; Pennsylvania RR; and Union Pacific. Three numbers per scheme; also available undecorated. Flat steel roof, 5-5-5 Murphy steel ends, and vertical hand-brake staff. \$39.98. Walther's Mainline. Wm. K. Walther's Inc., 414-527-0770, [walther's.com](http://walther's.com)

## HO scale passenger sets



- **Train of Tomorrow set.** Train of Tomorrow and Union Pacific *City of Seattle*. Set includes Electro-Motive Division E7A locomotive, dome coach *Star Dust*, dome sleeper *Dream Cloud*, dome diner *Sky View*, and dome lounge/observation *Moon Glow*. Passenger cars feature detailed interiors, separate grab irons, and underbody details. Minimum radius, 22" (18" radius with modification). Set includes Train of Tomorrow wine tumbler glasses and other memorabilia. Direct-current set, \$849.95; with DCC and sound, \$959.95. Rapido Trains Inc., 905-474-3314, rapidotrains.com

## HO scale commuter equipment



- **New York City Transit Authority R32 "Brightliner" subway cars.** Metropolitan Transportation Authority (modern logo, 2000+) and New York City Transit Authority (TA logo, 1964+ and 1970+; two-tone "M" logo, 1985+). Available as two-car sets (powered or unpowered options). NEM-style close-coupling system; track-powered, flicker-free interior lighting compatible with DC and DCC layouts; and multi-color interior detailing. Display set with platforms and cars and separate sale platforms also available. Two-car sets — unpowered, \$319.95; direct-current model without sound, \$399.95; and with DCC and sound, \$509.95. Cars plus lighted display, \$399.95. Subway display platform, \$79.95. Rapido Trains Inc., 905-474-3314, rapidotrains.com

## N scale locomotives



- **Electro-Motive Division F40PH without ditch lights.** Amtrak (phase 3).

## N scale



**14-section heavyweight sleeper.** RailSmith Models has released this newly-tooled car for Atchison, Topeka & Santa Fe's name train the *Scout*. The N scale sleeper, based on Pullman plan 3958, features a detailed interior; separate, factory-applied *Scout* plaques; screw-mounted three-axle trucks; metal wheelsets; molded underbody details; clear window glazing; and truck-mounted Accumate couplers. The ready-to-run car is sold in a two-pack for **\$129**. RailSmith Models, [lowellsmith.net/railsmith/](http://lowellsmith.net/railsmith/)

Two road numbers. All-wheel electrical pickup; directional, golden-white light-emitting-diode headlights; and body-mounted Kato magnetic knuckle couplers. Direct-current models, \$135; with motor-only Digital Command Control decoder, \$235; with DCC and sound, \$335. Kato USA Inc., 847-781-9500, [katousa.com](http://katousa.com)

## N scale freight cars



- **Gunderson 3250 two-bay covered hopper.** Greenbrier Management Services, Cemex (three AOKX patchout schemes), CSX, Dowell Schlumberger Industrial, Halliburton, Keg River Chemical, and Union Pacific. One to 12 road numbers per paint scheme. ASF Ride Control trucks with raised foundry data, 36" machined metal wheelsets, and body-mounted Micro-Trains compatible couplers. \$34.99. ScaleTrains, 844-987-2467, [scaletrains.com](http://scaletrains.com)

## Z scale locomotives



- **Electro-Motive Division SD60 diesel locomotive.** Norfolk Southern. Two road numbers. Prototype-specific details,

## In Memoriam

**Robert (Bob) W. Brown, 1933-2026**

**Bob Brown, Editor** of *Narrow Gauge & Short Line Gazette*, passed away on Feb. 1, 2026. He was 93 years old.

Bob traced his interest in the hobby to the October 1944 issue of *Model Railroader*. During his formative years he had an O gauge American Flyer train set which led to HO scale. Bob's later modeling was largely in On3.

Bob married his wife, Irene, in 1955 and was drafted by the United States Navy shortly thereafter. Following his military service, Bob began a 35-year career as a school teacher in the Palo Alto (Calif.) Unified School District.

In 1964, Bob launched *Finelines*, a publication devoted to what is known today as Proto:48. Eleven years later the magazine merged with *Slim Gauge News*, rebranding as the *Narrow Gauge & Short Line Gazette*. Bob, an NMRA Master Model Railroader, was editor of the *Gazette* for more than 50 years.

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# Broadway Limited HO EMD SD45



**Looking to add some flare** to your HO scale diesel locomotive fleet? Then you'll want to check out the latest run of Electro-Motive Division SD45 diesels from Broadway Limited Imports. The six-axle road locomotive features an ABS body, prototype-specific details, and a die-cast metal chassis.

**Electro-Motive Division produced** the SD45 between February 1965 and December 1971. During that time 1,260 units were built, all for railroads in the United States. The diesel was rated at 3,600 hp and featured a 20-cylinder, 645E3 diesel engine.

The sample we received is decorated as Great Northern 424, part of the railroad's 400 through 426 series. Unit 424 was built in July 1968. After the March 1970 merger that created Burlington Northern, the SD45 became BN 6454. The locomotive was returned to the lessor in December 1983.

**The Broadway Limited EMD SD45** is far from a cookie-cutter model. The diesel is offered with four front and rear pilot options, two short hood options, and a variety of m.u. receptacle arrangements. Other prototype-specific details include the dynamic brake hatch, front headlight arrangement, and cab roof antenna and type.

The multi-piece body consists of the short and long hoods, cab, dynamic brake blister, and sill unit. Factory-installed and painted wire grab irons are used throughout the SD45. The lift rings on top of the long hood are also metal. Multimedia 48"

dynamic brake and radiator fans consist of a plastic housing and see-through, etched-metal grills with separate fans.

**Our review sample is decorated** in GN's Big Sky Blue paint scheme, which was introduced in April 1967. The paint is smooth and evenly applied, and the separation lines between colors are crisp. Graphic placement matches a prototype photo of the 424 in *Great Northern Color Pictorial Volume 2* by Joseph W. Shine (Four Ways West Publications, 1993).

There were a few detail discrepancies. The full-size unit had four-cluster m.u. hoses (not three) and a straight uncoupling lever without loop handles on the front pilot. In addition, there shouldn't be a horizontal footboard handrail on the front pilot, and the small dynamic brake doors weren't on the prototype.

Drawings of the EMD SD45 were published in the 1970 *Car and Locomotive Cyclopedia of American Practice* (Simmons-Boardman Publishing Corp.). Most of the dimensions match or are within scale inches of the prototype. The biggest difference was the truck centers, which are a scale 39'-2" on the model compared to the 40'-0" on the prototype. This was done to help the model negotiate 18" radius curves.

I did the initial product testing at our workbench, which has an NCE Power Cab. At step 1, the SD45 moved at 2 scale mph. The road locomotive achieved a top speed of 75 smph. That's in line with the full-size units, which had a top speed range between 71 and 83 mph depending on the gear ratio.

For real-world testing, I took the model over to our East Troy Industrial Park layout to work the interchange at Mukwonago, Wis. The locomotive navigated the 28" radius curves and No. 5 turnouts without issue.

**Broadway Limited Imports offers** its HO scale SD45 in a colorful assortment of road names, including Class I railroads, regional carriers, short lines, and leasing companies. If you're looking to add a new diesel to your HO scale roster, you'll want to take a look at this solid six-axle road locomotive. — *Cody Grivno, senior editor*

## Facts & features

**Price:** Stealth Series without sound, \$259.99; with dual-mode Paragon4 sound decoder, \$389.99

### Manufacturer

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

**Era:** July 1968 to early 1970s (as decorated)

**Road names:** Great Northern, Erie Lackawanna, Helm Leasing, Louisville & Indiana, Motive Power International, Montana Rail Link, Southern Pacific, and Wisconsin Central. One to two road numbers per paint scheme.

### Features

- Metal Kadee-compatible knuckle couplers, at correct height
- Metal wheel stubs on plastic drive-axle gears, in gauge
- Weight: 1 pound, 1.3 ounces



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# Athearn Genesis HO GE Dash 9-44CW



The latest product sample from Athearn Trains sent me on a nostalgia trip. Inside was Burlington Northern Santa Fe Dash 9-44CW 960. The HO scale model, from the manufacturer's Genesis series, was decorated in the railroad's Heritage I paint scheme. I immediately flashed back to the second half of 1996 when these units were making their inaugural trips through my hometown on the newly-formed railroad.

General Electric produced the Dash 9-44CW and related engines, including the Dash 9-40C, Dash 9-40CW, and Dash 9-44CWL, between 1993 and 2004. During that time, more than 3,600 units were built. Features on the Dash 9-series of locomotives included a 7FDL16 diesel engine, a GMG197 alternator, and 752AH traction motors. The six-axle units were rated between 4,000 and 4,400 horsepower.

The sample we received is decorated as BNSF 960, the class unit of the railroad's 960 through 1123 series. The locomotive was built by General Electric in July 1996 under order number 1872. The Dash 9-44CW was sold in April 2025. It is still in service today as GECX 960.

Athearn's model has a plastic shell with factory-applied plastic, formed wire, and etched-metal detail parts; a die-cast metal chassis; and illuminated number boxes, ground lights above the front trucks, and walkway lights.

The Dash 9 models have a mix of universal and prototype-specific details. Among the details shared across road names are plastic uncoupling levers, train line and m.u. hoses, Celcon handrails, and a detailed cab interior.

Product features on the three units decorated in BNSF's Heritage I scheme include high mounted number boards, front ditch lights, a standard brass bell (located on the fireman's side of the fuel tank), a Nathan AirChime K3 air horn, and a Santa Fe-style "Gullwing" cab.

The orange and green paint on BNSF 960 is smooth and evenly applied. At 32", the lettering on the long hood follows prototype practice. The yellow stripes between colors are opaque. Placement of the lettering, herald, and other graphics followed the many prototype images found online.

Though sales literature lists the era for the Heritage I units as 1996+, it's a bit later than that based on a couple of features. The initial units (the exact number isn't certain, but it was around a dozen) had red walkways. Engines 960 through 1034 were delivered with 12" cab numbers; the remaining units had 15" numbers. Athearn's version of the 960 has orange walkways and 15" numbers. Based on photos, it looks like the 960 received larger numbers in the early 2000s.

Prototype drawings of the GE Dash 9-44CW were published in the 1997 *Car and Locomotive Cyclopedia of American Practices* (Simmons-Boardman Books Inc.) The Athearn Genesis model matches or is within scale inches of published data.

Our review sample features a SoundTraxx Tsunami2 decoder. I first put the six-axle road unit on our test track, which is equipped with an NCE Power Cab. At step 1, the Dash 9-44CW moved at 4 scale mph. By step 28, the diesel was moving at 78 smph. The full-size locomotive's top speed was 70 mph.

Next, I took the Athearn Genesis model over to our Milwaukee, Racine & Troy East Troy Industrial Park layout. I used the Dash 9 to work the interchange at Mukwonago, Wis. The model operated flawlessly.

It's hard to believe nearly 30 years have passed since those new BNSF Ry. Dash 9s were leading grain trains through my hometown. Thanks to Athearn, memories like this can be re-created in HO scale. — *Cody Grivno, senior editor*

## Facts & features

**Price:** Direct-current model with 21-pin NEM connector, \$259.99; with SoundTraxx Tsunami2 sound decoder, \$359.99

### Manufacturer

Athearn Trains  
2904 Research Rd.  
Champaign, IL 61822  
athearn.com

**Road names:** BNSF Ry.; Arizona & California; Canadian National (C44-9WL); Quebec, North Shore & Labrador; Norfolk Southern (Dash 9-40CW); and Union Pacific. Two to three road numbers per road name.

**Era:** 1993 to present (varies based on paint scheme)

### Features

- McHenry plastic scale couplers, at correct height
- Metal wheel stubs on plastic drive axle gears, in gauge
- Minimum radius, 18"; recommended radius, 22"
- Weight: 1 pound, 5.8 ounces

# Rapido Trains HO scale Rio Grande caboose



**Rapido Trains continues to expand** its lineup of prototype-specific cabooses. The manufacturer's latest release is an HO scale Denver & Rio Grande Western (D&RGW) 01400-series steel riveted caboose. The detail-rich plastic model is offered in multiple configurations covering the prototype's 45-plus-year history.

**Workers at D&RGW's Burnham Shops** in Denver, Colo., constructed the steel riveted cabooses, numbered 01400 through 01469, between 1940 and 1951. Our review sample is lettered as D&RGW 01430 and decorated in its as-delivered black-and-white scheme with four-pane side windows. The caboose was built in June 1944. The platform end gates were installed in July 1947. Electric lighting was added in January 1959, and a VHF radio installed in May 1962.

During the 1970s the 01430 received a variety of upgrades, including sealed beam marker and track lights, an electric water cooler, roller-bearing trucks, and a chemical toilet. The side carbody windows were plated over in March 1984. The caboose was retired in the early 1990s.

**An exploded-view diagram** included with the model shows how the caboose is constructed. It consists of a one-piece body with a separate cupola. The see-through, etched-metal running boards are attached to separate plastic standoffs on the roof. A formed wire brace is attached to the smokejack.

Multi-piece construction was used on the caboose ends. The ladders, platform end gates, and brake stand are cast as a single unit. The brake wheel is factory applied. The combined corner posts, outer step stringers, and vertical grab

irons are a separate plastic part. The end platforms and steps are see-through, etched-metal details. The carbody corners, ends, and cupola roof have free-standing grab irons.

Inside, the caboose has lockers, seats, tables, beds, and a stove. The interior and cupola lights, along with the red marker lights (where applicable), are track powered and compatible with DC and DCC. A MoPower capacitor prevents the lights from flickering over dirty track and dead spots. Notes on how to control the lights with the supplied Rapido Lighter are included in the instructions.

The underbody has molded floor-board and stringer detail. The center sills, crossmembers, and body bolsters are a one-piece casting. The plastic draft-gear boxes are separate screw-mounted parts. The brake system is made up of free-standing plastic and formed wire details.

A small bag of modeler-installed details is included with the caboose. Among the parts are etched-metal numbers for the cast road numbers on the sides of the carbody, Automatic Car Identification placards, and a vent stack.

**The sample we received** is painted in the as-built black scheme. The white printing is opaque. However, the new date should be 6-44, not 8-40.

Prototype drawings for the 01430 through 01439 series of cabooses were published in Volume 10, Numbers 2 and 3 of *The Prospector*, the magazine of the Rio Grande Modeling & Historical Society. Rapido's model matches published data.

For real-world testing I put the caboose in a train on our Winston-Salem Southbound Tar Branch. The

model performed without incident while being pushed and pulled on the layout, which features commercial and handlaid track and turnouts. The model navigated the No. 4 turnout and 30-degree crossing without issue.

**This is certainly a great time** to be modeling the caboose era in HO scale. Gone are the days of one-size-fits-all models. Rapido's lineup of steel riveted cabooses will satisfy D&RGW modelers re-creating the 1940s to the early 1990s. — *Cody Grivno, senior editor*

## Facts & features

**Price:** \$129.95

### Manufacturer

Rapido Trains  
382 High St.  
Buffalo, NY 14204  
rapidotrains.com

**Era:** 1940 to 1990s (varies based on scheme)

**Road name:** Denver & Rio Grande Western (as-built [black scheme], switch caboose scheme, early modifications [black scheme], postwar modifications [black, Aspen Gold and silver with single black stripe, and Aspen Gold schemes], and late modifications [Aspen Gold scheme]). Two to four road numbers per paint scheme.

### Features

- Body-mounted metal couplers, at correct height
- 33" metal wheel stubs on plastic axles, properly gauged
- Weight: 3.6 ounces, .2 ounce too heavy per NMRA Recommended Practice 20.1

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After using Omaha Orange and Pullman Green on its diesels for more than 25 years, Great Northern adopted Big Sky Blue as its new corporate look in April 1967. The paint scheme is shown here on an HO scale Electro-Motive Division SD9 from Wm. K. Walther's Inc. Bill Zuback photo

## Which railroads made major color changes to their diesel paint schemes?

**Q** I'm contemplating adding another, different paint scheme to some of the diesels on my freelanced railroad. I know a lot of roads had different schemes for passenger and freight locomotives, but what about major color changes? And I'm not counting mergers, either. I can think of Western Maryland, but then I draw a blank. What others am I missing?

*Morpar, via the MR Forums*

**A** The short answer? Quite a few. This is by no means a complete list, but here's what I — along with members of the Trains.com team — came up with: Amtrak; Atchison, Topeka & Santa Fe; BNSF Ry.; Burlington Northern; Boston & Maine; Canadian Pacific; Canadian National; Chicago, Burlington & Quincy; CSX; Grand Trunk Western; Great Northern; Lehigh Valley; Maine Central; New York, New Haven & Hartford; Northern Pacific; Pennsylvania RR; Reading Co.; Rock Island; Soo Line; Southern Pacific; Western Pacific; and Wisconsin & Southern.

I didn't count railroads that kept the same color palette but changed heralds, modified graphic placement, added stripes, and things of that nature. Examples include Detroit, Toledo & Ironton; Montana Rail Link; Norfolk Southern; and Union Pacific.

Let's take a closer look at one of the lines on the list, Great Northern. The railroad debuted its Omaha Orange and Pullman Green with gold stripes paint scheme in 1941. This became known as the *Empire Builder* scheme, named for the railroad's flagship passenger train.

In 1962, GN adopted the "Simplified Scheme" for use on its road and yard diesels. The omission of yellow stripes and wider bands of orange and green sped up the painting process. The *Empire Builder* scheme was retained for passenger equipment.

Omaha Orange and Pullman Green served the GN well for more than 25 years. In April 1967, the railroad adopted Big Sky Blue as its new paint scheme. Along with diesel locomotives, the new scheme was applied to passenger equipment, freight cars, cabooses, company vehicles, signs, and more. The scheme was used until the merger that created Burlington Northern in March 1970. A mix of all three schemes could be found on diesels up to and after the merger.

**Q** I am working on a track plan for my first real layout. I have looked through various layout plans in the database and see where elevations have been labeled along the routes. How does one go from a two-dimensional drawing to a three-dimensional layout?

*Jesse Brinson*

**A** Consulting Editor Tony Koester offers the following insights:

Jesse, since this is your first layout, I think it would be worthwhile to enlarge the plan to 1.5" scale ( $\frac{1}{8}$ " = 1 inch), print it out, use spray glue to attach the plan to a sheet of cardstock, cut it out, and build a model of your proposed model railroad. Then you can adjust the various areas of the plan to represent the elevations shown on the original plan. This should allow you to visualize how the actual layout will look. Frank Hodina built a cardstock model of my roughly 30 x 60-foot multi-deck Nickel Plate Road layout before construction began, which resulted in some minor redesigns.

If you like what you see, you can then build a level platform using a grid of 1 x 3 or 1 x 4 lumber with the cross members set 16" apart. Draw a grid on the original track plan representing 6" squares, then transfer the plan using that grid as a guide to sheets of  $\frac{3}{4}$ " birch plywood. (Or print out the plan full size, tape it to the plywood, and use the printed copy as a guide.) Use a saber saw to cut out the plywood subroadbed



Trains.com Director David Popp built this 1" = 1'-0" model of the N scale Canadian Canyons layout to prove the concept would work before we started construction on our 2019 project layout. The double-deck layout had a helix and a semi-hidden staging yard, among other features. Bill Zuback photo

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— make sure you wear hearing and eye protection while doing this. Leave enough width on either side of the centerline for the width of the ties plus the width of the roadbed (I use HomaRoad milled Homasote roadbed; cork also works fine) plus another 1/4" or so for a shelf to attach your scenery base.

Position the sections of subroadbed on the benchwork. Splice them together with foot-long pieces of 3/4" plywood. Then use 1 x 2 risers to raise the subroadbed to the desired elevation. Keep the subroadbed flat in towns and industrial areas so cars spotted there won't roll away. Avoid sharp "vertical" curves where you transition from level areas to grades.

When the subroadbed looks good to your eye and checks out using a level where appropriate, glue down your roadbed and lay track, checking for unplanned dips and kinks as you go.

**Q** Does anyone know what size(s) of lumber was commonly used for the decking on wood-deck flatcars?  
*allegedlynerdy, via the MR Forums*

**A** When I saw this question I thought I would find a quick answer in my well-worn Burlington Northern equipment diagram book that covers flatcars. The railroad-published book is undated, but is probably from the early to mid-1970s based on the equipment listed. In most of the flatcar diagrams the flooring was simply listed as "wood." In a few instances material thickness was indicated. Examples included 2 3/8", 2 5/8", 2 3/4",



and 3". Sometimes further specifications were given, like fir and hardwood. Longtime colleague and popular model railroad book author Jeff Wilson encouraged me to check various editions of the *Car Builders' Cyclopedia of American Practices* from Simmons-Boardman Publishing Corp. In the 1949-1951 edition, a diagram for a Pennsylvania RR class F30A flatcar indicated the width of the oak flooring was 5 1/4" to 9 1/4". That said, you could probably get away with scale 2 or 3 x 6 or 8 boards for most applications. Bob Frankrone used 2 x 6 stripwood on an Athearn HO scale 40-foot flatcar. He shared his easy-to-follow techniques in "Add a wood deck to a flatcar" in the June 2021 issue of *Model Railroader*. If adding a flatcar deck board by board isn't your speed, no worries. Berkshire Valley, B.T.S., and ITLA Scale Models Inc. are just a few companies that offer decks designed to fit flatcars from major manufacturers. If you're looking for a do-it-yourself one-piece flatcar deck option, consider

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purchasing scribed wood or styrene sheet and cutting it to size. Painting and/or staining and some weathering will make the sheet material look even more like worn wood. Contributing Editor Lou Sassi shared his techniques for making a plastic flatcar deck look like weather-beaten wood in “Weather a flatcar in one evening.” You can read the article in the June 2009 issue of MR.

**Q** I'm interested in making my own version of the Sierra Northern. I am wondering if there is a track list available so I know what track to buy.

Chuck Rodgers

**A** Thanks for writing in, Chuck. The N scale Sierra Northern was featured in the August 2022 issue of *Model Railroader* magazine (pp. 29-33). The 3'-0" x 7'-6" layout, which featured Western mountain railroading in 1949, was built on a hollow core door.

We typically don't list the track components in layout visit articles. I reached out to the Sierra Northern's builder,



Robert McLaughlin's N scale Sierra Northern layout was featured in the August 2022 issue of *Model Railroader*. A reader wants to know what track components were used on the layout, which was built on a hollow core door. Robert McLaughlin photo

Robert McLaughlin, for additional information. Here's what he had to say:

I'm glad someone is interested in building a layout like my old Sierra Northern. It's been a long time since I built it, but here is what I remember. All of the trackwork was assembled from Atlas code 55 flextrack. Where needed, I cut pieces to fit with a razor saw.

The two 180-degree turns at each end were laid out using the old pushpin-and-pencil-on-a-string method to draw a

centerline arc. I feathered out the ends of these arcs a bit to make a more gradual approach to the turn. The width of the layout at the turns was 3 feet, so I made the radius of the curve 15 inches. This left room to feather the turn. Flextrack was then glued down to the arc centerline.

The switches were also Atlas code 55. The mainline loop used No. 10 switches while the branch line had No. 5 and No. 4 switches. **MIR**



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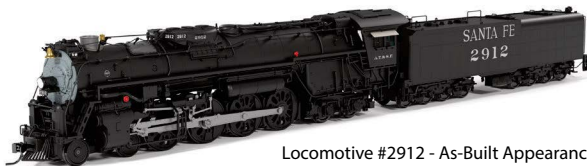
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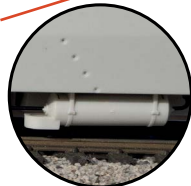


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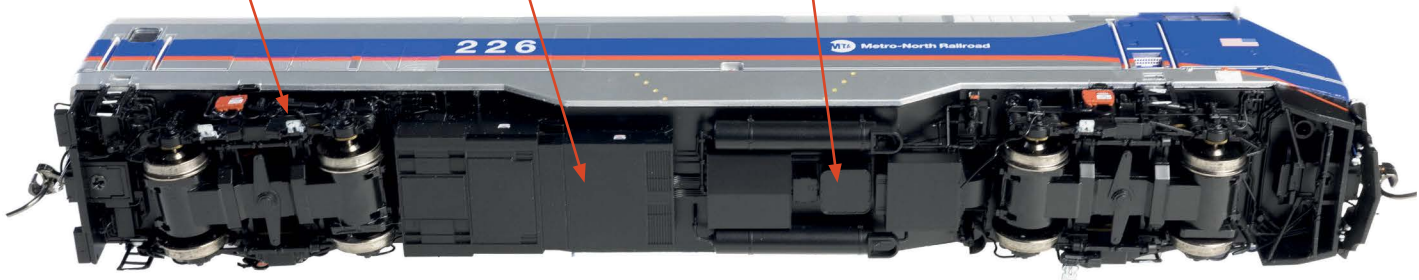


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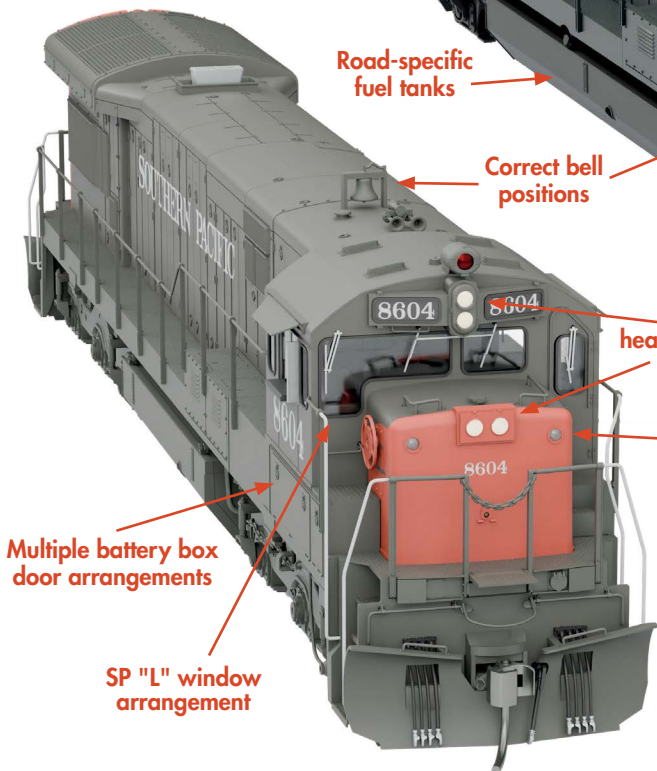
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The need for reliably operating rolling stock is the same for all railroads, full-sized or modeled. Lou Sassi offers several proven techniques he uses to keep the freight on the rails on his On30 Sandy River & Rangeley Lakes model railroad. Lou Sassi photos

## Fine tuning rolling stock for better operation

**Once I started** operating trains my On30 Sandy River & Rangeley Lakes, it didn't take long for me to realize I had a problem keeping cars on the tracks. My freight car fleet consists of 22 Bachmann cars, 14 of which are boxcars. Some time back, I re-equipped all of my rolling stock with Bachmann's low-profile trucks since they are a better representation of what the Maine railroads ran. [See "Low riders on the Sandy River" in the April 2016 issue of MR for more. — Ed.] This project was made easier after I called Bachmann and learned I could also order new underframes with flush-mounted bolsters, so I didn't have to rebuild the car's existing frames.

However, I soon discovered the cars needed more than upgraded trucks and bolsters to run reliably. After some experimenting, I came up with the following techniques to improve the operating quality of my boxcar fleet. These are easy tips that most On30 modelers can use to keep their trains running well.

### STEP 1 CHECK YOUR AXLES



**After the converting** my boxcars to low profile trucks, I noticed that when running them, either singly or in a train, out of a fleet of 14 cars, only two would traverse the layout without derailing on a turnout. Upon closer examination, I found that all 56 sets of wheels were lifting off the



rails at the frogs when passing between the running and guard rails of my Micro Engineering turnouts. When I checked the distance between the flanges of the wheels on each axle with an NMRA standards gauge ①, I discovered that in every case the wheels were too

## STEP 1 CHECK YOUR AXLES (CONT'D)



closely spaced, which would cause them to derail at the switch frogs.

Since one wheel on each axle is press fit over a plastic insulator that is itself press fit onto the axle, I remedied the problem by holding one



wheel tightly in one hand while slowly twisting the opposite wheel and at the same time, carefully pulling it away from the axle (2). The wheel will loosen slightly and pull out a fraction of an inch.

I then rechecked it with the NMRA gauge (3). To make sure nothing would slip out of alignment, I placed a drop of CA (cyanoacrylate adhesive) on each axle where it was pulled from the insulated wheel (4).

## STEP 2 WHY WEIGHT?



**In addition to out-of-gauge wheels** another thing that can cause problems during operation is running cars that are too light or vary in weight too much from each other.

Out of the box, the Bachmann cars weigh about 3½ ounces (5). The NMRA recommends 1½ ounces plus ¾ ounce per inch of length for On3 cars (which works for On30). That comes

to 5½ ounces total for my narrow gauge boxcars.

After cutting scraps of cardboard 1¼" x 1⅝" long I pressed two ¼ ounce self-stick automobile wheel weights onto each of them, then added another two weights on top of the first (6), giving me a total of 2 ounces of weight per car (1 ounce at each end). I painted the weights and



## STEP 2 WHY WEIGHT? (CONT'D)

cardboard assembly with flat red auto primer so they'd blend with the car's interior (7). Working through the open doorway, I used a bamboo skewer to add a drop of Weld Bond to the floor of the car as close to each end wall as possible. I then passed the cardboard pads, one at a time, through the doorway and used another skewer to push them into the wet glue and against the end wall of the car (8).



## STEP 3 LOWER CENTER OF GRAVITY



Before running freight cars on my HO scale West Hoosic Division, I always replaced the stock trucks and/or wheelsets with Kadee products. Kadee trucks consist of multiple metal components and sideframes that are sprung, allowing them to flex. And being made from metal, the Kadee trucks are heavier than plastic ones, providing a lower center of gravity that helps the cars track better.

Unfortunately in On30 that's not possible, as Bachmann's trucks are lightweight plastic castings. Even though I had increased the weight of the car, I felt it would be a good idea to also make the trucks a bit heavier.

I accomplished this with 1/4" flat washers with a 5/8" outside diameter. After taping them to a scrap of cardboard, I spray-painted the washers flat black, matching the truck sideframes (9). Later, I removed the washers from



the tape and brush-painted the remaining bare metal portions.

Next, I used a toothpick to apply Weld Bond glue onto the bottom of each truck and then placed the washers into position using a pair of tweezers (10). This adds weight lower on the car while still allowing access to the screw holding the truck in place.

With the washers on the trucks, plus the 2 ounces of weight added to the interior, I brought the total weight of each car up to 5 3/4 ounces (11).

Before entering service, I weathered the cars and put them back onto the layout. [See the January 2019 MR for Lou's "Basic weathering with pastel sticks." — Ed.] These modifications were easy to do, and I can now haul six- to eight-car freights (the maximum number that I run on my railroad) without concern that the cars will derail on the turnouts. **MR**



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# Detail, paint, and weather an S SCALE DIESEL

How to modify an American Models Baldwin switcher to more closely match a Baltimore & Ohio prototype

By Brooks Stover

Photos by the author

For more than four decades I've been researching and modeling the Buffalo Creek & Gauley (BC&G), a steam-powered, coal-hauling short line that operated from 1904 to 1965 ([buffalocreekandgauley.com](http://buffalocreekandgauley.com)). For most of its history, the line's primary customer was the Rich Run coal mine located at the end of the railroad. In the final three years, after the mine closed, the BC&G ran just 9 miles. The

railroad hauled cut lumber from a bandsaw mill at Swandale to an interchange with the Baltimore & Ohio (B&O) at Dundon, W.Va., the railroad's only connection to the outside world.

Up until the end, the BC&G operated three chunky 2-8-0 Consolidation steam locomotives, numbered 4, 13, and 14. It was those nifty Consolidations that first drew me to the BC&G years ago. So why am I writing about modeling a diesel locomotive?

After the sawmill closed and the BC&G ceased operations in 1965, the railroad sat silent until 1971 when a new company, Majestic Mining, opened a small coal operation near the original Rich Run mine. During its 14 years of operation, Majestic Mining leased a number of diesels from the B&O before it eventually purchased its own locomotive. One of the leased engines was 9271, a Baldwin DS4-4-1000, one of the 49 such engines the B&O had.

There are very few photos of the Majestic Mining operation, but I was able to find one nice image of the Baldwin while it was in service on former BC&G trackage. Truth be told, the 9271 wasn't a handsome engine. The proportions of the Baldwin engine are rather awkward, as the cab looks too small for the engine, at least to me. To make matters worse, the B&O scheme applied to the engine does it no favors. The wide sill stripe is overpowering and



In the early 1970s, Majestic Mining Co. leased Baltimore & Ohio Baldwin DS4-4-1000 No. 9271 to haul coal from a loadout at Bone Town Gap, W.Va., to the B&O interchange at Dundon on former Buffalo Creek & Gauley track. Brooks Stover shares how he detailed, painted, and weathered an American Models S scale Baldwin S12 to more closely match the prototype locomotive.

there's nothing interesting about the rest of the solid blue scheme. Nonetheless, I've modeled several of the other engines leased by Majestic Mining, so I decided to tackle the 9271.

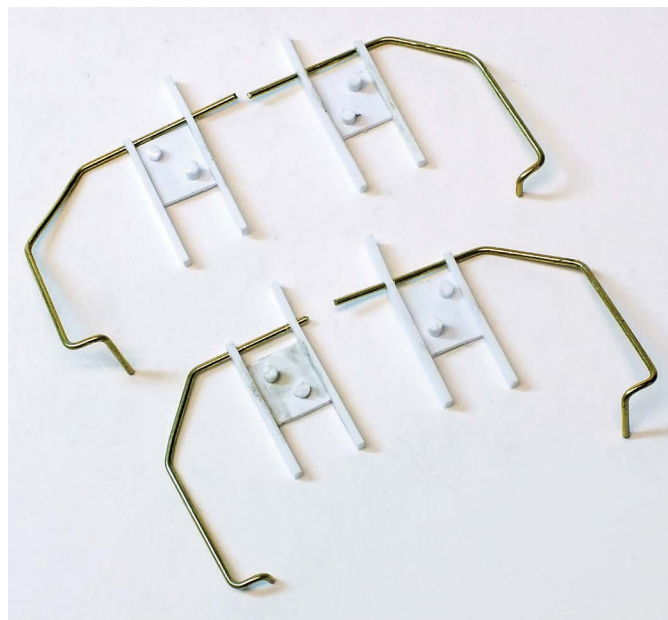
### Modeling in S scale

I've modeled in S (1:64 proportion) exclusively for decades. As I discussed in the article "S scale today" in the November 2024 issue of *Model Railroader*, while the size is ideal, being neatly positioned between HO and O, the availability of S products is limited. A certain amount of creativity is required to get what you want. But that's always been half the fun for me and for many who choose S scale. In this case, however, a great starting point was readily available.

American Models LLC (americanmodels.com) of Whitmore Lake, Mich., is currently the only full-line manufacturer of S locomotives, rolling stock, and track. One of its offerings is a Baldwin S12. Though there are small differences in appearance, the S12 is very close to the DS4-4-1000, so the American Models engine was ideal for this project.

The manufacturer offers its S12 decorated for a variety of railroads, including B&O, but not in the scheme I needed. Fortunately for me American Models produces an undecorated model, which I used for this project.

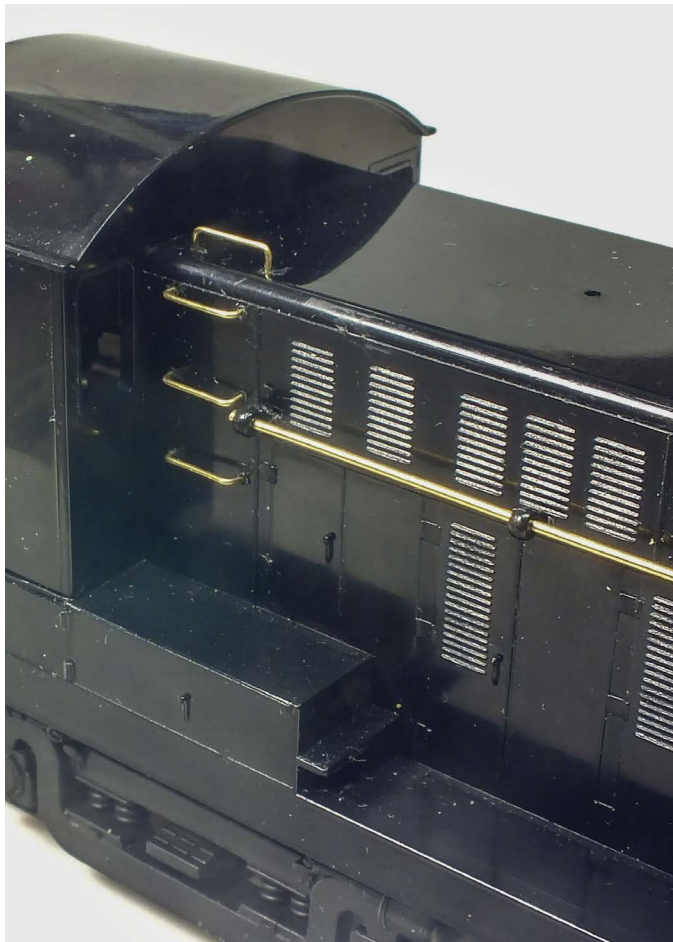
One place the AM Baldwin isn't accurate is the truck sideframes. The prototype was fitted with AAR Type A switcher trucks. American Models used the



**1 Styrene and brass.** Brooks used styrene strip and rod to model the distinct m.u. stands on the Baldwin switcher. He made the end handrails from .032" brass rod and trimmed them to size after they were installed on the model.



**2 Safety first.** The American Models Baldwin S12 shell lacked handrails by the rear cab door. Brooks made the pair shown here from .020" brass rod.



**3 Long hood.** Brooks added the walkway handrails using commercial eyebolts and .032" brass rod. He made the grab irons on the engineer's side using .020" brass rod.

sideframes from its Alco locomotives on this model. I chose not to replace or modify them.

### Cab and hood details

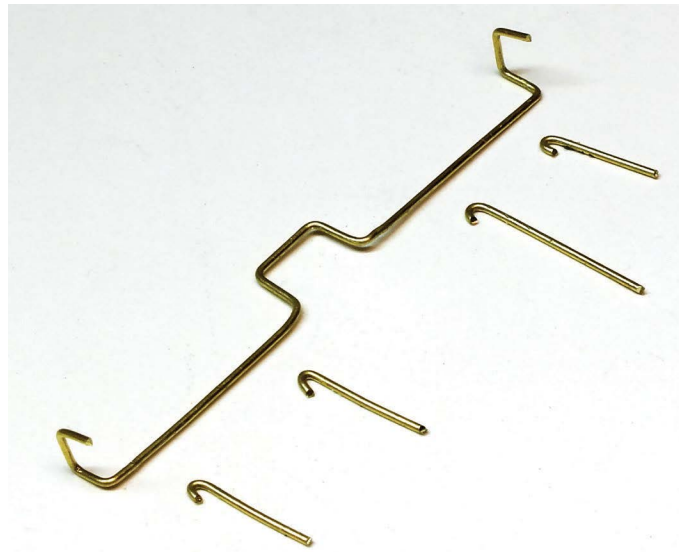
The American Models Baldwin is accurately proportioned with a sturdy, cleanly molded body shell. The chassis is fitted with a large can motor and flywheel mounted in the middle, driving all eight wheels. Like all AM locomotives, the Baldwin is a smooth runner with plenty of power. The size meant there was adequate room for a sound decoder, stay-alive device, and a speaker.

Though the AM Baldwin switcher has plenty of good points, it falls short when it comes to details, and that's what this project was all about. Like all the B&O engines in this series for

which I found photos, the 9271 had a rather unusual setup for the m.u. equipment. The connection points for the cables were on panels on either side of the drop step. I built these panels and supports from styrene strip and used short lengths of styrene rod to represent the round m.u. receptacles.

Next, I made the front and rear handrails from .032" brass rod, shown in **1** on the previous page. I didn't install the four m.u./handrail sub-assemblies until after the shell was painted as I was concerned that I wouldn't be able to get good paint coverage with them installed. The drop steps, brass castings from B.T.S. (btsr.com), were installed before painting.

The AM model comes with molded, flexible plastic handrails. The ones for the front steps are attached to the



**4 More bending and shaping.** Next, Brooks turned his attention to the front and rear pilots. He shaped the uncoupling levers and J-shaped mounting brackets from .020" brass rod.

sill. On the prototype, however, they were attached to the top of the walkway. I filled the holes in the sills with styrene rod, fabricated handrails and stanchions from .032" brass, and drilled new mounting holes on top of the walkway.

Similarly, I replaced the plastic vertical handrails for the rear corner steps with ones that I shaped from .032" brass rod. The smaller handrails on either side of the rear cab door aren't included with the AM locomotive. I made a pair from .020" brass rod **2**.

The horizontal walkway handrail on the sides of the long hood aren't represented on the American Models shell. I used commercially available eyebolts and .032" brass rod to re-create that detail. Then I shaped .020" brass rod for the grab irons just in front of the cab on the engineer's side of the long hood **3**. In addition, I added four U-shaped lift rings, also made from .020" brass rod, to the top of the long hood.

From the box, the Baldwin switcher has single-lens headlights on both ends. However, the full-size unit had twin-beam headlights. I was able to find these at Des Plaines Hobbies. I'm glad the

headlights were available as they're an important visual element of the prototype.

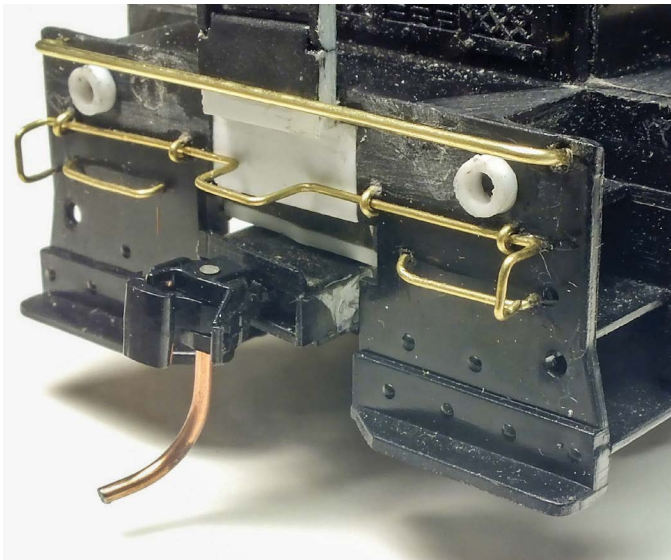
### Pilots and other details

Not to be overlooked are the front and rear pilots. I formed the uncoupling levers from .020" brass rod. The mounting brackets are J-shaped pieces that I made using the same brass rod **4**. I drilled corresponding mounting holes for the brackets in the face of the pilot on both ends of the locomotive.

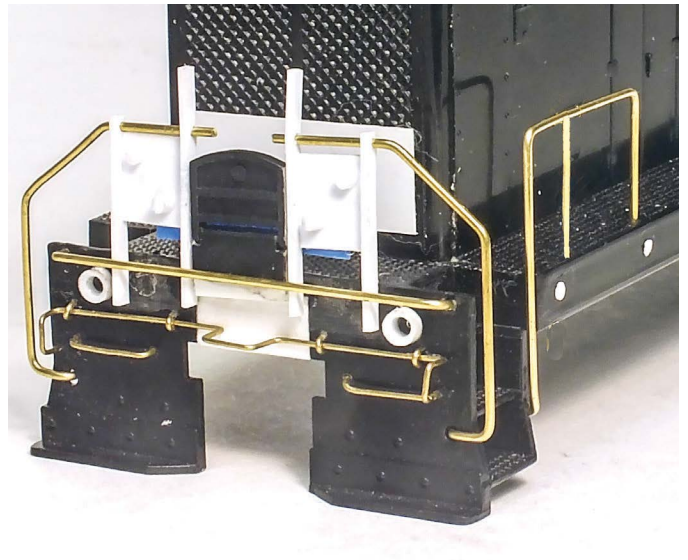
The AM shell has molded poling pockets, but their location was problematic for other details I wanted to add. I removed them with a chisel blade and made new pockets from pieces of styrene tube, chamfered with an oversized drill bit.

I again turned to the .020" brass rod for the two grab irons below the uncoupling lever. The footboard handrail that runs the full width of the pilot is .032" brass rod. All of these items can be seen in **5** on the opposite page.

The final details I added to the switcher prior to painting were cab sunshades (B.T.S.) and marker lights, which I had in my parts drawer. I fashioned the sheet metal



**5 Plain to prototypical.** In addition to the uncoupling levers, Brooks added grab irons (.020" brass rod) and a footboard handrail (.032" brass rod) to the pilots. The poling pockets are styrene rod chamfered with an oversized drill bit.



**6 Pre-paint details.** The Archer diamond plate decals on the walkways and steps and the .010" styrene cover on the lower portion of the radiator grill are visible in this image. The front handrails and m.u. stands were removed before painting.

panel that covers the lower portion of the radiator grill from .010" styrene.

I also applied O scale diamond plate from Archer Fine Transfers to the tops of the side walkways, end platforms, and corner steps **6**. I used the O scale version of the decals, which feature raised resin detail, as the larger texture shows up better on the dark body color.

### Paint and decals

I've built three other B&O diesels from this era and painted them with Floquil Dark Blue. Since I had a nearly full bottle on hand, I used it on the Baldwin switcher. Floquil paints are no longer available, but similar colors are available from other hobby paint manufacturers. I applied the solvent-based paint with an airbrush in a well-ventilated area while wearing personal protective gear.

Though there are a lot of S scale decals on the market, none were available for the B&O Baldwin switchers. I turned to Bill Brillinger at Precision Design Co. to produce decals based on prototype images. The set includes the SAFETY FIRST WATCH



**7 That new paint smell.** Here's how the switcher looked after Brooks painted and decaled it. He brush-painted the exhaust stack aluminum.



**8 It's the little things.** Brooks added two Artista crew figures to the model. He mixed Vallejo acrylic yellow, matched to the decals, to paint the step faces, handrails, and grab irons.



**9 Finishing touches.** Brooks added m.u. hoses from Master Creations to the front and rear of the diesel, tucking them behind the footboard handrail as seen in prototype images. He simulated the roll-up canvas cover for the radiator using styrene rod and fine wire.



**10 Ready for service.** With all of the detail parts installed, Brooks weathered the American Models Baldwin DS4-4-1000 S scale switcher with Vallejo acrylic paints and ground powder pastels. He used prototype images as a guide when applying the rust and grime to the end-cab diesel. The weathering makes the 9271 look like it has been earning its keep for many years.



**11 On the layout.** Even though Brooks' model railroad is set a few years before the B&O switcher arrived on BC&G rails, he developed an operating scenario that makes it feasible for the end-cab unit to appear on his model railroad. Here, B&O No. 9271 is busy setting out loads at the B&O interchange at Dundon, W.Va.

YOUR STEP stencils for the pilots and properly sized yellow sill stripes. See **7** on the previous page.

### Finishing touches

With the painting and decaling finished, I reinstalled the cab window glazing that came with the model. I also added two crew figures to the cab, both from Arttista.

I airbrushed the handrails blue. After installation, I brush-painted the step faces and select handrails and grab irons with Vallejo acrylic yellow mixed to match the

yellow of the decals. Then I painted the B.T.S. wind deflectors silver and attached them to the cab sides with canopy cement. After that, I installed the windshield wipers and single-chime air horn. Finally, I brush-painted the exhaust stack aluminum **8**.

The rubber m.u. hoses are from Master Creations. I tucked them behind the footboard handrail as seen in prototype photos. I made the distinctive roll-up canvas radiator cover from a small piece of styrene tubing and a couple of pieces of fine wire **9**. I weathered the end-cab

switcher with Vallejo acrylics and ground pastel powders.

### In service

I'm very happy with the way the locomotive turned out **10**. The robust drive train and all-wheel pickup, coupled with a Tsunami2 sound decoder and CurrentKeeper (both from SoundTraxx) and a speaker from RailMaster Hobbies, makes for a locomotive that runs and sounds as good as it looks.

I've developed a scenario that makes it feasible for this engine to appear on my

layout even though it's set a few years earlier than the 9271 was on BC&G rails **11**. I'm enjoying the sights and sounds of this not-so-hand-some engine in S scale. **MR**

*Brooks Stover models the Buffalo Creek & Gauley. His 12 x 25-foot S scale layout was featured in Great Model Railroads 2023. The retired General Motors engineering executive is a National Model Railroad Association Master Model Railroader. Brooks' article "Creating composite photographs" appeared in the August 2025 MR.*

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# THE EVOLUTION OF THE **NORFOLK SOUTHERN** NEW HOLLAND DIVISION

Collaborations and friendship helped build the railroad

By **Bill Orman** • Photos as noted



① Seeburg Industrial Park is a hive of activity on Bill Orman's HO scale Norfolk Southern layout. Chuck Higdon photo

**MY IMMERSION INTO MODEL RAILROADING BEGAN** at an early age with the fascination of peering through the car window at passing train traffic in and around our hometown. The experience of driving under a rail bridge leading to the local station and yard brought the sights, sounds, and smells of steam locomotives through the open car windows.

Other rail crossings in the area allowed views of the trains that supported the phosphate mining and heavy manufacturing industries. Early memories include trips to the local station and yard with my grandfather, who I later learned had been the telegraph operator in his earlier years.

The yard visits were enhanced by my grandfather's knowledge and being allowed in some areas that were off limits to the public. We were able to walk through a concrete tunnel under the yard



② Norfolk Southern Electro-Motive Division SW1500 No. 2324 shoves a load of malt to Brett's Brewery in Tucker. Chuck Higdon photo

and get a much closer view of those enormous steam engines, as they seemed to a 6-year-old. These experiences, as well as seeing model layout displays at a hobby shop, were the catalyst that sparked my interest in the modeling hobby.

## First layouts

My parents built a small Lionel layout for my brother and me for Christmas, complete with two sets of diesel engines and cars, one passenger and one freight train. Just two separate loops at different levels, but it was great! We enjoyed "playing trains" until we moved four years later to another home. At that time, my grandfather moved all the track, buildings, rolling stock, etc. to a room above his garage and expanded the track plan to a double track layout with crossovers and sidings. It was larger with more opportunities to operate some of the animated rolling stock, like milk cars. Within the next year, I was building HO scale rolling stock kits and even one engine kit, *The General*. I still have *The General* on display for the railroad museum on my present layout.

Like many of us, my college years, early family, and work years didn't allow much time for model railroading. My interest was still there, but time didn't allow an active pursuit of the hobby until

our children became a little older and I built a small direct current HO layout on a 4 x 8 plywood sheet on sawhorses in one side of our garage. It could be assembled and taken down as needed, but it helped introduce our children to the hobby and reignite my interest. I had kept abreast of the hobby through *Model Railroader* and other publications on a sporadic basis, but I didn't see a possibility to build a more complete layout until retirement.

Fast forwarding to my retirement in 2007. We moved back to Tennessee from Illinois, where I had worked the previous eight years. It took some time to get moved into a new home and complete preparations in our basement, but by 2010, I was able to begin concentrating on building a model railroad. I was excited by the challenges I knew it afforded, learning new skills

required to build a layout and keeping me focused on enjoyable tasks.

I had previously spent time reading about the various newer products and technologies like Digital Command Control. I also called a friend to view his railroad and discuss the process he had experienced. His

layout was beautiful, and I thought his firsthand knowledge would help me determine if I could complete the project. That discussion convinced me I could build the layout I was envisioning and complete the project. It also identified one area of my skill set that would require





**3** A Broadway Limited Imports Trackmobile spots a tank car of corn syrup at the Quaker Oats plant in Simmons. Chuck Higdon photo

Lance Mindheim's The Shelf Layouts Co. Lance's process of collecting the client's requirements and wishes is detailed and quite helpful. He's very professional in guiding the client through multiple options and never pushes toward what his own preferences might be. Instead, he discusses how the option might affect the plan overall. Lance did request I send my plan as a guide to my thoughts. His comments on my plan were that I was trying to put too much into the space, and "sometimes, less is more." After a few months, I had a track plan that I knew would work.

### Help with benchwork

By mid-June 2012, I was ready to start building my layout. After discussions with Lance concerning benchwork, I decided to use Sievers Benchwork. Woodworking is the missing skill I referred to earlier, and I had no power tools at the time. Lance had used the company's benchwork for clients previously and he was complimentary of it.

During a previous vacation to Wisconsin, I talked my wife, Sarah, into a ferry ride to Washington Island to have a firsthand look at Sievers' products. The only "construction" I had done previously was building "duck blinds" with hunting buddies to house four to six people. They were sturdy but were never square.

Construction began in June 2012 with painting the room a sky blue and assembling the first side of the benchwork. My wife was a great help in getting the



**4** The Seeburg Industrial Park is a warren of track nestled in canyons of concrete buildings and steel containers. A lone GATX Rail Locomotive Group Geep prowls the area looking for its next pickup. Rusty Lacy photo

sharpening — more on this later. At this point, I was ready to start putting my design thoughts on paper.

### Finding the right space

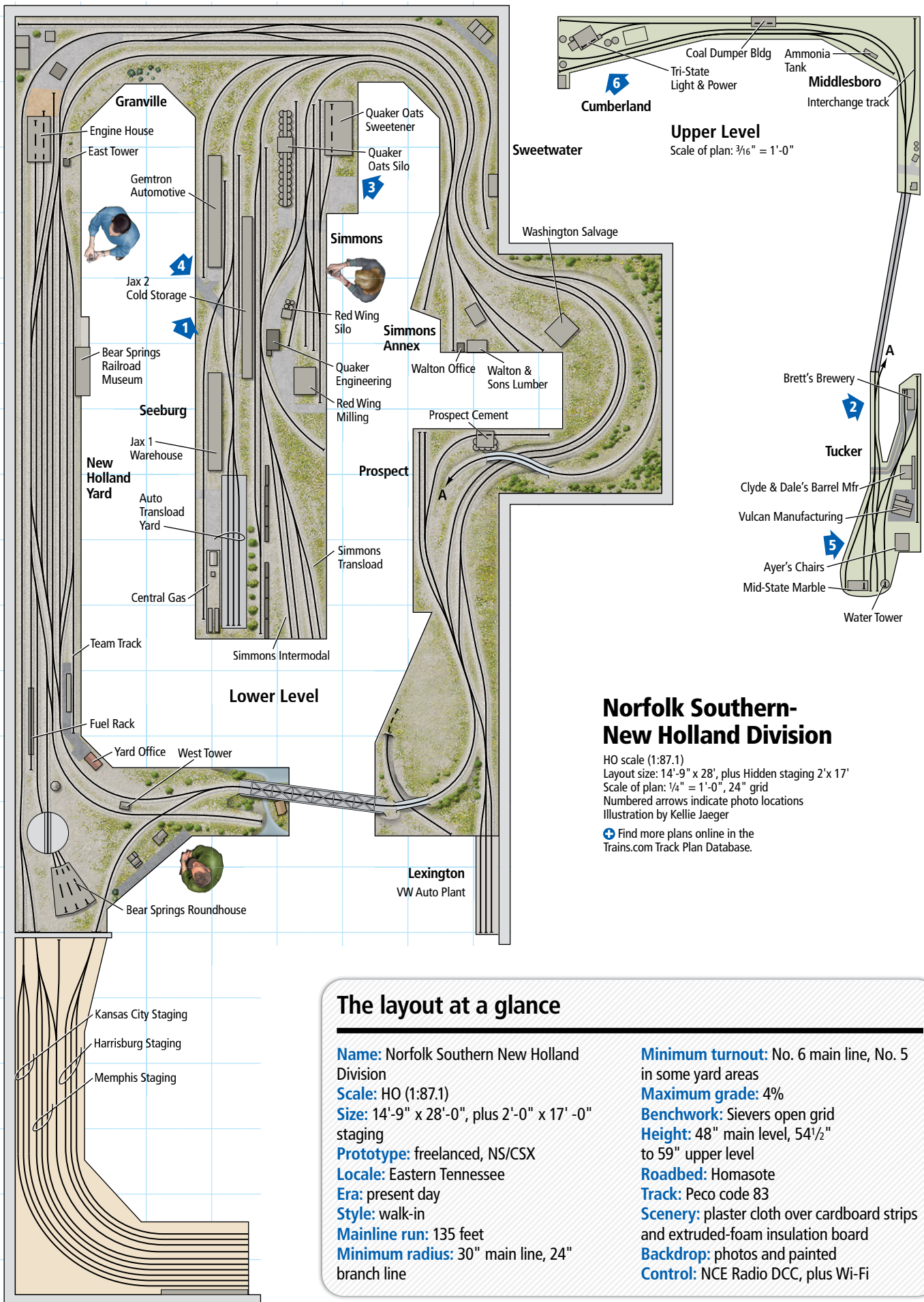
My original thought was to have the layout in our basement, but as I tried various designs it became clear that too many compromises would be necessary to be successful, primarily due to multiple entrances and exits from the room. I then looked at a bonus room over our garage. It had only an entrance door. The bonus room has angled walls on each side due to the roofline, but the angle starts 6 feet from the floor, and rises to the 9-foot ceiling. So there was no issue with the height of the layout.

Now I was ready to create the layout design. The room is 15 x 28 feet and I wanted the layout to go around the room with a peninsula and a double-ended

yard. I knew I wanted to operate, but only envisioned having myself and maybe a couple of grandchildren, at most, running the railroad. As I worked through various arrangements, I couldn't get to a point of completion or satisfaction. I was 90% there but I needed some help completing my plan.

My general thoughts were to build a present-day freelanced layout representing the southeastern Tennessee region where we live. The "present day" decision came from our grandchildren when I asked what trains they might enjoy seeing run on the railroad. Even though it is present day, I could enjoy steam engines and excursion trains to fulfill my affinity for those relics of the past.

The main traffic was to be intermodal and automobiles, as well as coal, grain, chemicals, and sweeteners. I contacted three companies that advertised model railroading planning services and chose



## Norfolk Southern- New Holland Division

HO scale (1:87.1)  
 Layout size: 14'-9" x 28', plus Hidden staging 2' x 17'  
 Scale of plan: 1/4" = 1'-0", 24" grid  
 Numbered arrows indicate photo locations  
 Illustration by Kellie Jaeger

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

### The layout at a glance

**Name:** Norfolk Southern New Holland Division  
**Scale:** HO (1:87.1)  
**Size:** 14'-9" x 28'-0", plus 2'-0" x 17'-0" staging  
**Prototype:** freelanced, NS/CSX  
**Locale:** Eastern Tennessee  
**Era:** present day  
**Style:** walk-in  
**Mainline run:** 135 feet  
**Minimum radius:** 30" main line, 24" branch line

**Minimum turnout:** No. 6 main line, No. 5 in some yard areas  
**Maximum grade:** 4%  
**Benchwork:** Sievers open grid  
**Height:** 48" main level, 54 1/2" to 59" upper level  
**Roadbed:** Homasote  
**Track:** Peco code 83  
**Scenery:** plaster cloth over cardboard strips and extruded-foam insulation board  
**Backdrop:** photos and painted  
**Control:** NCE Radio DCC, plus Wi-Fi



5 Norfolk Southern 2324 spots a boxcar at Ayer's Chairs. The Tucker section of the layout was added when Bill's desire for more operational opportunities arose. Rusty Lacy photo

### Operations lead to evolutions

As I proceeded through the building stage, I got to know members of a local modular club that met in a shopping center space where some of their modules were set up. Through those connections, I met additional model railroaders who either had a layout or were in the process of building one, all designed with operations in mind. Some of the guys operated with a group north of Atlanta and asked that I join them. What an eye-opener for operating schemes!

The trackwork was complete in late June 2014, and I had my first operating session in July. As you may imagine, it was far from smooth, but it was fun. Each of the following sessions introduced suggested changes from the previous one. However, we continued to have issues, even after reducing the number of cars to be moved during the session. The time for some changes to correct the issues had arrived — the beginning of the “evolutions.”

The first change suggested was adding a separate staging area. I contacted Lance to get his thoughts on this and he was in agreement. Since the layout is 48" high, we discussed placing it at a lower level, about 12-15 inches below. After careful consideration, we determined



6 Tri-State Power in Cumberland receives strings of coal hoppers and ships out ash in covered hoppers, such as the car being picked up by Southern Ry. No. 1033, an Electro-Motive Division NW2 switcher. Rusty Lacy photo

project underway. An extra set of hands was helpful in speeding up the leveling process as the sections were bolted together. I used 3/4" plywood as subroadbed raised on 3/4" blocks above the benchwork. This idea was a tip from Lance. Trackwork began as each full wall of benchwork was completed.

### Wiring and control

As I assembled the benchwork, I marked sections in 4, 6, 7 and 8-foot lengths for future wiring and disassembly needs. Each “module” is a stand-alone section for its bus and track power drops. The section bus is connected to the main bus and is detachable.

In the beginning, there was just one main bus since I expected my operations

to be just for one to three individuals. I chose the NCE 5-amp system for DCC power and used DC power for switch machines and illuminated structures and scenes.

As I was building out the benchwork around the entrance to the room, I found there was a 14 x 36-inch area available to use that wasn't on the plan. With a slight change to one of the stub-end switching tracks, I could incorporate an auto rack loading area at an auto assembly plant. I installed three tracks for spotting cars and added a backdrop image of a similar area at nearby VW plant. This change supported the movement of auto racks to a vehicle transload yard. The empty auto racks then go from the transload yard to staging.



that wasn't practical. Then someone asked, "What is behind that door that always remains closed?"

It was a full bathroom, with enough width to contain a 2 x 10 foot yard. Of course, I'd have to cut a hole in the wall to make this possible. I knew that was going to require "permission" from a higher authority. As I began my explanation, and before I could finish my sentence, my wife said: "so you want to put a hole through the wall?" I laughed — she had clearly overheard some of our conversation. To my amazement, she agreed. "As long as it was reversible, when needed," she said.

After the yard was completed, one of our daughters and our son-in-law were visiting and wanted to see the layout and its progression. He immediately christened it Crapper's Yard. He gifted me a framed sign, which was proudly placed over the door to bring a chuckle to all visitors.

Over time, I've made revisions to the staging yard. In 2018 I added a 90-degree turn to the benchwork. This modification allowed me to add 5 feet to each track. I also opened a second hole to move a turnout in the main area. Repositioning the turnouts let me add more length to the staging tracks.

In 2021 I added a third opening. This gave traffic from the opposing direction a third destination in staging. I also expanded the number of tracks to 10.

Another addition was incorporated simultaneously as hidden staging

progressed — an upper level, known as Tucker. This was adjacent to the dormer window space, to provide additional switching opportunities for five industries and to create a view block for the transition to the auto assembly plant. The grade to Tucker is 4% and requires a helper engine to be added at the yard.

As operating schemes advanced, I wanted to increase the diversity of car types used for switching. Originally, there were two suppliers for assembled auto parts on the peninsula business park moving the same car types. I decided to change one of those areas to a Quaker Oats plant and include an adjacent flour mill. Work began in December 2020 on Quaker Oats, which had been a prominent local business for many years.

This change would add covered hoppers (grain) and tank cars (sweetener) to the roster. To provide enough space, I added an 8 x 36-inch section to the benchwork to allow a transload building for tank cars. The change to Quaker Oats also required that I move the lumber yard and the salvage yard from the peninsula (Simmons) across the aisle to what became Simmons Annex.

The concept of a coal-fired power plant was also discussed to add other car types. As before, it was a question of how to incorporate it. Since Tucker already existed, I drew plans to add a coal facility that would require a bridge across the dormer window opening to an upper level a few inches higher than Tucker.

After discussions with several of my crew members and a few revisions, construction started in December 2018 and continued until mid-2021. I still wasn't certain how I would build the bridge that would be more than 7 feet long, but knew I would find a solution.

## Meet Bill Orman

**Bill Orman lives** in Soddy Daisy, Tenn., with his wife, Sarah. He retired from Olan Mills Studios after 30 years. He began work on his railroad after retirement and has also enjoyed playing golf and hunting game birds since the age of 12. He appreciates having made new friends in all of these endeavors.



The level of the coal-fired plant is 59", a few inches higher than Tucker. The total length is 21 feet. This area provides space to contain the coal plant, silos for lime and ash, a coal dump with tracks for loaded and empty hoppers, and an area for loading anhydrous ammonia. The approach from the bridge provides space for farmland, other scenery, and an interchange track. The interchange adds another job, either as a local run from the yard or the Tucker job, depending upon which of my three variations of operating session is used.


The bridge from Tucker to Cumberland was built using U-shaped aluminum and balsa with supports on both ends. As with many of us, the Covid shutdown in 2020 stopped our regular operating sessions. It did allow extra time to work on completing the changes that were already in progress.

We had our first operating session post-Covid on June 27, 2021. It included the coal train and the new staging destination, Harrisburg, Pa. This "new beginning" seemed like an appropriate time for a name change to my railroad. When we began operations, I had to create a name and chose MLS&T, which are the first name initials of our seven grandchildren (no, none of them have the same name, just first initials). The new name, Norfolk Southern New Holland Division, recognized the completion of the structural plan and a new beginning for the layout.

## With a little help from my friends

Throughout the process, I've had a lot of help and a lot of fun. From crew members assisting with Tortoise by Circuitron and Rapido RailCrew switch machines and offering benchwork and track plan suggestions, to my grandkids making puffball trees and ballasting and my wife helping paint walls, assemble benchwork, and sew fascia skirts, the layout has become a family affair.

The Norfolk Southern New Holland Division has given me more than a place to run trains. It has provided me with new skills, additional friendships, and countless hours of satisfaction. More importantly, I've learned that this hobby can be whatever you make of it. Whether you're into construction, scenery, history, electronics, operations, or collecting, there's room for everyone. The key is to start somewhere and enjoy the train ride!

We look forward to seeing you here during the open houses and operating sessions during the 2026 NMRA National Convention. 



The East Troy local pulls a string of hoppers across the Mukwonago River bridge on our HO scale project railroad. As shown here by the river, backdrops are a great way to extend modeled scenes all the way to the horizon.

# EAST TROY INDUSTRIAL PARK

## EASY PAPER BACKDROPS

**Part 5:** Combining printed commercial products with a painted hardboard sky for our project railroad

By David Popp // Photos by the MR staff

**Y**ou can make the best models in the world, but as soon as you can see the layout room wall behind them, they lose some of their realism. Adding a backdrop behind your layout is a great way to extend the miniature world beyond what you've modeled.

Back in part 2 of our project railroad series, I explained how we built the backdrop for our layout using simple wood frames covered with tempered hardboard. We painted the backdrop's sky with a hazy horizon using light blue

and white latex flat interior house paints. Though the blue sky is nicer than a bare wall, it's still not that much of an improvement.

Fortunately, commercially available products make adding a detailed skyline to your model railroad is easy. We worked with backdrop maker SceniKing ([sceniking.com](http://sceniking.com)) and ordered a variety of scenes to use on our layout. These come as rolls of paper printed with details that are scaled to model sizes. Follow along as we show you how we easily adapted them for use with our painted sky.

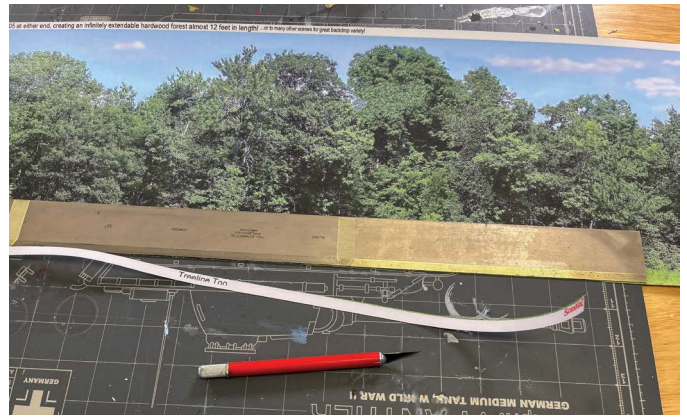


SceniKing offers a wide variety of backdrops in several scales. You can order them with or without a printed sky.

## TRIM THE BASE

**Cody Grivno and I** spent a day preparing and installing the backdrops on the layout. We purchased backdrops from SceniKing's Juniors line, as these have a minimal amount of sky on the printed roll, which is designed to be removed before installation. The first step is to trim away material from the base of the backdrop, as the printing does not extend all the way to the

bottom. Using a metal straightedge and a sharp hobby knife, Cody trimmed the bottom white strip from each of the backdrop rolls. We scrounged the workshop for as many cutting mats as we could find and laid them out in a line to give us plenty of working room. Even though our scenery is relatively flat, in some places we eventually cut notches into the base of the paper backdrops to follow elevation changes in the scenery.



Using a straightedge and a sharp hobby knife, Cody trimmed the unprinted bottom strip from the backdrop.

## CUT AWAY THE SKYLINE

**The last time we did** a project like this, Cody and I were working mostly with industrial buildings that had straight edges. Our East Troy Industrial Park layout is quite different, however, as there are trees visible in all directions. As such, we used a lot of tree-lined backdrop sections. While we could have just kept part of the printed sky, matching it to our painted sky would have been difficult at best. As such, the printed sky had to go.

In the past we've used knives to work our way around all of the treetop detail. *Classic Toy Trains* Editor Rene Schweitzer and I did just that on the State Line N scale layout years ago. It took us days to get through 16 feet of backdrop – a process I didn't want to repeat!

This time around, Cody and I tried crafting scissors.

We picked up a set of 12 Hobby Lobby decorative craft scissors (item 290544), which includes a variety of patterned blades that make decorative cuts. We experimented with several types until we found a scalloped pattern that includes both curves and points (dark blue handle), which worked perfectly for the irregularities of the printed tree canopy. Using the scissors, we trimmed away much of the sky, leaving just a hint of blue at the edges. The repeating pattern was fine enough that from 24" away you'll never notice it.

In places too tight for the scissors, especially where we had small, trapped spaces of sky, we used a sharp hobby knife to clear it away.

Both the scissors and the knives worked really well. We were able to clip out the first 20 feet of backdrop in just a couple of hours.



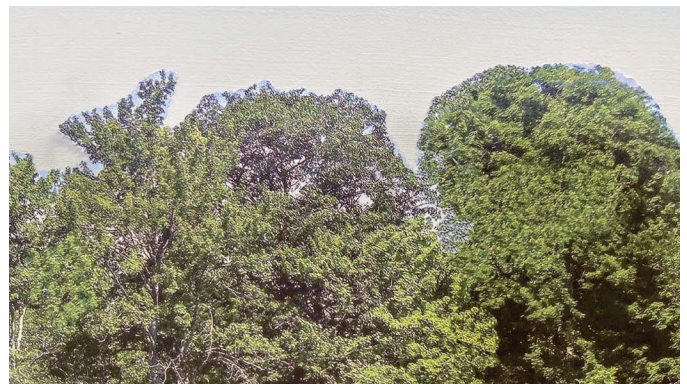
For less than \$15, Cody and David got a bucket of 12 crafting scissors from Hobby Lobby with blades that had a variety of patterns, as marked on the sides of the tools in white.



This pair of scissors had a fine scallop pattern with single and double points that proved effective for cutting away the blue sky around the treetops.



For smaller cuts, Cody and David used hobby knives, which were better at working in tight places than the scissors.



While you can still see a fringe of blue where the trees meet the painted backdrop, it is hardly noticeable.

## MAKING IT STICK

Anytime you add glue to a project, things tend to get messy, and our backdrop was no exception. To apply the backdrop sheets to the hardboard, you need to be able to apply a lot of adhesive quickly. Nothing works better for this than 3M Super 77 spray mount for this task.

After preparing a backdrop section for mounting, Cody took it into our paint room and laid it face down on a sheet of plastic tarp on the floor. He also fired up the spray booth to vent the fumes from the room and donned his respirator and a pair of gloves. Cody then applied a liberal coat of spray adhesive to the back. He used scrap boards from the benchwork project to hold the backdrop flat for this process.

With the adhesive still damp, Cody and I then

carefully positioned each paper section onto the painted hardboard. This is a two-person task, and you really get only one shot at positioning a panel correctly.

While you can peel it away carefully before the adhesive cures, you will need to spray it again before reapplying the piece. Before applying the adhesive we made light pencil marks on the hardboard to help position the pieces properly. Once a section is tacked in place, carefully smooth it out to eliminate air bubbles and make sure the edges are flush.

One important note about this step: When spraying the next section, be sure to use a different section of tarp, or your backdrop will stick to the overspray on the plastic sheet from the previous section. We simply kept refolding the plastic to get a clean face each time, then disposed of it when finished.



Cody applied 3M Super 77 adhesive to the back of the paper backdrops, using scrap boards to hold the ends flat and keep the paper section from moving.



It takes two people to position and apply long sections of backdrop because the adhesive will stick as soon as it comes in contact with the painted hardboard.

## EXTENDING THE RIVER

To keep our river from ending at the backdrop, we ordered a special river section from SceniKing. Unlike the other backdrop sections, the river piece dips down about two inches from the baseline, allowing it to follow the riverbed below the ground level. The river is about 11-12" wide, and we were fortunate that the riverbed we'd already installed in our benchwork only needed to be widened slightly to match.

We trimmed up the edges and the skyline similar to the other sections. However, at the far end of the river the trees are very small, so we switched to scissors with a straight blade on this section, as the individual branch detail didn't show.

While it was fairly easy to slip the paper river behind the plywood benchwork and

riverbed while testing the fit, it would have been impossible to do so with the adhesive on it. As such, after carefully marking the location of the benchwork and riverbed on the painted hardboard, we removed this part of backdrop from the layout, making it much easier to apply the river cleanly. After the river was glued in place, we replaced the backdrop on the layout.

Unlike the trees and farm scenes, the river section is not a full roll so it needed to be spliced into other backdrop pieces. While the flat, open grassy spaces of the printed river worked well on the right side of the image, we needed taller trees to appear more quickly on the left to better match what we had planned for foreground scenery. SceniKing backdrop sections are made to connect together at straight edges,



David and Cody test-fit the river section. Although we didn't know it at the time, the river was almost the same width as the one printed on the backdrop.



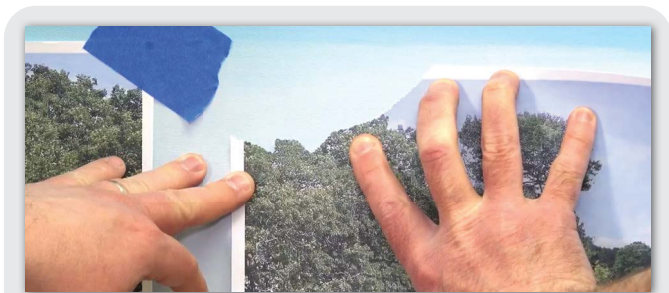
Because the river has to fit below the riverbed and benchwork top to complete the illusion, David and Cody removed the backdrop to apply it more easily.

and the company lists which backdrops can connect seamlessly to each other on its website. However, the printed trees and buildings are also easy to clip around, especially when using craft-scissors for foliage. This allows one backdrop section, or even just small pieces, to be layered over the next without having an actual connecting point.

With this in mind, Cody and I started the next tree line section at the river's left bank by cutting out the first full tree to appear on the printed roll. After testing it to make sure it would work, we finished clipping out the rest of the section, then applied it over the left side of the river print. This layering technique works really well with the photo prints.



Although you normally don't see sailboats on rivers, these Preiser models give you the idea that thanks to the backdrop, watercraft will have a place on the finished layout.



**Watch us work!** We filmed the entire backdrop project start to finish for our layout. Members can watch it in episode 20 of the East Troy project series on [Trains.com](https://www.trains.com).



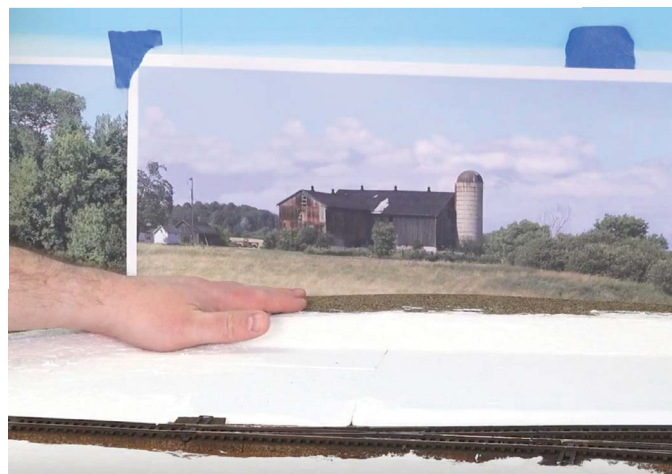
While the river looked good, the flat banks didn't fit the rest of the planned scenery, so David and Cody used more tree sections to cover the unwanted parts.

## A DISTANT FARM

The east end of our layout is mostly rural, and in much of southern Wisconsin you can't throw a stone without hitting a barn. As such, we found an ideal barn scene among SceniKing's offerings to add to the layout. The large, weathered barn and silo fit perfectly at the point the road was to curve into the background to run roughly parallel to the backdrop and would provide a nice break in what otherwise would be a seemingly endless wall of trees.

Similar to the river, we encroached on the barn a bit by overlapping tall tree sections on each side of it. To the right of the barn, the road needed to appear to pass through the backdrop behind a line of foreground trees. On the left, the farm's field needed to transition quickly to Central Ink's rail-served plant. We used taller sections of backdrop trees in both locations as a frame.

Although it's not a large detail, as shown in the final photo, additions like the barn go a long way to providing depth to a scene. **LMR**



Before cutting anything, David and Cody test-fit the barn and field scene behind the road that runs along the low ridge separating the modeled scene from the backdrop.



With the barn scene clipped out, Cody and David next tested various places where tall trees would overlap the field and stand behind taller foreground objects.



After the finished scenery and structures have been added, the distant barn and glimpse of its surrounding fields add realistic depth to this part of the layout.

# — WELCOME TO — EAGLE RIVER

This 4 x 18-foot HO scale layout depicts  
the northern Wisconsin community in 1910

**By Glen Johnson** // Photos by Dave Rickaby

**E**agle River, Wis., has long been a popular vacation destination. My wife and I have vacationed in the northern Wisconsin city for our entire marriage. We purchased a lot on a lake in 2001 and built our own log cabin in 2004. When we both retired in 2009, we moved to Eagle River permanently. Little did I know a conversation at a volunteer fair would lead me to building a 4 x 18-foot HO scale model railroad depicting Eagle River in 1910.

The layout, displayed at the former Chicago & North Western depot on Railroad Street, is only the third model railroad I've built. When I was in eighth grade, I constructed a 4 x 8-foot O gauge layout for a Lionel train that my grandmother bought for me. After our son was born, I built another 4 x 8-foot model railroad, this time in HO scale. I completed the freelanced layout more than 30 years ago.

Unlike my previous model railroads, the Eagle River layout is based on a prototype. Extensive research and hours of scratchbuilding resulted in a model railroad that residents and visitors can enjoy.

## The idea for a layout

My wife and I like volunteering. We drove for Meals on Wheels and took people to appointments and other errands for the local senior center. Then we saw an advertisement in the newspaper for a volunteer fair and decided to attend. My wife ended up volunteering for a conservation group. I had a discussion with the Eagle River Historical Society.

History has long fascinated me. The historical society was looking for docents for its local museums. I was a little



interested in doing that, but then I asked the museum representatives if they'd ever considered building a diorama of the town set at some point in the past. They lit up. Yes, they definitely were. One of its museums is located in the old C&NW depot, known locally as the Depot Museum. We set up a meeting date to discuss the project further.

The first priority was to decide what to model and in what time period. The museum staff wanted to re-create Railroad Street, which is the main street in town and fronts the former C&NW tracks. I could build a model railroad and historical diorama at the same time. Great!

With the location settled, we next had to determine an era. In the late summer of 1910, a fire destroyed one of the key buildings at the corner of Railroad Street and Wall Street. A few years later an entire block of Railroad Street burned to the ground. There were a lot of photographs of Railroad Street in

① Chicago & North Western 4-4-0 No. 973 has just pulled up to the Eagle River, Wis., depot with train No. 12, the southbound passenger train from Watersmeet, Mich. The scene takes place on the 4 x 18-foot HO scale Eagle River, Wis., layout built by Glen Johnson that's displayed at the Eagle River Historical Society's Depot Museum.



② Chicago & North Western southbound train No. 12, led by 4-4-0 No. 973, leads a passenger train over the Wisconsin River. The American is a Model Die Casting (Roundhouse) model that's available again from Athearn.

and prior to 1910, so the museum officers chose to model Railroad Street in 1910, prior to the fires. I decided I could model in true HO scale from

Wall Street to just north of the Wisconsin River in the 24-foot long space the museum provided.

### Prototype research

Though the museum's collection of prototype photos were helpful, there were next to no dates on them. My first priority was to use known years and events to put the images in order. For example, the building that burned in 1910 was the O'Connor Block. If it wasn't in an image, the photo was later than 1910.

Another known year was 1893 when the sewer system was installed. During that project fire hydrants were placed throughout town. Any images without fire hydrants predated 1893. Over a period of months and a lot of research I was able to put the images in chronological order.

The next issue was the size of the buildings. Fortunately, we had Sanborn Fire Insurance Maps that had plan drawings of the structures and also gave the street widths. The information on the maps let me scale the bases of the buildings. I was able to scale the structure heights from photographs.

A final, and very significant issue, was building colors. Naturally, all of the photographs were in black and white. The most important building on the layout is the C&NW depot, built in 1894. Fortunately, I have a neighbor, Bob Brownell, and a friend, Fred Bloedorn, who were both former C&NW executives. They put me in touch with the appropriate people at the Chicago & North Western Historical Society (C&NWHS).

The organization verified that the Eagle River depot was painted two shades of red. What shades? They had no idea. I selected Floquil Caboose Red and Boxcar Red, under the assumption the railroad purchased these colors in large quantities and therefore they would be less expensive.

Fortunately, the full-size versions of two buildings depicted on the layout are still standing. I talked with the current owners and got permission to take small paint scrapings, from which I determined what I thought were the original 1910 colors. In other situations, I spoke with decedents of the original building owners to ask them what colors they would like their great grandparents buildings to be.

### Layout construction

I built the layout on 2 x 4 benchwork with a plywood top. I constructed it in 2 x 6-foot sections for ease of transport to the



museum from my workshop. The layout is set at a height of 40" and the track is set in 17" from the edge. Thought it's a non-operating static display, it could be wired fairly easily as there's only the main line and a passing siding.

I used Midwest Products cork and Atlas code 83 nickel silver flextrack for the road-bed and track. The lone turnout is a Micro Engineering No. 6. The ballast is Woodland Scenics Gray Blend Medium.

### Eagle River structures

I scratchbuilt each structure by copying scale plans that I drew and attaching them to mat board with rubber cement. Then I cut the mat board with a hobby knife. I built the window frames from cardstock. I added individual siding pieces, also cut from cardstock.

I used scale blueprints prepared by Brad Pagels for his book *Switchback in the Pines* to model the C&NW depot. I turned to a kit from HRM Laser Models for the water tower, modifying it to match blueprints supplied by the C&NWHS.

Though I made all of the buildings on the layout for which I had photographs, there are four structures that are stock plastic buildings — the lumber shed and three private residences. If photographs are discovered that show these buildings, I will make scratchbuilt replacements.

### Northwoods scenery

Since the layout is set in the northwoods of Wisconsin, I needed lots of trees. I scratchbuilt more than 200 pine trees



3 This overall view of the Eagle River, Wis., layout shows the intersection of Wall Street and Railroad Street. The Chicago & North Western depot and water tank are visible at left.

using wood skewers and furnace filter material, a technique I learned in a *Model Railroader* article I read more than 30 years ago.

To model the dirt streets I applied plaster

to the plywood, crowning it in the middle. After the plaster had dried, I painted it flat tan and applied sifted dirt that's similar to the sand in the Eagle River area.

For grassy areas, I also started with a layer of plaster. I painted it flat olive and then added Woodland Scenics blended turf for the rougher areas, with small bits of the scenery manufacturer's light green and burnt green Clump-Foliage to simulate weeds. In well-kept areas, such as the park and lawns, I used JTT Scenery Products green turf.

I modeled the riverbanks by applying plaster-impregnated gauze over cardboard strips. After the plaster had dried, I painted it flat olive green and added Woodland Scenics blended turf, Clump-Foliage, and assorted pine and fir trees.

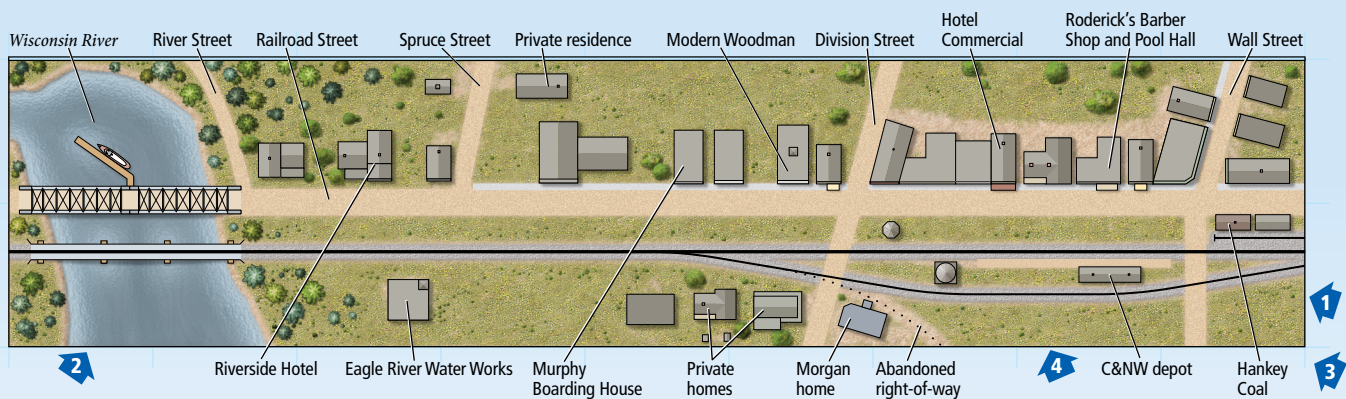
The riverbed is birch plywood, painted flat black, with a layer of West System epoxy resin over it. The flat black gives a nice sense of depth and helps reflect the blue backdrop to give a good water look.

I modeled lily pads by sharpening various sizes of brass tubing to punch out discs from cardstock that I'd painted in shades of green. Then, using a hobby knife, I cut a small slit into each one.

I kitbashed the railroad and pedestrian bridges from Central Valley Model Works parts. The wood supports for the



4 Logging was still quite prevalent around Eagle River in 1910. Here, a C&NW 0-4-0 leads a short log train on the passing siding, destined for the local sawmill. The red building in the background is the Hotel Commercial.



## The layout at a glance

**Name:** Eagle River, Wis., circa 1910

**Scale:** HO (1:87.1)

**Size:** 4 x 18 feet

**Prototype:** Chicago & North Western Ry.

**Locale:** Eagle River, Wis.

**Era:** 1910

**Style:** diorama

**Mainline run:** 18 feet

**Minimum radius:** none

**Minimum turnout:** No. 6

**Maximum grade:** none

**Benchwork:** sectional

**Height:** 40"

**Roadbed:** cork

**Track:** Atlas code 83 Flextrack

**Scenery:** hardshell, ground foam, and scratchbuilt trees

**Backdrop:** 1/8" tempered hardboard

**Control:** none

## Eagle River, Wis., circa 1910

HO scale (1:87.1)

Layout size: 4 x 18 feet

Scale of plan: 3/8" = 1'-0", 24" grid

Numbered arrows indicate photo locations

Illustration by Kellie Jaeger

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

railroad bridge are based on period photos. The pedestrian bridge even includes a sign that was on the prototype that read "5\$ Fine for driving over this bridge faster than a walk."

Figures in period-appropriate dress proved difficult to source. I'd hoped to find female figures in long dresses, but no such luck. As a result, I took a package of unpainted figures and added modeling putty to create the long dresses. I also added figures to the passenger cars and installed drivers in all the vehicles moving on the streets.

## Locomotives and freight cars

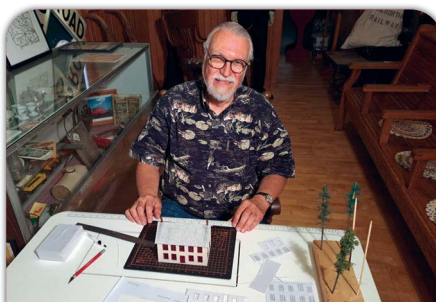
There are two trains the layout. The passenger train is pulled by C&NW 4-4-0 No. 973. I got this Model Die Casting (Roundhouse) model from the C&NWS through Mike Lenzen, a former C&NW employee and terrific model railroader. I weathered the steam locomotive and changed the decals to match a period photo of the 973 at Eagle River.

Mike also alerted me to LaBelle Woodworking Co. in Cheyenne, Wyo. I ordered a 58-foot open-platform coach and a 1905 60-foot baggage car kits from the company. I kitbashed both cars to match period photos and painted them Floquil Pullman Green.

The logging train is pulled by an 0-4-0 steam engine. The model was

donated by Craig Moore, a past president of the Eagle River Historical Society and a longtime member. His great grandfather owned the Hotel Commercial. A model of the hotel is located along Railroad Street on the layout.

The logging cars also came from Craig. They were originally decorated for Milwaukee Road, but I relettered them for C&NW. I also replaced the horn-hook couplers with Kadee No. 5s.




## Meet Glen Johnson

**Glen Johnson** was born and raised in Chicago. He's a graduate of Augustana College, the Lutheran School of Theology, and Northwestern University. Glen and his wife, Cindy Thompson, have two children, Bjorn and Britta, and are the grandparents of Remi Tait and Nels Einar Johnson.

## From plan to reality

When I gave the Eagle River Historical Society my budget and timeline for the layout, I originally thought that I could complete it in three years. This is my sixth year working on it and I'm still tweaking small items. The society would like me to add a key or legend so people can identify the different structures. I'm still working on a good way to do that.

I'm deeply indebted to Dave Rickaby. His photographs bring the layout to life. He also made me aware of Berkshire Valley Models. I bought its various buckboard, surrey, and wagon kits, along with drivers, for the model railroad.

If you're ever in the Eagle River, Wis., area, please stop by the Depot Museum and see the model railroad for yourself. Visit [eagleriverhistory.org](http://eagleriverhistory.org) for museum hours and directions. 



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# SCRATCHBUILDING IN THE DIGITAL AGE



Steve Zapytowski constructed this award-winning sailmaker's building using laser cutters and 3D printers.

## A look at computer aided modeling

**By Steve Zapytowski**

Photos and illustrations by the author except as noted

**C**omputer-aided design (CAD) and 3D modeling were common tools for me to use in my profession. But when I began building my first railroad after being absent from the hobby for more than 25 years, I found CAD played a role for me in both layout and structure design. It's in the last few years that I've explored other avenues for using computers in building my railroad. In particular, laser cutting and 3D printing profoundly changed what I'm able to build.

## Sophisticated pencils

Before I retired from a strongly artistic field, people were surprised at my extensive use of computers for my work. I explained to them that CAD was just another form of pencil, a more complex and sophisticated pencil, but a pencil just the same. As a different form of pencil CAD also changed the nature and outcomes of my work. In my modeling work the most used tool on my bench is the single-edge razor blade. Though a bit



**1** The Epilog Zing laser.

more of a stretch than my pencil analogy, I equate laser cutting and 3D printing to a vastly more capable single-edge razor blade. While a whole new set of skills is required to work with these technologies, they also have a profound effect on the nature and outcomes of modeling.

I started using both Epilog Zing and Epilog Mini lasers for cutting and etching my model parts. These machines have been superseded, so I won't address their specifications and capabilities here; instead I will refer you to [epiloglaser.com](http://epiloglaser.com) for information on current products **1**. The 3D printers I used were the Form 1 and the Form 2 from Formlabs ([formlabs.com](http://formlabs.com)) and they are both high resolution liquid resin printers. The Form 1 and Form 2 are no longer sold.

Did I own these machines? No, I didn't. Their costs ran into the thousands of dollars and were impractical for the average modeler to own as making a few models for my layout aren't worth spending \$5,400 to buy an Epilog Mini. I have the good fortune of having a friend,



**2** The M5s is the center left machine while the 6K is at the center right. These are flanked by a pair of Anycubic's wash and cure machines. On some projects Steve has kept both printers running every day for a month.

Gary Kohler at Portland Locomotive Works, who owns both laser cutters and a 3D printer.

However, since I started on this journey, prices have dropped substantially and I now use machines from Anycubic's Photon line. I have a Photon 6K, and a Photon M5s, shown in photo **2** above. These are the fourth and fifth machines that I've owned. I frequently run them simultaneously which, depending upon the print, will basically double (obviously) my output. When running 6, 8, 24, or even 30-hour prints that makes a big difference.

While the bulk of my recent work has not involved laser cutting, I still use the Epilog Zing and Mini at Portland Locomotive Works when needed. These machines, though, are getting rather long in the tooth. The university I retired from now has a number of maker spaces on campus and there I've been using a Universal Laser PLS6.150D, though it's often overkill for what I'm doing. I'm considering getting one of the

Glowforge laser cutters. I have a backlog of laser cutting projects and having my own machine would certainly speed things up.

However, you don't need a friend in the business or to run out and buy equipment as there are other options. In addition to colleges and universities, many public libraries now have maker spaces. These spaces are open to the public with a nominal charge for machine time and materials consumed.

Can you make anything you want with laser cutting and 3D printing? No. Both technologies have physical limitations that you must design within. If those limitations are ignored, your parts will fail. I'll explain more about these restrictions later and offer some handy workarounds that I've discovered over the years.

If you wish to explore 3D printing and laser cutting, you can learn about these constraints on the manufacturer's website for the equipment you're using. Proper design gives you good results.

## LASER CUTTING AND ETCHING

**There's a process to laser** cutting and etching that not only involves hardware and software, but a specific workflow as well. There are considerable expenses that come with laser cutting and the most obvious to the novice are the hardware and software involved. Costs that are less obvious are in materials and machine time. Parts that don't fit properly aren't worth making, and if some are inadvertently produced it's best discard right away. Though they might have some use as scrap wood, the bits of material you salvage are not worth the risk of getting these bad parts mixed in with your good parts. Unfortunately, I do make errors in designing model parts

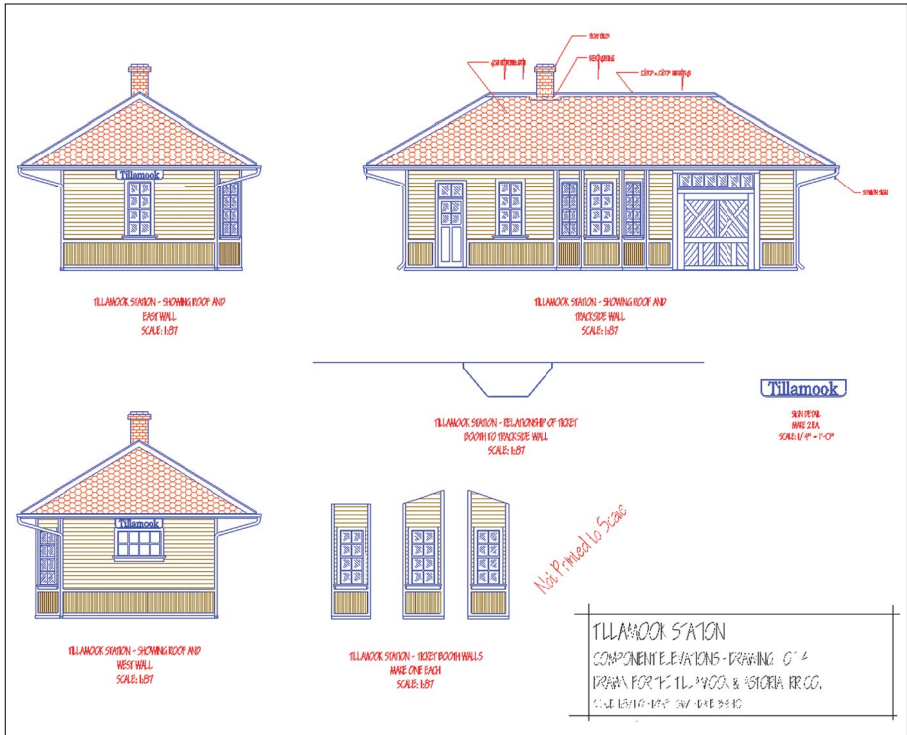
and I will explain how I use 3D visualization software to minimize this problem.

Software can play an important role in the modeling process, but is essential for laser cutting. Model parts can't be cut by a laser without designing them in a computer. I use AutoCAD, Inventor, and CorelDraw to transport an image in my mind to a laser cutter and then to my workbench.

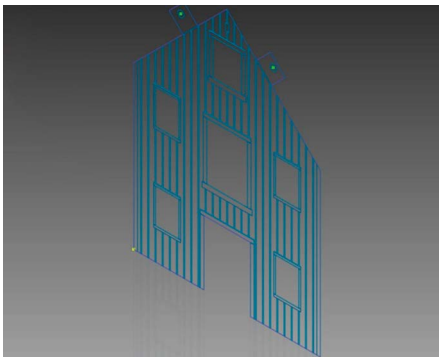
Though these are expensive programs, you don't need to use the same products I do. You can find less expensive or even public domain packages that will accomplish the task for you. I won't make any recommendations as this article is about my process for computer

aided modeling. Regardless of the software packages you choose, if you're not already familiar with them, be prepared to invest significant time learning how to use them. There are hundreds of tutorials available from most manufacturer's websites and YouTube.

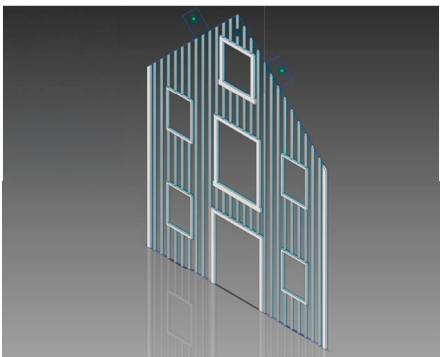
Most of my modeling projects begin in AutoCAD ([autodesk.com](http://autodesk.com)). While it's excellent for two-dimensional drafting and for modeling three-dimensional parts, I find it cumbersome for converting two-dimensional drawings into 3D parts, then combining those parts into more complex assemblies. For that need I turned to another Autodesk product called Inventor.



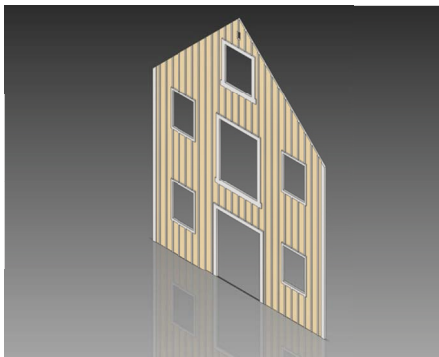
**3** Steve drew elevations of structures that he later scratchbuilt using traditional construction methods. This example is a 16 x 40-foot combination station he built using old fashioned "single-edge razor blade" technology.



**4** Note the different colors of lines used in this AutoCAD drawing of Wall 1 of the sailmaker structure in the lead photo. Each color represents a different layer. Line color, and layers, become important later when preparing files for cutting and etching.



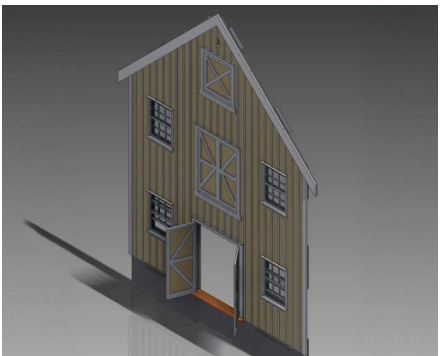
**5** Steve exported the exterior board-and-batten siding drawing of Wall 1 from AutoCAD to Inventor. It's still a two-dimensional drawing, or sketch, as it's called by Inventor.



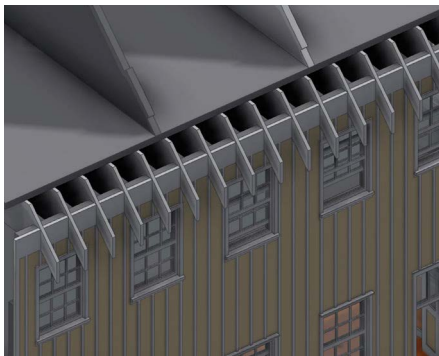
**6** Next, Steve extruded the boards between the battens to a thickness of about one scale inch below the thickness of the battens. This step completes the exterior siding board and batten for Wall 1.



**7** Individual parts are combined within Inventor to build assemblies. The software aligns and then "glues" the parts together.



**8** Here's the finished Wall 1, an assembly of assemblies visualized using Inventor. There are two styles of open window on the first floor. The doors and threshold were parts added to the wall after placing the windows.



**9** Assemblies can become complicated and difficult to visualize without using software like Inventor. Steve builds the model digitally first, testing the fit of each part so he doesn't waste materials and machine time.

## Getting down to the pieces

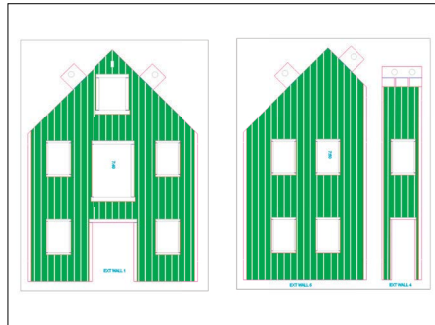
In the past I created drawings of structures using AutoCAD, and like my construction methods at the time my drawing methods were traditional, too. I drew elevations of each wall and, if needed, sections or detail drawings of the building **3**. Elevations, however, aren't useful for laser cutting parts for a model. Each component on each wall



**10** Inventor creates renderings that are photographic in quality, allowing you to manipulate light sources and more.

must be drawn as a single part. One of the five major components of Wall 1 is seen in **4**. There are over 500 parts in the finished structure and each one had to be drawn in AutoCAD for laser cutting. These, in turn, all had to fit together.

Drawing individual parts is just the beginning of the process. I use Autodesk Inventor to visualize each part and then place the parts into assemblies that eventually become a finished computer



**11** This is a CoreDraw file for three walls Steve used in a model. The green areas will be etched away.

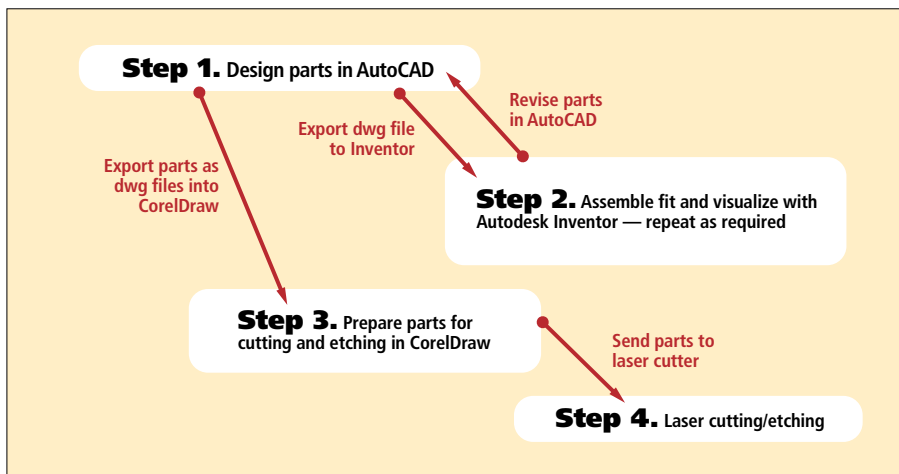
model before laser cutting begins. Each part is exported individually from AutoCAD into Inventor **5**. Inventor easily converts a two-dimensional drawing, or sketch, into a three-dimensional object by extruding areas of a sketch to a given thickness. Two thicknesses of extrusion were needed for this part, one for the battens and window/door framing, and the second for the boards between the battens **6**.

I extruded the main parts for Wall 1 inside Inventor and then combined them into an assembly **7**. For my windows I combined eight separate parts to create a window assembly. Then I made assemblies of assemblies to create the finished Wall 1 **8**. In a similar manner the rest of the model was assembled **9, 10**.

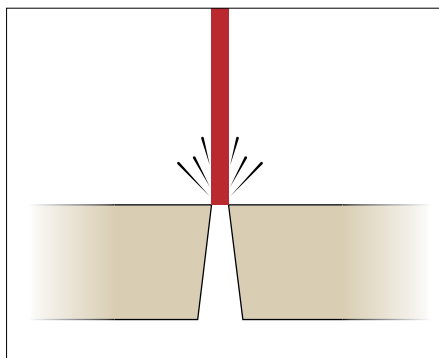
## Software for lasers

Once all the model parts are designed and their fit is confirmed, each item is prepared for laser cutting and etching. I use CoreDraw for this part of the process as it produces the files most commonly employed with the Epilog lasers I use. Line color and layer control are important to laser cutting. When AutoCAD drawings are imported into CoreDraw the color and layer information is also imported. When sent to a laser, layer colors are interpreted differently during the cutting process.

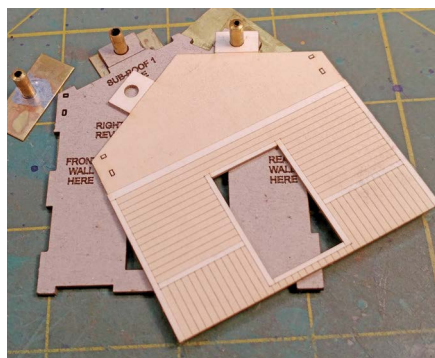
In **11**, for example, there are lines of various colors and areas of green fill. The lines in the drawing will produce a cut that may pass entirely through the material or scribe its surface. These are known, technically, as vector cuts. Areas filled with solid color are etched away, but are known as raster cuts in the laser industry. Modelers tend to say etch rather than raster cut.



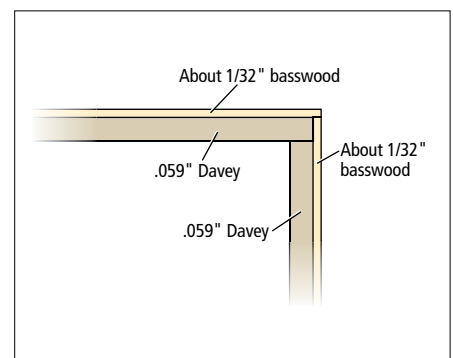
**12** This chart summarizes the steps Steve follows for laser cutting model parts. Step 2 is the most used in the entire process, especially the “repeat as required” note.



**13** Though exaggerated in this illustration for clarity, the edges of cuts in thick material tend to flare outwards. When putting parts together this results in poor fitting in corners.



**14** A simple alignment pin made from scraps of brass provides exact positioning of the inner and outer walls for gluing. Once the adhesive has set the tabs are cut off.



**15** Though both pieces of outer wall in this illustration are nominally  $\frac{1}{32}$ " thick, slight variations in actual thickness can cause the parts to not meet properly at corners. Use a thickness sander to ensure consistency.



**16** The circled post end and notch in the lintel shown in the upper portion of the illustration don't look like that will go together as drawn. In the lower portion, after laser cutting, the material lost to the laser's kerf lets them fit together nicely.

This process results in good and usable parts coming out of a laser cutter. The steps summarized in **12**, repeated over and over, produced the parts needed for my sailmaker structure model.

### Choose the right materials

I use a variety of materials for my laser projects. I used  $\frac{1}{32}$ " basswood for the board-and-batten siding on the sailmaker building. Under the siding is a layer of .059" Davey Board. We're all familiar with basswood, but perhaps not with some of the other materials mentioned here. Davey Board, also known as book binder board, is used in the hard covering of books. More importantly, Davey Board is acid free, a key quality for a modeling material. It's available in several thicknesses.

Laserboard is a resin-impregnated Kraft paper and comes in both brown and ivory in thicknesses from .011" to .025". Lastly, I use cherry wood for parts such as decking and finished flooring. Its tight, dense grain sands smoothly and gives a richer coloring with stains.

The choice of adhesive is important, too. Avoid water-based adhesives as the moisture in them can physically alter the thickness of the material you're joining. I use BSI's IC-Gel ([bsi-inc.com/hobby/ic\\_gel.html](http://bsi-inc.com/hobby/ic_gel.html)), which is an ethyl cyanoacrylate gel. Be careful when using a capillary action type adhesive that wicks into materials as it can alter the thickness of the materials being joined.



**17** All the steps Steve has talked about went into the making of this simple looking wall. Being careful throughout the process resulted in a high level of precision.

### Laser factors

There are numerous factors to consider when setting up for laser cutting. When making raster cuts (etches) there are two variables you must address, the speed of the laser's travel over the material and the power of the laser. Both of these are expressed in percentages of the laser's total power output and speed of travel over the surface to be cut. When vector cutting a third variable is added, and this is measured in pulses per inch (PPI), or how many times the laser turns on and off when traveling over one inch of your material's surface. The difficult part comes in finding the right balance between these variables that produces the fastest cut without sacrificing detail or setting your material on fire.

Using too much or too little power sacrifices detail. Setting the speed too high or too low also sacrifices detail. When vector cutting, setting the frequency too low adds time to the job (and will affect your speed and power settings). If you set the frequency too high it may set your material on fire. Don't leave a laser cutter unattended while it's running.

Material thickness plays a role in the accuracy of cuts. As thickness increases residual heat causes the edges of the cut to flare away from vertical as seen in **13**. I often use a thin material for outer walls, but must support them with an inner wall to provide structural support **14**. Alignment of the inner and outer walls while being glued together is crucial. Referring to **11** you'll see small tabs on

the tops of the walls. These alignment tabs on the outer walls shown line up perfectly with the tabs on the inner walls.

The actual thickness of materials plays a role in making good looking corners on a building. When planning outer walls, one must fully overlap the end of one wall with the other to create a proper corner. I mentioned using  $\frac{1}{32}$ " basswood earlier and I've found that it comes thicker than it should. The various pieces in my supply typically vary slightly in thickness **15**. To fix this issue use a thickness sander to reduce the basswood to the designed thickness for the parts you are making.

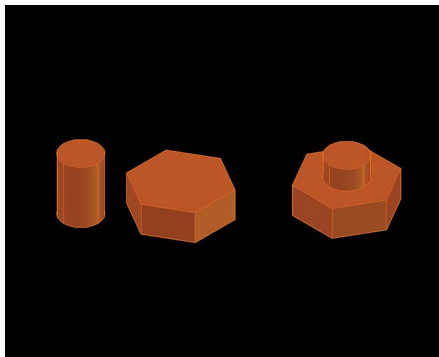
Laser cutters, like saws, have a kerf, a space left by the cutting process. This kerf must be accounted for when designing the parts for a project. The kerf width will vary from machine to machine and with the power levels employed. A simple way to determine the kerf for the laser, settings, and materials you are using is to cut a square drawn to 1" per side. Then measure the finished part and determine how much smaller than 1" square it is. Do a little math and you'll know how much material was lost to the kerf and, thus, how to adjust the design of your parts to account for the kerf **16**.

Spectacular results are possible when using laser cutting to build models, but remember the process has limitations and is more complex than it might initially seem. There are many discreet steps outlined here and they are all essential to producing a good set of parts for your model **17**.

# 3D PRINTING

**As with laser cutting** and etching, software is essential to the process of 3D printing. Most of my 3D work, as with laser cutting, also begins with AutoCAD. I find building three-dimensional objects fairly straightforward. The process is one of combining simple shapes into more complex ones as seen in **18**. Complex shapes are made by joining simple objects together into more complex shapes **19**, **20**. AutoCAD, however, will not produce a file that I can send directly to a 3D printer. My AutoCAD dwg or dxf files must first be converted to an stl or an obj file before they can be printed.

Once designed in AutoCAD, I import my files into 3ds Max, also an Autodesk product, then export them as obj files. Then, as obj files, my objects can be loaded into Preform, Formlabs' 3D printer software.

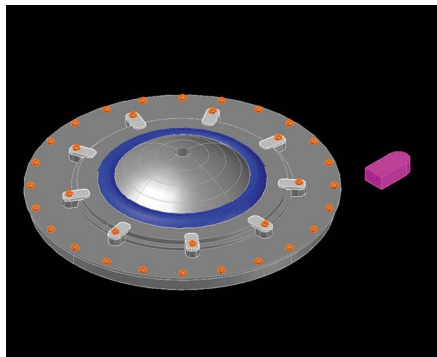


**18** Three-dimensional parts are created in AutoCAD by combining simple shapes into more complex ones.

## Prepare to print

Orientation of the part inside of Preform is important because the software needs to generate supports before printing. Parts printed on Formlabs machines must be properly oriented and fully supported during printing, otherwise the print will fail. Though Preform will automatically generate supports, this process isn't perfect. Sometimes points of failure, indicated by red areas on the part, need to be fixed by reorienting the part or manually adding extra supports **21**. The workflow I use is shown in **22**.

While 3D printing may seem like the ultimate solution to many scratchbuilding challenges, there are limits to the process just as there are in laser cutting and etching **23**. As I gained experience with the small parts I made for HO scale models, I



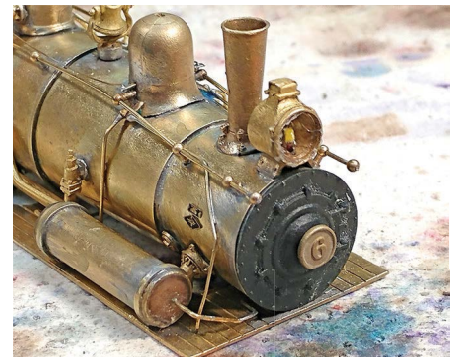
**19** The nut and bolt seen in **18** were combined with several or other shapes in making the smokebox seen above.

found a workaround that I was able to use in some cases that I'll explain later.

## 3D-printed figures

One of the more useful applications for 3D printing I've found is making animals and people to populate my railroad. As my modeling experience grew, I felt a need for figures in poses not commercially available. Eventually, I began designing my own and using the Form 2 to print them.

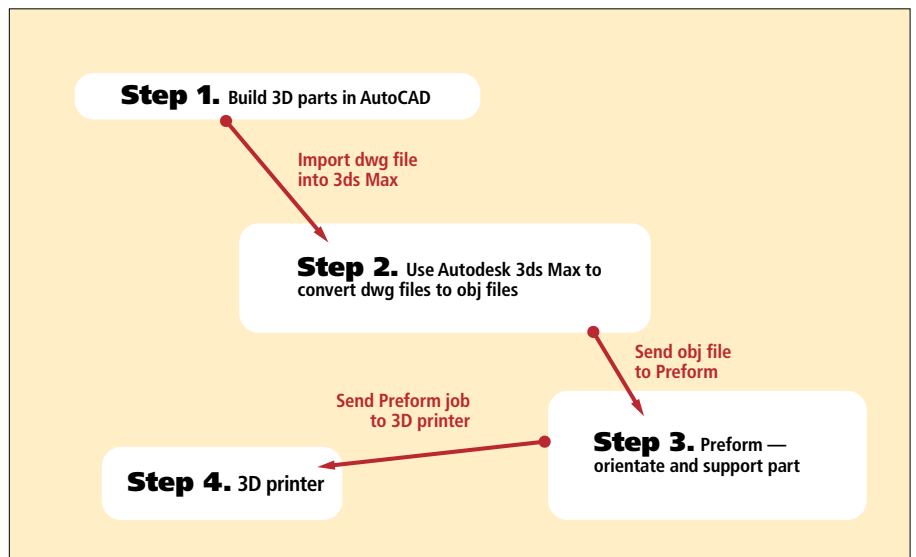
The software I use for figures is Daz Studio (daz3d.com). This software is free and comes with a series of tutorials. Daz Studio uses a series of base figure mesh models that can then be modified into the body type desired, clothed, and then posed to create what is needed for your intended purpose **24**. A couple of free



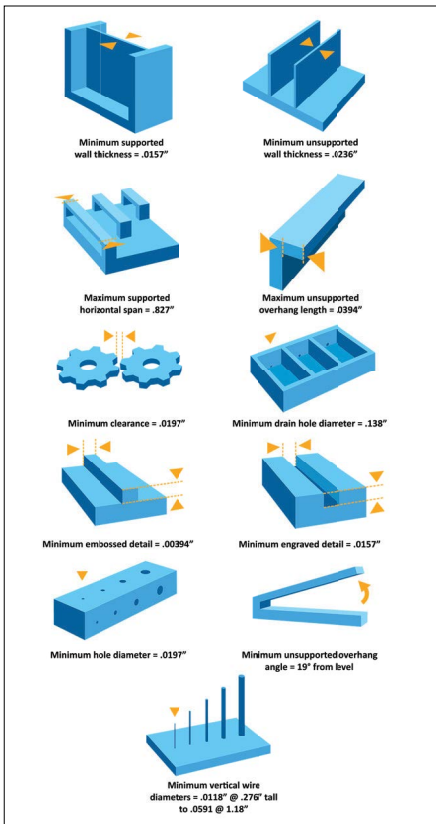
**20** With experience, parts can be printed to an accurate size. The smokebox front fits snugly.



**21** Supports were automatically added to this simple smoke vent by Preform after Steve oriented the part. Complex shapes are more likely to require reorientation or support editing to ensure proper printing.



**22** This workflow is simpler than the one Steve uses for laser cutting and etching. 3ds Max is only used for file conversion in this process, but there are many other ways to manage the file conversion required. Preform 3D printing software is available for free from Formlabs.



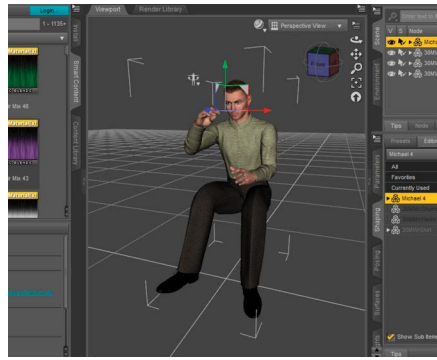
**23** These are the requirements for parts printed on Formlabs' Form 2 printer. All printers will offer these specifications.

basic figures also come with Daz Studio. These mesh models have the same joints the human body has. This helps in creating poses for them for your own purposes. In the case of this sail worker I posed the individual finger joints in each hand. The individual fingers of the right hand are shown as I posed them in **25**.

Daz Studio will export finished figures as obj files, which is what Preform needs for printing. However, the files exported from Daz Studio are large, on the order of 70 to 80 megabytes. That will drastically slow the print process. They're also dimensionally big. If loaded into Preform directly, they'd be larger than the Form 2 could physically hold. As an intermediate step I import the obj files from Daz Studio into 3ds Max.

First, I do a rough reduction in scale to an approximate size. Then I use a process called "Optimize" to reduce my files down to 10 or 12 megabytes. As these are printed in HO scale the finished figures are so small there is no visible loss in surface detail **26**.

My final resizing takes place inside of Preform. Here I insert a box of a known size, then visually scale the figure next to that box **27**. The process I employ for printing figures is seen in **28** on the next page.



**24** This is Sail Worker 2 that Steve made with Daz Studio. He used the software to change the figure's shape.



**26** This is Sail Worker 2 in 3ds Max, which optimizes the file to greatly reduce the size.

## Finishing the parts

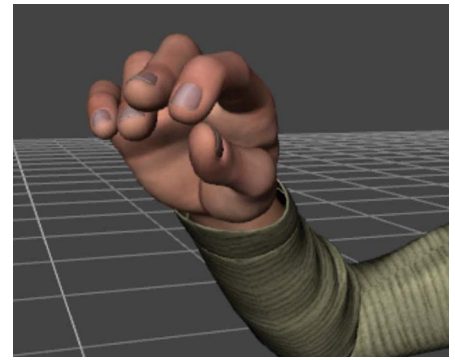
Once printed, parts coming from the Form 2 need to be washed and cured. When removed from the printer, parts are coated in residual resin. Though Formlabs now has more advanced washing and curing options, I make use of earlier, simpler equipment.

Curing the printed parts is done under ultraviolet (UV) light. The cure time varies based on the type of resin used. I use a simple nail polish curing lamp available from Sally Beauty Supply. It's best if the parts rotate while under the UV light. A small model turntable may be used for this **29**.

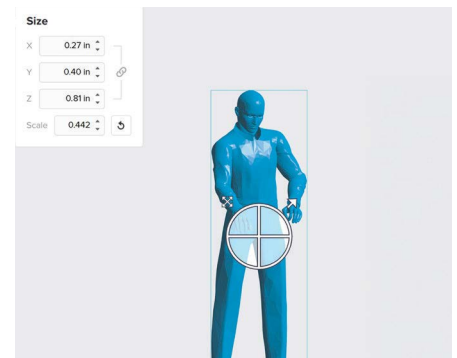
Once cured I cut the parts from their supports using a motor tool with an abrasive cut-off disk. I then smooth the ends of the sprues with jeweler's files. Don't use a sprue cutter for this purpose as the resulting stress may cause the part to break. Once painted I placed the finished parts on my models or layout. One of my finished figures is shown in **30**.

## Tricks and considerations

Earlier I mentioned a workaround for printing parts that don't meet the minimum requirements in seen in **23**. My



**25** Each joint in Sail Worker 2's wrist and fingers was individually posed to achieve this finished look.

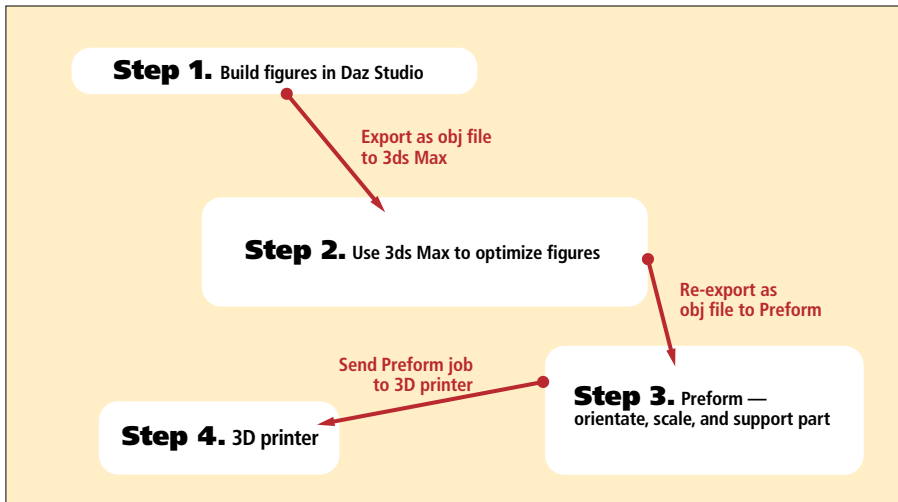


**27** By clicking and dragging the arrow, the entire figure will smoothly scale up and down in size in Preform.

favorite example is that of the seagulls I used on my layout. I prepared these in Daz Studio, then exported them to 3ds Max for scaling and optimization **31**. In 3ds Max I copied the entire seagull, offsetting the copy a few thousandths of an inch below the original figure, essentially doubling the thickness of the fragile looking wing **32**. As it turned out they printed well **33**.

I prefer to have the figures in my models doing something, even if they're just loafing. Their action must in some way be related to the model or the scene they occupy on my layout. Much of my research of the period I model (1900 to 1910) showed workers lined up next to each other or standing next to the machines they operated. This isn't an accurate representation as they were posing for photographs rather than working.

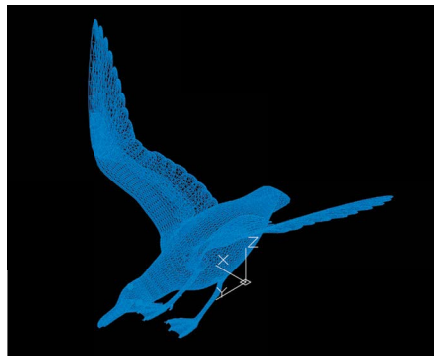
Unless it happens to be a Sunday, any industrial or commercial building would have workers present 12 hours a day, six days a week during that time period. The advantage of using Daz Studio and 3D printing is that I can make figures physically doing something in or around the building where I've placed them. This helps the viewer understand what's going on in the scene and how a building is being used **34**.



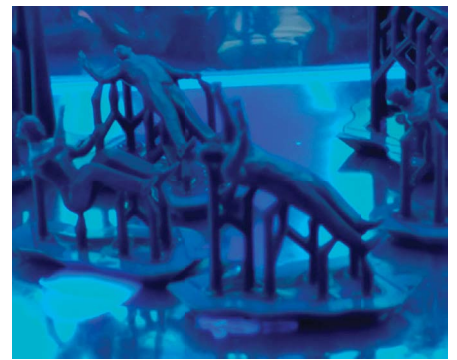
**28** The process here is similar to the one seen in **22**. The one difference is that 3ds Max isn't used for file conversion. Rather, it's employed for rough scaling and reducing the overall file size of the figures.



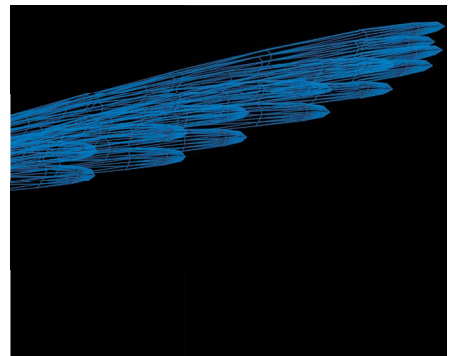
**30** Here Sail Worker 2 is in place on his workbench sewing two parts of a new sail together.



**31** This is a seagull Steve imported into 3ds Max. Steve was concerned about how thin the wings were.



**29** Steve uses a nail polish curing lamp as the source of UV light to cure the parts. In this case he didn't use the small turntable normally employed because some of the parts were too tall to fit under the lamp. These parts took 20 minutes to cure. Steve has also used the turntable under direct sunlight.



**32** By making a copy of the seagull almost on top of itself, Steve increased the thickness of the wing.



**33** These are some of the seagulls on Steve's layout. As he hoped, the wings printed well and they don't appear doubled up at all.

I see this as an important aspect of scratchbuilding, and one that was made possible by the advent of affordable 3D printing. With a little practice you can make figures that integrate well into your models and thus enhance the overall impact of your work. [MR](#)

*This is Steve Zapytowski's first byline in Model Railroader.*



**34** The activities of these two sail workers was implied from two separate photographs taken from around 1900. The difference between the model and those photos was the men in the photos were sitting or standing and posing for a photograph instead of actually working. In Steve's model, he chose to have them working at their appointed tasks.

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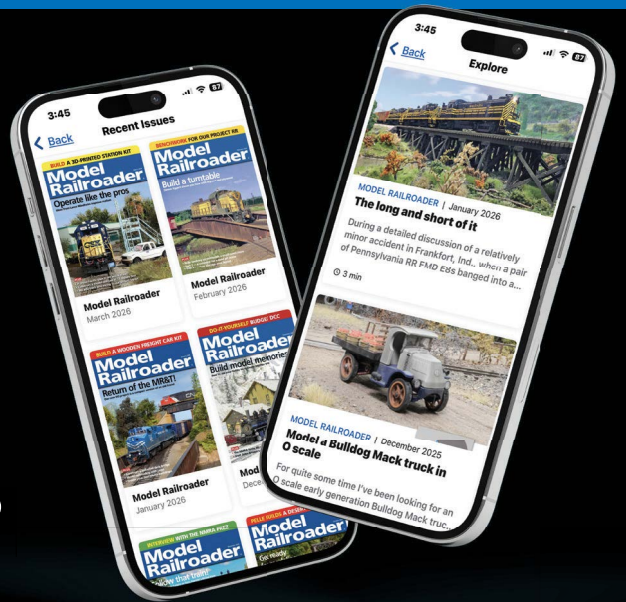
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**Canadian National Track Geometry car** No. 1501 rides the turntable on Rick Tracy's HO scale Central Illinois & Western. The car was built by C.J. Oglesby, who belongs to the Springfield Model Railroad Club. Rick was the lead supervisory person for CN in the construction of the car at Gateway Rail Services in Madison, Ill. Rick Tracy photo



## Send us your photos

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**It's April 1985, and the kudzu continues** its onslaught on the railroad's infrastructure. Two Seaboard System GP40-2s are in charge of a southbound local along the former Seaboard Air Line main just north of Southern Pines, N.C., on Dave Foxx's HO scale layout, The Carolina Sandhills Lines. Engine No. 1640 is a former Seaboard Coast Line unit, and No. 6614, still wearing the Family Lines scheme but patched for the Seaboard System, is a former Louisville & Nashville Geep. Dave Foxx photo



With Yoder coal tippie receding in the background, double-headed EM-1s 7620 and 7627 pull a coal drag across the summit of Harry Clark's Indian Creek Valley RR. Featured in the December 1985 issue of MR, the 25 x 50 foot HO scale layout has been moved, twice, in one piece. Harry passed away before the second move when the ICV was lifted by crane and placed into the Connellsville Canteen. Visit [connellsvillecanteen.org](http://connellsvillecanteen.org) to see the video. Carver McGaughey photo



**Train No. 1, the westbound Cedar River Rambler**, has just passed the Thoney Farm on its return trip to Stephenson, Mich., on Dave Rickaby's On30 Stephenson, Cedar River & Eastern layout. We'll have more about Dave's forest floor scenery techniques in a future issue. Dave Rickaby photo

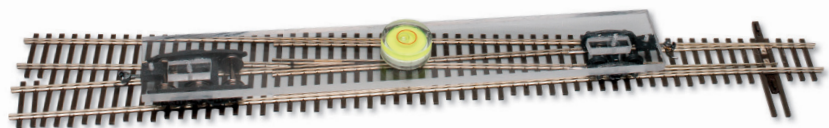
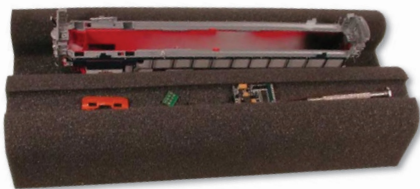
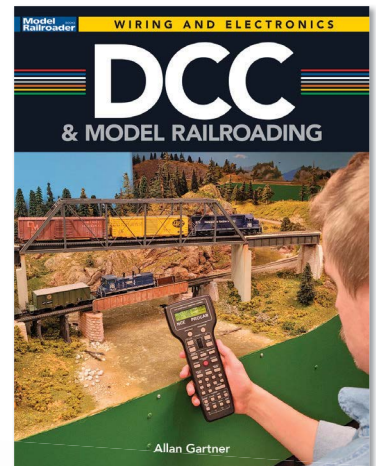
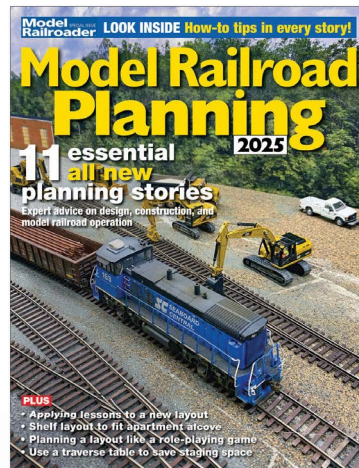
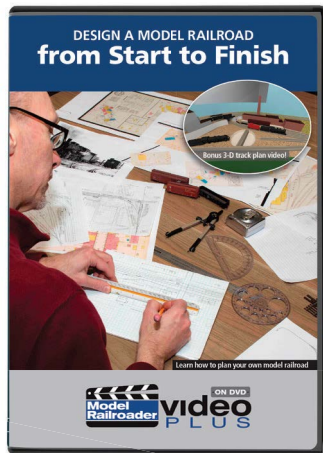


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## Schedule of Events

**AZ, GLENDALE:** ARHS Model Train Swap Meet. Glendale Christian Church, 9661 North 59th Ave., Glendale, AZ 85302. Saturday, May 9, 2026. 9:00am-1:00pm. Everything Trains — Food — Fun. Admission \$5.00. Tables \$25.00 — to sign up, send check or money order to: ARHS, PO Box 5816, Glendale, AZ 85312-5816. Contact: Craig Faris, 623-340-3529

**FL, BROOKSVILLE:** Regal Railways presents Toy Trains & Hobby Show. Hernando Fairgrounds, 6436 Broad St., Brooksville, FL 34601. Saturday, May 23, 2026. 9:00am-2:00pm. Admission: \$6.00 adults, children under 12 free. Vendors and model train layout. Lunch available. Contact: Joe at 727-244-1341 or visit: [www.regalrailways.com](http://www.regalrailways.com) for more information.

**IL, COLLINSVILLE:** 19th Annual St. Louis Railroad Prototype Modelers Meet. Gateway Convention Center, 1 Gateway Dr., Collinsville, IL 62234. July 23-25, 2026. Friday 9:00am-9:00pm and Saturday 9:00am-5:00pm. Admission: \$35.00 for both days; \$25.00 for Saturday only. Thursday & Friday, 6:00pm-10:00pm layout tours, operating sessions and social gatherings. For information, [www.stlrpm.com](http://www.stlrpm.com) or Contact: Lonnie Bathurst, [bathurst@litchfieldil.com](mailto:bathurst@litchfieldil.com) or 217-556-0314

**IL, EAST MOLINE:** Quad City Society of Model Engineers Open House and Swap Meet. Saturday, May 23, 2026. 9am-2pm. 740 16th Avenue, East Moline, IL 61244. (The Old East Moline Public Library.) Admission: \$5 (cash only), children 12 and under are free. John's Trains & Hobbies will be there selling.

**NC, RALEIGH:** Neuse River Valley Model RR Club 9th annual SPRING INTO TRAINS Show. NEW DATES: May 23-24, Sat 9-5; Sun 10-4. Larger venue: Graham Building at NC State Fairgrounds. 400 vendor tables, 16 operating layouts. Display your models at our Craftsman's Showcase. Admission: \$10 covers both days, children 12 and under free with adult. Visit [www.nrclub.net](http://www.nrclub.net)

**NH, DOVER:** The Great Northern New England Spring Train Show. Dover Lodge of Elks #184, 282 Durham Road, Dover, NH 03820. Saturday, April 11, 2026, 10:00am-3:00pm. Admission: \$5 per person, children under 12 free. Exhibitor tables \$35, includes entrance fee. All scales, operating layout, railroadiana items, and food on premises. Contact Ed Martin, [efmenter@aol.com](mailto:efmenter@aol.com) or 603-362-4300

**NJ, BRICK:** ECTP and Collectibles LLC presents The Brick Train Show. Elks Lodge, 2491 Hooper Avenue, Brick, NJ 08723. Sunday, May 17, 2026, 9:00am-2:00pm. Admission: \$7.00; under 12 free with adult. John LaLima 732-845-5966. Go to [www.eastcoasttrainparts.com](http://www.eastcoasttrainparts.com) and click on The Brick Show.

**NY, DUNKIRK:** TCA Upstate NY Chapter Toy Train Show. Dunkirk Fairgrounds, 1089 Central Ave., Dunkirk, NY 14048. Saturday, May 9, 2026. TCA Members: 8:30am. General Public: 9:00am-2:00pm. Admission: Adults \$5.00, Children 12-17 \$3.00, Upstate Chapter Members & children under 12 FREE. Tables are \$20, for reservations email: [tcaupstatechapter@gmail.com](mailto:tcaupstatechapter@gmail.com). Dave: 716-208-5842

**PA, BEAVER FALLS:** BLRHS Spring Train Show. Saturday, May 2, 2026, 10:00am-3:00pm. Chippewa Township VFD Social Hall, 2568 Darlington Rd., Beaver Falls, PA 15010. Adults \$5.00 (\$4.00 if you mention Model Railroader ad). Children under 12 free. Tables \$25 each. For show info: [blrhsinc.org](http://blrhsinc.org) or table reservations: Tom Bianculli, [tbian64@gmail.com](mailto:tbian64@gmail.com) or 412-585-3614

**WI, MARINETTE:** Trains, Games, and Automobiles Show. 24,000 sq.ft. of fun at the Marinette Recreation Center. 2501 Pierce Ave., Marinette, WI. Saturday, June 27, 2026, 9am-5pm. Sunday, June 28, 2026, 9am-3pm. Free Admission! Sponsored by the Wisconsin & Michigan Model Railroad Club, Enginehouse Services, and Game Knights. Contact Dave Rickaby at [wmwestdiv@yahoo.com](mailto:wmwestdiv@yahoo.com) or 715-584-9310

**WY, CHEYENNE:** Sherman Hill Train Show and Hobby Expo. Archer Event Center, 3801 Archer Pkwy, Cheyenne, WY 82009. June 13 & 14, 2026. Saturday 9am-5pm; Sunday 10am-3pm. Admission: Adults \$10.00, Children under 12 free. Model Trains, Plastic & Diecast Models, Radio Control, Slot Cars, Other Crafts. For info contact: Duane Dorn, [shmrcts@gmail.com](mailto:shmrcts@gmail.com) or 970-381-4711

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# Action at Locust Summit



Watching *The Williamsporter* sprinting past a slow-moving coal drag at Locust Summit on Jim Hertzog's Reading Co. are (from left) Gordon yardmaster Charles Kadyk, passenger train engineer Eric Craig, and helper-engine crew John Shucavage. Jim Hertzog photo

**Jim Hertzog's Reading Co.** should be familiar to regular readers of MR and *Model Railroad Planning*. It's a large, basement-filling HO railroad that also includes a segment of Jim's other favorite railroad, the Lehigh & New England. Both the RDG and LNE are fallen flags, the LNE by abandonment around 1961 and the Reading via merger into Conrail. But they live on to fight another day in Jim's eastern Pennsylvania home.

One of the advantages of accurately modeling a prototype railroad as a series of Layout Design Elements (LDEs are recognizable models of actual locations such as small towns, harbors, engine terminals, industries, signature scenes, etc.) is that you can re-create the action often seen only in old black-and-white photos. But on your railroad, these images assume three-dimensional form, take on color, add motion, and can emanate sound effects as a bonus.

**Among the locations** Jim has depicted on his railroad is Locust Summit. As the name implies, it's at the top of a steep gradient out of Gordon, Pa. In the transition era, the Reading routinely assigned T-1 4-8-4s as pushers to help westbound trains make the climb. Jim's HO version features a 60-foot-long grade of almost 3%, so the pushers added at the base are not merely window dressing; they are actually needed.

Because the railroad is designed with the towns and other features in the correct geographical order, it's possible for crews to see and participate in re-enactments of events that routinely happened on the prototype many decades ago. Such was the case at a recent operating session. Jim had a regular full crew of highly qualified individuals, so this allowed him to "railfan" his layout rather than problem-solve, as I'm sure anyone who owns a large home layout appreciates.

"I took several photos during the session," Jim told me, "but one photo op caught me totally by surprise. The Shamokin Eastern coal turn was slowly climbing the 2.6% Locust Summit grade on its return to Shamokin. On the head end were two loud T-1s, while an equally noisy T-1 was assisting on the rear end.

"As the helper came into view, Train 11, *The Williamsporter*, came flying by on the opposite main, similar to how a passenger train would hustle past a slow-moving one on Horseshoe Curve. The dispatcher didn't want to have a coal drag hold up his passenger train and elected to have it run by.

"In an instant, it was over, but for those who saw it," Jim concluded,

"something special happened on a remote railroad grade in the coal region of Pennsylvania."

**That's why some of us** are prototype-based modelers. We want to see events from our distant pasts re-created, or action we never got to see brought to life. If our modeling is accurate enough and our operating schemes are faithful enough to what once was, we can enjoy those "Eureka!" moments when it all comes together in one serendipitous occasion.

As long as we were chatting, I also asked Jim about the future of the railroad. I've noticed that some modelers whose railroads are as complete as Jim's start looking for other mountains to climb.

Jim begged to differ:

"I am thoroughly content with the layout, its era, and operating premise," he quickly responded. "It's checked off all my boxes. I have over 30 guys on my callboard. Generally, 16 to 20 come to a session, which fills positions quickly. If I decided to change to a smaller single-track railroad, like going back to the LNE, many operators would be left out.

"At 71, I have too much time, money, and equipment invested in the current railroad to switch," he concluded. "I want to see it come alive each month, so no teardown or major change is anticipated. I get a great deal of satisfaction from operational enhancements and upgrading scenes around the layout." **MR**

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— TONY



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- CP 6644 - Features a paint scheme based off the Royal Canadian Air Force Spitfire planes flown on D-Day.
- CP 7020 - Finished in NATO green, replicating the standard camouflage used by Canadian and U.S. military vehicles.
- CP 7021 - Features a desert tan paint scheme, representing vehicles operating in sand-heavy climates.
- CP 7022 - Detailed in a grey, red, and black paint scheme inspired by Canadian and American warships.
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