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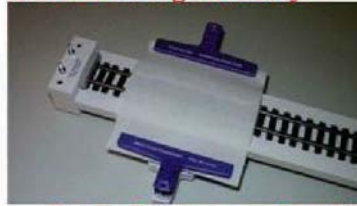
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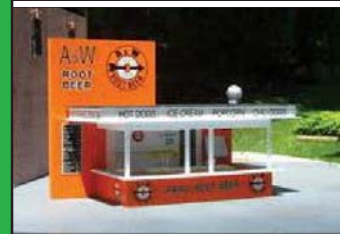
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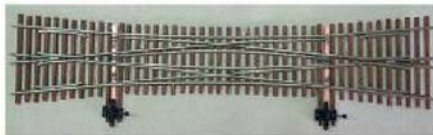
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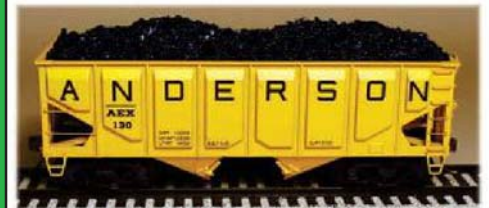
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PUBLISHER
Kevin EuDaly

EDITOR
Stephen M. Priest, MMR
E-MAIL: spriest@rmodelcraftsman.com
6324 N Chatham Ave., Box 117
Kansas City, MO 64151

ASSOCIATE EDITOR
PRODUCT ANNOUNCEMENTS & REVIEWS
Tony Cook
E-MAIL: tcCook@rmodelcraftsman.com
Railroad Model Craftsman
PO Box 177
Plattsburg, MO 64477

ASSOCIATE EDITOR
Harry K. Wong
E-MAIL: hkwong@rmodelcraftsman.com
6324 N Chatham Ave., Box 117
Kansas City, MO 64151

SUBSCRIPTION INQUIRIES:
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ART DIRECTION/PAGE LAYOUT
Paired Rail Railroad Publications, Ltd.

ADVERTISING
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Railroad Model Craftsman (ISSN 0033-877X) (USPS No. 513-670) is published monthly by White River Productions, Inc., 24632 Anchor Ave., PO Box 48, Bucklin, MO 64631. Periodicals Postage Paid at Bucklin, MO, and additional mailing offices. SUBSCRIPTION RATES: U.S.A. \$44.00 per year, Canada \$59.00 per year, International \$69.00 per year. Single copies are \$6.99 plus shipping. Payment must be in U.S. funds. POSTMASTER: Please send address changes to Railroad Model Craftsman, PO Box 48, Bucklin, MO 64631. Send new subscriptions, renewals, and change of address (please include mailing label if available) to Railroad Model Craftsman, PO Box 48, Bucklin, MO 64631 or email subs@whiteriverproductions.com. Please allow six weeks for change of address.

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ON THE COVER:

JOIN US FOR A VISIT TO THE DETROIT, TECUMSEH AND MUSKEGON. THIS HO SCALE RAILROAD WAS DESIGNED FOR OPERATIONS.
— DAVE RICKABY PHOTO



April 2017
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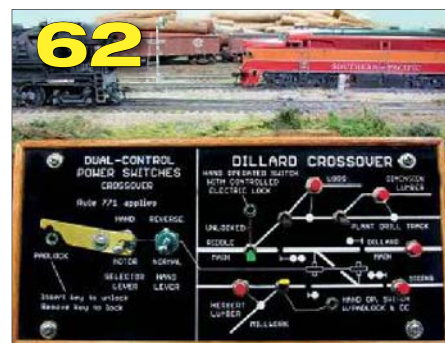
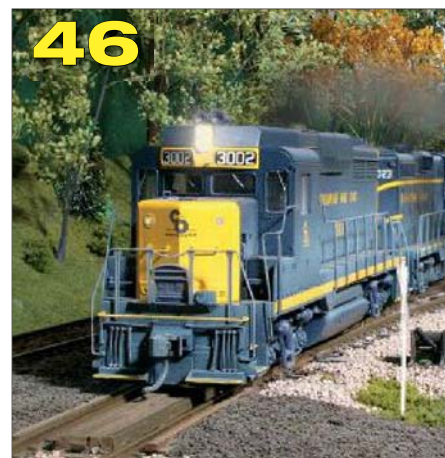
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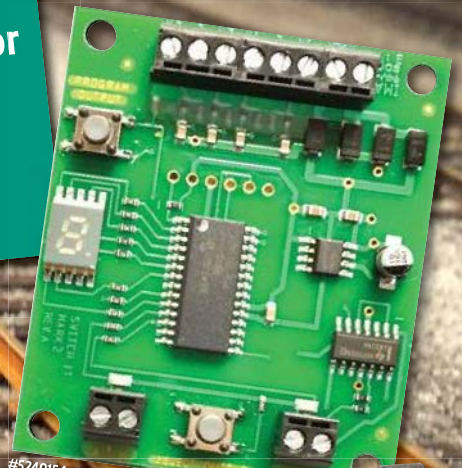


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Editor's Notebook



Miniature History Representation

In a recent conversation with a major hobby shop owner in the Chicago area, I presented the following question: "What era sells best?" The owner quickly replied, "It used to be the steam/diesel transition, but it is now clearly the current era." I was a little stunned by that answer, expecting to hear the 1980s or earlier. Nope, 2000 to the present was the winner.

I understand that there are plenty of steam-era modelers out there and the Penn Central, Western Pacific, and even the Santa Fe still have their strong fan bases. I suppose many people model their "formative years" or, better put, "the good ol' days."

The act of modeling begs us to select a year, location, and railroad. To do a credible job, you have to narrow the focus. Putting on the blinders helps you know your railroad and allows you to study its history, creating a recognizable model of the prototype. This clarity helps you select appropriate rolling stock, structures, and locomotives. These, in turn, paint the picture for those visiting your layout. Careful study of your era will provide you with valuable information, including what types of automobiles were used, how people dressed, what types of billboards were common, and how life was in general. There is period architecture and types of signaling and communication. All these

things support your efforts.

Modeling is a hobby, and so there are varying degrees of historical correctness. A spectrum to be sure, ranging from no era or location to an exact date and location. Neither of these is wrong in any sense, but I will share that falling to either end of the scale can be problematic. Purchasing or building your models free of any constraints creates a dog's breakfast of visually incompatible models. The newest GEs running with that 4-4-0 degrades the impact and believability of both models. Living on the other end of the stick is just as bad. Not starting a project before you do decades of research on it keeps you from really achieving anything and often leads to "paralysis by analysis." I believe it is best to live near the center of the scale, taking care to employ adequate research to attain believability in what you are modeling without being hindered by the amount of material you can quickly obtain.

Most modelers — such as Ron Weyher, whose layout is featured starting on page 46 — have created a believable world full of supporting believable detail. My good friends Joe Kasper and Bret Overholtzer model a short period of time but a specific railroad and a specific location. Joe cannot let go of cabooses on his Burlington Northern Railroad, so we just run the double-stack trains with them. The believability of his railroad is sufficient to carry this "inaccuracy," and most people never mention it, if they even take notice. Bret is just about perfect in everything he undertakes.

The internet definitely has allowed a higher degree of quick research to take place. Need a locomotive number or to check when

it was delivered to your favorite railroad? Just hit your resource library or the 'net for the answer. I am sure most of you regularly do this type of research. A word of advice: be careful and check several sources for a consensus on data when researching on the internet. The 'net is full of "opinions" put forth by people who often do not identify themselves, and I have found discrepancies that have made my hair stand on end.

Historical societies are a great place to interface with information and people who actually worked for the railroad you are wanting to model. Lots of meaningful information can be quickly obtained by talking with these folks. White River (the publisher of this magazine) offers lots of research material in the form of books and magazines penned by knowledgeable researchers writing about areas of their interest. Don't forget about museums, libraries, CDs, and video tapes.

If you enjoy history and, in particular, the history of your railroad, you will want to start researching soon. Remember, you will be tying history into your modeling. It will act as a guide so that what you create is plausible, believable, and — best of all — done at the level of your interest. You will be able to share what you have learned with those who visit your layout and ask questions.

Alco FA-1 and FA-2 cab units

I greatly enjoyed the article in the March issue on the FA-2s, in part because some interesting information about these locomotives just recently surfaced in the Chesapeake & Ohio Historical Society archives.

It seems that demonstrator 1602 ABCD tested on the C&O from May 20 to June 15, 1951, comparing them with an ABA set of C&O F7s. We've had a photo of an ABA set of FA-2s with the C&O's dynamometer car DM-1 for about a year. More recently, the test reports for these tests surfaced — one report by the C&O and one by Alco. The results of these comparison tests were that, for the most part, the Alco-GE and EMD engines were equivalent in performance, with the exception that the Alco units were equipped with dynamic brakes — something new and quite interesting to the C&O. After the tests, C&O went on to buy more F7s, this time equipped with dynamic

brakes, before ordering a horde of GP7s and GP9s, all equipped with dynamic brakes.

I'm attaching copies of two photos. The black and white shows the ABA set of FA-2s with the dynamometer car on Powell Hill grade leading north out of Columbus, Ohio. The color photo was included in the Alco-GE test report and shows the ABBA set of FA-2s somewhere in the southwest, perhaps along Southern Pacific.

I hope this information is interesting.

KAREN PARKER
HISTORIAN
C&O HISTORICAL SOCIETY
KARENPARKER@POBOX.COM

What a great article on the Alco FA-1 and FA-2 cab units by Bob Losse. I can't wait for the Rapido release. The section on the Great Northern FA-2s is, however, a tad confusing and might be misleading to the casual reader. Mr. Losse states "GN also purchased a third A/B set numbered 277 A/B."

Blame that on the GN for the way it numbered and lettered its diesels. GN 277A and 277B were not A (cab) and B (booster) units, but A units numbered 277A and 277B, that ran back-to-back and required no turning. According to the GN roster from *The Great Northern Railway – A Pictorial Study* (Charles and Dorothy Wood, 1979), the GN Alco FA-2 units were 277A/277B, 278A and 279A, and 278B and 279B. However, the website "Great Northern Empire - Then and Now" (great-northernempire.net) states that 278A, 279A (ALCO-GE demonstrators 1602A and 1602D) were FA-2 units, and that 278B and 279B were FB-2 units (ALCO-GE demonstrators 1602B and 1602C), and that only 277A and 277B are listed as having steam generators. Wikipedia states that ALCO-GE 1603A-D was sold to Chicago & North Western. I suspect the historians get just as confused by GN's number/letter system as the rest of us.

NIGEL PHILLIPS



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Previous Product Photo Shown



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Loaded Cars or Empty Promises?

Bill sez...



Mike, we have been discussing topics on how we are modeling many aspects of the hobby — from accurate rolling stock modeling to model railroad operations. One aspect I would like to address relates to what a railroad actually carries — that is, modeling the freight and passengers transported by trains. Now, we know your primary interest is modeling passenger trains in the mid-1960s, so running empty passenger cars on your money-losing Illinois & St. Louis passenger trains is probably quite realistic. But what about those 2,000 freight cars wandering around

the I&StL?

Generally speaking, the cargo carried by boxcars, refrigerator cars, covered hoppers, and other enclosed cars is not an issue. If we can't see inside, it doesn't matter much. We can simply specify that a car is "loaded" or "empty" by stating its status on a waybill or switchlist. However, the load status of open hopper cars, flatcars, and gondolas is painfully obvious. Installing loads can be a simple way to display to viewers that the model railroad exists to move cargo and people.

For example, loaded hoppers — with a visible load — moving from a mine or quarry toward their destination and return-

by Mike Schafer
& Bill Navigato

At the Chicago & Western Indiana's Burnham Yard on Mike Schafer's HO-scale Illinois & St. Louis, we find the yard job at work building blocks of interchange as a freight moves east. We see both empty and loaded hoppers in the mix; the C&EI hopper in the foreground has a removable fake load of coal in it while the Shenandoah, Valley & Gulf two cars up has a live load of real coal. Flats and gons need loadings, too, don't forget. —Mike Schafer photo





Bill's world

*Says Bill, "Say, Mike...
There goes your Gulf,
Mobile & Ohio State Line
coal train headed for the
power plant near Lake
Michigan. Um, it appears
to be loaded with... dust!
Where's the coal? Did it
leak out of those brand-
new Commonwealth
Edison coal gons?
Better tell ComEd that
they have some faulty
coal-train cars! —Mike
Schafer photo*



ing empty, better represents the movement of commodities. On my Chicago, Peoria & Southern, there is a constant parade of loaded hoppers rolling toward online customers and the return of empties to various mines — unlike the empty hoppers on the Illinois & St. Louis that seem to roam the railroad aimlessly after being picked up at the Joliet quarry. Why not load some of those hoppers and make it look like the I&StL is actually moving cars for a reason? Adding loads also benefits switch crews. For example, when switching a mine or quarry, crews will instantly know which cars are really “loaded” and need to be picked up and which are really the “empties” that need to be spotted under the tipple. No more guessing if a given car is a really a “load” or an “empty.”

There are many ways hoppers can be loaded. You can use actual, scale-sized coal or various

commercially available one-piece coal or stone loads. Accurail, Chooch Enterprises, Walthers, and other manufacturers offer easily removable loads. Also, there have been many articles in *RMC* and other publications on how to make removable loads. Mike, do you recall visiting that still-operating anthracite coal yard in Sayre, Pennsylvania — John H. Murray & Son — and buying the 50-pound bag of coal with the intent to make real coal loads? Well, how about getting started on that project? You can begin by just dumping the coal into all those empty hoppers. Perhaps you can let the I&StL make a little revenue to offset those HO-scale passenger train deficits.

There are pros and cons to using each method. Real loads can be a mess when a mishap occurs. Real coal can also be a little oily and leave a residue. Pre-formed inserts may not look

Bill's world

An empty coal train heads toward Litchfield on Bill's CP&S, to be sent out to be loaded at area mines. In the foreground, gondolas are standing by to be loaded at the scrap yard along with one that already has been loaded. Refrigerator cars in the background don't show if they are loaded or not. However, cars like hoppers and gondolas will look more prototypical if they contain some sort of load when the car is earning revenue and empty on its return. — Bill Navigato photo



Bill's world

Mike McBride works a mine local on Bill's Chicago, Peoria & Southern. Most all hoppers that are spotted at the mine are empties—but not all. Some empties are loaded at a small coal truck-dump and are taken to the mine/preparation plant for cleaning. All hoppers picked up from the mine have loads. But generally speaking, an observer will know that if hoppers are loaded, they are heading toward a customer, and the empties are headed toward a mine. — Bill Navigato photo





exactly like a loose load, but that can be easily remedied by sprinkling loose coal or stone over the forms and gluing it in place. I realize you are concerned about how much time it takes to load or unload hoppers. It really doesn't take that long, if you ever get around to doing it. Accurail's removable loads include a couple of steel balls on the underside, which allows easy removal with a magnet. They even offer the magnets too. An entire train of hoppers with their coal loads can be "unloaded" in just a few minutes. In fact, when using Accurail's loads and magnet, a train can be loaded or unloaded faster than it takes to waybill it.

Besides hoppers, other cars would look like they are paying their way by having a load about half of the time. Construction equipment, vehicles, lumber, pipe, machinery — just about anything — can be loaded on a flatcar or in a gondola. Several companies make lumber, pipe,

and other simulated loads that can be placed on or in freight cars if you don't want to take the time to fabricate loads. Even your helicopter flatcar would qualify. Just try to remove it on its return trip, so it doesn't always look like the load keeps getting rejected by the customer and returned to the shipper. To convey a sense that business is going on, flatcars with motor graders move from the Caterpillar plant in Decatur to various destinations and return empty on the CP&S.

If you want your operators to buy into the idea your model railroad is a transportation system with a purpose, they may take notice of these and similar movements. This is even true with specialized loads and rolling stock, such as a transformer flatcar. But try not to overdo those unusual loads or rolling stock, or it will begin to look more like that American Flyer set under your Christmas tree.



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Bill's world

Above: Another example of obvious loads being used in hoppers on Bob Perrin's Illinois Central. Empty hoppers are switched to the mine, and the loaded cars pulled onto tracks for pickup by a mine sweeper. — Bill Navigato photo

Bill's world

Right: Hoppers are not the only cars that have their loads exposed. Flatcars are another example. Ideally, these motor graders should be tied down with chains and some additional blocking. But in the interest of speed, a simpler blocking was used to allow for quick unloading once the car arrives at its destination. Once the car is unloaded, it is returned for loading. — Bill Navigato photo



(Note to Mike: It's April; time to take down the tree.) Of course, that missile launching car can liven up any subdued operating session if it accurately targets that exploding boxcar.

So maybe take a little bit of time to look over all those open cars roaming the railroad. There

are plenty of ways to add loads quickly and easily to all those open cars. You may start to appreciate that small representation that the I&StL is in the business of moving freight from shippers to customers. Like other aspects we add to our model railroads, it may take a little ef-

fort to start, but once we do, we like it and find it to be easier than we thought, expanding upon them. Who knows? You may even decide to put a passenger or two in some of those empty passenger cars to make it look like you really are in the passenger business!



Mike sez...

Bill, you ignorant nut, once again you need a dose of reality. Not all of us out here are retired, with a lovely spouse to do your wash, vacuum your home office, and feed and water you, leaving you with hours and hours of free time to tend to your layout's every detail — like emptying 200 hoppers of HO-scale coal into a bucket between sessions so that the loads that came into the power plant will, at your next op session, be there as empties to take out. And vice versa.

Maybe that's why the American Flyer No. 23785 Operating Coal Loader — a Flyer classic! — and the No. 25007 Operating Dump Car were so popular. Not to mention all the other cool operating accessories (action milk car, oil drum loader, lumber-unloading car, and so forth) that actually loaded or unloaded cars during an “operating session” — such as they were in our childhoods. But things are different in HO (or N or fine-scale O) Land where devices of this nature have to be custom-built, and they need to be done in such a way that they are un-toylike. For example, on Mike Ritschdorff's HO-scale Norfolk & Western-Virginian layout set in the coalfields of Virginia and West Virginia, Mike has built operating coal dumps that are very effective and the talk of Chicagoland model railroads.

Currently, on my HO-scale Illinois & St. Louis, I have several examples where there are open gons, flatcars, and hoppers that, theoretically, are moving loaded or as empties. But time so far has prevented me from accurately portraying loaded or empty cars correctly per their move. And in the 13 years or so I've been hosting operating sessions, not until my November 2016 session did any of my operators comment on this. Most of the time, they are focused on following the instructions on the cars' movement on

the waybill, paying little if any attention as to what the car actually is — or isn't — carrying. I doubt in real life a train crew would address this; they are just following switching maneuvers, and what the car is carrying or not carrying matters not to them. For all they know, that empty hopper being delivered to a power plant is for taking waste material out of the plant.

Will I address this some day? Sure, but right now, it's not as high on my list of priorities as signaling and scenery. Coal loads would be the easiest to deal with since I have a whole box of simulated coal loads that easily can be dropped into a hopper to “fill it” or lifted out to “empty” it. But they're all different sizes and have to be sorted out, which I could do while doing mind-numbing tasks such as reading Bill's emails explaining to me how he's redesigned his new Peoria yard for the tenth time.

One very effective method of solving the loads/empties conundrum — and I had it on my

first version of the Illinois & St. Louis — is the old “loads in/empties out” scheme, which eliminates the need to actually load or empty hoppers and such between operating sessions. On my first I&StL, I did this involving two industries: Little Max Mine and Central Illinois Power & Light. As the diagram shows, each industry was on each side of the basement steps, and the hidden tracks connecting the two were under the steps.

This idea is not at all new, and I wouldn't be surprised if it were the brainchild of the late John Armstrong, whose never-tiring brain was always coming up with clever solutions to any number of situations wrought upon us modelers. For those not familiar with this rather simple scheme, it worked like this: From the depths of Little Max Mine came the coal, which theoretically was conveyed up to the mine tipple (one could add a coal-sorting/washing step in here if so desired) for temporary holding until loaded into hoppers. Hopper cars thus



Mike's world

It looks like Mike has decided to fill the empty hoppers on his layout with real coal. Yes, he actually bought this bag of anthracite coal from Murray & Son at their incredibly neat coal-distribution facility at Sayre, Pennsylvania. He plans (key word here) to crush it into an even smaller grade to have live loads in hoppers roaming his Illinois & St. Louis. Hey, Mike. I took this photo in 2013. How's that coal-crushing project coming along?
— Bill Navigato photo



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Building a Barber Shop

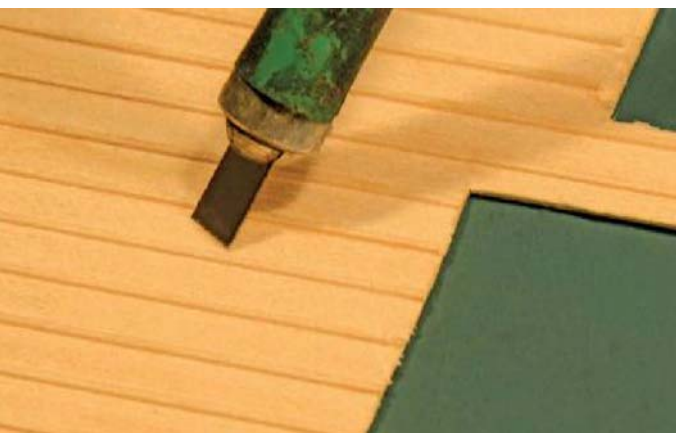
CRAFTSMAN/Bob Walker, photos by the author

Distress

Below: Distress the walls a bit to give a little graining to the wood.

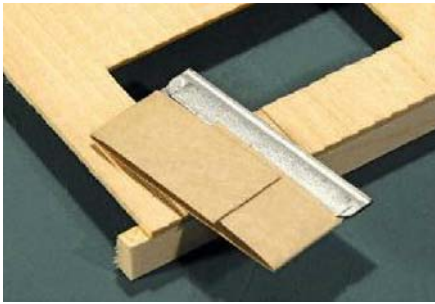
Typical Shop

Above: A typical small-town barber shop with a small footprint can be located most places, even on smaller pikes.



Considering the number of emails recently, I suppose I should address the reason most of these projects have little or no dimensional data other than footprint numbers. In my estimation, all railroads have some size constraints that require a degree of selective compression. We just cannot model an entire railroad unless it is an extremely short short line. The Cotton Plant-Fargo in central Arkansas was a little over a mile long and had four turnouts, so I suppose you could model the whole thing in your basement. Not so, the Pennsy! Those of us modeling Class I or II roads need to be selective

in what we choose to represent. Limited square footage dictates how much track we can stuff in, and that amount of track limits the size of the buildings we can use to make things a little more believable. Every railroad and its builder have differing priorities and scale acreage. I have chosen to omit most dimensions, leaving those final measurements to the individual builder. The reader can then tailor the model to fit the space allotted to it. A good example would be the Montrose (Colorado) enginehouse written up over a year ago. The prototype was 172 feet long, which comes out to 43 inches in O scale. My



I always start a new project with new blades.

little staging yard there just did not have that kind of space, so I shortened it to fit my needs. Some folks have more room; some have less. I have always known that my readers have the knowledge and skill to size their project in a logical fashion and build what suits their needs. I choose to make those size decisions up to the individual reader. All that being said, this barber shop has a 32x20 footprint. Build yours to whatever works for you.

The inspiration for this month's project came from Miller Engineering's "Lightworks" series of lighted signage, the barber pole (#8082). It runs on three AAA batteries and has several lighting patterns. These animated signs really dress up a scene. They are simple to install, requiring only some sort of access to an on-off switch. I made the roof removable on this model, which is the last of a small five-building street scene on my On3 Montrose scenicked staging yard. The other four were presented over the past few months, and all that remains to be done is the street itself and some street lights.

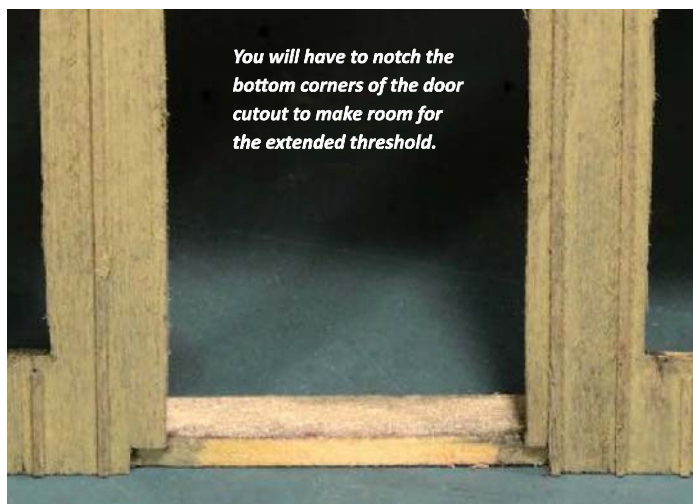
This model goes up against the backdrop, so I stuck a piece of wood



The planked-over rear of the false front wall, showing the interior and roof bracing.



A slot cut into the front wall will accommodate the sign's printed circuit.



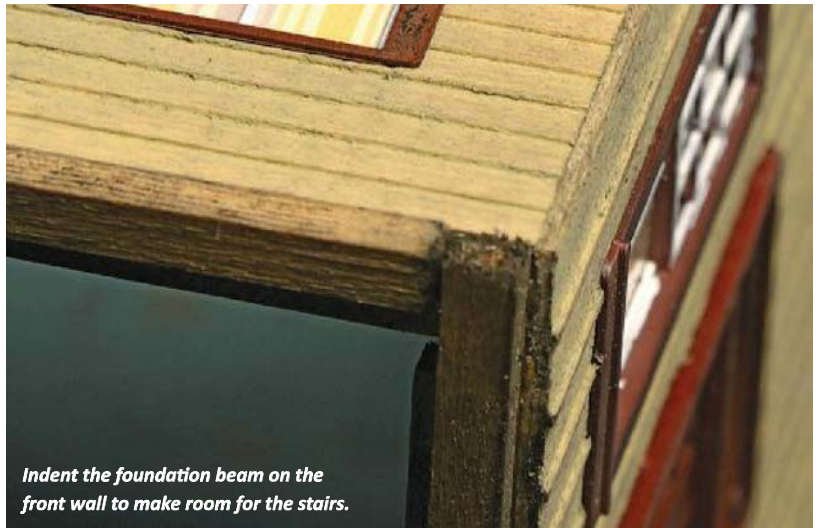
You will have to notch the bottom corners of the door cutout to make room for the extended threshold.



A neat way to paint small components is to stab the non-show side with a knife. This will mostly keep paint off your fingers.



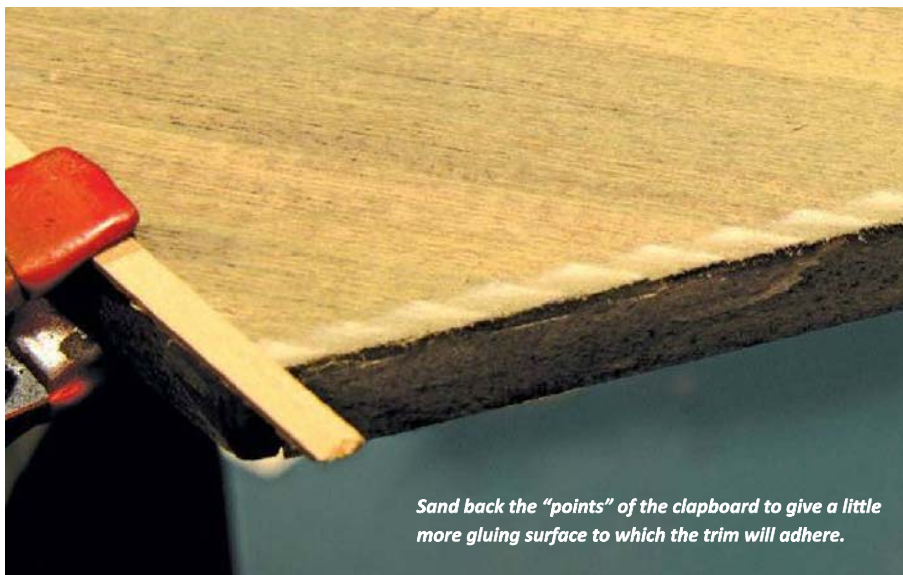
Above: Use a wire brush to distress the still tacky paint from the window and door moldings. Pre-paint them a weathered gray.



Indent the foundation beam on the front wall to make room for the stairs.



Add the glazing and other window treatments prior to attaching them to the model.



Sand back the "points" of the clapboard to give a little more gluing surface to which the trim will adhere.

along the track, running my biggest locomotive back and forth until it failed to hit the stick. I then measured the distance to the wall to ascertain the exact maximum width of the building. It came out to 20 feet.

I built this as a typical turn-of-the-century Western town building: wood, single story, false front, and pitched roof. Also typical: nine-inch board & batten front, six-inch clapboard sides, and tin standing seam roofing, on a six-inch timber foundation.

Being a cheapskate, I tend to save scraps of material of all kinds. Over the years, I have constructed many a building just using stuff from all those scrap boxes. This project was no exception in that most everything was gleaned from scraps, leftovers, and saved bits and pieces. Smaller structures, like this one, make it easier to bring off.

After finding enough of the appropriate Northeastern wood in the scrap bin, I cut the four walls to size, cut in the window and door openings, and braced them with 1/8x1/4-inch stripwood, also from the odd-lot cutoffs bin. As an aside here, I buy my single-edge razor blades and X-Acto No. 11 blades by the hundred, not only because they are cheaper this way, but also because I go through so many of them. Every new project now starts with *new* blades — another of the many lessons I have learned the hard way! Trying to get too much out of those blades is an exercise in unneeded frustration that I no longer tolerate in my advancing years. Okay, off the soapbox.

Scrape a little grain into the exterior walls to give the model a bit of a



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The front stairs snug up against the foundation beam, giving a decent mounting surface on which to work.

“weatherbeaten” look. For my World War II-era layout, the building would be in its 40s, and Colorado winters can be rough on structures. With those winters in mind, I stained the walls with India ink/alcohol before doing the final paint job, brushing off some of the still-tacky paint to let that weathered wood show

through. I tend to give the walls their final coloring prior to assembly since they are easier to work with flat on the bench than assembled into a three-dimensional “box.” Test-fit the windows and doors to a snug, but not tight, fit. Then paint the interior a dark color. After I had airbrushed the windows and

doors to their basic color, I used a small brush to hand-paint the muntins white. I then completed the window treatments (glass, shades, and curtains) before plugging them into their holes.

You can now make that “box.” Measure that “box” to determine the size of the roof halves you need. I used Evergreen #4524 standing seam roofing with 1/2-inch (24 inches in O scale) spacing. (Lacing the “standing seams” into their slots takes a bit of practice, but it is not as hard as one would think. The trick is placing the thin seams into their grooves, and then applying an instant — I use Tenax 7R — solvent with a *very* small brush. Ol’ cheapskate here had to cobble two pieces of roofing together to get the proper length, thus the odd-looking braces on the inside of the roof structure.)

Use the building’s roof pitch to create two styrene roof brace panels. Brace the angled upper section with strip stock. In this case, I used 1/8 x 1/4. Again, I used the instant Tenax solvent to assemble the “halves” into a roof.

Paint the underside of the roof a dark color and the outside a rusty reddish brown. We will add chalk weath-



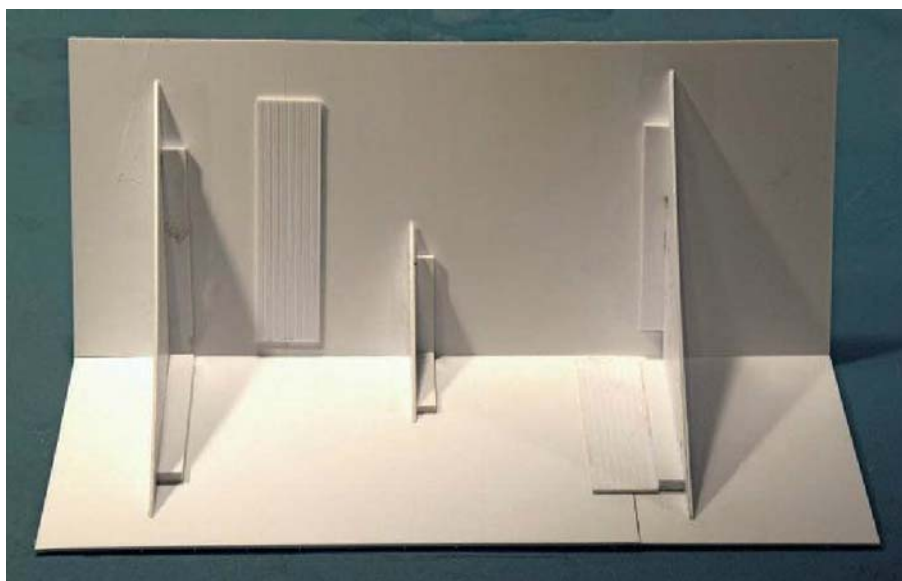
The electronics were mounted to two sticks of styrene to rest just under, and clear of, the roof.

ering later to bring out more of that “rusty” look. If you want a new roof, paint it “old silver” and dull it down with some gray chalk.

Now we come to the inspiration for this project: the lighted barber pole. I made a 3/32-inch-wide slot in the front of the building to accommodate the printed circuit tab that protrudes into the building. I was tempted to use a 3/32 Dremel cutter to make the slot, but then had visions of making it too big, so I did this with an X-Acto No. 11, with the building upended on the bench. I should have made the cut prior to assembly — it would have been a lot easier to do.

Put two stout strips of wood or styrene — whichever you have the most of in the scrap box — along the upper side walls to hold up the electronics and battery pack. I used double-face tape to mount these components. The roof is removable for the switch and battery changes.

The final details were quick and easy. The two-step stair entrance was made of 1/8-inch strip stock, as was the timber foundation. I indented the



When you use scraps and cutoffs from the last project, sometimes you have to scab together some of the material to get the length you need.

foundation by 1/16-inch, and then attached the stairs under the door, flush with the front door. The signage was clip art, and the chimney was a chunk of 3/16-inch styrene tube. Run that No. 11 blade around the inside of the top to render the thickness of the “tin” more believable.

Well, folks, that about does it for the project-type columns for now. Next month, we will address the idea of mass production. We will wind down the project style gently, since we will cover making 10 logging disconnects all at once, which you could say is “kind of” a project. *Boy!* Was it ever! **RMC**

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APRIL 2017 **25**

Test Track



Tangent Scale Models: Northern Pacific Mini-Hy Cube

HO — While I've now lost count of its numerous projects over the past decade, Tangent Scale Models has been a prolific producer of HO-scale freight cars that exhibit incredible museum-like quality details, and its latest boxcar offering is no different — the Pullman-Standard PS-1 Mini-Hy Cube. Available factory direct and through select dealers, these popular prototypes from the late 1960s, especially designed for railroads that serviced appliance manufacturers, come in eight different flavors, each in multiple road numbers: Burlington Northern, Chicago, Burlington & Quincy (with and without door stripe); Denver & Rio Grande Western; Illinois Central; The Milwaukee Road ("DF2" and "DFB" schemes); and Northern Pacific, at a suggested retail price of \$44.95 each, as well as an undecorated kit for \$37.95.

By the 1960s, the railroads were already in heavy competition with the trucking industry in the hauling of a wide range of commercial commodities. As such, railroads made every effort to provide the best service possible to their on-line customers, including the use of industry-specific freight cars. In particular, the appliance industry required more efficient boxcars in which to ship their re-

frigerators, washers, and stoves than the standard 40-foot cars of the day could offer. Pullman-Standard answered this call for a tailored boxcar, which it referred to in advertising as the "Mini-Hy Cube." This design maintained the common 40-foot, 6-inch interior length of the company's PS-1 design boxcar, but increased the inside width to 9-feet, 6-inches and height to 12-feet, 9-inches. This extra vertical capacity allowed products such as refrigerators and hot water heaters to be double-stacked and shorter appliances to be stacked three high. This arrangement provided the new car with a 4,900-cubic-foot capacity.

As might be expected with a specialized car such as the Mini-Hy Cube, Pullman-Standard only built 122 of these boxcars, which were delivered to five different railroads in 1967 and 1968. Chicago, Burlington & Quincy received 50 Hy Cubes, Denver & Rio Grande Western 11, Illinois Central ordered 30, The Milwaukee Road purchased 25, and Northern Pacific owned only six of the PS-1 boxcars.

Similar 40-foot length dedicated appliance cars, generically referred to as "baby Hi-Cubes," were also produced by other car builders too. For example, Santa Fe

owned cars of comparable dimensions built by Transco in 1967, and Union Pacific's Omaha Shops constructed 66 hi-cube boxcars, classed as BF-50-4, also in 1967.

Regardless of their origin, most of these cars were assigned to other railroads, however, as the appliance factories they served were off their right-of-way. The Evansville, Indiana-based Whirlpool refrigerator factory on the New York Central was a destination for some of the hi-cubes, while Whirlpool's Marion, Ohio, washer and dryer factory on the Erie Lackawanna was home for a number of Santa Fe and Rio Grande appliance cars. Finally, a quantity of the CB&Q's PS-1 boxcars was assigned to the Admiral refrigerator plant at Galesburg, Illinois.

A majority of these cars were outfitted with load-restraining devices and cushioned underframes. Santa Fe and Rio Grande denoted these cars with a "DF" on the car sides, signifying damage-free load restraining mechanisms, while the CB&Q indicated the inclusion of these devices in its cars by adding a white diagonal stripe to the doors. Typical equipment included Evans belt rails and Equipco or Transco load dividers. Nonetheless, production certainly did not last long for these cars as newer

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larger boxcar designs began to be accepted. By the 1980s, few of the original PS-1 Mini-Hy Cubes were still in revenue service with most ending up in maintenance-of-way duty or the scrap line.

As 1:87 scale modelers, we have already experienced some of the other 40-foot baby Hi-Cube appliance boxcar prototypes over the years via a number of manufacturers, but this Tangent release is the first ready-to-run offering of the Pullman-Standard type to grace HO rails and is welcomed with its high level of detail. Simmons-Boardman's 1974 *Car and Locomotive Cyclopedia* provided excellent photos and car diagrams of the PS-1 Mini-Hy Cube with which I compared *Railroad Model Craftsman's* sample. Consistent with the company's past offerings, I found the Tangent boxcar to be quite precise in every measurement I checked. The original car data shows 29-feet, 6-inches between the truck centers, 40-feet, 8¼-inch length over the end sills, and an outside width of 10-feet, 1-1/16-inches. The 5-39/64-inch long (over the delicate-appearing end sills) miniature car matched these dimensions perfectly.

The tooling created to form the injection-molded one-piece boxcar shell displays Tangent's usual craftsmanship as well. This is evident in the model capturing the correct profile of the various ribs, panels, weld seams, and rivet heads making up the all-steel construction of the prototype as molded-in features. These important characteristics include: the roof with its raised "bow-tie" stamped pattern and very subtle peak; the 12 welded panels making up the side walls; the L-shaped angle brackets under the lower door guide and the riveted-on doorstep; the welded-on lower door opening gusset plates, which also contain various reinforcing rivet detail; the four panel fabricated 10-foot wide door with the three upper sections, which were riveted together, containing the proper four ribs each and a narrow flat section added at the bottom; and, likewise, the Mini-Hy Cube's unique 3-4-4 ribbed pattern ends with an additional flat section at the top. And just like the real deal, a line of fine rivets populates the edges where the ends, sidewalls, and roof are joined together. In fact, just to be completely thorough, I noted that there were a total of 51 corner post rivets dis-

played on the HO-scale rendering, which matched that of the prototype exactly!

Of course, there are plenty of separately applied details to dote over as well. This category of the Tangent rendering includes two short, four-rung ladders on each side and end; delicate appearing, but durable, stirrup steps; tack boards; wire handholds on the car ends; see-through photo-etched coupler cross-over platforms; the appropriate style of trombone-type coupler cut levers; and a brake wheel with housing on the B end of the car — complete with chain and linkage to connect it to the miniature bell crank situated below the car end.

On its underside is even more eye-candy for the freight car detail aficionado. An add-on center sill representative of the cushioned design found on the prototype is present, along with the underframe's associated crossbearers molded in the plastic floor. A complete AB style brake setup is present too with not only individual components making

up the reservoir, control valve, cylinder, and retaining valve (the latter detail correctly located on the left side of the car, I might add), but all the levers, slack adjuster, and piping as well. The brake system's plumbing actually extends all the way out to the trainline air hoses with gladhands, which are situated alongside well-executed extended draft gear boxes (yes, the latter even includes the side key detail). Finally, the Mini-Hy Cube boxcar rides on the appropriate Barber S-2-A 70-ton roller bearing trucks complete with hand-applied brake shoes and brake beams as well as blackened metal scale 33-inch diameter wheelsets.

RMC's review sample arrived decorated for Northern Pacific. Car number 659996 was one of six cars in the 659994-659999 series delivered by Pullman-Standard in November 1967. The dedicated appliance service car was to be returned to the Illinois Central at Kankakee, Illinois, as appropriately listed on the HO-scale model's lower





car sides. The review model, like its NP prototype, has been painted in “Lowery” dark green as used pretty much on all NP’s insulated boxcar fleet along with a black-painted roof and underbody. The Tangent replica’s consistently perfect paint finish is further enhanced by the sharp graphics that include a large eight-scale-foot diameter herald and billboard size “NP” lettering. All the tiny car data, printed in white, is opaque and fully readable under magnification too. Basically, this car has a decoration job that lives up to Tangent’s now well-established quality.

Equipped with metal Kadee couplers and very free-rolling wheelsets, the

1:87 shorty appliance car will negotiate curves with a radius as tight as 18 inches with relative ease, so it will be a welcomed addition to any size layout. Furthermore, I checked the sample with a National Model Railroad Association’s Standards gage and found both wheel gauge and coupler height to be within specs. The model’s weight, which has been aided by the addition of an internally installed steel plate, registers 4.4 ounces — only about a half-ounce over the NMRA’s recommended weight based on car length calculation.

Tangent has done it again — another masterpiece to add to your HO-scale rolling stock collection. The Mini-

Hy Cubes, while limited to only a few original owners, do represent a very colorful and interesting prototype that saw service across many different U.S. railroads and, therefore, are perfectly suited for inclusion in almost any consist dated from late 1967 through the 1980s era. — **DAVID OTTE**

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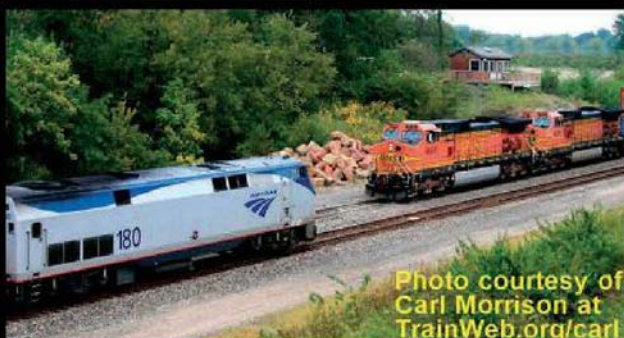


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A minimum of \$100 and a Dremel Rotary Tool Kit with a variable-speed Dremel 3000 rotary tool and accessories are awarded to the monthly winner of the RMC/Dremel Kitbashing Award.

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Richard E. Bradley Building Ma & Pa No. 35

Searching through Bob's Photos at a train show, I came across an image of Maryland & Pennsylvania No. 35 RPO/Baggage. The photo was made in Baltimore, Maryland, on June 22, 1941. The photographer is not listed. I like the looks of Ma & Pa No. 35; I bought a copy of the photo with the dim thought of making a model of it.

Learning

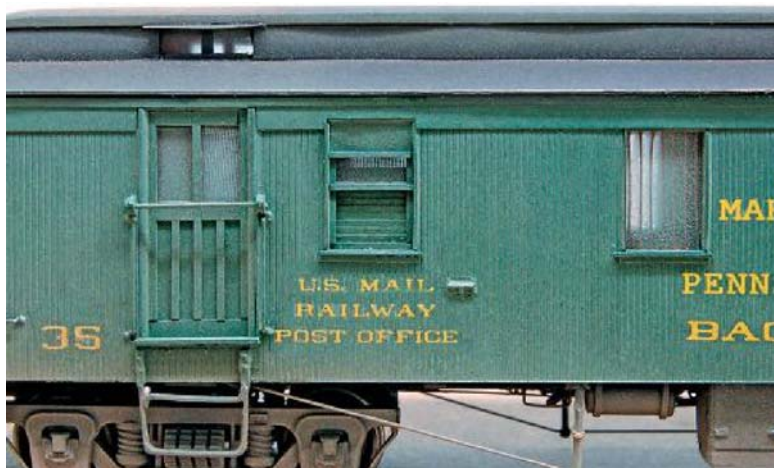
I began with two private publications by Charles T. Mahan, Jr., obtained through the Maryland &

Pennsylvania Railroad Historical Society: *Passenger Equipment List and Notes* and *Passenger Car Data and Notes*. Immediately, I found that there were two Ma & Pa RPO/Baggage cars numbered 35.

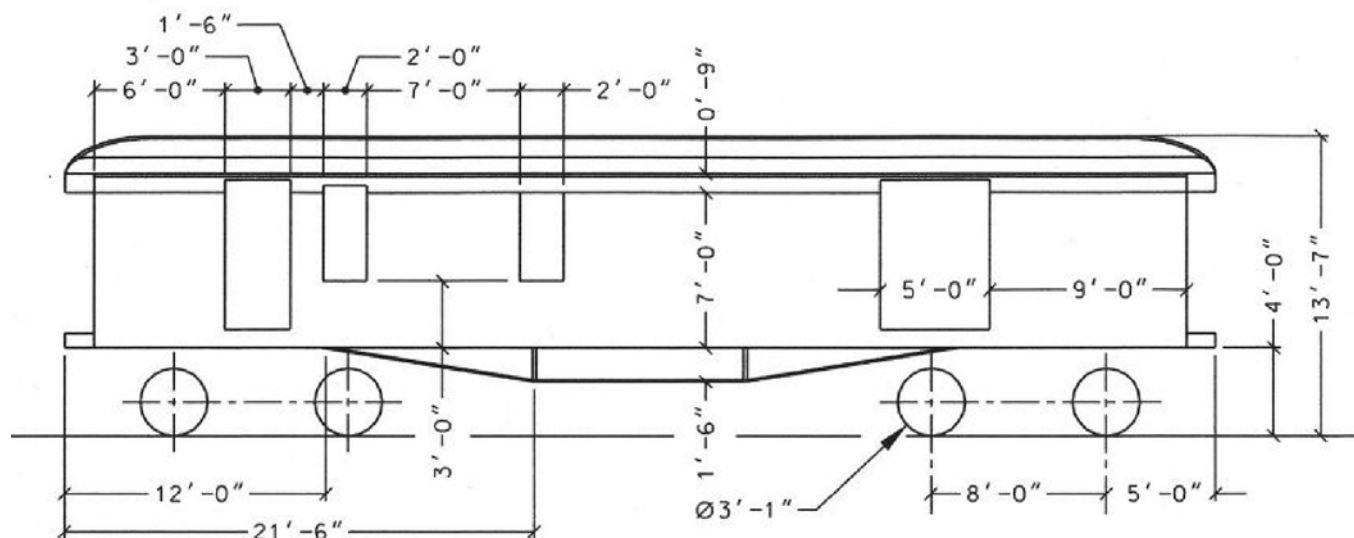
The first No. 35 listed by Mr. Mahan was purchased by the Ma & Pa in October 1920. It was originally built by the Pullman Company for the Colorado & Midland as its baggage car No. 306. From Colorado Midland, the car went to the Arkansas Valley Interur-

ban and then to the E. H. Wilson Co. before purchase by the Ma & Pa. The car went out of service in October 1942 when it was converted to a storeroom at Fallston, Maryland.

The second No. 35 came to the Ma & Pa as second No. 42 in October 1906. Second No. 42 was newly built in the Ma & Pa Falls Road shop. In October 1942, it was rebuilt into second No. 35. This car was sold to the National Railway Historical Society in March 1956. Since then, it has



Ma & Pa RPO/Baggage No. 35 at Baltimore, Maryland, on June 22, 1941. — Bob's Photos



Above: Brook Rhinehart's CAD drawing of the side and plan for Ma & Pa.

resided in the B&O museum in Baltimore, Maryland.

Planning

These are the dimensions for first No. 35 from Mr. Mahan's passenger car data tables:

Inside Length

Baggage: 33-feet, 6-inches

Mail: 15-feet, 8-inches

Total: 49-feet, 2-inches

Inside width: 9-feet, 2-inches

Inside height: 7-feet, 6-inches

Outside length: 52-feet, 8-inches

Outside width: 9-feet, 8-inches

I believe the given outside length and width exclude the grab irons extending beyond the walls. And I surmise the outside length is over the end sill, not over the end wall. For the length over end walls, I guessed a wall thickness of four inches and added twice that to the inside length to give an outside length over ends of 50 feet.

With a PhotoShop enlargement of the Bob's photo, I used the propor-

tional ratio calculation procedures to derive positions for the doors and windows. My paper sketches with calculated dimensions and Bob's photo were given to Brook Rhinehart — he's a CAD expert and a fine model railroader. Promptly, he provided me with a dimensioned outline drawing for No. 35.

The end dimensions were derived from those plans of the floor, side, and roof. The arrangement of the underbody is unknown to me. I followed the layout used on the Westwood kit for Ma & Pa RPO/Baggage No. 33.

My construction method followed the usual styrene car-building procedures. In this article, I'll mention procedures particular for this car. I'll neglect repeating oft-used modeling methods. The styrene dimensions are in thousandths.

Parts

Since the roof is a major factor in my choice of No. 35, I looked into a way to

model it. Of the several wood shapes and plastic roofs available, I chose the MDC (Roundhouse/Athearn) No. 2999. It is listed for a 50-foot car, seemingly too short, but that car has open platforms, and this roof is actually too long for No. 35. It has windows along the clerestory. It needs modification.

The trucks are four-wheel Pullman style from MDC (No. 2937). Cal Scale supplied the UC passenger brakes (No. 300), and the battery box is Bethlehem Car Works (No. 18). The couplers are Kadee No. 711. The center sill is for an Athearn 57-foot mechanical reefer (No. 54602). I used Tichy turnbuckles (No. 8021) and several sizes of Detail Associates brass wire. Evergreen styrene sheet and strip formed the majority of the car body.

Floor Construction

The styrene floor is the full length of the car. Its width is determined by the

Below: The RPO end of No.35.



flanges on the MDC roof. Trim the ends to the angular shape and add a buffer block. Parts are trimmed from the At-hearn center sill casting and glued in place according to the needs of No. 35. The Kadee 711 couplers are located, and their mounting screw hole drilled and tapped. A 0-80 round head screw holds the coupler pocket.

Next, the plastic brake components and the battery box are glued to the floor. These are followed by the plumbing and piping made from various sizes of brass wire. Very long queen posts are needed. Mine are Grandt Line 0.020 plastic rod supported by 0.010 wire braces.

The MDC trucks receive Kadee 36-inch wheels. Brake beams are glued on the upper ends of the frames. Along the bottom of the sideframe is a piece of 0.010x0.020 brass strip. It bends to run up from the bottoms of the journals to the brake beams. Drill and tap the body bolster for 2-56.

On the ends of the floor, add the Tichy drop grab irons with their NBW castings. Bend a coupler lift from 0.010 wire and attach it with Detail Associates wire eyes.

Paint the floor and trucks Grimy Black. They will have a long curing time while other parts are made.

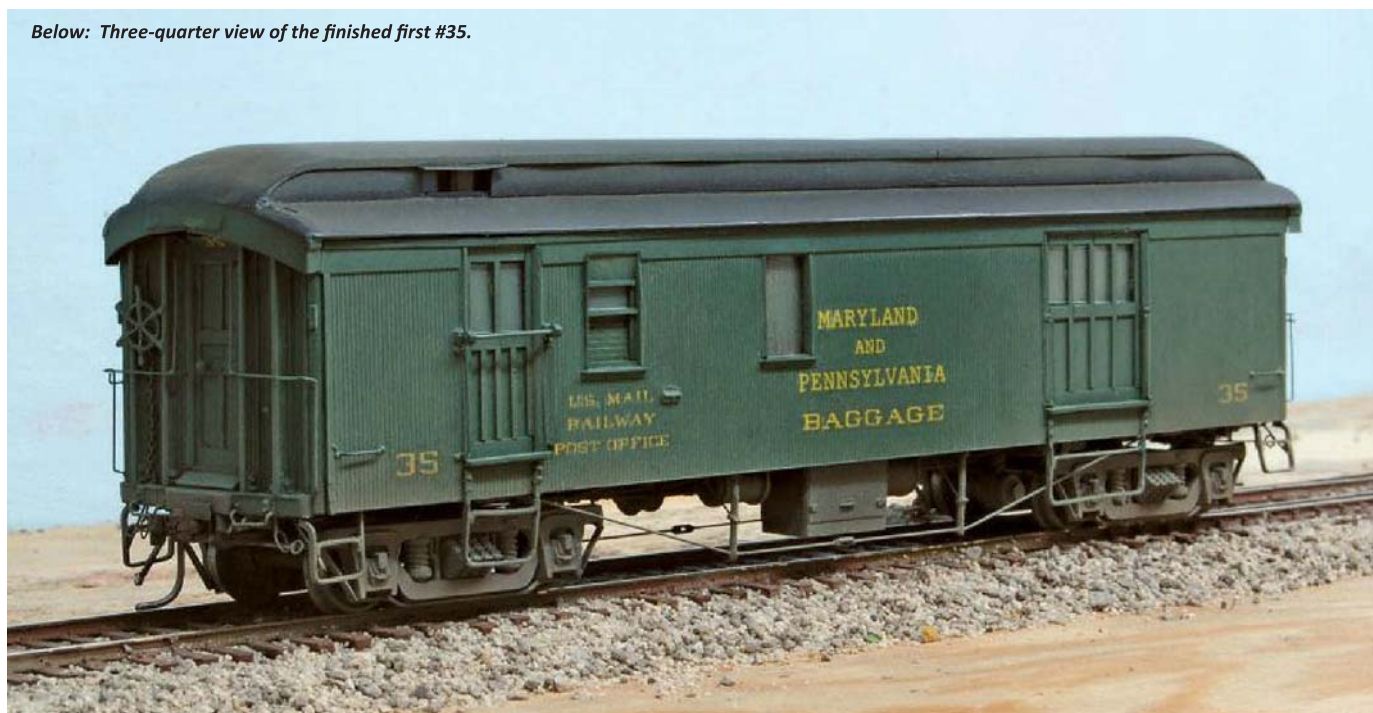
Sides

Sides and ends are constructed from Evergreen HO passenger car styrene sheet. Because of the RPO and baggage ends, the sides are symmetrical, not



Above: Side view of the model of first No. 35 seen in Bob's Photo.

Below: Three-quarter view of the finished first #35.



identical. For layout, butt the tops of the two sides together and carry the window and door layout lines across the tops from one side to the other. Mark vertical dimensions individually on each side.

Cut open the doors and windows. Along the back of the side glue a 0.060 square with its bottom edge aligned with the bottom of the door openings. This supports the floor. Door blanks are over-width 0.020 styrene sheet. They must not interfere with the floor and roof. Cut the window openings before gluing the door blanks inside the walls. Stiles and rails for the doors are cut to fit from 10x30-inch and 10x40-inch strip. The vertical edges of the doors are lined with quarter round. Doors get sills and lintels of 20x60-inch strip. Grab irons are cut from 0.010 brass wire. After bending to shape and inserting in No. 80 holes, add Tichy NBW castings at their ends.

The small window sashes are 20x60 styrene strip glued to the back of the wall. The pieces have a 0.030 reveal. Then line the small window with 10x20-inch strip. Add a 20x30-inch sill.

The larger, double-hung window with a partial upper screen begins with making the upper sash as for the small window. Then use 0.020 fillers along the edges of the lower sash. Glue the lower sash pieces on top of these. Line the edges of the window with 10x20-

inch strip. From a scrap of fine screen, cut a piece to fit the top half of the upper sash and add a strip of 20x20-inch at its bottom. Add a 20x30-inch sill.

Glue on a six-inch piece of 10x20-inch as the letter drop slot. Make the side fascias from 20x80-inch strip.

Ends

The underside of the roof end is not a true arc. I trimmed paper to fit and then used that as a template for the plastic ends. Another paper template was used to determine the shape for the end fascias.

The ends are the same scribed styrene sheet used for the sides. Before cutting out the door openings, prepare the blank that goes behind the end wall door. Only the baggage end had a door window. When the doors' openings are cut, the end walls are fragile and need prompt reinforcement by the door blanks. Door stile and rail addition follows with quarter rounds along the sides.

The exterior vertical stiffeners are pieces of Code 70 rail. Form brass 0.010 wire for the grabs and attach with Detail Associates wire eyes.

After a fruitless search, I made the brake wheels by soldering together soft copper parts held in place on a wood block by double-faced tape. Initially, the spokes were overly long to provide

a sticking surface and heat dissipation; they were trimmed to length after soldering. Squeeze the spoke ends for the handles.

Paint the sides and ends CNW Green. Transfer the Clover House lettering to decal film. Gloss coat the sides and ends, and apply the decals. Spray the thoroughly dry decals with Dullcote. Mist with a very thin coat of CNW Green to tame the too-bright lettering.

The baggage end door and the side doors get plain clear styrene "glass." For the small RPO window, mark the size of the opening on an oversize piece of "glass." With spots of glue above and below the marked opening, attach prepainted brown (black won't show well) 0.015 vertical wires to represent the bars. The upper sash and behind the screen get clear "glass." The lower sash has horizontal bars made like the others.

Assemble the floor, sides, and ends. Use lots of interior bracing. Bend and solder together the steps from 0.010x0.020-inch flat brass strip. Touch up the paint. Screw on the trucks.

Roof

Cut an amount from the roof to shorten it to the car length. Under the roof, use several thick styrene strips as splice bracing. Fill the splice with putty and sand smooth. Cover the clere-

Below: The completed underbody.



story windows with 0.010-inch strip. It needs to be trimmed for height and to fit the curves in the ends. Don't cover the windows above the RPO door. Spray the roof Grimy Black. Add weight to the make the car weigh six ounces. Glue the roof onto the car.

Sidebar

Using proportions to derive dimensions for parts within an object of known length has a long tradition in modeling. It is greatly aided by Adobe Photoshop. Bob's Photo provided the image to scan.

Begin by image modification with the Skew and Free Transform tools with the grid overlay to generate a squared image of a side of No. 35. Use the largest practical image for the best alignment.

It's okay that the ends are weird; only the side is of present interest. Crop away most of the background to concentrate on the side.

Turn on the ruler and the Line tool to draw thin (two-pixel wide) white lines up from significant parts of the car side to the ruler. Draw carefully and go back to redraw as needed to obtain the best vertical line locations. Do not allow the "snap to grid" option; it can move your lines.

Count the number of 1/32 ruler marks in the PhotoShop ruler view of the length of the car. It is 275. My estimate for the length of the car sides is 50 feet or 600 inches. Divide 600 by 275 to give the inches per 1/32nd ruler mark. It calculates to be 2.1818181 — that is the

proportion number. Find the real inch length for sizes and positions of the windows and doors by counting the number of 1/32 ruler marks and multiplying by the proportion number.

As I count and multiply, I consider the reasonableness of each result. For instance, the small window comes out 24 inches wide, which seems okay. The baggage door is 60.1 inches wide, or about five feet, again okay. All the dimensions are recorded on a paper sketch of the side of No. 35.

Vertical dimensions are found in the same manner. More notes are made on the side sketch for No. 35. **RMC**

Below: Behind the Bachmann model of Ma & Pa No. 6, the model of Ma & Pa mail/baggage first No. 35 leaves the High Rock cut on my layout.



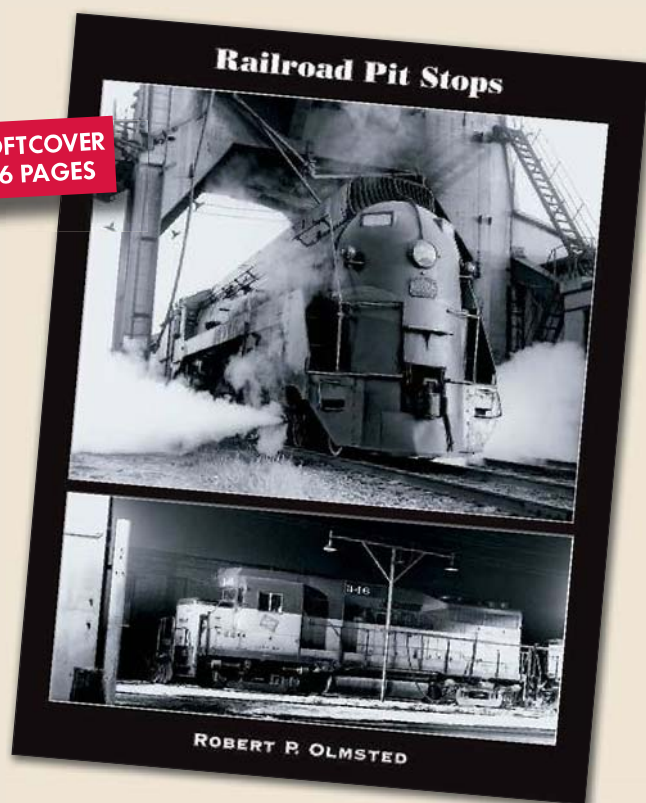
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RAILROAD MODEL CRAFTSMAN

I'm not a car enthusiast by any means, but I know a lot of people who are, and I understand the adrenaline rush of looking for a new vehicle, spotting something sporty on a dealership lot, taking it for a test drive, and negotiating a good price to take it home. At some point, the novelty will wear off, but the exhilaration of that first day won't be forgotten.

As a railroad enthusiast, I can relate. I'm attracted to "newness" in the realm of motive power. As a newsroom veteran, it's my nature to think "new," "fresh," and "first." If there's a new locomotive out with a fresh coat of paint, I want to be the first to get it. I have a few good first-time/new-power experiences that are among my more memorable railfanning moments.

What's Out at Mid-America?

Having lived in the Kansas City area for nearly eight years, I tried to keep tabs on a few new units turned out at the Mid-America Car facility. I didn't do too well, but I had two occasions that were "hits." Some railfan friends tipped me off to the release of two Iowa Interstate units in September 2008. That scoop resulted in some roster shots of ES44ACs 507, 509, and, a couple of weeks later, 505.

The second occasion was in December 2014. My friend in Florida was eager to photograph the new Florida East Coast ES44C4s upon their arrival. Two of them came out of Mid-America, and thanks to a tip, I was fortunate to photograph 806 and 809 under gray skies. I confess I was a bit giddy emailing the images to my friend before they dominated his local rail scene. I haven't asked if he's tired of them already.

Little Town with the Biggest Name in North Carolina

The release of Union Pacific's heritage units in 2005 gave fans something new to look for on the rails. My goal was to catch them all. Sadly, more than a decade has passed, and I haven't completed the set. I've yet to see the Denver & Rio Grande Western, I have a very poor shot of the Southern Pacific, and I could use a much better image of the MoPac. The other three I can live with.

Imagine my thoughts sitting in KC in 2012 when Norfolk Southern made its earth-shattering announcement of turning out 20 heritage units to commemorate its 30th anniversary. They trickled out of the shops one by one from March through June, NS photographer Casey Thomason posted his images on the company website, and railfans slobbered all over their computer screens, hoping one would pass through their neighborhood in the near future. I thought, "Not a chance

for me."

Then, NS made another sterling announcement — a heritage celebration to share with the public July 2–4. The place? Spencer, North Carolina. Not terribly close to us, but not far enough to miss out on such a monumental railroad event. I got in on the first two days, but missed the third. As I positioned myself for photos of the units crawling on the runway, I kept thinking, "You've got to be kidding me — I'm dreaming." NYC, Pennsylvania, Lackawanna, Jersey Central, Reading, and more. "This is nuts!"

While a few units escaped the ideal shot, the exhibition allowed me to bag far more than I ever would have caught one by one. And to this day, I still haven't seen one outside of that event. It was, indeed, one of the most enjoyable railfan experiences I've had.

It's Old, but it's New

Sometimes the "new" can be found in the "old." There's plenty of Genesee & Wyoming paint across the country, and it's getting pretty repetitious. But the company's takeover of Central Oregon & Pacific puts a new scheme on an old route. My interest in the historic Siskiyou Line makes this a big drawing card.

This is where old SP SD9s once hauled and switched and where big SD45s and tunnel-motors put everything they had into getting freight over the Siskiyous. Now, recently repainted GP38s of Baltimore & Ohio vintage and SD40s of Canadian National vintage are working away to keep the Northwest's timber products on the move. Catching them is not as easy as standing at Spencer and shooting the runway parade, but the feeling of bringing home something new is the same.

Modeling Connection

The purpose in sharing these brief, memorable encounters is simply inspirational. I'm the type whose modeling and purchasing habits are driven by what I see and photograph trackside. For the record, I'm an N-scaler who never could settle on one railroad to model because my interest in North American railroading is far too broad. I like setting up a generic layout to accommodate my ever-changing operating moods.

That said, the presented images also serve to highlight some of the missing road names on the more modern GE and EMD locomotive types from the big two N-scale manufacturers: Kato and Atlas. Though not shown, Ferromex, Kansas City Southern, and Montana Rail Link deserve equal attention. I was anticipating such offerings after they thoroughly captured my interest, but it wasn't to be. My hope is that the model makers will catch the fire here — I'll be waiting in the wings with hobby dollars in hand.

New Units, New Paint Schemes... New Models?



Norfolk Southern ES44AC 8102, the Pennsylvania heritage unit, strolls down the runway at the North Carolina Transportation Museum in Spencer on July 3, 2012. The NS Heritage Tribute and 30th anniversary event was shared with the public, allowing many railfans to catch a glimpse of the road's 20 heritage schemes — 10 applied to SD70ACes and 10 applied to ES44ACs. Kato released the 10 EMDs in N scale but have yet to produce the GEs. —Steve Jessup photo

Iowa Interstate Railroad ES44ACs 507 and 509 are photographed at Mid-America Car in Kansas City on September 23, 2008. The units are painted in the road's regular scheme. IAIS later added two "heritage" units that paid tribute to the Rock Island. All three designs would be welcome additions to the N-scale market. —Steve Jessup photo



Fresh out of the shops at Mid-America Car, FEC ES44C4 809 sits under gray Kansas City skies on December 13, 2014. Knowing that the unit won't be seen on a regular basis in KC, this first photo opportunity was both lucky and gratifying. FEC is just one of many colorful regional railroads deserving of a release in the N-scale model market. —Steve Jessup photo



Central Oregon & Pacific GP38-3 2062 works at Merlin, Oregon, on June 15, 2016. Genesee & Wyoming's takeover of CORP brought their corporate paint scheme to the Siskiyou Line, marking a third generation to serve on this historic route. This unit was built in 1967 as Baltimore & Ohio 3816 and later served for G&W-owned Maryland Midland Railway before coming to CORP. —Steve Jessup photo

Thinking Inside the Box



CRAFTSMAN/Craig Chandler, photos by the author

Great Photos

The inexpensive photo-studio-in-a-box produces high-quality images that look like they were done in an expensively equipped studio.

Writing an article for *RMC*? Photographing your newest detailing and painting skills for a contest or website? Trying to sell some of your extra equipment on auction sites? Want to photograph your equipment for insurance purposes or your car-routing cards? Nothing helps show off the model's details more than a well-lighted photo of the model on a white or neutral background.

When you look through issues of *Railroad Model Craftsman*, you'll notice how-to articles accompanied by model photos on a clean background. The *RMC* designers then add tags pointing to the added detailing parts.

While purchasing a small model studio could run you a couple hundred dollars, you can actually build one by thinking inside the box — a cardboard box. And the best part is the studio can be made for free or just a few dollars.

I will say here the idea is not mine. I found the box on David Hobby's Strobist blog and web-

site (<http://strobist.blogspot.com/2006/07/how-to-diy-10-macro-photo-studio.html>).

The Box

To build a model studio, start with a box. I purchased my 16x16x16 box at the local big box store, or you can use one you have around the house. This size box works great for N and HO; S and O-scalers will need a bigger box.

What makes these photos successful is how the light wraps softly around the model, eliminating harsh shadows. This method also opens up details in dark areas of the model such as the trucks and underframe (or any steam engine or Penn Central model). It also keeps the highlights from washing out (having no detail). Finally, the wrap-around light evenly illuminates the backdrop, making the model appear to float on the background.

First, let's build the studio. Assemble the box and tape the bottom closed. I then cut off two

flaps across from each other on the open end. Now place the box on its side so that the two remaining flaps are on either side of the opening. These flaps will keep light from flaring into your camera lens when you take the photos.

Next, I took a mat knife and cut large squares out of the two sides and top of the box. I left about an inch border to give the box some rigidity, but do realize the box will be a little flimsy. Now dip into the holiday wrapping paper and pull out three sheets of white tissue paper. This tissue paper can be new or even recycled tissue from last year's gift box. Or, if you don't have any around the house, you can always buy tissue at the store. I use tissue because it's so inexpensive. You can purchase vellum or large sheets of tracing paper at the art supply store if you want to make it more tear-resistant. Tape the tissue across the openings. I use box tape, but anything will work.

A Photo Studio for Your Models That's Almost Free



The Box

Lights: I used two inexpensive clamp-on lights for my studio. You can use anything from table lamps to the sun. I do recommend using new bulbs of the same wattage for best results. The pieces of rail given to me by a friend make great light stands among many other uses on my model railroad.



Cheap Lighting

I purchased a couple of inexpensive clip-on light fixtures and equipped them with a matched pair of CFL lamps. It is imperative that the bulb temperatures are identical to maintain color balance when photographing. I used a couple of short pieces of rail to hold the light fixtures while shooting.

Now you need your background for the models. I use a sheet of poster board you can buy at the Xmart for less than a dollar. Matte looks better than glossy. I prefer white, but you can use any light color. Gray might be useful if you model the Kansas City Southern during the railroad's white diesel days.

Trim the poster board the width of your box. The length isn't important as long as it reaches from the rear top edge and sticks out the front of your box. Tape the top edge of the poster board to the top edge of the back of your model studio box. Let the paper flow down with a curve at the back bottom edge. Do not put a crease in it. The curve is what fools the eye into thinking the model is floating on the background.

Adding Light

You need two light sources for your model studio. These can be as fancy as electronic strobes photo-slaved to the camera or as simple as two lamps, one on



each side of the box. I'm trying to keep this inexpensive, so I used two clamp lights purchased at the Xmart for about \$10. Just make sure the bulbs in the light are the same wattage and color balance. Mixing tungsten and fluorescent bulbs or two varieties of fluorescent bulbs will give you off-color results especially noticeable in the neutral backdrop. I suggest using two brand-new bulbs. Light bulbs change color cast as they age.

It's slight, but you can notice the difference.

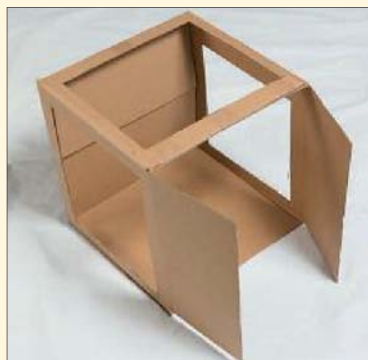
You need a space for your box and lights. Commandeer the kitchen table for the evening, or set up on the section of benchwork that isn't covered with anything yet. Set up your box with the open front edge at the front edge of the table or benchwork. You need room to set up a tripod for the long exposures you'll need. No tripod? Move the studio box back

Shooting Tips: The Box

I purchased a 16x16x16 box to build a model studio. You will need a larger box if you want to photograph larger scales than HO or a large structure. The advantage of this design is that light wraps softly around the model, eliminating harsh shadows. This approach floods the details in dark areas such as the trucks and underframes. It also keeps the highlights from washing out (having no detail). The box also makes the model appear to float in a sea of white.



First, assemble the box and tape the bottom closed. I keep the two side flaps to shield the camera lens from the lights. Next, I took a mat knife and cut large squares out of the two sides and top of the box. I left a one-inch border to give the box some rigidity; the box will still be a little flimsy. I reused gift tissue because it's so inexpensive. However, you can purchase vellum, tissue, or large sheets of tracing paper at an art supply store if you want more tear-resistant material. Tape the



tissue across the openings. I use box tape, but anything will work.

Now you need your base background. I use a sheet of flat white poster board for this. Gray works well if you are shooting white models such as tank cars or reefers. Trim the poster board the width of your box. The length isn't important, as long as it reaches both the top and front of the box. Do not crease it — you will want to create a solid-white backdrop upon which the model "floats."





onto the table, and set your camera on books or foam blocks to support the angle you want.

Start Shooting

My poster-child for this story is a Santa Fe GP7u that I kit-bashed from a Proto2000 GP7. I love these engines and am glad Athearn is now building them. I really enjoyed shooting the locomotive because it is one of my crowning achievements. Good photographs allow me to share them with you! Well, there are a couple more steps. For the best quality, you should determine the exposure and color balance. (See the sidebars for more details.)

Once you open the images on your computer, you will be rewarded with great color and great detail. Notice the light bouncing around inside the box opens up the detail on the trucks and

underframe.

This box's ability to not wash-out highlights is evident in the photo of my Gleaner combine harvester. The combine is mostly grays and whites, and the box shows off the details in that range while still giving detail in the black underframe. The same goes for the image of the Accurail PS4750 covered hopper I detailed for Collingwood Grain — a Santa Fe customer during the 1980s era I model.

Black locomotives and steam engines also photograph well in the box. The soft light and low contrast show off all the details.

Play with the Lights

When you view the results of the studio box, you will see the true colors of your modeling work pop out at you when you view them on the back of your camera



or computer screen. I am always pleased with the results. Occasionally, however, I want to add a little more snap. I'll use one of my cabooses to illustrate.

I placed the caboose in the box and moved one of the lights forward or back along the side the outside of the box. This will cast the light a little differently on the

Soft Light

Whites, grays, and blacks all reproduce with great detail when using soft lights. The light parts of the models are not washed out, as can be seen in the two shots above.

Black

IHB SD20 2920 photographed well because of the even balance of the lights. Black is typically difficult to photograph because it absorbs much of the light directed at it.



Down-On Shooting

Using cheap tissue paper for the light baffles allows us to cut a hole in the top to shoot down onto our models. The paper is easily and cheaply replaced.



model. I could increase the highlights on the end wall of the caboose by moving the light toward the rear edge of the box. You can also move one light closer or farther away from the tissue paper wall to increase or decrease the light on the model and give it a little more three-dimensional definition. Just be sure to watch the background tones. They may not remain even but can still be pleasing — you are the judge.

Remember, it's Only Tissue Paper

To obtain the same great lighting to show the roof details of your diesel, just cut a flap in the top sheet of tissue paper and stick your camera lens through it. Once you are done, tape the flap closed or you can tear off the top tissue and apply new. That's another reason I like tissue paper over more expensive art store papers. I don't feel guilty cutting into it and sticking it back together with tape.

Exposure

All that white paper can con-

fuse your meter with an improper exposure. It can also confuse your eye into thinking the light is pure white when it's not. Therefore, you need to know how to make the best exposure and set the correct color balance. As incredible as our cameras are today, they still don't know what you want. As far as exposure goes, it will take whatever level of light is in front of them and deliver an exposure that is the equal of 18 percent gray across the area you are metering. If you totally rely on your camera meter, your model photographed on white paper will probably turn out looking very dark on a medium gray background. To compensate, I go old school and use a photo gray card. They are photo



Shooting Tips: Histogram

Does your camera show a histogram? A histogram is a graphic rendering of where every pixel in the image falls in terms of light or dark value. It often looks like a bell curve. If you take a photo of your gray card with the camera set on automatic, the histogram will show all the pixels in a spike in the exact center of the histogram. In my image, you might notice a few pixels making a spike in the curve along the left edge — that's the black of the Santa Fe decal on the gray card. Now, overexpose the gray card by slowing the shutter down a couple of speeds, and take a photo of the gray card.

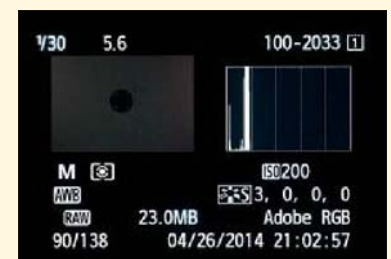
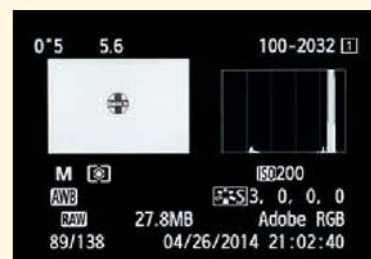
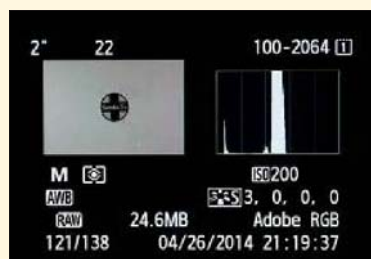
Notice how the gray is now whiter, and the histogram curve spike is to the right side of the image. Now underexpose your photo by setting the shutter several speeds higher, and once again, photograph the card. The spike will now be on the left side of the histogram, and the image will be dark.

Now that you know what a correctly exposed gray card looks like compared to one over- and under-exposed, you can use it to set your exposure manually. Set your aperture to a small opening. Take photos of the gray card, and adjust your shutter speed until the histogram shows you the correct

exposure.

Remember how I said to turn the room lights off when you shoot? In low light situations, the bright LCD screen may make your image look great when it is actually underexposed. In the dark, the image on the LCD screen almost always looks terrific. You won't realize this until you open the photo on your computer for viewing. By trusting the histogram to double-check your gray card exposure, you will always create a good exposure.

Using your histogram gray card exposure, take a quick photo of your white



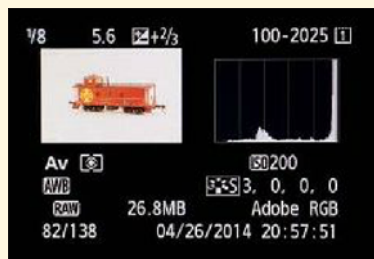
gray on one side and white on the other. These cost about \$4 at the camera store.

Set up the box and turn on the studio lights. Turn off the room lights, so it doesn't affect the color balance of your final image.

Start with your gray card. Place the gray card in your box where your model will sit later. You will use the white side later, so keep it kinda clean and not marked up. I prop it up so that I don't have to hold it. Get in close or zoom in so that the viewfinder is filled with the gray card. I applied a small decal in the middle of my card to give my camera something on which to focus. Otherwise, the featureless card drives the autofocus camera crazy as it unsuccessfully focuses back and forth while you set the exposure.

Photographing on a white background works best if your camera can be set manually. If you have a manual camera, take a meter reading off the gray card and adjust the shutter for proper exposure. Remember to use the smallest aperture setting pos-

background without the model. Check the histogram. You should see the spike over to the right side (where it belongs) but not totally at the far right edge, or even half cut off. A cut-off spike means the white is falling outside the exposure range. If you get this, cut the exposure a half-stop or so (set a slightly higher shutter speed or move your lights a few inches back from the box). Doing so will keep a little detail in the white and not make it totally washed out. Congratulations, you have now mastered half of the technical stuff.



sible (f/16, f/22, f/32) to give you the greatest depth of field for your small model.

If your camera can't be set manually but has an exposure compensation dial, you can still use the box. Just fill the viewfinder with the card and observe what the exposure says. Write down the setting. Now replace the gray card with your model and compose your photo. You'll notice the camera has set a different shutter speed — probably faster. Just turn the compensation dial — usually by turning the dial in the “+” range — until it gives you the same exposure you wrote down while using the gray card. You have now fooled your camera into making a good exposure.

Color Balance

Different light sources will alter the color cast of your final image if you don't control it. The factory choices on your digital camera (daylight, tungsten, flash, fluorescent) will get you close, but if your camera can do a custom balance, be sure to use it. You can just set the camera to the factory setting, but not every bulb is exactly the same balance as the camera's default setting. For example, I made photos of my caboose illuminated by my two fluorescent bulbs with the camera set for fluorescent, tungsten, and daylight balance. Each of these settings does not produce a perfect white back-

ground, and so the color on the caboose is a little off. While you can correct this afterward with photo editing software such as Photoshop, the better digital file you start with, the better your final photo will be.

To reproduce the best colors of your model, you will probably need to set a custom white balance. It's easy to do. Set your exposure before setting your color balance. While you should consult your camera's instruction book for which buttons to push, the theory is the same. First, set your exposure and then take a photo of the gray card. Now flip it around and take a photo of the white side. Be sure you fill the viewfinder with the card. From there, set this image as the custom white balance and keep the setting for the rest of your photos.

Now place your model back into the box and shoot away! As you can see, the whites are white, and the colors are perfect. At the end of your photo shoot, remember to set the balance back to where you had it before.

RAW versus JPEG

The RAW format allows you to adjust and fine-tune — within limits — the color balance, exposure, and other details such as sharpness and saturation before the file is open. This allows the pixels to be altered before they are opened. Once a JPEG file is on the screen,

Gray Card

Prop your gray card in the box — I used a paint can to hold it up. Now move your camera closer or zoom the lens until the gray card fills the frame, and set the exposure. At that point, you are ready to shoot.

Fluorescent Lighting



Daylight Lighting



Tungsten Lighting



there are limits to what you can do. Each camera manufacturer calls their RAW format by its own name. For example, Canon files will append .CR2 at the end of each image file. Nikon files will append .NEF to specify RAW images.

If you want the absolute best results, shoot in RAW format if your camera allows. It requires working with the file in a photo editing software, such as Photoshop. Many camera makers include basic RAW editing software with the camera. Instructions are usually in the phone-book-thick instruction manual!

The photo image software is working with the raw pixels, so there is great latitude built into the image file. JPEGs, on the other hand, can be adjusted after they have been recorded, but much of the latitude has been "thrown out" and locked down by the camera when it saved and compressed the original image. JPEG is also a compression algorithm, meaning each time the image is saved, it is compressed. This compression occurs in a JPEG by removing some tonality from each color. Let's say you have 50 shades of red in an image, which makes up the tonal differences in that image. When you save the image as a JPEG, the program compresses the image by removing some of those shades of red. Eventually, you may have only 20 shades of red in an image that originally had 50. This compression caused by repeatedly saving JPEG images is what eventually creates the artifacts around the edges of objects in a JPEG. If you must use JPEGs, modify the image as a RAW or .tiff and then make the last save into a JPEG.

If your camera allows, save each frame in RAW *and* JPEG format. This allows you a quick JPEG image to post or share while letting you go back to the RAW image if needed. JPEGs also print out on home printers much quicker. If you have set a correct

Custom Setting

For the best color balance, follow your camera instructions, and set a custom white balance. First, I set my exposure using the gray card. Remove the card, and take a photo of just the white poster board in the empty box. Use that image to set the custom balance.



exposure and color balance, the JPEG is often near perfect. In that case, the RAW is a mere backup. Magazine editors like to have the RAW files whenever possible so that the images can be tweaked for maximum reproduction quality. Be aware that the RAW files are much, much larger than JPEGs and will fill up your camera's memory cards and hard drives much faster.

Final Thoughts

You can even use your model studio box outside on a sunny day. Shoot at midday for very even light, or wait until later in the day so that the light is stronger on one side of the box than the other if you want some variety. Just don't do it on a windy day. Trust me on that one!

And when your photo shoot is done, you have three storage options. First, you can leave the box as is and store it away with the lights inside the box, ready to use again. Second, you can remove the backdrop from inside the box, slit the tape on the back and fold the box away until next time. Or



third, if you think it will be a long time until you might need to use it again (or you just didn't like using the box), *recycle* and make a new one when the time comes. **RMC**

JPEG Degradation

This image has been repeatedly saved as a JPEG, and you will notice how the gradients are no longer smooth. JPEG compression removes colors in an attempt to compress the image during each save. An image that needs 50 shades of gray to represent a gradient can eventually have only 10 shades of gray after being repeatedly saved as a JPEG. The solution: work on the images in a lossless format like .tiff, and then do a final save as a JPEG. Do not work in JPEG.



DT&M

Dundee, Tecumseh & Muskegon

An Operations Oriented HO Scale Railroad

CRAFTSMAN/Dave Rickaby, photos by the author

Tower Operations

The train crew has stopped their train at Dundee Tower due to traffic congestion on the line (and the need for a hot cup of coffee). DT&M C-425 430 and GP40 501 are typical power for this train.

Ron Weyher's interest in railroading began in his formative years while living 100 feet from Ann Arbor Railroad's main line in Dundee, Michigan. He has many fond memories of hanging around the railroad and getting to know some of the crews. Especially memorable were the cab rides in the "Annie's" Alco FAS from Dundee to the interchange point with the Detroit, Toledo, & Ironton at Diann, three miles down the line.

He also enjoyed watching the football trains supplied by the Chesapeake & Ohio Railroad that would bring football fans to Ann Arbor to watch the annual Michigan versus Ohio State game. Although he fell in love with the blue, yellow, and gray, the "Annie" was always Number One with him. During high school, his fam-

ily moved to Britton, Michigan, where he lived close to the Wabash main line. While working for the State of Michigan Highway Department in the 1960s and 1970s, he did a lot of work around the C&O tracks — mainly grade crossings and such — and always took the time to catch a train or two.

Ron's Journey

Ron got started in model railroading at age 4 in 1946 when he received a Marx train set from his dad for Christmas. Shortly after that, they switched to American Flyer, built a layout on a 4x8 sheet of plywood, and had a lot of fun running trains. In the mid-1950s, Kix cereal was offering a plastic Varney boxcar for fifty cents and two Kix box tops. Varney had just come out with the plastic cars,

and it really looked nice on the cereal box. He knew he had to have one, and once it arrived, he was hooked on HO, fatefully ending his American Flyer days. Shortly afterward, Ron found a little hobby shop in Monroe, Michigan, called Ace Model Shop, which offered unpowered HO-scale F7 Globe diesels for ninety-eight cents. He bought one of those and several sections of brass Atlas flex track complete with fiber ties, and was off to the races.

Fast-forward to 1980: Ron walked into a shoe store in Tecumseh, Michigan, which was owned by Howard Schrader, now the proprietor of Schrader's Railroad Catalog (www.railroadcatalog.com). The two men talked at length about model trains and operation. Howard suggested that Ron join him for an operating ses-

sion in Blissfield, Michigan. The owner of the layout was renowned modeler, Doug Tagsold. Doug and Ron became good friends, and Ron credits Doug with helping him to understand what operating a railroad was all about.

Developing a Freelance Railroad

We all travel down different tracks on our journeys as model railroaders, and Ron is no exception to that rule. His route brought him to the world of freelancing, where he developed his fictional Dundee, Tecumseh & Muskegon Railway.

Although Ron was a member of the Ann Arbor Technical & Historical Association, he built his home layout of the Ann Arbor based on what he liked and not necessarily what was prototypical for that railroad. Drawing the ire of some of his fellow members who were quick to point this out, Ron decided to freelance his railroad following Ann Arbor practices and colors. Being a fictitious railroad gave Ron the freedom to model his line as he saw it — not as someone else might have seen it.

Ron was familiar with an old prototype railroad — Detroit, Toledo, & Milwaukee Railroad — built in the 1880s, bisecting the southern half of Michigan's Lower Peninsula. It later became part of New York Central.

He realized that the initials for this line could be filled in with the names of towns to which he was personally connected: Dundee (where he was born and raised) and Tecumseh (where he worked). Ron, being very passionate about Great Lakes car ferries, knew he had to have one on his layout; therefore, Muskegon was chosen for the end of the line. The premise for his freelanced railroad is that his DT&M is a fictitious subsidiary of the Ann Arbor Railroad following the original DT&M route. Running from Dundee through Britton, Tecumseh, Homer, Marshall, Battle



Creek, and Allegan, DT&M gained access to Muskegon via trackage rights on the Chesapeake & Ohio. Connections to and from the Wisconsin railroads at Milwaukee were made here via carferry. Prior to the Wabash and Norfolk & Western merger, Ann Arbor and DT&M were under Wabash control and followed that railroad's

practices. Control of those railroads passed to the Detroit, Toledo, & Ironton after the merger.

Most traffic on this freelanced railroad is related to the food and refrigeration industry. Construction, farm, and automotive products are also prevalent. In 1955, iron ore was discovered near Allegan, and a spur was built to the

Special

C&O's Resort Special splits the Pinery of the Lower Michigan woods as it crosses under the overpass that leads to the Dunningville iron ore mine.

Engine Facility

Muskegon, Michigan, is a busy Great Lakes port. In this scene, we see DT&M and Ann Arbor locomotives basking in the afternoon sun between assignments.

newly opened Dunningville Mine. Construction of a new ore dock next to the carferry slip in Lake Muskegon started in 1957. Iron ore is still a major commodity on the railroad today.

Although the railroad is purely fictional, Ron did try to model the south end of Tecumseh faithfully, including the interchange track and mainline diamond with the New York Central's former Michigan Central main line.

The original layout was built in 1985 and went through several changes. The only part of that layout still in existence is the Muskegon Yard, which survived a move to the Upper Peninsula community of Iron River, Michigan, with Ron in 1998.

Operation

This C&O freight leaves Muskegon, heading toward the DT&M interchange track between Muskegon and the boat yard. GP30 3002 and GP7 6023 will make their setouts and pickups here and then continue down the line.

The Layout

The present operations-based, point-to-point layout, started in 1998, was built around the walls and includes three peninsulas. A



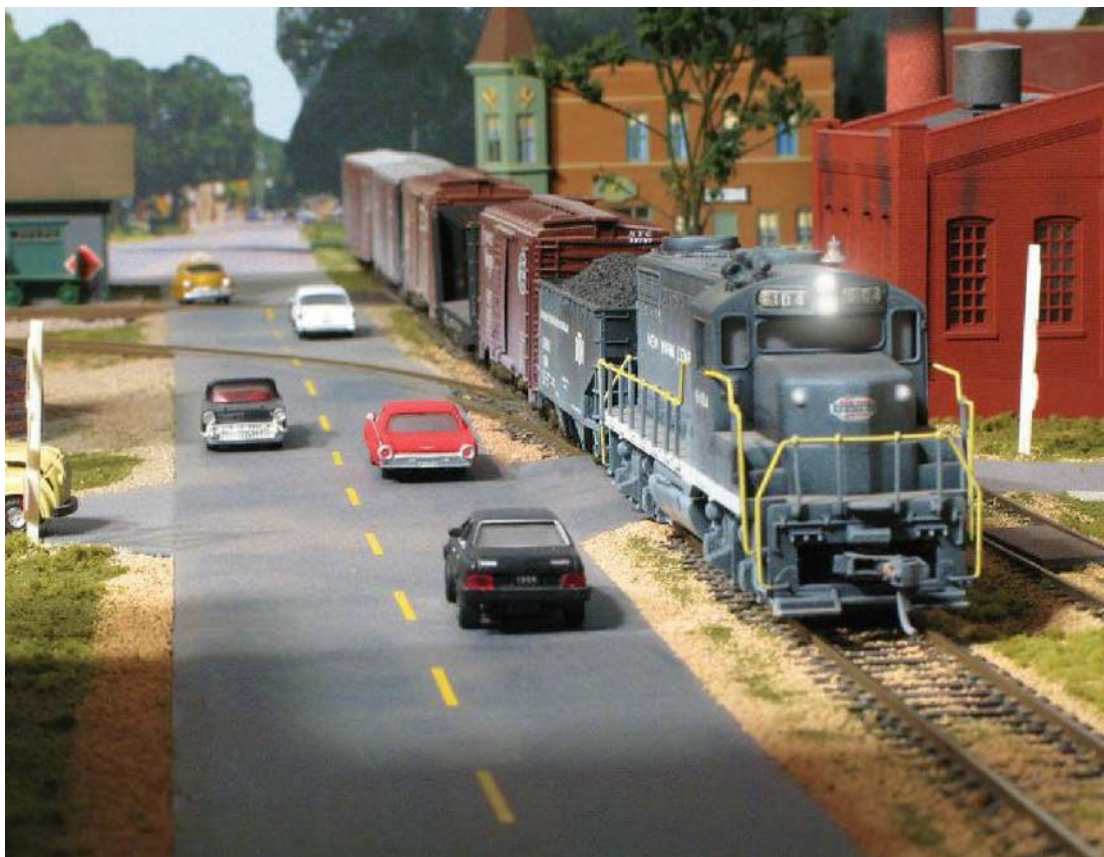
swing bridge at the layout room entrance allows continuous running for visitors.

The present layout encompasses a 23x23-foot area in Ron's basement. The layout runs from Dundee through Tecumseh, Allegan, and Muskegon. Trains traverse a main line run of 105 feet, rising from a mean elevation of

50 inches and topping off at 52 inches with a maximum grade of 1 percent and a minimum radius of 30 inches. The grade on the ore dock approach reaches a whopping 8 percent!

This HO-scale freelanced railroad covers the years from 1960 to 1985, which gives Ron the flexibility to run Ann Arbor's parent



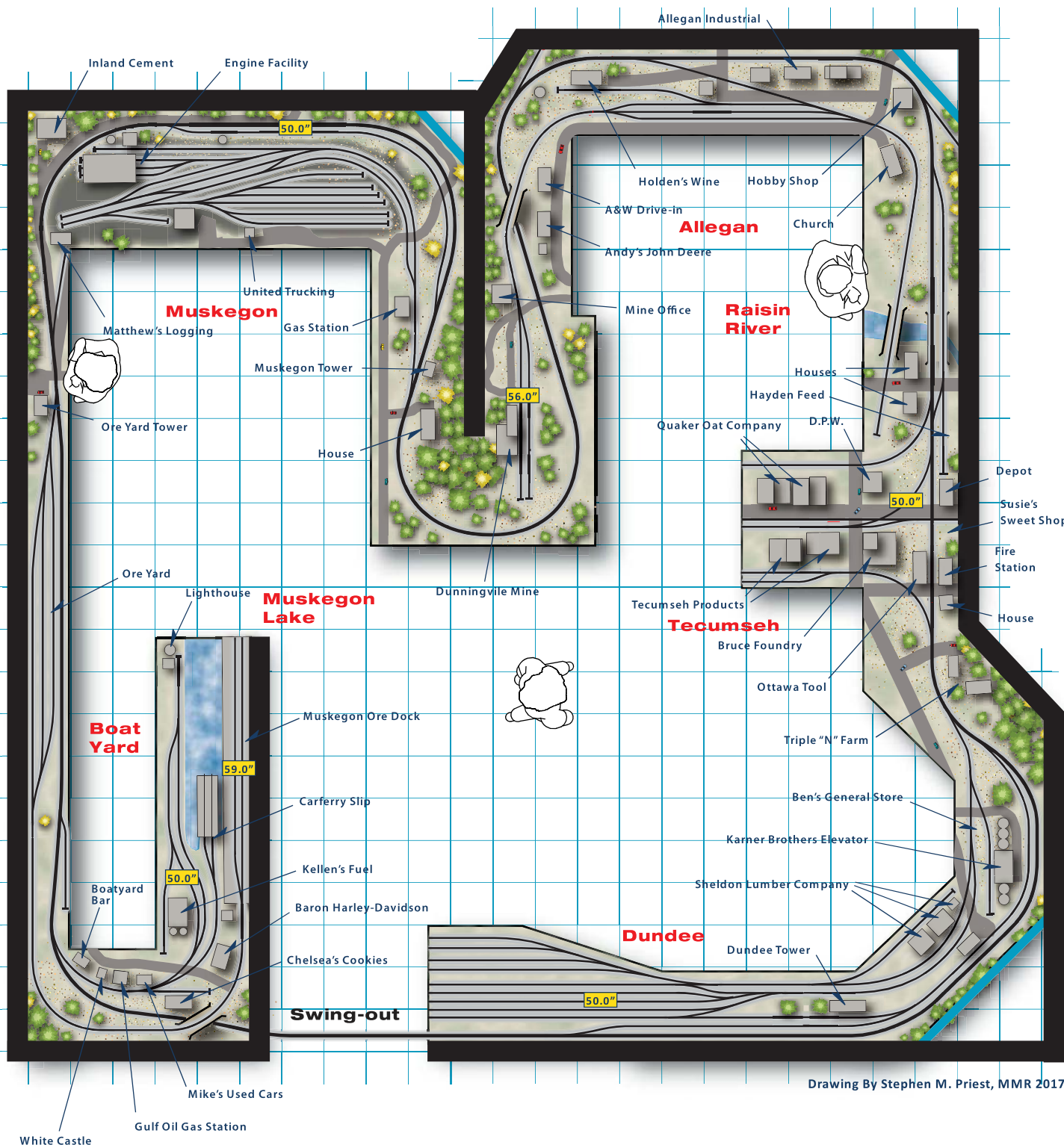


D&M

Interchange

It's early morning, and New York Central's (former Michigan Central line) Toledo, Ohio—Clinton, Michigan, local with GP20 6104 leading its train slows down to switch the interchange track along Evans Street at Tecumseh. Soon, it'll be ready for the six-mile run to the yards at Clinton. After the NYC local sets its cars out, it's DT&M's turn. The train will run to the far end of the interchange track, do its setouts and pickups, and then back down and across Evans Street onto home rails. DT&M F7 250 leads today's train.





Drawing By Stephen M. Priest, MMR 2017

D&M
HO scale

Room Size: 23 feet x 23 feet
Curve Radii: 22-inch to 32-inch
Turnouts: No. 6
Track: Code 100 flex
Track Height: 50 to 59 inches

Switching

DT&M RS-1 23 switches the Hayden Feeds elevator at Tecumseh, Michigan — one of many industries in town served by DT&M.

company Wabash paint scheme, along with C&O and NYC operations or the Ann Arbor, in its orange scheme, with Conrail and Chessie System operations. In 1964 the Detroit, Toledo & Ironton became AA's parent company, which, in turn, became DT&M's parent company. DT&M paint schemes follow Ann Arbor practices.

Building the ore dock and iron ore mine were afterthoughts. Obviously, these wouldn't have existed in lower Michigan, but Ron's interest in the ore trains of the Upper Peninsula dictated that he have these on the layout. Because he didn't have room for this, Ron included the ore dock in Lake Muskegon, which is home to the carferry/carfloat slip. Ron hopes to finish his model of Ann Arbor No. 4 someday. For now, carfloat DT&M No. 1 will have to do.

Ron's benchwork is a combination of open grid and L-girder, using 1x4s for the framework and 2x4s for the legs and bracing. The subroadbed is 5/8-inch plywood with 1x4 risers.

Main line track is Atlas Code 100, and Code 83 is used on the sidings and spurs. Turnouts are a mix of Atlas and Shinohara, with No. 4s in the yard and No.6s on the main line. Caboose Industries ground throws control the reachable turnouts, while the hard-to-reach ones use switch machines from Atlas and Circuitron. A stop board protects the diamond in Tecumseh, which works in conjunction with the NYC interchange track turnout. All the track is weathered and on Midwest cork.

Ron's rolling stock collection reflects the 25-year period that he models. His collection of more than 300 cars includes renderings from AHM, Athearn, MDC, Accurail, InterMountain, Kadee,



and Kato. If the model didn't come with metal wheelsets, Ron was sure to change them out to either Kadee or InterMountain wheelsets.

Ron's locomotive roster includes engines from Athearn, Atlas, Proto 2000, Stewart, and

Bachman Spectrum. Motive power includes locomotives from the Ann Arbor (both the Wabash and orange scheme), Wabash, C&O, NYC, DT&I, and, of course, DT&M. Just for fun, he also collects engines from Santa Fe, Detroit & Mackinac, Tuscola & Sagi-

Marine Life

RS-1 23's crew takes their lunch across from the ore loading dock and carfloat.

naw Bay, CSX, Chessie System, Norfolk Southern, Norfolk & Western, Amtrak, and BNSF.

Scenery

When Ron started building the current layout, he decided that he wouldn't build more than six feet at a time and to "sub-scene" each section before building the next. In doing so, he felt that the base scenery would be finished as he went along, and he wouldn't end up with a layout full of plywood and track. Once the layout was finished, he could then go back and finish detailing and completing the scenery.

Initial layout landforms were created using cardboard webbing topped with plaster-soaked towels and gauze. Ron eventually shifted to extruded Styrofoam covered with gauze and Sculptamold or really thick paint.

Ron made his rockwork using commercially available latex rubber molds. He also tried his hand with carving Sculptamold. Once these were applied, he painted them with earth tone latex paints.

The ground cover and ballast is from Woodland Scenics. He found that the best results were to use natural sand and gravel first and then to apply the ground foam on top of that. Ron uses a combination of natural plants such as peppergrass, sesame bloom, and goldenrod, to create his trees. He also uses deciduous trees from

Woodland Scenics and conifers from Grand Central Gems, along with homemade flocked bottle-brush trees.

Ron has used a combination of products to create his water scenes. Lake Muskegon started out as an experiment. Ron started the base with a piece of 1/4-inch Masonite, smooth side up. He then outlined where the shoreline would be and painted the middle black, feathering out to the shoreline with shades of blue and green. He left the beach area unpainted because the brown color of the Masonite matched the color of wet sand that he desired. Placed on top of this was a sheet opaque rippled Plexiglass from an old shower door. He made the water for the Raisin River using Woodland Scenics Magic Water, which he brushed on instead of pouring.

To create his roadways, Ron used 0.40 styrene cut to fit for some and used a spongy craft board for the rest. These were painted gray or black, depending on what type of road surface he was trying to represent.

A variety of structures is found on this layout, ranging from Design Preservation Models and Walthers to Atlas and AHM. Ron kitbashed some of these buildings to create larger structures and scratchbuilt the barn at the Triple N Farm. Some of the smaller buildings are laser-cut models from BTS.

Ron and his wife, Susie, painted the backdrop directly onto the drywall, using a blue latex paint for the sky. To paint his clouds, he taped three sheets of typing paper together and cut it out to represent a cloud form. He placed the backdrop and spray-painted the

white clouds, starting with a heavy application at the top and feathering it out toward the bottom.

In some places, he used paper cut-out backdrops from Walthers. The backdrop for Tecumseh is a photograph that Ron took from the real Evans Street in Tecumseh while standing 300 feet back from the diamond used by the prototype DT&M and the New York Central (Michigan Central).

When Ron built the layout, Digital Command Control as we know it today wasn't available. His layout is wired for DC block control, and he uses three MRC Control Master 20 and a Starr Tech Hogger walk-around throttles, with memory, to control his trains. He's fine with DC and points out that it would be too expensive to equip his 167 locomotives with decoders! He feels satisfied with how his system works saying, "If it ain't broke, don't fix it!" The layout is lit with standard four-foot fluorescent shoplights.

Operation

Ron uses 2x3 1/2-inch freight routing cards printed on cardstock to route his cars over the railroad. Each card contains the pertinent information for the individual car such as reporting marks and car type. Unlike car cards with four cycle waybills, the single card has four destinations listed, such as EB (eastbound) Local, WB (westbound) Local, EB Thru Train, and WB Thru Train. He tries to keep the operation simple. Between operating sessions, there aren't any waybills to flip over because the next move is already written on the card; i.e., if the car arrived at the end of the line on an eastbound local, it would go back out on a westbound local to a new, predetermined location. The operating session is managed with an Order of Operations.

At the beginning of each session, the yardmaster shuffles the cards at the Muskegon Yard and will make up an eight-car east-

Car Cards

Each car on the DT&M has a car card acting as a guide for the train crew. The card has the car's reporting marks and number, along with car type and destination. These cards bring the railroad to life.

DT&M RY.
Iron River, MI
Freight Car Routing

Car No. _____

Car Type _____

Destination _____

E.B. Local _____

W.B. Local _____

E.B. Thru _____

W.B. Thru _____

DT&M RY.
Iron River, MI
Freight Car Routing

Car No. NS 950 665

Car Type 50' BOX

Destination _____

E.B. Local TECUMSEH
HAYDEN PERDS

W.B. Local MUSKEGON
CHILBERT'S CRORIES

E.B. Thru DUNDEE
A.A. INTERCHANGE

W.B. Thru MUSKEGON
BOAT YARD

DT&M RY.
Iron River, MI
Freight Car Routing

Car No. LCRC 1000

Car Type 50' BOX

Destination _____

E.B. Local TECUMSEH
NYC INTERCHANGE

W.B. Local ALLEGAN
HOLDEN'S LINES

E.B. Thru DUNDEE
A.A. INTERCHANGE

W.B. Thru MUSKEGON
BOAT YARD

DT&M RY.
Iron River, MI
Freight Car Routing

Car No. AA 2

Car Type 39' CON. HOPPER

Destination _____

E.B. Local TECUMSEH
NYC INTERCHANGE

W.B. Local MUSKEGON
C&O INTERCHANGE

E.B. Thru DUNDEE
DUNDEE CEMENT STORAGE

W.B. Thru MUSKEGON
BOAT YARD

bound train and a six-car westbound train. This is predicated on the amount of storage he has in staging in Dundee. It is understood by the road crews that they will switch out the cars that you have cards for and that you will basically drop one and pick up one and so on, so you still end up with the same amount of cars at the end of your run.

The first job out is the Boat Train from Dundee to the dock. One of two passenger trains comes next, either one of the C&O (Pere Marquette) trains or the DT&M *Muskegon Limited*. This is followed by an eastbound empty ore train that goes from the ore dock yard to the mine and returns with loads for the dock. By the time the ore train comes back, the Boat Train is returning, and the yardmaster should have an eastbound local ready to go. All eastbound and westbound locals return to Muskegon Yard in reverse direction. The last train is a C&O local, which runs through and picks up cars on the C&O interchange track between Muskegon and the boat yard. Then the entire sequence repeats itself, and the session is finished.

Ron's operating sessions usually last about 2½ hours and can handle four operators, which includes the Muskegon yardmaster and three road engineers. The yardmaster somewhat doubles as a dispatcher because he has control of all the blocks on the railroad.

Although he can choose any era between 1960 and 1985, he usually operates the railroad in 1984 because this allows him to run cabooses.

Thoughts by Ron

Ron feels that too many people think that those in our hobby just "play with trains." To this end, he would encourage anyone interested in model railroading in his community to come over for an operating session or attend an operating session in their own

town to see what it's like to run a railroad. He also suggests getting involved with a group, either a round robin operating group or a club and join the National Model Railroad Association.

Some may not have room for a layout in their home, but this shouldn't stop them from enjoying the hobby. There are plenty of people and resources out there that can help you to get started and to encourage you. Go to your local hobby shop, for example. There are plenty of books on the subject, and you can spend countless hours online learning how others build layouts and such.

The number one reason that Ron is in this hobby is because he has fun — it's a very relaxing hobby. You could be having a really bad day at school or work and come home, drag out an Athearn blue box kit, and all your stress or tension just melts away. You always get a sense of accomplishment when you can stand back, look at your layout, and marvel at the fact that you just finished a certain project.

The creative part of his hobby allows him to go back in time to the years that he remembers as a kid. Back then, cars were kept clean, and the only "graffiti" was the chalk marks from the trainman. A whole new national fleet of cars, cabooses, and diesels were entering the scene — everything was colorful and clean.

Ron loves painting, decaling, and detailing rolling stock and locomotives. Most of Ron's fleet is painted and decaled. He says that we build scenery because we have to, the same with ballast and buildings and such, and it's things like creating motive power from different roads that aren't available commercially that fuel his fire.

One thing that Ron notes is that he's seen many layouts during his life, some of which were very nice; some not. Ron stresses that he will never criticize nor lament anyone's efforts because

ORDER OF OPERATIONS



- 1) DT&M, *Great Lakes Limited*, or C&O No. 18 passenger train from Muskegon to Dundee and return.
- 2) Train BT1, "Boat Train," works from Dundee to Boat Yard, switches the carferry, and returns to Dundee.
- 3) Train MB-10, eastbound local, works from Muskegon to Dundee. At Dundee, the train is left at the Ann Arbor interchange track, and cars from this track are for MB-11, the westbound local, which works from Muskegon to Dundee. Online industries are worked in both directions.
- 4) Train MBY-13, westbound local, works from Muskegon to Boat Yard and returns as BYM-12.
- 5) Train IOEB, eastbound empty ore train, works from the ore dock to the mine. The loaded train returns as IOLB.
- 6) C&O R-415, Muskegon to Dundee. Works the C&O/DT&M interchange only.
- 7) Train MD-14, eastbound local, works Muskegon to Dundee. Works the Ann Arbor interchange at Dundee and online industries. Returns as DM-15.
- 8) Train MBY-17, westbound local, works from Muskegon to Boat Yard. Returns as BYM-16.

When the sequence is completed, the events are repeated one more time before the end of the operating session.

it's their layout — that's the way they wanted to do it, and they're promoting the hobby. The bottom line is, if a modeler is happy with what he or she is building, then we should all support them. Ron certainly enjoys the heck out of his railroad.

Ron Weyher looks upon this hobby as an art form. He hopes that anyone who visits his layout will liken the experience to visiting an art museum. He steps back and watches the looks on their faces as they study every piece, hoping that they experience the *wow!* factor of the World's Greatest Hobby. **RMC**

Order of Operations

This form spells out the DT&M operating sessions, clearly instructing crews what to do and when.



Pennsy's Largest Flatcars: The FD2 and FW1 in N scale

CRAFTSMAN Josh Surkosky, photos by the author

"Queen Mary"

The car was built as a dual-deck, heavy-duty flatcar capable of carrying a variety of heavy and tall loads.

Pennsylvania Railroad usually held the honors of having "the most," "the heaviest," and the largest," and in this tale of two flatcars, a combination of "heaviest and largest." The FD2 depressed center flatcar (a.k.a. "Queen Mary") was built in April 1952. The car itself weighed in at 500,400 pounds and had a 500,000-pound capacity. Thus, a fully loaded car could weigh more than one million pounds! It was 121-feet, 9-inches long and rode on two sets of PRR Class 4F5-T1 trucks salvaged from fallen Pennsylvania Railroad T1 locomotive tenders. The first load was a Westinghouse turbogenerator that shipped from East Pittsburgh, Pennsylvania, to Dawes, Texas.

The FD2 is still around. It lives in Altoona, Pennsylvania, at the Railroaders Memorial Museum. On occasion, the museum uses it as a bandstand for events.

The FW1 was a well flatcar that shared the same set of span bolsters and trucks used on the FD2. The carbody was sold to PRR in September 1960. It was built to ship a 442,000-pound United Engineering & Foundry Co. rolling mill housing from Vandergrift, Pennsylvania, to Youngstown, Ohio. The light weight of the car was 410,600 pounds, but photos show this car carrying other types of loads.

Much to my surprise (and pleasure) N Scale Kits released a craftsman style kit of the FD2.

This kit had some assembly issues, but I took it as a challenge to level up my modeling skills by learning some new techniques.

The first obstacles to tackle were the white metal castings. Every surface was rough and pitted. Square surfaces were not. I started with a flat, wide rasp to smooth out the tops of the decks. Once I had a flat surface,

Poor Fit

The issues with the curved transition pieces are evident. It is too thick, and the ends are not parallel. In its current state, there is no way this transition will line up to form a square deck.





I squared up the deck sides. Unfortunately, the curved transition sections between the flat decks did not line up well and were not capable of creating decks parallel to each other.

The answer: sand and file the pieces, getting them as close to square as possible and then using JB Weld as a filler and bond between the parts. It was not easy to sand in those narrow areas to keep the thickness and shape of the parts. I did most of my work with sanding/reshaping sticks.

The biggest challenge was that the curved transition pieces were too thick. They were thicker than



both the upper and lower decks, and the ends of these pieces were not square. I used diamond files to fix this. I also had to grind down the undersides with a Dremel diamond sanding drum. I then decided to sand off the bottom flange of the lower deck for two reasons: better access to sand the sideframe, and I was going to create a new flange with thin styrene strips.

I had to file off the bottom flange (the lip), allowing me to clean up the deck sides and add a new one using styrene.

Next, I assembled the deck. I used CA glue and JB Weld. JB Weld is a great product because it provides reinforcement and is sandable. I needed something stronger than just body putty for this application. The angles of the transitions were way off, and the tabs/guides for gluing were too thin and short. The JB Weld did a nice job of reinforcing, but I ended up drilling holes and gluing old drill bits (pins) into the joints for extra strength.

Once dry, I sanded the JB Weld smooth. During this process, I learned that the transition pieces were molded too narrow, so

I had to “feather” out the JB Weld while sanding to make up for the height difference. Later, I learned that there were actual seams in the prototype around that area; in retrospect, this extra step would not have been necessary.

I did most of the reshaping of the transitions with a Dremel diamond drum. After the reshaping was complete, and I had checked everything with a square, it was time to glue the upper decks to the transitions. I turned them upside down and laid them on a flat, smooth surface and used CA to bond the pieces together. I used gap-filling CA, checking that everything was level and square. Once I was happy with the resulting bonds, I added more JB Weld to fill in the gaps and strengthen those joints. Once dry (no odor), I sanded everything down again using a combination of diamond files, diamond Dremel drums, and Dremel sandpaper discs. While I was at it, I used a little more JB Weld on the decks to fill in a couple of deep imperfections and unsightly gaps.

The deck of the prototype flatcar had a series of grooves in it. These were likely just seams from the steel assembly or some type of recessed welding seams. I used a set of calipers to scribe in this deck detail. I realize calipers are precise measurement tools, but they are still made from steel. Steel is hard. White metal is soft. Since my sides were square, I used the lower caliper arm as a guide while the top arm scribed a line. When doing this, go deep-

Fixed

Reshaping of the transitions was done with a Dremel diamond drum. JB Weld was used to reinforce and fill in gaps.

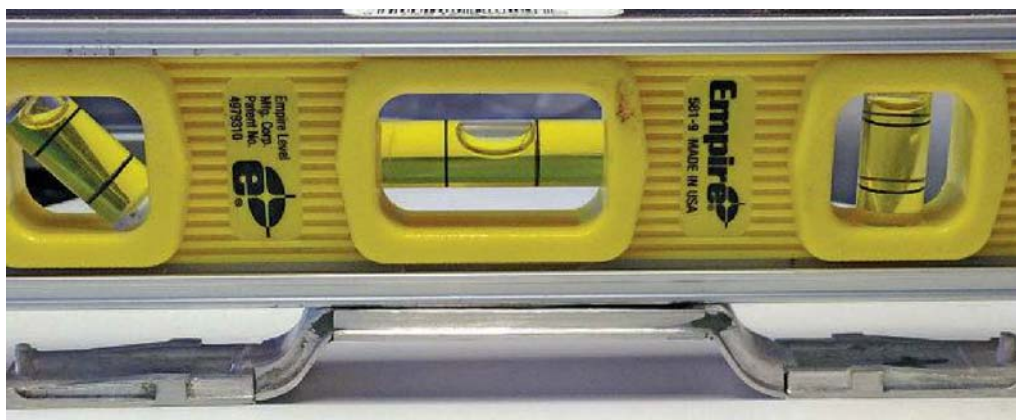


Smoothing

I did lots of sanding and filing to get the body shapes to be square and true.

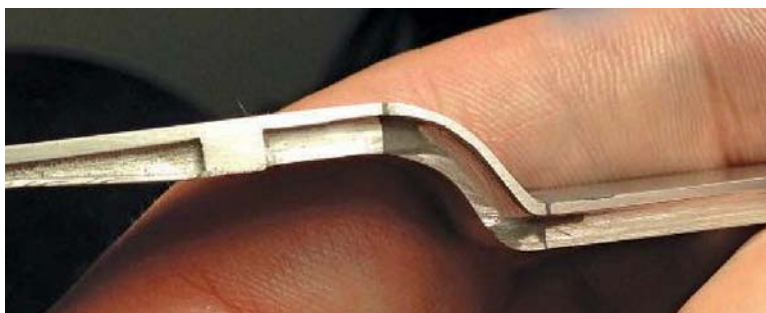
Cross Section

Cross section of the deck. I would need to file off the bottom flange (the lip) so that I could clean up the deck sides and add a new one in styrene.



Reference

A flat surface and a level help to check deck alignment. Constant adjustment created a straight and true carbody. Filing and sanding at every step of the way helped keep things even. I regularly checked my progress by carefully looking at my work.



er than you think you need to — paint and weathering will fill in some of the scribed gap. I scribed one side and then turned the model 180 degrees and did the other side. I then widened my calipers and repeated this process until complete. I scribed in perpendicular lines with a metal ruler and a compass needle, creating nice detailing on the deck that made the car more prototypically correct.

With the goal of creating a more accurate model, I removed the cast-on tie-downs and drilled out holes for some free-standing scratchbuilt versions. This proved to be harder than planned because the thick wire made it difficult to bend to 90 degrees.

I added a styrene flange to the lower cord of the car's side sill. The styrene for the flange was flexible enough to conform to the underside of the transitions, and I used CA to glue them. Additional pieces were used under the keystone placards.

I flooded the center of the deck with JB Weld to fill in the cavity and give the styrene a good, flat surface to stick to, which also strengthened and added some weight to the car. As mentioned

earlier, I eventually drilled holes through the transition into the deck for more strength. I drilled two holes with a No. 76 bit and then glued in old and dull No. 76 bits. I clipped off the excess and filed down the stub.

Next, I turned my attention to the span bolsters and trucks. The kit came with two truck options (etched steel, and white metal truck face castings), but the manufacturer recommends using its 3D printed trucks on Shapeways. I felt the 3D printed trucks offered more depth of detail and would be more robust in operation. The 3D printed trucks cost around \$20, which may seem expensive, but this included four sets, so \$5 each isn't all that bad.

When I ordered the trucks, they were only available in one type of resin (Frosted Ultra Detail or FUD). Since then, a new material, Frosted Extreme Detail (FXD) became available. FXD has a finer detail but costs more. In the case of the trucks, it only costs \$3 more, so I would recommend FXD. FUD and FXD parts must have the forming wax removed prior to use. I use Bestine. A 24-hour soak will dissolve the wax,

but my friend, John LeMerise (the genius behind Keystone Details on Shapeways) found that using an ultrasonic cleaner will do the job in 10 minutes! If you work a lot with 3D printed parts, spending \$29 on an ultrasonic cleaner may be worth it. I did make one mistake with the trucks in that I removed a support for the brakes, and I promptly busted them off — leave them on! You won't even see the supports once painted and weathered.

After all the truck assembly and cleaning had been completed, I painted the FUD trucks. I didn't want to flex the trucks any more than necessary, so I installed only two sets of wheels for my initial testing.

The Queen Mary rode on 36-inch wheels. I used Fox Valley Models N 3601 36-inch wheels with 0.540-inch axles. Some cleanup on the axle points inside the trucks may be required. It is a good idea to hollow out the bearing surfaces with a small drill bit or a hobby knife blade to help the cars roll better. The deck of the span bolsters had the same issues of pitting and un-square surfaces as the rest of the kit, so I filed and sanded some more. There was a cast-in-place air hose that I re-

Tie-Downs

The use of phosphor-bronze for the tie-downs was overkill since they are purely cosmetic. A better choice would have been 0.008 steel wire.





moved from the side since I was going to use wire for this detail, and the details were incorrectly molded on the opposite sides of where they should be.

There was no provision for how to attach the brake equipment, so I had to improvise with two pieces of styrene. I used brass

wire to simulate the piping found on the prototype.

The kit's method of attaching the trucks to the span bolsters was unsatisfactory to me. As specified by the instructions, there was a blind hole on the underside and a white metal bolster pin that would need to be glued in place. One of



the pins on my car was so undersized it didn't even fit the hole for which it was destined. I decided to tap and drill 00-80 holes for the trucks. Since a walkway would cover the top of the deck, I decided to drill completely through the body and tap it accordingly. I also, very carefully, drilled out the hole in the trucks.

The main deck of the car rode a little high, so I filed the pins until the car looked correct. FUD is brittle, so use light pressure and progress slowly. I also drilled and tapped holes for Microtrains 1016 couplers. I was pleased to learn that the coupler height was correct on the car as built. No shimming or filing was necessary for the coupler height, thankfully. As a final underframe detail, brass wire was used to simulate the air hoses.

Now that I had a car that could actually be assembled and roll on tracks, I tested it out on a 9.25-inch radius S curve. Just for curiosity, I played around with tighter radii on a piece of flex track before adding the final delicate details and parts. I wanted to see how the car would perform in a test. My friend, Eric Payne suggested bringing the car to my local NTRAK show. He said, "If your car can run on the 'Wild West' that is NTRAK, you'll know you have got a robust and stable creation." I did so; again, the car performed

Underside

I flooded the center of the deck with JB Weld to fill in the cavity and give the styrene a good, flat surface to which to adhere.

Styrene

This close-up shows the styrene bending along the transitions and JB Weld patches. I eventually drilled holes through the transition into the deck for more strength. I drilled two holes with a No. 76 bit and then glued in old and dull No. 76 bits. I clipped off the excess and filed down the stubs.

Brake Rigging

I used the same styrene to support the brake rigging that I used for the deck flange.

Flexible

When the basic car had been assembled, I tested it by running it through curves and on a layout during a local N-Trak meet.



Span Bolster

Composite picture of the span bolster, the trucks, and the bolster pins. You can see the defective bolster pin on the left.



Trucks

I used 3D printed trucks for this car. They provided the best choice for both sideframe relief and ease of construction.



admirably. I was ready to move forward with final assembly; it was time to add the walkway details.

The walkway itself, the hand rails, and the stirrups were a single piece of etched steel. The first thing I did was clip the stirrups from the sprue and drill some No. 80 holes in the side of the car deck.

Because I knew I was going to have problems with glue clogging up the etched walkway when I added the deck to the model, I looked to the prototype for a so-

lution. The walkway on the actual car did not sit flush with the deck; it sat on little risers. I cut strips of styrene and used tweezers to glue them to the bottom of the walkway. I then glued the walkway to the car. The outcome worked well, and the car looks good with the etched decks.

Next, I cut the handrail pieces from the etched fret and then used needle-nose pliers to bend the handrails into position. My basic plan for assembly was to do the delicate detailing last so that I wouldn't "fat-finger" them while

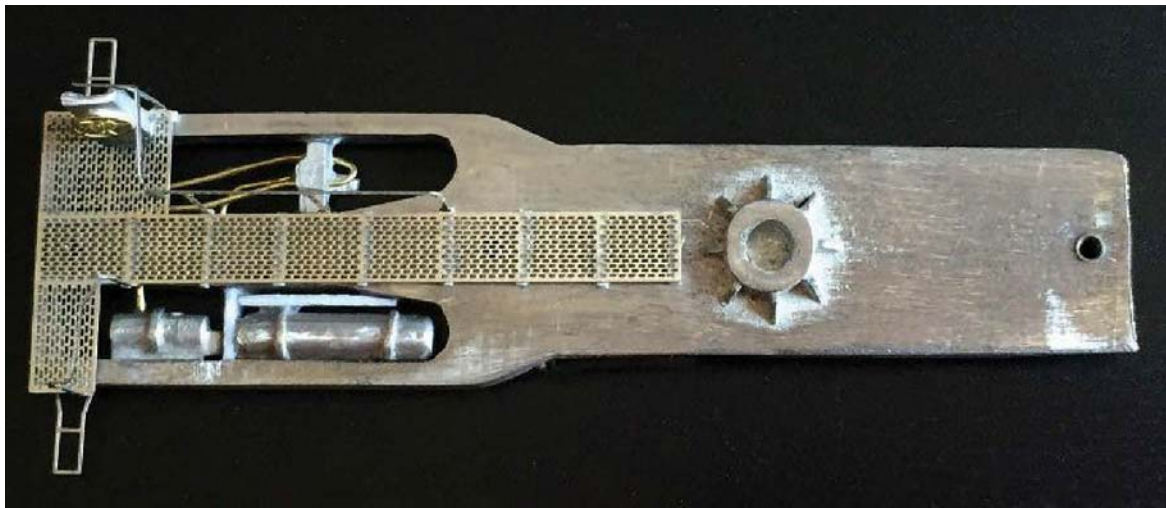
building.

Next, I added air lines to the side of the car. As previously mentioned, the original air lines were molded on, but they were on the incorrect side of the car, so they needed to be removed and replaced. These lines ran the length of the car from span bolster, through the deck, to the other end. I used some flexible wire scraps from some old LED Christmas light for this. I drilled a hole in the span bolster and glued in the wire. I couldn't simulate a quick-release hose like the prototype had, but I could bend the wire and put some tension on it that would keep it in place. The quick-release "bend" was added after the car was complete.

The car was painted with Polly Scale Zinc Chromate primer because it is my preferred 1950s PRR freight car color. I made sure the base finish of the car was glossy so that the decals would adhere well. The decals from "Mount Vernon Shops" were included with this kit, and they worked well. These decals were originally released in HO, so they reduced the artwork for this exclusive N-scale run. Decals were provided for both carbody types, and I am glad that they did this.

I like to seal my decals with a gloss before I Dullcote to create an even sheen on the car paint and decal surface. An airbrush is best for this because of its fine spray and degree of control. When the gloss had dried, I oversprayed the car with Testors Dullcote.

Weathering was light since this car would be "new" in my era. I sprayed some light tans and grays to simulate dust and dirt. While still wet, I removed some of the paint to create variations in textures and streaks. I finished with washes of Windsor & Newton water soluble oil paints. I used Burnt Umber, Burnt Sienna, and Ivory Black. These paints are great to use because they have a long working time, have an oily look,



End Deck

The walkway was glued to the deck with CA. Note the stirrups have been glued in, but not bent down. Since the deck wouldn't sit flat with them down (and possibly become damaged), I will bend them down before painting.

and are easy to clean up.

The Load

The signature load for this car was a Westinghouse Turbogenerator. Most of the pictures we see of the FD2 shows it carrying one of these turbogenerators. They were manufactured by Westinghouse outside Pittsburgh and typically went west to Texas; this car could regularly be seen off system. No exact generator is produced in N scale, and I initially thought I would have to scratchbuild it. Lucky for me, the technology of 3D printing was up to the task, and I knew a guy who could model it in CAD.

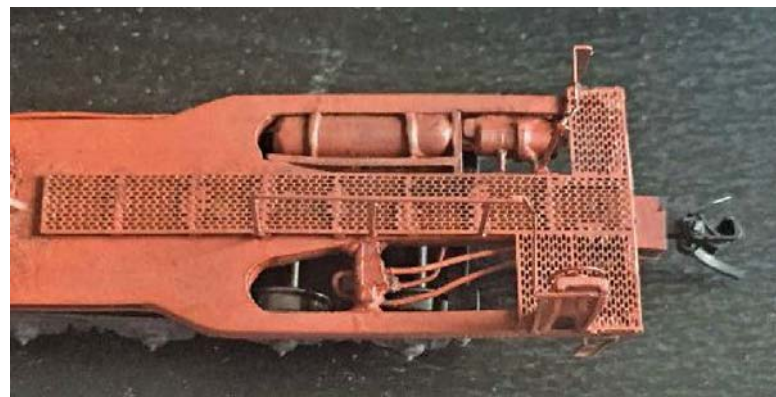
My friend and modeling mentor John LeMerise is a fellow N-scaler and Pennsy modeler. He started designing and 3D printing parts for his needs under the name "Keystone Details." Based on my excitement for this project, he was kind enough to design this turbogenerator for me. Working from photographs, he was able to "ball-park" the dimensions. We knew that the wheels on the car were 36 inches in diameter, so using that single, known measurement, he came up with a proportionally correct load. He did a terrific job!

One of my criticisms of the many items on the internet site Shapeways is that the designers design their projects as only a complete part. John creates kits and options for separately added parts when feasible. This



Walkways

Here are the completed walkways drying upside down on foam. I used other pieces of foam to support the walkway while gluing on the spacers.



Painted End Deck

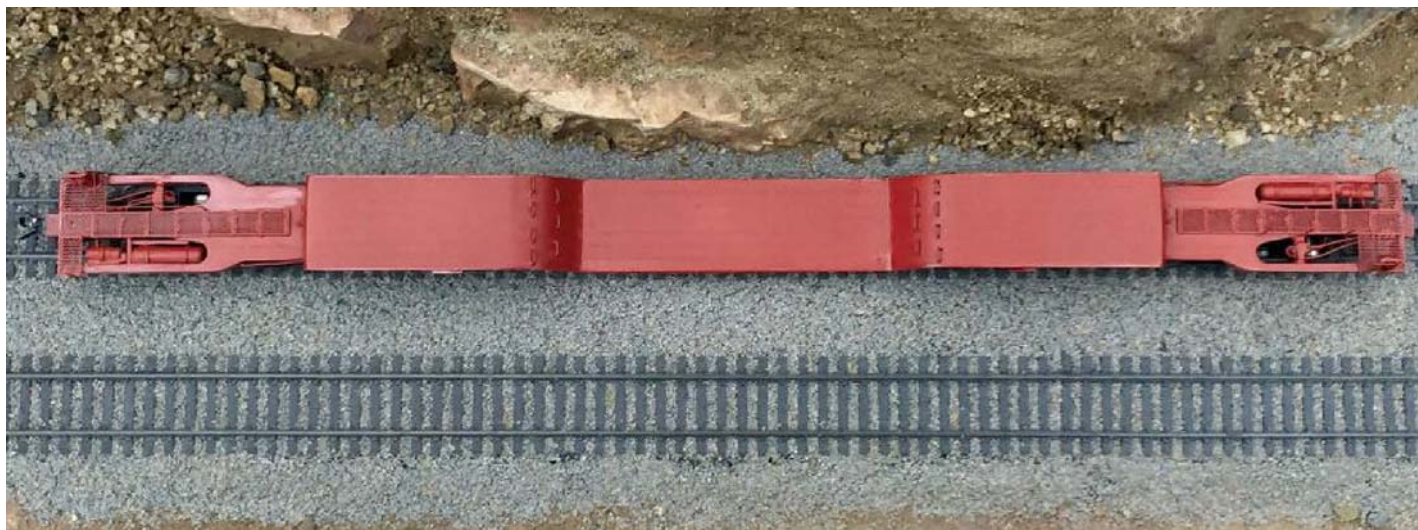
The oily black wash provides a nice sheen. I had to be careful not to let the wash highlight imperfections in the metal that wouldn't sand out. Note all the detail, including the brake piping.



End Railings

Although the end railings are not round in cross-section and are a flat etching, the effect is acceptable, and their minute size does not detract from the car's appearance.

is important because 3D printing leaves striations that must be sanded down. He designs things to maximize the sandable sur-



Curves

The car is pleasing to look at because of its curves and length. The complexity of form also adds to the visual interest. I am glad that I took the time to remove, drill, and replace the thick tie-down loops located on the upper curved transition. These really add to the appearance of the car.

faces on an object. For example, this kit comes in four pieces: top and bottom halves, and two end caps. I glued these pieces together with CA and sanded the top with a Flex-i-File.

I painted the generator load a dark gray color based on color photos of similar generators at the time. It was then mounted on the deck with Walthers Goo. That took care of securing the load, but I still needed to simulate the bracing that bolted the turbogenerator to the deck. As with most of my projects, I shared my problem with the brain trust over at www.therailwire.net and soon had a solution. Max Magliaro suggested Berkshire Junction EZ Line. This elastic polymer is great for modeling telephone and electric lines. It is flexible, stretchy, and instantly snaps back to its original shape. I used the black, fine 0.010-inch diameter line.

I was apprehensive about drilling holes in the side flange of the deck. They needed to be perfect and in line. I used a brand-new No. 11 blade to start a dimple for the No. 80 drill bit. I went very slow and was pleased with the results. I also drilled similar holes in the sides of the turbogenerator. I dipped one end of the EZ Line in Aleene's Original Tacky Glue and, using tweezers, glued it into the deck. I performed this process on both sides.

When the glue was dry, I thread-



ed the EZ Line through the load. I stretched the line with just enough tension to not sag. I taped the loose end of the line to the top of the load. I applied more tacky glue to the thread hole in the load. When dry, I simply cut the line as close to the hole as I could.

The final challenge was the Westinghouse placard. I found a Westinghouse graphic online and sized it down and printed out with a laser printer. The results were not clean. Again, sharing my woes on The Railwire resulted in Peter Wisniewski using his ALPS printer to print me a placard on a thin plastic film. I couldn't believe how sharp it was at only 600 dpi! The placard was glued on with tacky glue, but you could also use Goo.

Now that the FD2 was complete, it would not take much more to model the FW1. The span bolsters were shared between the



FD2 and the FW1, and just like the prototype, I needed only one set of span bolsters and would never run them together.

I went back to John at Keystone Details and talked with him about designing the FW1. It was a relatively uncomplicated car, so it would be easy for someone of his talent to design. The basic car dimensions and drawing are available online. Working from the diagram and photos, he pieced together a carbody ready for 3D printing. Since John didn't have

the model, I was his guinea pig for the carbody. When I received the print, it looked great. There was no warping due to proper internal bracing. I am pleased to share that even after six months, still no warping.

John did manage to miss the air line because it is only on one side. He changed his design to have holes in the side ribs, but I still had to figure out a way to drill them out. So, the plan was to use a piece of phosphor-bronze wire to simulate the air hose. I cut

a length of wire the length of the car. On one end, I clipped off a small piece to get a sharp 45-degree angle. I chucked the other end into my Dremel tool. Essentially, I made a long, flexible drill bit. This gave me the clearance to drill along the car side. Be careful not to drill into the side of the car accidentally. You can use a small strip of paper inserted between the bit and the car to protect the side from getting chewed up. I used my fingers to apply pressure on the bit/wire to keep

it in place. Next, I sanded the car body, painted it, glossed it, and decaled it. This part of the project went pretty fast compared to the other carbody, the FD2.

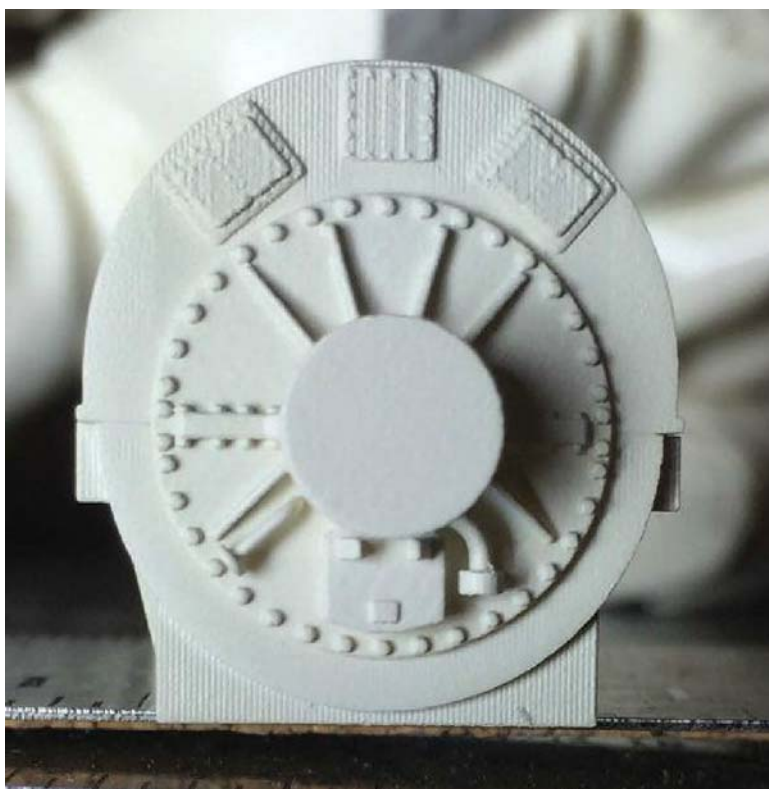
The load is a rolling mill housing, also designed by Keystone Details and 3D-printed. It comes in three pieces: the load itself, and two I-beam cross beams. I painted these a dark gray after sanding.

The FW1 was very light because the body consists of FUD resin. Weight was easy to add by shaping lead weights into small rectangular blocks. These were then added to cavities in the underside of the body.

This project took more than a year to complete. It certainly had its highs and lows: lots of tedious, and demotivational filing, and lots of unique construction challenges. I would like to extend special thanks to John LeMerise, Max Magliaro, Peter Wisniewski, Tom Mann, Ed "Ed's Law" Kapuscinski, and the fine folks over at www.therailwire.net. They helped me stay the course and encouraged me to "stay on track." The FD2 took its maiden voyage at the B&O Railroad Museum in Baltimore, Maryland. My local NTRAK club (BANTRAK) sets up for a few weeks every year in December. It was quite rewarding to see a project that really challenged me in a lot of different ways roll around flawlessly on the rails. **RMC**

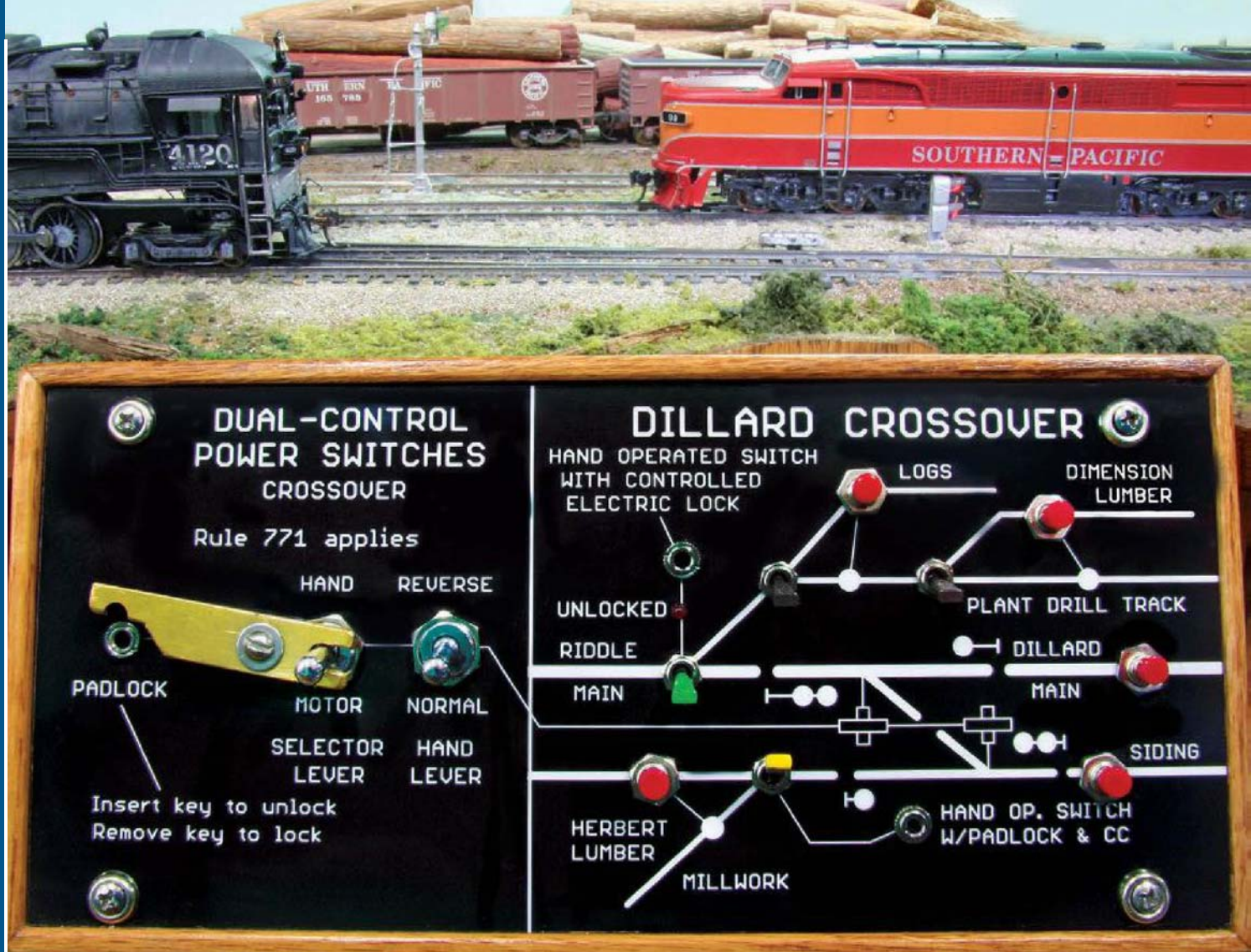
3D Artifacts

A close-up of the striations. Some of them are more obvious than others. Those on the top would require a little more cleanup.



Placard

The placard was glued on with tacky glue. You could also use Goo. Photos of models often highlight some mistakes your eye may not have caught. In this case, I will need to clean up the excess dried tacky glue from the supports.



Controlled Electric Lock and CTC Interlocking

Understanding Railroad Signals - Part 14

CRAFTSMAN/Dr. Bruce Chubb, MMR, photographs by the author

Controlled Electric Locks

Controlled electric locks operate similarly to automatic electric locks except that the dispatcher is required to take physical action to send a “control request” to the field circuitry to release and restore the lock. This request is in addition to all the actions that the train crew needs to take, which are identical to those required with an automatic electric lock as covered in Part 13 in the February 2017 issue. From the train crew’s perspective, it typically goes unnoticed whether or not the hand-operated switch is functioning with an auto-

matic or a controlled electric lock.

The lead-in photo shows how train crews on the Sunset Valley Oregon System use a fascia-mounted control panel to manipulate electric-locked, hand-operated switches. The turnout diverting from main track CTC to the Plant Drill Track is such a switch. The presence of the unlocked LED and the green-handled toggle, representing the hand-throw lever, signify this is a controlled electric locked hand-operated switch. After receiving verbal authority from the dispatcher, a train crew member inserts a switch key, as covered in Parts 12 and

13, into the padlock represented by the jack located just above the LED. This action simulates the trainman unlocking and opening the door to the electric lock mechanism and moving the crank handle (illustrated in Photo 4 of Part 13) from the “locked” to the “unlock request” position. This action, coupled with the dispatcher’s action, starts the unlocking sequence, whereupon the red LED on the fascia panel begins blinking. Once the sequence is complete, almost immediately if a “quick release” is granted or after a built-in time delay if a “time release” is granted, the LED goes

Train No. 9

The Shasta Daylight executes a running meet with Extra 4120 East at the center crossover in Dillard, Oregon. The siding is sufficiently long to sport a dispatcher-controlled center crossover. The associated fascia panel provides extensive information and capability all designed for ease of use by train crews switching the large Roseburg Lumber Complex adjacent to the main track. Consequently, the crossover is equipped with dual-control switch motors enabling, with dispatcher verbal authorization, the road crew to unpadlock the switch and transition the selector lever from motor to hand-enabling manual control as covered in Part 12. Additionally, because the hand operated switch leading to the Plant Drill Track is on CTC main track, it requires an electric lock mechanism. The jack hole is for train crew insertion of their switch key; the unlocked LED blinks during the period when unlocking is taking place, and the “green handled” toggle (simulating the hand-throw lever) becomes active when the switch is unlocked as denoted by a steady-on LED. By contrast, the two turnouts on the plant drill track are totally separate from the signaled route and not padlocked, so can be thrown at will as indicated by their brown-handled toggles. The Herbert Lumber’s Millwork Spur branches from the siding, which on the SVOS is rated at under 30 mph, thus requiring just a padlock and circuit controller. Simply insert a switch key to unpadlock the switch stand, and then use the yellow toggle hand-throw lever to operate the switch. Although not discussed in this installment, the red push buttons activate the electromagnetic uncoupling ramps.

steadily on and the hand-throw lever (the green-handled toggle) is activated, enabling the train crew to control the switch manually. Instead, if the LED transitions from blinking to dark, the train crew knows that the unlock request was denied, i.e., the field circuitry granted a “no-release.” Assuming a release is granted, and the train crew’s work is complete, the trainman restores the switch alignment to normal and removes the switch key, simulating setting the “crank” back to its locked position, shutting and

padlocking the door. Once padlocked, the trainman informs the dispatcher that work is complete, the switch is restored to normal, and padlocked. Subsequently, once the dispatcher completes restoring the lock operations, the LED goes dark, and the switch is electrically locked. At this point, the only way that the switch can be unlocked is to repeat the complete unlocking scenario in its entirety.

Although automatic electric locks are easier to implement and less costly, the advantage provided by controlled electric locks is an added layer of safety by prohibiting train crews — model and prototype — from “mistakenly” unlocking a switch for which they have not received specific authority to do so. Thus, there are many applications where the added safety considerations inherent with the controlled electric lock justify their application.

Electric Locking at Dispatcher Panel

As an example, using a US&S lever-type CTC machine, the dispatcher initiates his or her “unlock request” through a lock control lever and a code start button. Typically, lock levers are located in the same horizontal row as the switch levers. However, with crowded machines having insufficient panel space or as stipulated by certain railroads, a separate row is used.

There are many variations with US&S machines, but the most popular lock plate is identical to the switch control plate except the word “LOCK” is used in place of “SWITCH.” Photo 2 shows an example panel layout when implementing a dispatcher-controlled electric lock on a US&S CTC lever-type machine. The corresponding two lock indication lamps indicate the field status of the lock where the lock normal lamp (typically green) indicates switch is locked. Correspondingly, the lock reversed lamp (typically red) indi-

cates the switch is unlocked. The dispatcher performs his or her portion of unlocking the “spurs” at Raymondale — usually in response to a request from a train crew working the area — by transitioning Lock Lever 67 from normal (locked) to reverse (unlocked) followed by pressing the code button below. This action transmits a control code to the field, denoting that the dispatcher has initiated an unlock request. Additionally, if vital field circuitry determines that a “time release” is required, the dispatcher’s action is what starts the timer.

During the time interval that the unlocking process is taking place, both lock indication lamps are turned off. Once completed, including the actions required by the train crew, and an unlock is granted, an indication code is sent from the field to the machine that illuminates the “red” lock indication lamp denoting the switch is unlocked. If the vital field circuitry, software in our case, denies the unlock request, the returning indication code illuminates the “green” lock indication lamp, denoting that, in spite of the request, the switch is remaining locked.

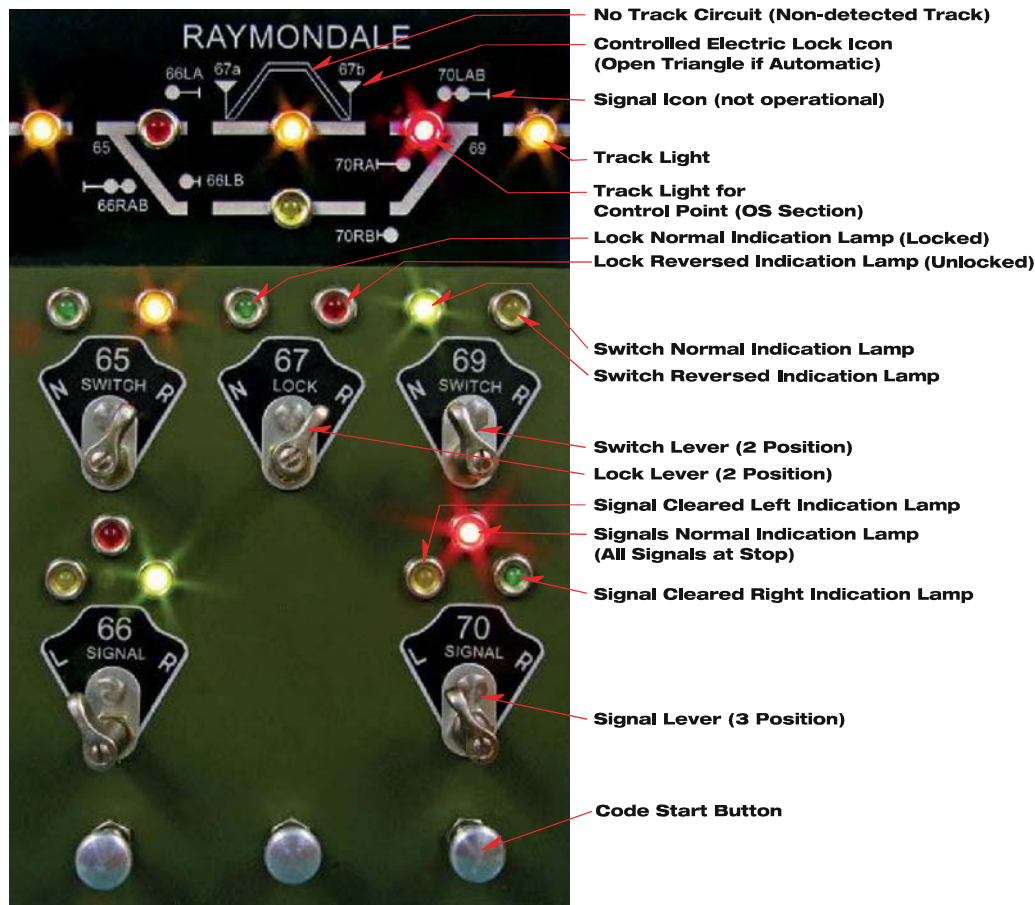
As indicated in Photo 2, a single lock lever may unlock multiple turnouts within the same signaled block and, in some cases, across several signaled blocks. Additionally, it is standard procedure for both US&S and GRS to use a filled-in “lock triangle,” as illustrated on the track layout for Lock 67, to denote a controlled electric lock. Conversely, an open triangle indicates an automatic electric lock. Also, track shown with “open” parallel lines denote non-track circuited, i.e., undetected track.

Rather than using a separate code button for the lock, thereby using up a code address and because the number of available code addresses is limited, many CTC installations incorporate the unlocking function into one of

Photo 2

Dispatcher has routed a westbound freight into main track at Raymondale to work the double ended spur protected by Controlled Electric Locks 67a and 67b. Moving Lock Lever 67 from normal to reverse and pressing the code button below has initiated a "time release" because the block containing the switch is occupied and as denoted by both indication lamps for Lock 67 extinguished. Once the unlocking timer has expired combined with the requirement that the trainman has inserted his switch key to unlock the padlock and moved the control lever from "locked" to "unlocked request", the "red" lock reverse indication lamp will illuminate denoting to the dispatcher that the switches are unlocked. The procedure

can be the same for your railroad, as it is for the SVOS, with the simplification that the trainman need only insert his switch key; thereby informing the unlocking subroutine that the train crew has carried out their portion of the required action to achieve unlocking. Additionally, while the westbound is working via the main track, Photo 2 shows the dispatcher has cleared an eastbound movement into the siding as denoted by the reverse indication lamp for Switch 65 and the signal cleared to the right indication lamp both illuminated. The fact that the Signal Lever 66 has subsequently been moved to the left position has nothing to do with the situation, because it is the indication lamps that reflect the field status not the positioning of the levers.



nearest already-in-use OS section "coding stations." In this situation, the locking lever (or a simple toggle as sometimes used) is placed in the same vertical alignment as the OS levers. Typical locations are either directly below the signal lever or sometimes in place of the Maintainer Call Toggle if this is not employed.

Table 1 summarizes the physical actions required by the train crew and the dispatcher for electrically unlocking and locking a

hand-operated switch. Just as soon as the train crew receives verbal authority from the dispatcher, the trainman can unlock and open the lock mechanism door and move the control lever, the crank, from "locked" to "unlock request" position. This may occur before or after the dispatcher moves his lock lever to reverse and presses the code start button. There is no tie-in as to the timing of when each does their steps except that both must complete

their individual tasks before unlocking and locking are achieved.

Flow Charts and Programming

The previous installment illustrated how a flow chart is a neat way to explain logic intensive activities such as electrical unlocking/locking of hand-operated switches. The chart was created using a system approach that included the direct interactions of the trainman combined in with the vital circuitry logic. The result (Figure 2 in Part 13) does a good job explaining how the overall unlocking/locking process operates. However, it falls short in defining specifics related to how the software can be written to emulate the operation of the vital field circuitry. Why? Because the logic indicated reaches multiple locations, or "boxes," including statements such as "Trainman moves control lever from unlock request to unlocked." Such a "box" or "statement" cannot be incorporated directly into software, i.e., software cannot control, or force, the trainman or the dispatcher to carry out an action. Additionally, software cannot wait at a particular point, such as waiting a minute or so in the modeling case for the "unlocking timer" to expire. Other areas of the railroad need to be serviced on a near-continuous basis, such as monitoring changes in block occupancy status and setting signal aspects.

It is possible, and some professionally experienced programmers will undoubtedly adopt the approach to set up events or interrupt processing where when the "unlocking delay timer" expires, the computer software will jump out of its other processing and process the actions required as a result of the "interrupt." Using this approach, you quickly get into interrupts interrupting interrupts and the stacking of interrupts. Such complexity is unnecessary when emulating prototypical railroad signaling. My

philosophy with C/MRI software is to make it straightforward, easy to understand, and easy to implement. Multi-thousands have followed this approach and have working C/MRI-based signaling systems with the majority not having any previous software experience.

Furthermore, as you will see when delving deeper into system programming, most everything with the C/MRI is provided for you in the form of “standardized subroutines.” For example, there is a subroutine for handling automatic and controlled electric locks, dual-control power switches, time locking, general purpose time delays, setting traffic sticks, and clearing traffic sticks. Another subroutine provides the capability to control your grade crossing warning devices, including flashers, bell, and crossing gates, and it does so for any complexity of track arrangement.

Controlled Electric Lock Protocol

Figure 1 is a flow chart defining the field logic involved in establishing the complete “unlock” and “lock” protocols for controlled electric lock operation. It uses an approach more amenable to programming. That is, it does not “command” that actions take place but simply looks to see if the action has or has not taken place and then branches accordingly. In a few cases, the detailed wording reflects operations with a separate “lock box” in the field. However, all the logic stays identical when using electric switch locks involving the foot pedal. Furthermore, the flow chart applies equally well to US&S and GRS lever-type machines, the more modern console type machines, and up through the most modern all graphics-based dispatching systems. Thus, Figure 1 forms the basis for creating the C/MRI’s Controlled Electric Lock Subroutine that is invoked, or Called, each pass through the re-

al-time-loop for each such lock on your railroad.

The first check is to examine the status of any unlock or lock request that may have been received from the dispatcher for which there are three possibilities: no request received, unlock request received, or a lock request received. If “no request” received, the subroutine branches to see if a train crew member has inserted a switch key (simulating unlocking and opening the entry door to the electric lock mechanism and moving the control lever, the “crank,” from “locked” to “unlock request”). This is necessary because there is a possibility that the train crew initiated the unlock request ahead of the dispatcher. In either case, the field circuitry (software for us) must immediately set the signals leading into the block with the switch to display “all red” and to do so irrespective of who initiated the unlock request and independent of whether the signals are intermediate signals or absolute signals or a combination of the two. If the train crew’s action set the signals to red, then no further action can take place until the field circuitry (our software) receives an unlock request from the dispatcher; thus, the subroutine branches to “End Sub” awaiting to check for the dispatcher’s action during the next real-time-loop cycle and its corresponding subroutine call.

Now assume an unlock request

is received from the dispatcher, either before or after the train crew’s request, the signals leading into the block containing the switch are set to all red. Additionally, because the intermediate signals with CTC function the same as with APB, and because no direction is established, i.e., no traffic sticks are set, the “red” aspects controlling traffic toward the switch will propagate, via tumble-down, until reaching the absolute signals at each of the two control points, or OS sections.

Returning to Figure 1, the next set of six checks down the center of the page are identical to what we developed in Part 13 for automatic electric locks. Let’s check out the sequence of operation assuming that the releasing section exists and is occupied. This results in the subroutine branching toward a “quick release.” However, before granting the release, the software must check if the train crew has inserted the switch key. If the switch key is inserted, the unlocked LED is set to “steady on,” and the quick release is granted. If the switch key is not inserted, the LED is set to slow blink, denoting unlocking sequence still in play followed by branching to End Sub. This enables the real-time loop to continue functioning while waiting for the train crew to insert their switch key. As soon as a subsequent pass through the subroutine detects that the switch key is inserted, the quick release

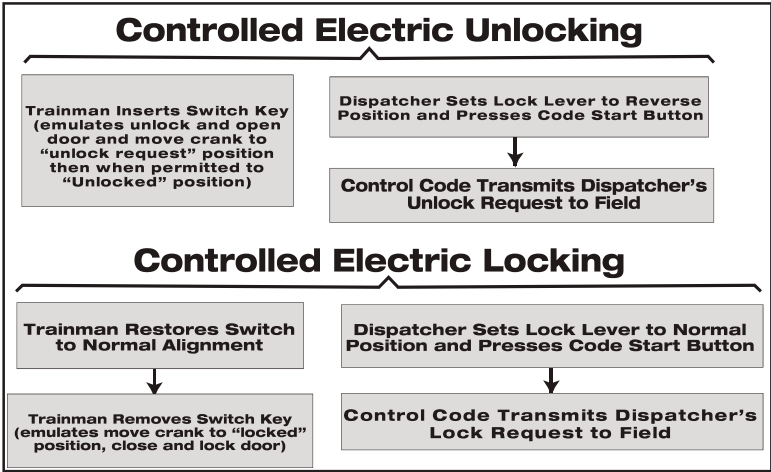
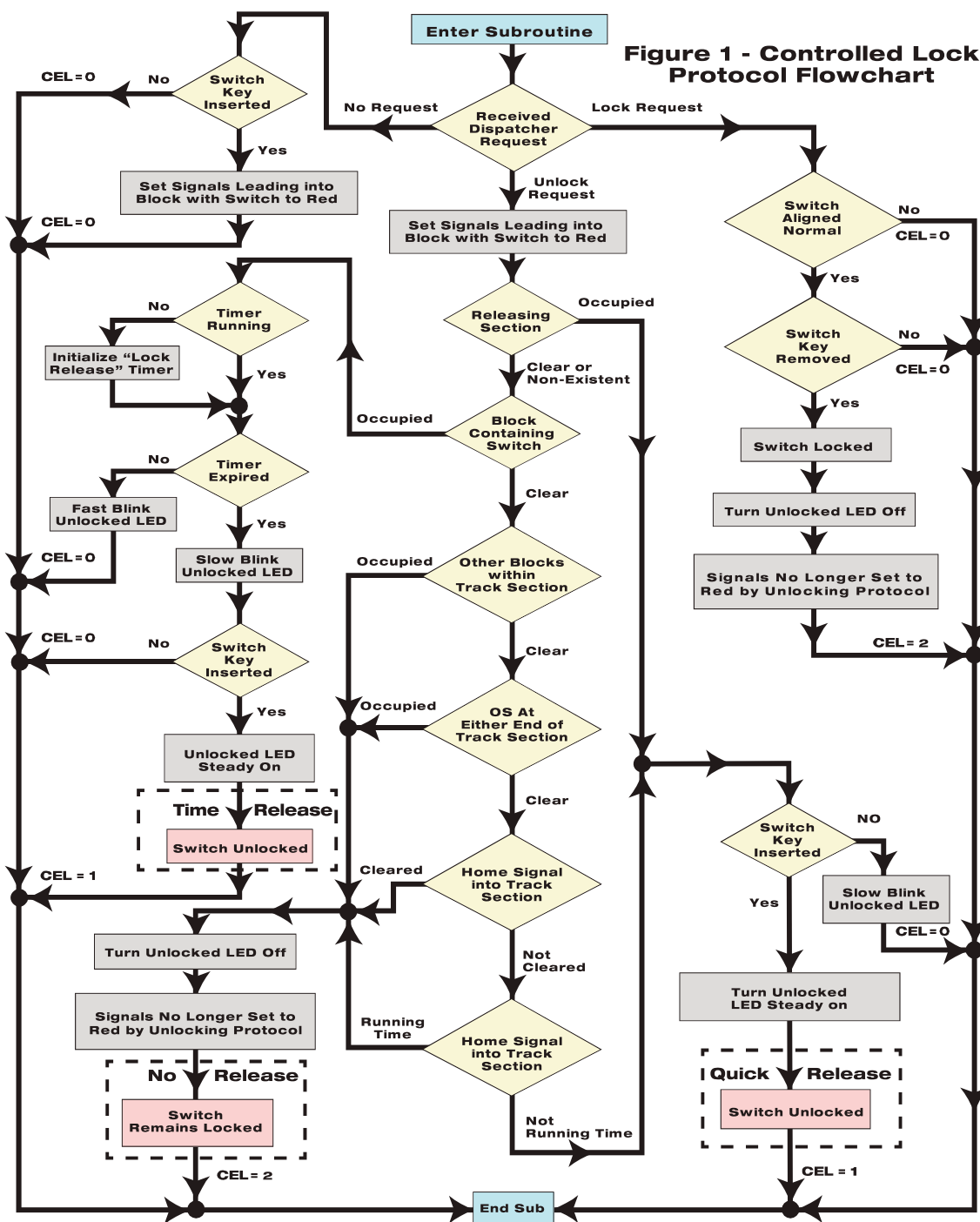


Table 1
Train crew and dispatcher actions for unlock/locking of controlled electric locks.

Figure 1 - Controlled Lock Protocol Flowchart



ing to the train crew that the timer has expired. The next check is to see if the trainman's switch key is inserted. If yes, the unlocked LED is turned on, and the "time release" is granted. With this amount of description coupled with what we did in Part 13, the remaining logic should be relatively straightforward to grasp.

The output of the subroutine, in addition to controlling the status of the "unlocked LED" used by the train crew, is the variable CEL, standing for Controlled Electric Lock output. This variable, set with each branch to "End Sub" takes on three values: 0 denoting that unlocking/locking is still in process, 1 denoting that switch is unlocked, and 2 denoting that switch is locked. Dependent upon the needs of the hardware, this variable can be outputted to the railroad via the "WRITER" subroutine. Additionally, CEL is used by the "INDICATIONS" subroutine that includes implementing the delay associated with transmitting indication codes from the field to the CTC office and then driving all the indications lamps on the CTC machine. The latter includes the lock lever indication lamps or the single red "unlocked LED" associated with the unlock toggle or the equivalent display used

with modern graphics-based dispatching systems.

Although not specifically indicated in Figure 1, the trainman, after receiving verbal authority from the dispatcher, is free at any time to remove the padlock and open the access door of the electric lock housing. However, with the Controlled Electric Lock, such action has no effect on the system, except for dropping the

is granted.

Now let's examine the path toward granting a "time release." The first requirement, because we will be looping through this subroutine multiple times checking for different actions taking place, we need to check if the delay timer is already running. If not, then we initialize the timer by setting the timer count equal to the number of seconds to be delayed. From

that point forward, the count is automatically decremented by one for every one-second interval. The next check is to see if the timer has expired, i.e., counted down to zero. If not expired, the program sets the "unlocked LED" to a fast blink, denoting that the time delay is still active followed by branching to End Sub. If the timer has expired, the unlocked LED is set to a slow blink, denot-

signals to red, unless the dispatcher has coded in his or her unlock request.

It is important to point out that once the dispatcher has transmitted the “unlock request” to the field, and the field circuitry (the software in our case) has accepted the request by granting a quick or a time release, the trainman has complete freedom to physically unlock the switch and operate it by hand. Even if the trainman moves the lock lever back to the locked position, or in our case removes his or her switch key, which physically locks the switch, the trainman can change his or her mind and again unlock the switch by re-inserting the switch key for continued switching.

It is only after the dispatcher’s request to lock the switch reaches the field, coupled with the trainman restoring the switch to normal and “locking-up” by removing the switch key (emulating moving the lock lever to “locked” and closing and locking the access door) that the switch is fully locked. At this point, the only way that the switch can be again unlocked is for the dispatcher and the trainman to repeat the complete unlock protocol.

Complexity and Variations of Electric Locking

If you haven’t thought so already, it is safe to say that electrically unlocking hand-operated switches in CTC territory is one of the most complex areas of railroad signaling. Additionally, electric locking is the one area where actual implementations vary the most between different prototype railroads. For example, placement of lock levers on CTC machine varies between different railroads and sometimes even between machines employed on the same railroad. Some railroads use toggles rather than levers. Some that use toggles use a single typically red “unlocked lamp” associated with the toggle

to show actual field status. Others simply illuminate the track light if a switch within the block is unlocked or in the process of being unlocked. To differentiate between when the track is occupied or a switch is unlocked, some railroads, including the SVOS, flash the track light if the switch is unlocked and the block is clear and maintain it steady when the block is occupied regardless of the lock status. A significant advantage to this approach is it saves a precious “indication step” in the code system by using an already existing track indication to perform a dual purpose.

Other railroads such as Santa Fe and Nickel Plate use push and turn panel switches for implementing controlled electric locks where the pushing action circumvents having to push the code start button. Other railroads such as the Reading use the same push and turn action for controlling power only and dual-control power switches. Furthermore, the shape of the lock plate can vary on US&S machines from the standard we are most familiar, as illustrated in Photo 2 and employed on most US&S machines (with the word “Lock” used in place of the word “Switch”) to a diamond shaped plate. Others use a rectangular plate with a peak on the lower edge to encompass the hole for the rotary switch.

Some prototypes, including Southern Pacific as a major user, substitute “Lock Toggle Switches” in place of the conventional “Lock Levers.” In these cases, there are no corresponding “Lock Indication Lamps,” so they elect to follow the procedure used with automatic electric locks, by either illuminating the occupancy light for each block containing an unlocked switch or as done by other railroads, including the SVOS, use a single red “Unlocked Lamp” or an LED in the modeling case associated with each toggle. The positioning of the toggle handle reflects the dispatcher’s request

if he or she was to push the code start button whereas the LED reflects the actual field status of the electric lock, i.e., illuminated when switch is unlocked.

On the SVOS US&S machine, we use lock toggles (typical SP practice) in place of levers with a single red “unlocked-light” denoting when a switch is unlocked. Additionally, we blink the track light if unlocked and not occupied. The main advantage of this to us is it informs the dispatcher when a train crew has “left town” and forgot to remove their switch key (simulating they did not close and padlock the door).

Releasing Section Applicability

Releasing sections are most frequently used with automatic electric locks to shorten wait time before train crews can use the switch. Installations with controlled electric locks are becoming more prevalent with modern railroading and serve the same time-saving function. However, with controlled electric locks, it’s possible, even without a releasing section, for the dispatcher to shorten “wait time” for the train crew by initiating the time release just as soon as the train enters the block containing the switch. This “courtesy unlock” circumvents the safety feature built into electric locking. However, with the dispatcher knowing there is no other train in the area and not prohibited by rules, the result can be used to save time.

Electric Locks with GRS

Up to this point, we have been focusing on US&S. Before moving on, it’s important to take a look at the electric lock situation with GRS. Photo 3 shows a portion of the GRS CTC machine on the SVOS employing conventional GRS-style lever knobs for the unlocking-locking function. The lamp, actually a white LED in our case, mounted inside the



Photo 3

Electric locking operations using a GRS lever-type CTC machine.

switch shaft illuminates to denote when the lock in the field is “out of correspondence” with the lever position. Note the two locks at McLaughlin, 172 and 173, with their “open triangles” are automatic electric locks with no dispatcher controls. Because automatic electric locks do not have any lock lever or lock toggle with an associated panel number assignment, automatic electric locks are numbered by “milepost number” to the tenth of a mile times ten, i.e., following the same procedure used for numbering intermediate signals and explained in detail in Part 5 in the April 2016 issue.

By contrast, the two electric locks at Pasco Junction, with their filled-in triangles, are controlled electric locks handled by Lock Lever 68. Similarly, the controlled electric locks associated with the hand-operated crossover between the two main tracks is handled by

that typically is not incorporated into US&S machines. These are “power switch locked lamps.” Customarily, GRS has these displayed directing above the power switch control levers as noted by the illuminated “red lamp” directly above Switch Control Lever 72. The switch is locked as a result of what is called “indication locking” to be discussed shortly. This is a result of the dispatcher clearing Signal 71RAB to the right, which, in turn, locks both Switches 72, i.e., once a signal is cleared for a defined route, “indication locking” prevents the route from being changed.

Interlocking Functions

With CTC, every Control Point (CP) is an interlocking plant. Thus, extensive “route checking” needs to be performed within each CP and between adjacent CPs before turnouts can be aligned and

Lock Lever 70. The dispatcher working with the train crew occupying the leftmost block on Main Track 2 and getting ready to move over to Main 1 to work Pasco Junction, already has transitioned Lock Levers 68 and 70 from “normal” to “reverse” but as noted by both “out-of-correspondence” lamps being illuminated has not yet pushed the code start button directly below the lock levers.

While looking at Photo 3, it’s interesting to point out a neat feature built into GRS machines

signals cleared. Instead of using thousands of relays to perform this function, as used on the prototype, we can accomplish the same level of the prototype fidelity using the computer’s inherent logic capability, combined with easily prepared C/MRI software.

To understand CTC logic, and to understand how best it can be programmed, we need to develop a working knowledge of the different interlocking protocols used in all interlocking implementations, including those embedded within CTC. Understanding how the various interlocking levels function and how they interrelate is critical to developing an understanding of how CTC signaling systems operate and how easily they can be interfaced and programmed using the C/MRI. Therefore, let’s examine each of these five locking techniques.

• **Route Locking** — The easiest application of “Route Locking” is the locking of a single power-operated switch when a train occupies the switch. Typically, such an elementary requirement can be solved by adding a simple program branching statement that skips over calculating a new alignment for a track switch when the switch is occupied. You might not think of such an uncomplicated procedure as “route locking” but what is being achieved is a rigorous example of route locking.

Route locking, in its full definition, covers more than the switches that are being occupied at any point in time. For example, once a route is set up for a given train movement, route locking prevents the realignment of every turnout within that specified route until a train has completely traversed through that route. Fundamentally, route locking extends to include all track switches in advance of the train along a selected route, including the fouling points of track on which the train is moving. In normal interlocking, route locking can be released only when a train has completely traversed

through the entire route that has been locked.

Large interlocking plants sometimes include a feature called "sectional releasing," which permits route locking to be released on a section-by-section basis; once a train clears each particular section, that section is automatically released. This capability is little used where individual interlockings are small such as with CTC. By contrast, if we were covering "Interlocking Plants at Terminals and Junctions," sectional releasing would be an important topic.

• **Indication Locking** — To some degree, indication locking overlaps route locking, in that it also locks power-operated switches, but it also relates to the situation where a signal governing movement over such switches is cleared. A signal is said to be cleared anytime its aspect indicates a more favorable indication than "stop." Additionally, for a signal that has been cleared, indication locking extends to include locking all opposing, or conflicting, signals to stop.

Fundamentally, indication locking and route locking work together to protect a movement through an OS section, i.e., the interlocking plant. To illustrate this, consider the following normal sequence of operation:

1. Turnouts are aligned to set up a selected route.
2. A signal is cleared to provide access through the route which, via indication locking, locks all the power switches in their aligned position while also locking all opposing signals at "stop."
3. Once the route becomes occupied, the cleared signal indication changes to "stop," and indication locking ceases. However, because the plant is now occupied, route locking takes over to retain the locking of all the switches within the plant.
4. Once clear of the plant, route locking ceases.

Thus, indication locking is

initiated first followed by route locking.

• **Time Locking** — Sometimes, after a prescribed route has been set up, and a signal for entering the plant has been cleared, a change in the route is desired prior to the movement entering the plant. Examples might be that the dispatcher, or the interlocking plant operator, initially may have set up the "wrong route." Alternatively, the approaching train may have been delayed, or changing circumstances made it desirable to select a different route. As a further alternative, it may become necessary to clear a "higher priority" train through the plant, prior to clearing the initially cleared train. Time locking is the built-in safeguard that enables these changes to be made.

From a definition standpoint, time locking is implemented to prevent an established route from being changed in the path of an oncoming train, that is, until a predetermined time interval has elapsed. Fundamentally, you can think of time locking providing protection against the dispatcher clearing a signal for an approaching train, then setting the signal back to "stop" and changing the original route, frequently referred to as "knocking down" the signal. When the dispatcher manually sets the signal to "stop," the way-side signal drops to "all-red" immediately, that is just as soon as the control code is received from the CTC machine. At this point, the signal system forces the dispatcher to wait a set "time interval" before any previously conflicting signals can be cleared or before any switches within the established route can be realigned to a new route. This waiting period is referred to as "running time."

While the signal is "running time," the dispatcher cannot change the original route or clear any conflicting signals. This is to ensure that any approaching train that may have passed the govern-

ing "clear" approach (intermediate) signal has a chance to stop short of the home signal that is now unexpectedly displaying "stop." Even more importantly, if the approaching train is unable to stop, its route will still be "locked" and free of any conflicting movements, avoiding what may have been a catastrophe without time locking.

However, with time locking, if the dispatcher should change his or her mind once again, before the expiration of "running time," he or she can re-clear the same previously cleared signal without waiting for the "running time" interval to expire. In summary, time locking is initiated automatically by the system any time that a signal has been set to "stop" by means other than normal train operation.

• **Traffic Locking** — Traffic locking prevents the clearing of a signal into a section of track for which an opposing signal has already been cleared, is "running time," or has been accepted by a train. It also assures that the established direction-of-traffic remains in effect in advance of each train movement while clearing one block to the rear of the movement thus, permitting opposite but not opposing movements on the same section of track.

Think of traffic locking as protection against the dispatcher routing a train onto sections of track when opposing traffic has already been cleared onto that track. Traffic locking with CTC performs the same protection it did for APB signaling, i.e., it protects against opposing trains traveling on the same section of track. However, there is a subtle but very important difference in how traffic locking is implemented with APB and CTC. With APB, traffic locking is established when a train passes the entering head block signal, while with CTC, traffic locking is established as soon as the dispatcher clears the signal for entry to a section of track.

Interlocking Function	Summary of Protection Provided
Route Locking	Prevents realigning a turnout while a selected route is occupied.
Indication Locking	Prevents realigning a turnout or clearing a conflicting signal when a signal for entry into the route has been cleared.
Time Locking	Prevents realigning a turnout or clearing a conflicting signal for a period of time after the dispatcher has “knocked down” a cleared signal.
Traffic Locking	Prevents clearing a signal into the section of track for which an opposing signal has already been cleared, or is “running time” or has been accepted by a train.
Approach Locking	Cancels the time locking requirement for the situation where no train is in approach to the previously cleared signal.

Table 2
*Interlocking functions
and protection provided.*

Once a given traffic direction has been established for a section of track between interlockings, that direction of traffic is unchangeable until the governing signal is set back to “stop” and “time” has run and all blocks, including the OS sections at each end, become clear. For these conditions, the direction-of-traffic changes to “no direction,” which remains in effect until a new direction is established.

- **Approach Locking** — Approach locking performs all the checking and protection provided by time locking and when employed actually works in conjunction with time locking. The additional advantage provided by approach locking is that a signal “knocked down” by the dispatcher needs to “run time” only if there is an oncoming train within the approach section to that signal. By contrast, with time locking only, the knocked down signal needs to “run time” independently of an approaching train.

On first impressions, it would seem that approach locking would be preferred and, therefore, frequently implemented. However, in actuality, approach locking is seldom implemented. Why? Because all the additional hardware required and its complexity (particularly in older relay-based systems), there is little, if any, advantage in time savings to train traffic. Let’s think about it for a moment. If the dispatcher “knocks down” a signal for which no train is approaching, then there is no train close enough to be delayed by

the signal system running time. By contrast, if the dispatcher “knocks down” a signal with an oncoming train within the limits of the approach, the approaching train will be delayed to allow for the expiration of “time.” Just the same as if straight time locking was implemented. In the end, the main attribute approach locking provides for is a convenience factor for the Train Dispatcher or Control Operator. Should he or she change their mind with no train on the approach, the routing can be changed immediately, where with straight time locking, he or she would be required to “check back” to verify the completion of “time.”

In spite of its low benefit, approach locking in post-World War II CTC implementations saw a boost in popularity. Most railroads were in a very good position financially due to the war boom, and CTC was considered a state-of-the-art technology. It just seemed almost natural to install it with all of the bells and whistles, one of these being approach locking. By the late 1960s and early 1970s, as the railroad industry waned, many railroads opted to remove approach locking to reduce maintenance cost of cross arms and wire on the pole line. In some cases, in the early to late 1970s, many Eastern railroads single-tracked their predominantly double track and opted to remove approach locking, in favor of straight time locking. In today’s modern prototypical computer-based CTC system, the cost for

implementing approach locking is considered minimal. However, there are very few Class I railroads that implement approach locking in favor of streamlining interlocking software and its testing. Table 2 summarizes the five locking functions just discussed.

Knocking Down a Signal and Running Time

I find many modelers contemplating CTC reach an early conclusion that they do not need to get into the detail of signals running time. To me, that is sad. Running time is a big part of prototype railroading. Even with modern graphics-based dispatching, you can hear over the scanner dispatchers saying, “It’s running time” or “I’m paying a time penalty.” Adding “running time” to your CTC system adds much prototype fidelity, and I can vouch 100 percent that its addition will cut down drastically on your dispatcher’s making errors in setting up routes.

To get an understanding of the timings that can be involved, Table 3, takes a look at the situation where the dispatcher has cleared a signal for transit through an OS section and then decides to cancel the route by “knocking down” the cleared signal to “stop.” The total delay between the dispatcher sending the request to knock down the signal and the signal changing to red is five seconds. However, the total time before the dispatcher is free to change the routing is 75 seconds.

This example assumes transmission of control and indication codes take 5 and 10 seconds, respectively, and the delay for running time is set at 60 seconds. Prototype running time delays are significantly longer, typically in the range between two and eight minutes. The setting established for each signal is dependent upon such factors as track speed, tonnage, and breaking distance and the distance between the home

and approach signal. For most modeling situations, where travel distances are shorter, traffic density is higher, and we may well be using a fast clock, employing “running time” delays in the neighborhood of 20 to 60 seconds are typical. With the potential for such delays, the dispatcher is wise to double check that he or she is clearing the correct route through an OS section, or an even larger interlocking plant, before momentarily pressing the code button. The major point is making certain that all the switches are aligned correctly before clearing a signal.

Understanding Time Locking Values

Before digging deeper into CTC system programming, it is vital that we develop a thorough understanding of the inter-working of the Time Locking Value (TLV) a prototypical term used extensively by signal engineers. TLV plays a key role in how prototype CTC systems operate, and accordingly, it needs to play a key role in our CTC system programming.

As we learned back in Part 8 in August 2016 issue, traffic sticks are the core ingredient used in programming APB. Correspondingly, traffic locking values are the core ingredient used in programming CTC. I like to quote the statement, “If you are not calculating and using traffic sticks, then you do not have APB, and if you are not calculating and using time locking values then you do not have CTC.”

In essence, every OS section, and in actuality, every signal lever, even when there is not an OS section, is set up with its own TLV, which, depending upon a variety of circumstances, is set to one of three values. These are “right,” “left,” and “no value.” Assuming your panel is set up with east to the right, then clearing a signal for an eastbound movement through an OS section sets its TLV value to “right,” and clearing a signal for

Elapsed Time (seconds)	Event Description
0	OS section has route cleared to right with track switch at “normal”. The switch lever “normal” indication light and signal lever “right” indication light are illuminated. No track circuit detection in the OS section or in the blocks immediately adjacent to the OS section. The eastbound wayside signal in the field is cleared.
0+	Dispatcher sets signal lever to the “normal” (stop) position and momentarily presses code button. Transmission of the control code to the field begins denoting that the signal lever is at “normal” (stop), however the signal lever “right” indication light remains illuminated as does the switch “normal” indication light.
5	Control code completes its cycle and the previously cleared wayside signal changes to “stop” and the signal “running time” counter is initiated causing the signal to run time. Transmission of the automatic station recall indication code back to the office begins, denoting that the wayside signal is at “stop” and “running time”.
15	Automatic station recall indication code completes, signifying to the CTC machine that the wayside signal is at “stop” and “running time” and therefore the signal lever indication lights all go dark.
65	Signal running time counter, which is located in the field, expires (i.e. after running time for 60 seconds) which initiates transmission of another indication code back to office, denoting that the signal has completed running time.
75	The second indication code completes resulting in illumination of the signal lever “normal” indication light on the CTC machine. This action informs the dispatcher that another route can now be established.

a westbound movement through the OS section sets its TLV value to “left.” For normal operation, when an approaching train accepts the cleared signal, and thus occupies the OS section, the TLV value for that OS section is reset to “no value.”

Important Points Involving Time Locking Value (TLV)

Every OS section has its own TLV which can take on three values: “right,” “left,” or “no value.” Clearing a signal for an eastward movement through an OS section sets its TLV value to “right.” Similarly, clearing a signal for a westward movement through an OS section sets its TLV value to “left.” Once a specific TLV value has been set to “right” or “left,” it can only be returned to “no value” by either of two actions:

- 1. The OS section becomes occupied (normal operation), or*
- 2. The dispatcher sets the signal lever to “stop” and presses the code button, i.e., manually “knocking down” the “cleared signal” followed by having the signal complete running time. Keeping these conditions clearly in mind is paramount to understanding CTC system programming.*

During normal operation, the above sequence repeats itself continuously for every OS section in the system. However, when the dispatcher “knocks down” a previously cleared signal to “all-red,” prior to the train occupying the OS section, the TLV value for the OS section remains unchanged,

and the signal is forced to “run time” prior to allowing the TLV to be reset to “no value.”

Understanding Traffic Locking Applied to CTC Systems

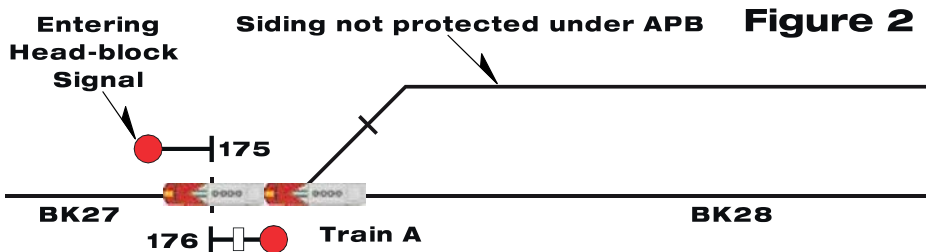
We might not have referred to it as such, but “traffic locking” performed a dominant role in our coverage of APB signaling in Parts 7, 8, and 9 in the June, August, and September 2016 issues, respectively. The prototype’s application of a Traffic Stick Relay (TSR) associated with each intermediate signal, with the exception of those at head-block locations, is key to protecting against opposing movements on the same section of track. That protection is, by definition, traffic locking. To be more specific, traffic locking prevents clearing a signal into a section of track for which an opposing signal has already been cleared, or is “running time,” or has been accepted by a train.

Important Definition and Corollary

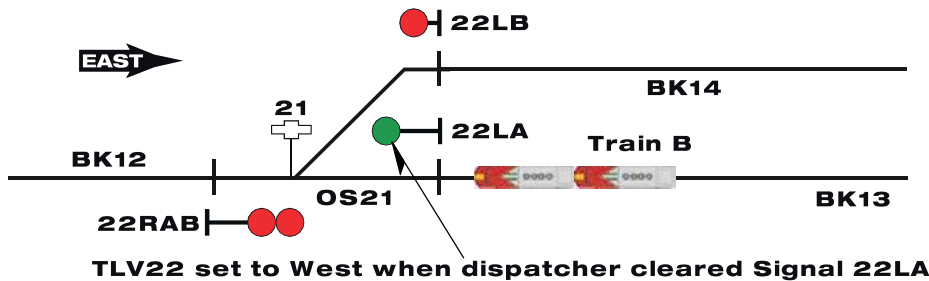
- 1. Traffic locking prevents the clearing of a signal into a section of track for which an opposing signal has already been cleared, or is “running time,” or has been accepted by a train.*
- 2. Traffic locking also assures that the established direction-of-traffic remains in effect in advance of each train movement while clearing one block to the rear of the*

Table 3

Running time on a signal in order to cancel a cleared route.



a. Traffic locking with APB takes effect when train passes entering head-block signal



b. Traffic locking with CTC takes effect when dispatcher clears signal

movement thus permitting opposite (but not opposing) movements on the same section of track.

The approach used to incorporate “Traffic Locking” as an integral part of APB carries over directly to CTC systems. Therefore, much of what we learned concerning the operation and programming of APB signaling is directly applicable to programming of CTC applications.

There is, however, one very important difference. With APB, traffic locking goes into effect as soon as a train passes the entering head-block signal as illustrated in Figure 2a. With CTC, traffic locking goes into effect as soon as the dispatcher clears a train movement through the OS section as illustrated in Figure 2b.

Looking at Figure 2a for a moment, Train A operating within APB territory established traffic locking for the section of single track being entered when it passed Signal 175, i.e., commonly referred to as the entering “head-block” signal. Also, note the APB conventional placement of the Head-block Signals 175 and 176 and the fact that Signal 175 is absolute and Signal 176 is per-

missive, denoted by its having a number plate. Also, note that with APB, the turnout proper is part of the “track circuit” for BK28. Additionally, as almost always the case with APB, the siding is not track circuited and, therefore, not protected. If any of these concepts are a little foggy, you might want to consider reviewing Part 8 in the August 2016 issue.

By contrast, looking at Figure 2b with Train B operating within CTC territory, traffic locking for the section of single track being entered is established as soon as the dispatcher clears Signal 22LA a significant improvement over APB. Although different in their initiation of traffic locking, both applications, i.e., APB and CTC, achieve the same result. That is, causing all opposing signals up to the “eastbound departing signals” at the next passing siding down the line to “tumble down” to display “red,” thereby, providing the desired level of protection against opposing movements. Our next installment will venture further into optimized CTC system programming. *RMC*

Color Code Defining Turnout Type

Coloring the hand-throw levers, as represented by the toggle switch handles, on all SVOS fascia panels helps operators and guests differentiate between the different types of prototypical hand-operated switches and how each is equipped and operated. The code, as defined in the table below, is based on the level of protection provided by each type of turnout. Brown is for “down in the dirt” yard and industrial switches not padlocked and can be lined at will. Red is for padlock-only switches as employed in main track dark territory and woe be to the train crew member leaving a switch not lined and locked for the main track. Yellow is for switches equipped with padlock plus circuit controller as required with ABS/APB main track and CTC sidings rated at 30 mph or less and without intermediate signals. Green with a yellow tip is for switches equipped with an automatic electric lock. Solid green is for switches equipped with a controlled electric lock and, thus, the highest level of protection offered for hand-operated switches.

SVOS Toggle Handle Color Code	Turnout Characteristics
Brown	Non-Padlock
Red	Padlock Only
Yellow	Padlock plus Circuit Controller
Green with Yellow Tip	Padlock and Circuit Controller plus Automatic Electric Lock
Green	Padlock and Circuit Controller plus Controlled Electric Lock
Silver	Dual-control Power Switch
Not Applicable	Power Switch Only

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Receiving Yard *Compiled by Tony Cook*



HO Scale Product News

Any company wishing to submit products or press releases for Receiving Yard may do so by providing them to the address below. Submitted materials will not be returned.

Please send products to:
Railroad Model Craftsman,
ATTN: Tony Cook,
P.O. Box 177
Plattsburg, MO 64477

Email: tcCook@rrmodelcraftsman.com

Goldie Electric Co. from Bar Mills Scale Model Works

HO—Goldie Electric Co. is a new Bar Mills release sold direct from the manufacturer only. The kit produces a 10x14-inch diorama and includes two HO-scale structures featuring

a laser-etched brick design for the buildings. You also receive dry-transfer lettering, as well as metal and resin details in this \$134.95 offering. Bar Mills also includes a Woodland Sce-

nics-made pickup truck with its Goldie Electric Co. offering.

Bar Mills Scale Model Works
P.O. Box 609, Bar Mills, ME
04004; 207-929-3400;
www.barmillsscalemodels.com

P-54 passenger cars from Con-Cor

HO—Con-Cor plans a spring delivery for a new production of HO-scale P-54 passenger cars. Pennsylvania Railroad started building its 54-seat cars in 1908. Con-Cor's model will reproduce this 65-foot passenger car with accurate ends

featuring porthole windows, as well as separately applied wire handrails and complete illuminated interiors. Announced road names include Long Island, Pennsylvania Railroad, and Pennsylvania-Reading Seashore Lines in multiple liv-

eries. You may reserve these models now from your hobby dealer or direct from Con-Cor online.

Con-Cor
8101 E. Research Court
Tucson, AZ 85710-6758
888-255-7826
www.con-cor.com

Bowser snowplow F9Am

HO—A new production of Bowser's HO-scale Executive F-units will include rebuilt F9A prototypes with large snowplow. The prototypes started as Union Pacific roster members and later worked for Rock Island. Bowser's model will present two Union Pacific F9Am offerings (505 and 517) with an F3B available in matching decoration numbered 522. Rock Island models will come in Armour Yellow with Union Pacific markings painted out and Rock Island herald on the nose carrying road number 4168, as well as a red with yellow Rock Island (4150) with large white speed lettering. The accompanying Rock Island F3B (4104) will come decorated Armour



Yellow with Rock Island herald. Prototype image shows Union Pacific F9Am 517 at Denver, Colorado, in August 1971. — *Thomas Chenoweth photo, Kevin EuDaly collection*

Bowser Manufacturing
1302 Jordan Avenue
P.O. Box 322
Montoursville, PA 17754
570-368-2379
www.bowser-trains.com



Tangent releases second run for X58 boxcar

HO—Tangent Scale Models now offers a second group of its HO-scale X58 boxcar replicas. The prototype is Pennsylvania Railroad's 50-foot outside-brace boxcar with insulated plug door. For this new run, Tangent offers a 1964-built Pennsylvania Railroad X58 in the road's Freight Car Red with "LD" and "Cushioned Car" labeling. A white Lehigh Valley X58 reproduces a 1965-built group of cars and includes the black roof and ends and the road's Cornell Red flag herald on the door. A pair of green Penn Central repaints include a red-and-white "PC" herald on a 1968 prototype, as well as

a 1974 car with Pennsylvania markings painted out. Later prototype examples include Conrail repaints from 1978 and a Lehigh Valley re-stencil from 1979.

The fully assembled X58 boxcar replica sells for \$44.95 and comes in multiple road numbers. For custom projects, Tangent offers assembled and painted X58s in Pennsylvania's Freight Car Red, Penn Central green, and Conrail red.

Tangent Scale Models
PO Box 6514, Asheville, NC 28816
828-279-6106
www.tangentscalemodels.com

Culver's comes to Walthers Cornerstone



HO—Modelers reproducing contemporary scenes will enjoy the new HO-scale Culver's restaurant kit (#933-3486, MSRP: \$49.98) available from Walthers. The new officially licensed Cornerstone release recreates the restaurant chain's look with a structure molded in multiple accurate colors along with sign, outdoor tables with umbrellas, drive-thru menu board, and more.

Wm. K. Walthers, Inc.
5601 W. Florist Ave.
Milwaukee, WI 53218
800-487-2467
www.walthers.com



GE's latest Tier 4 GEVO coming from ScaleTrains.com

HO—ScaleTrains announced and showed early samples of its coming HO-scale General Electric Tier 4 GEVO diesel at the recent Amherst Train Show. These officially licensed models will come to hobbyists in two versions: Rivet Counter and Operator.

ScaleTrains will provide its Rivet Counter Tier 4 GEVO will accurate details that will include one of three cab roof designs, high-or-low headlight, correct antenna and PTC arrays, and one of two truck sideframe

styles. The non-sound Rivet Counter model features a 21-pin socket for conversion to Digital Command Control (DCC) and sells for \$149.99. The Rivet Counter Tier 4 GEVO with DCC and sound will feature ESU-Lok-Sound Select 4.0 with "Full Throttle" and two cube speakers and sells for \$224.99. The first round of Rivet Counter Tier 4 GEVO diesels will include BNSF, Canadian National, CSX, General Electric Demonstrator, Norfolk Southern, and Union Pacific.

The company also plans an Operator version Tier 4 GEVO for \$99.99. This model will present the same body style across all road names with a separately sold detail kit available to enhance the appearance. ScaleTrains' Operator Tier 4 GEVO will possess the same high-end drive installed in the Rivet Counter releases.

ScaleTrains.com, Inc.
7503 Highway 411
Benton, TN 37307
www.scaletrains.com

Summit USA adds Pizza Hut kit

HO—A contemporary-design Pizza Hut restaurant is new from Summit USA for its Custom Cuts series of HO-scale kits. This \$89.95 craftsman-level release provides the builder with all necessary parts (made of milled black or white styrene), as well as laser-cut clear acrylic window material. The offering includes the structure and sign. Color logo signage is included, along with detailed and illustrated instructions. The finished Pizza Hut is 9x6-1/8-inches and 2-3/4-inches tall.

Summit USA
512A Ford Street
Lake Charles, LA 70601
337-436-8481
www.summit-customcuts.com





WalthersProto GP35 second run announced

HO—Six more GP35s are coming from Walthers for its Proto diesel model. This all-new HO-scale reproduction of EMD's popular 1960s four-axle diesel will provide a late-production version with road-accurate details promised for announced road name. The coming GP35 Phase II models will include Chessie System; Conrail; Gulf, Mobile & Ohio; Rock Island; Santa Fe; and Southern Pacific.

The second collection will see Santa

Fe return from the first run. The new Santa Fe GP35s will this time include the road's Freight Warbonnet scheme, the first Walthers release included as-delivered livery, introduced in 1972 with details matching the appearance of GP35u in service in the 1980s and into the early 1990s. The four coming Santa Fe GP35 road numbers will include 2896, 2904, 2907, and 2911. In addition to the Phase II body style, these new releases will come with operating beacon, air condition-

er, ground plates with antennas, and air deflectors on top of the model as found on the prototypes, as well as other road-specific attributes. Prototype image shows Santa Fe 2906 at Verdmont, California, in December 1985. — *Peter Wester photo, Kevin EuDaly collection*

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N Scale Product News



Micro-Trains Husky-Stack well car

N—Micro-Trains new well car reproduces a prototype first in service on North American railroads in the early 1990s. Built by Husky-Stack, this 70-foot well car is capable of carrying shipping containers of up to 48 feet in length. Micro-Trains' new N-scale well car will also hold your 48-foot containers and debuts decorated for

Trailer Train with yellow body and red "TTX" lettering and DTTX reporting marks. Two road numbers are available for this \$27.90 release.

Micro-Trains Line Co.
P.O. Box 1200
Talent, OR 97540-1200
541-535-1755
www.micro-trains.com



Air Force set from The N Scale Enthusiast

N—A recent release available exclusively from The N Scale Enthusiast is an Atlas-made Baldwin VO-1000 diesel switcher and caboose set. The pair come decorated for United States Air Force service. The matching paint scheme presents a dark blue body with red-and-white stripes, white lettering, and yellow handrails on the switcher. Additionally, these

models include multicolor Department of the Air Force and U.S. Bicentennial seals. The set is available for \$119.50, plus \$9.50 shipping to U.S. addresses. Visit the N Scale Enthusiast website for more details.

The N Scale Enthusiast
31 Homesteader Lane
West Haven, CT 06516
www.nscaleenthusiast.com



Kato UP Excursion E9

N—A special production of N-scale E9s from Kato's Kobo Custom series provides models featuring details found on Union Pacific (UP) Excursion Train diesels. Two UP E9As (949 and 951) are available, along with a E9B (963B) in this Kobo Custom release. The E9A models include added ditch lights, modified headlight, and rooftop details. The special release E9B includes the rooftop fan covers and both A- and B-units feature updated lettering. Kato's UP Excursion Train E9As sell for \$175 each and the E9B sells for \$140.

Modelers desiring to add these details to their existing UP E-units will find Kato offers its Ultra Detail kit (#E9UDP) for \$24. The kit provides fully decorated parts, including MU hoses, ditch lights, replacement headlight lens, roof beacon with hole-filler plug, five-chime air horn with bracket, and roof vent covers. Each kit contains enough detail parts for an E9A and E9B.

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O Scale Product News



PendelX Lowloader from NZG

O — NZG's new PendelX Lowloader trailer, in near O-scale size of 1/50th proportions, provides an eye-catching addition to a model layout. The depressed bed can be used to haul a variety of loads, including railroad equipment. These Low-

loader trailers, available at 3000TOYS.com, come in multiple colors (blue, red, and yellow) and two styles (3-axle and 5-axle). Prices start at \$194.99 for the 3-axle PendelX Lowloader trailer.

3000TOYS.com; 417-659-8697
www.3000toys.com



Southern Pacific AC-9 coming from Lionel

O — Featured in Lionel's new 2017 Signature Edition catalog, the company plans a Built-To-Order series O-gauge Southern Pacific (SP) AC-9 steam locomotive. SP rostered a dozen of these Lima-built 2-8-8-4 steam locomotives beginning in 1939. Lionel plans three releases reproducing the appearance of Southern Pacific's AC-9 from 1939 to 1952, before its conversion to burn oil. The \$1999.99 release will

come with as-delivered Southern Pacific Lines lettering and later large Southern Pacific lettering on tender. Additionally, a "what-if" AC-9 will be available in *Daylight* livery. The Legacy-line AC-9 will include sound, digital control, and will operate on a minimum of O72 curves.

Lionel LLC
 6301 Performance Drive
 Concord, NC 28027; 585-949-4100
www.lionel.com

Atlas O announces alternate history Airlsides

O — A new group of Atlas O's General American 2,600-cubic-foot capacity Airlside hoppers will arrive decorated for alternate history liveries. The model will be fully assembled with accurate O-scale dimensions and will feature separately applied grab irons and brake line details, as well as opening hatches. The 3-rail release (MSRP: \$72.95) will operate on O27 and wider curves and will come with die-cast articulated couplers. Atlas O's 2-rail Airlside carries a \$77.95 suggested list and will be fitted with 33-inch scale metal wheels and Kadee-compatible scale couplers. The announced road names present modern looks for Burlington Northern, BNSF, CSX, Kansas City Southern, Norfolk Southern, Santa Fe, and Southern Pacific. Atlas O plans to have these new Airlsides available during the 3rd Quarter of this year.

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 Hillside, NJ 07205
 908-687-0880
www.atlaso.com

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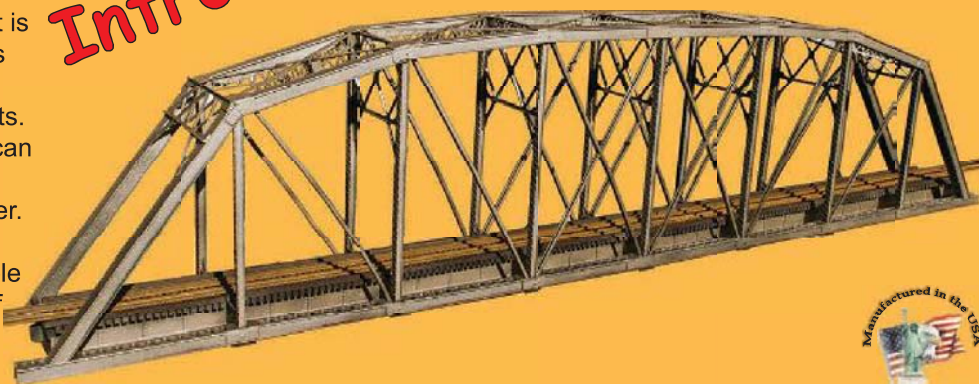
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This 200' Parker Through Truss (single track) Bridge Kit is designed to interchange parts with all other Central Valley Model Works Truss Bridge Kits.

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Large-Scale Product News



Grizzly Flats from LGB

G— One of Walt Disney's animators, Ward Kimball, was an accomplished model railroad enthusiast. Kimball's backyard Grizzly Flats Railroad operation included the "Chloe" steam locomotive that originally worked moving sugar cane in Hawaii. LGB announces a new G-scale Grizzly Flats "Chloe" steam locomotive (#L23131, MSRP: \$369.99) that will be decorated in authentic colors and lettering and will include engineer figure. The model will feature power to drive both axles.

LGB will also offer a Grizzly Flats

First Class passenger car (#L30431, MSRP: \$94.99) reproducing the road's open-air observation car with seats that may be reversed. A Grizzly Flats passenger car set (#L32441) is coming for \$169.99 with two red gondola cars with seating. All of these new G-scale Grizzly Flats Railroad releases are expected from LGB by year's end.

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MTH RailKing Norfolk Southern diesels

G—Among the newly announced MTH Trains G-scale diesels are a number of General Electric Dash 8 examples. MTH will present Norfolk Southern's specially decorated First Responders (#70-2115-1) and Veterans (#70-2116-1) paint schemes on its Dash 8-40CW for its RailKing line. These new RailKing diesel models will be part of MTH's "One-Gauge" collection and will include 1/32-scale dimensions. The electronics will allow for 2-rail DC or 3-rail AC us-

age. These new Dash 8 diesels list for \$749.95 and will include operating ProtoSmoke exhaust and digitally controlled flywheel-equipped drive, as well as MTH's ProtoSound 3.0 audio system. Check MTH's latest RailKing catalog or the manufacturer's website for other road names planned for this Dash 8 series of releases.

MTH Electric Trains
7020 Columbia Gateway Drive
Columbia, MD 21046; 410-381-2580
www.mthtrains.com



B&O Sentinel boxcar from Piko America

G—Piko America now offers its 40-foot boxcar decorated for Baltimore & Ohio's (B&O) Sentinel service. Similar to other railroads, B&O specially painted selected examples of rolling stock to promote its freight services in after World War II. B&O's Sentinel scheme included a blue car with silver roof and upper sides, as well as a yellow rectangular logo. The fully as-

sembled Piko America G-scale boxcar includes a working sliding door and separately applied brake wheel and running boards. The \$67.99 release rides on Bettendorf trucks.

Piko America
4610 Alvarado Canyon Road, Suite 5
San Diego, CA 92120
877-678-4449
www.piko-america.com

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Multi-Scale Product News



Boulder Creek's RollBy OnBoard Speedometer

Multi-Scale — Boulder Creek Engineering announces its new RollBy OnBoard Speedometer and RollBy Train Speedometer app for Android users. The RollBy OnBoard Speedometer installs in your HO-, N-, or O-scale freight car and transmits speed and distance data during movement to the RollBy Train Speedometer app on your Android device.

You can download Boulder Creek Engineering's RollBy Train Speedometer app free at the Google Play store.

The program can keep track of several OnBoard Speedometers at one time and displays maximum and average scale speeds, as well as real and scale distances traveled in feet or miles (or meters/kilometers). The app requires a 4.3 Android device and Bluetooth Low Energy support. You can download the app prior to purchasing Boulder Creek's RollBy OnBoard Speedometer and check your device's capability to confirm you can run the unit. The company is currently work-

ing on an Apple-version of its app for future release. The new RollBy OnBoard Speedometer retails for \$79.95. You can view a video of the system in operation by visiting Boulder Creek Engineering's website or searching for them on YouTube.

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www.bouldercreekengineering.com

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PULLMAN Plan 3973A 10-1-1 SLEEPER Car was built and photographed by Jeff Tyrrell



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Kit #1503 - Northern Pacific painted Pullman Green with gold decals
Kit #1504 - Northern Pacific painted Lowey two-tone Green with white decals

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Cabooses from Bluford Shops

HO & N—The first new additions to Bluford Shops line of HO- and N-scale caboose models since 2015 have been announced. The new production will include an early paint scheme CSX; Toledo, Peoria & Western; and Union Railroad for the company's short bay window model. New short-roof transfer caboose road names will feature Central Indiana Railway Company, Chicago & North Western, Conrail, Detroit Terminal Railroad, Indiana Harbor Belt, Kansas City

Southern, Missouri Pacific (including "Dodger Service"), New York Central, Rock Island (blue "The Rock" in two schemes), Southern Pacific (safety slogans and covered side windows), and Southern Railway. These fully assembled models carry a \$49.95 list for HO versions and \$37.95 for N-scale releases.

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Multi-Scale—Model Rectifier Corp. (MRC) introduces a Prodigy Wi-Fi module (#0001530) for use with existing Prodigy Digital Command Control (DCC) systems. This new module connects to your Prodigy DCC unit and provides the interface to allow operators to control their model railroad via a smart device. MRC's module broadcasts its own Wi-Fi network and works with WiThrottle (Apple devices such as

iPhone or iPad) and Engine Driver (Android devices). You can run up to eight smart devices with a single MRC Wi-Fi module and your Prodigy DCC system. The module carries a \$119.98 suggested retail price. You may view a demonstration at MRC's website.

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Micro-Trains adds Port Huron & Detroit to Per Diem Series

N & Z — The Per Diem Series continues for Micro-Trains N- and Z-scale boxcars. A recent addition is the 12th model in the collector series featuring Port Huron & Detroit Railroad on a rib-side 50-foot boxcar. The blue car includes red-and-white lettering and

sells for \$27.95 for either the N- or Z-scale offering.

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Atlas Trainman plans more trash flatcars and containers

HO & N — Atlas will offer a new production of its HO- and N-scale trash flatcar, as well as trash containers for 3rd Quarter delivery. The flatcar is an 85-foot open-deck example used in trash-hauling service on today's railroads. Three new road names are coming, as well as new number for three previously offered roads. To go with the Trainman-series HO- and N-scale trash flatcar model, Atlas will offer more of its 20-foot high-cube MSW trash con-

tainers. Five new looks are coming for this container for this fall release. The HO trash flatcar lists for \$34.95, and the N-scale version carries a \$27.95 suggested retail price. The containers come in 4-packs, selling for \$24.95 (HO scale) and \$22.95 (N scale).

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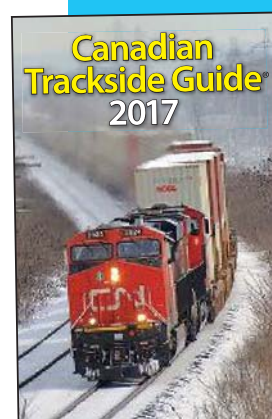
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Trainworx announces Drop-Frame Trailers

HO & N — A new group of HO- and N-scale trailers is coming from Trainworx. This release marks the second batch of 40-foot drop-frame trailer vans for the company's new HO line. Seven trailers in this new group will include red underframes and REA markings, in addition to railroad placards on the sides and ends. The new REA Leasing 40-foot drop-frame trailers will include Atlantic Coast Line, Chicago & Eastern Illinois, Illinois Central, Louisville & Nashville, New Jersey Central, Rock Island, and Tennessee Central. Additional new drop-frame trailer models will reproduce Northern Pacific, Brown, and Clipper prototypes. The fully assembled trailers are expected later this year and sell for \$18.95 for N-scale models and \$28.95 for HO versions.

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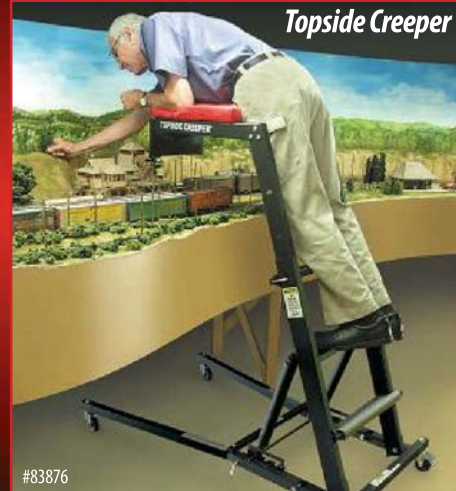
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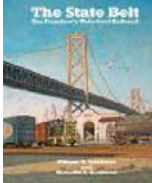
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Multi-Scale — You'll find a new line of hobby adhesives and other related products for model railroad available from your Horizon Hobby or Walther's dealer. Deluxe Materials, a British company started in the mid-1970s, now offers its line to North American modelers. Deluxe Materials offers a collection of cyanoacrylate glues un-

der its Rokat-brand, as well as two-part Epoxy II products. New from Deluxe Materials is its Ballast Magic collection of items for doing track work scenery and detail. You can download a copy of the company's catalog by visiting its website.

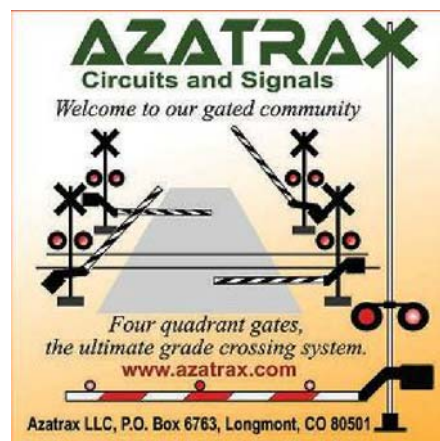
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SceneMaster static grass flocking

Multi-Scale — Walther's adds static grass flocking material in 3½-ounce re-closable bags retailing for \$11.98 each. The new addition to the company's SceneMaster line is made by Noch for Walther's and comes in four colors (brown, green blend, dark green, and yellow) with green blends offered in two different lengths each. Also new to the Walther's SceneMas-

ter line is an 8-ounce bottle of glue for use with static grass projects that sells for \$9.98. For more information on the entire SceneMaster line, visit www.walthers.com.

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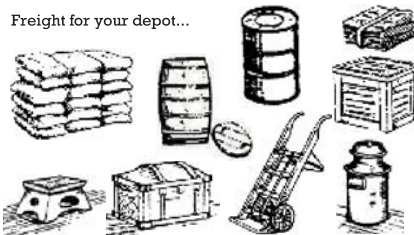
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Z Scale Product News



Rio Grande and Union Pacific SD45s from AZL

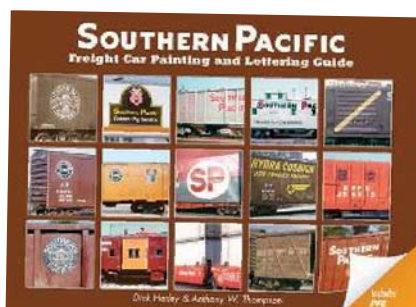
Z—American Z Line's (AZL) continues to expand its collection of SD45 diesel models. This recently introduced plastic version of EMD's 3,600-hp mid-1960s flared-radiator SD45 is now available decorated for Rio Grande (with large speed lettering) and Union Pacific (as-delivered with "Dependable Transportation"

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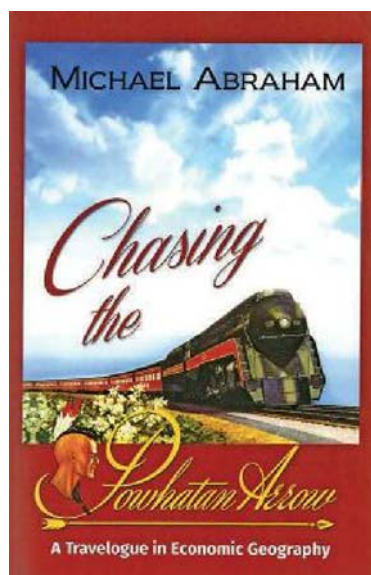
***Chasing the
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Railbook Review

Michael Abraham's latest travelogue, *Chasing the Powhatan Arrow*, does not follow the normal course of a book about railroads, which usually feature the nuts and bolts of motive power, rolling stock, and rights-of-way. Mr. Abraham approaches his subject from the viewpoint of presenting an economic geographic assessment of the region between Norfolk, Virginia, and Cincinnati, Ohio. Norfolk & Western Railroad (N&W) defines the nexus for this diverse region. The *Powhatan Arrow*, powered by the streamlined J locomotive, provides the herald for the line, as well as the region, tying Abraham's tale together into a cohesive and entertaining format.

Norfolk & Western Railroad was the result of the consolidation of three Virginia railways following the Civil War under the leadership of William Mahone. The turbulent post war years led the line into receivership in the 1870s only to be reorganized in the 1880s. By the turn of the 20th Century, the line was engaged in providing fuel for the nation in the form of Pocahontas and West Virginia Coal sent both eastward to the port of Norfolk and westbound to the manufacturing heartland of Ohio. More than just another railroad line, N&W was a major employer that tied the region together culturally and economically even though it never served any major population centers. Consequently, there has always been a regional affection for the line that is not usually given to



many corporations. For many readers, the term "economic geography" may lack clear meaning, so as follows is a definition provided by Wikipedia: "Economic geography is the study of the location, distribution, and spatial organization of economic activities across the world. It represents a traditional subfield of the discipline of geography."

In order to describe the many diverse economic and cultural regions author Abraham has laid out the book following the west bound timetable of the *Powhatan Arrow* traveling from Virginia's Tidewater region at Norfolk through the Commonwealth of Virginia into the dormant coalfields of West Virginia ending at Cincinnati's iconic Union Terminal. Every stop along the route is punctuated with interviews of both leaders and the ordinary citizens of the area. Intertwined with these personal vignettes is the history and industries at each local along the way.

The common thread running through out *Chasing the Powhatan Arrow* is one of change. Leading off with the changes of fortune is the port city of Norfolk, both economically and geologically, the tale continues

through the agricultural region of South Side Virginia famous for peanuts and tobacco, eventually reaching Petersburg where the last major actions of the War Between the States culminated at Appomattox Court House. From Appomattox the line crosses the piedmont region of Virginia into the City of Lynchburg, which lies at the foothills of the Appalachians. First a transportation hub, then a market and manufacturing center the city now survives on a service and technology economy. After cresting the Blue Ridge grade the journey continues into Roanoke, which once was the corporate headquarters and central shops for the railroad. While the shops continue to provide maintenance to the line as well as continued construction of rolling stock, the headquarters have moved to Norfolk with the consolidation of the N&W and Southern Railway into the Norfolk Southern Railway. From Roanoke the line ascends the Alleghenies to Christiansburg and the junction at Radford where the westbound line diverges from the route to Bristol and heads into the coal country of Southwest Virginia and southern West Virginia. The trail through West Virginia is a heart wrenching vision of economic failure whose fortunes have been tightly tied to the declining coal industry. Industrial and business flight from the region has left the area with declining population and opportunity. Some counties have become virtual ghost towns due to these factors. Once across the Ohio River the journey heads towards Cincinnati along the pea vine, formerly a three-foot narrow gauge line standard gauged by the N&W, through the river towns in Southern Ohio. They too have felt the impact of eco-

conomic change but are fighting to make a comeback as they try to attract new businesses and manufacturing opportunities. The tale ends in Cincinnati, Ohio, the largest city on the Norfolk and Western. Cincinnati was and still is a crossroads for industry and transportation. By virtue of its size, resources and leadership the city has weathered the vicissitudes of change remarkably well even though it still faces daily challenges.

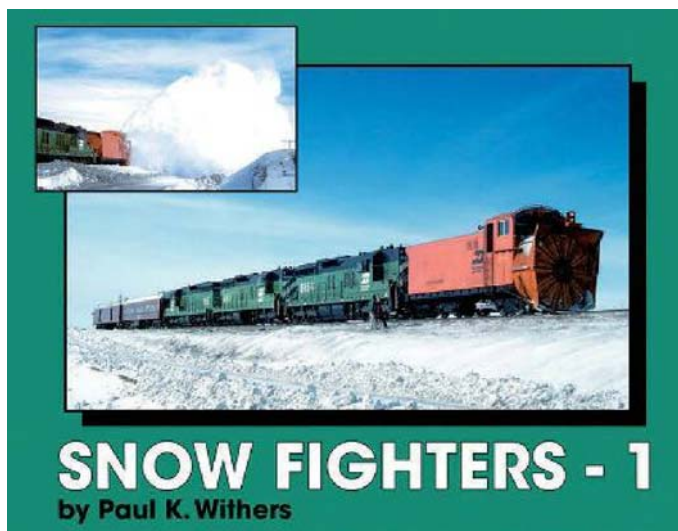
This resulting travelogue fills out the details of this richly diverse and interesting area of the United States from an unusual perspective. While some of the specific details may be in question, the overall observations and conclusions are not. Chasing the Powhatan Arrow clearly illustrates the impact that transportation and regional economies have on one another as well as the citizens of each location. One should find Michael Abraham's book an interesting, although not truly railroad specific, read and hopefully a catalyst for a visit to any one of the area's historic and interesting sites. – GEORGE RILEY

Publications of Interest

Snow Fighters documented in limited-run book from Withers Publishing

A new limited-run softcover book is available from Withers Publishing covering an overlooked piece of essential railroad equipment. Similar in the approach given in Withers' Big Hooks series, the new Snow Fighters documents snow removal equipment owned by U.S. and Canadian

railroads. The \$39.95 pictorial is 96-pages of 150 black & white and color images. Presented in 8-1/2 by 11 inch horizontal format, Snow Fighters – Volume 1 covers roads A-through-D and includes Santa Fe (ATSF), Burlington Northern, BNSF, Canadian Na-



tional, Canadian Pacific, Denver & Rio Grande Western, and more.

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S Gaugian Magazine

S Gaugian includes photos, plans, feature articles, news, regular departments and ads from major manufacturers. Six issues a year, \$39 USA; \$73 Canada; \$86 elsewhere. Sample copy \$12 pp in U.S.



Sn3 Modeler Magazine



Sn3 Modeler, published twice a year, covers narrow news, offers plans, photos, how-to articles, regular departments and ads. \$18 USA, \$30 Canada, \$34 elsewhere. Sample copy \$12 pp in U.S.

S Scale Product Catalog

Our 228-page illustrated **S/ Sn3 Model Railroad Catalog & Reference Manual** lists thousands of S products. \$17.95 USA; \$26.95 Canada; \$35.95 elsewhere.



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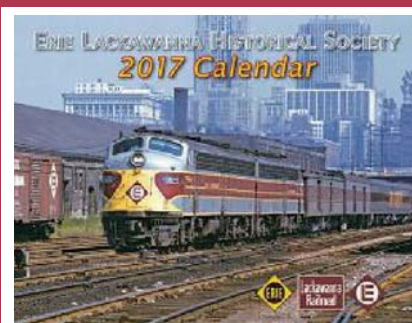
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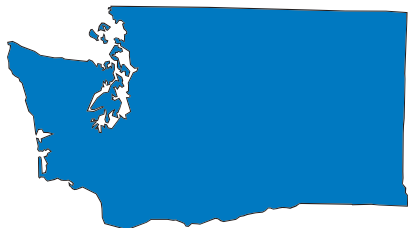
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Timetable listings of model railroading events are printed free of charge on a space-available basis. Notices must be submitted at least 90 days prior to event date to be considered for publication in the magazine. White River Productions is not responsible for errors in listings, please confirm details with event sponsor.

**Please submit your events online at:
www.rmodelcraftsman.com/timetable.**

SPECIAL EVENTS

SONORA, CALIFORNIA, April 29-30, 2017. West Side Reunion and Sierra Seminar at Sonora Elks, 100 Elk Drive. Saturday - Enjoy logging and mining railroad presentations, model contest, vendors, and door prizes. Sunday- Enjoy historical and modeling presentations, vendors, pizza lunch, and field visit. Pre-register for special events. See web site for details. Admission: \$25.00 and \$15.00. Contact Frank Markovich at (408) 505-2727 or visit www.westsidereunion.com



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SCRANTON, PENNSYLVANIA, May 12-13, 2017. Transportation History Exposition - Key Lock & Lantern Convention at Radisson Lackawanna Station Hotel, 700 Lackawanna Avenue. The annual KL&L Convention is a full weekend of events. Transportation History Exposition features historical exhibits and railroad memorabilia sales, lectures, banquet, train excursions and tours. Visit our web site for registration info. Admission: Varies, see web site. Contact David Hamilton at (518) 439-8392 or visit www.klnl.org

BULVERDE, TEXAS, May 13, 2017. "What is Model Railroading?" at Bulverde Spring Branch Library, 131 Bulverde Crossing. Discover the hobby of model railroading. Sponsored by the Bulverde Spring Branch Library and the San Antonio NTRAK Association. Admission: Free. Contact Bulverde Spring Branch Library at (830) 438-4864 or visit www.bsblibrary.org

NMRA EVENTS

BAKERSFIELD, CALIFORNIA, April 19- 23, 2017. PCR Daylight Express, 2017 at DoubleTree by Hilton Hotel, 3100 Camino Del Rio Court. Enjoy five days of clinics, BSA Railroading Merit Badge Program, contests, layout tours, operating sessions, Tehachapi Loop tour (extra fare), and more! Banquet speaker is Michael Gross, actor, model railroader, railroad historian, and part owner of the Santa Fe Southern Railway in New Mexico. Admission: \$115.00. Contact Doug Wagner at (661) 589-0391 or visit www.pcrnmra.org/conv2017

ATLANTA, GEORGIA, May 16, 2017. Piedmont Division Monthly Meeting at Holy Innocents Episcopal Church, 805 Mt Vernon Hwy NW. Join our monthly meeting featuring, brief announcements, theme of the month and a clinic presentation. Join us for an evening of model railroading fun and fellowship. Admission: Free. Contact Gary Jarabek at (770) 509-6941 or visit www.piedmont-div.org

EAST BRIDGEWATER, MASSACHUSETTS, April 22, 2017. Spring Training at Wellesley Community Center, 65 Branch Rd. Enjoy our annual spring show featuring modular model railroad displays, vendors, and more. Featured clinician is RMC editor Stephen Priest. See web site for details. Admission: Adults \$5.00, Children under 12 free. Contact Peter Watson at (508) 378-3582 or visit www.hubdiv.org

MONTEVIDEO, MINNESOTA, April 15, 2017. Minnesota River Valley Division/TLR Annual Meeting at Toppers Bar & Grill, 311 State Road. Business meeting, election, model clinics, railfan slide show, show-and-tell model projects, white elephant gift exchange-bring wrapped item, lunch on your own, with visit to Milwaukee Road Heritage Center HO layout depicting Montevideo circa 1950s. Admission: Free. Contact Terry Davis at (320) 587-7820.

NORTH PLATTE, NEBRASKA, April 8-9, 2017. 23rd Annual Train Show at D&N Event Center, 501 E Walker Road. Enjoy our train show featuring operating model railroad displays, and vendors selling new and used model railroad related items in all scales. Presented by Nebraska West-Central Division MCR NMRA. Admission: \$4.00 adults, \$1.00 youth (12-5), under 5 free with paid adult. Contact Gene R. Tacey at (308) 386-2489.

BALDWIN, NEW YORK, April 29, 2017. Sunrise Trail Division Spring Meet at First Church Baldwin Methodist, 881 Merrick Road. Enjoy our spring meet featuring operating modular layouts, six modeling clinics, and a white elephant table. Attendees are encouraged bring their models and photos either for the model and photo contests or for display. Refreshments available. Presented by Sunrise Trail Division NER NMRA. Admission: \$7.00 Children under 12 & scouts in uniform free with paying adult. Contact Steven Perry, MMR at (631) 744-6462 or visit www.sunrisetraildiv.com

BLUE RIDGE SUMMIT, PENNSYLVANIA, April 8, 2017. MER South Mountain Division and Mainline Hobby Supply 5th Annual Mini Con at Blue Ridge Summit Fire Hall, 13063 Monterey Ln. Enjoy our convention featuring prototype and modeling clinic presentations, modular railroad displays, and more. This year's theme is modeling steel mills and the steel industry. Admission: Free Admission. Contact Donald Florwick at (717) 414-0660 or visit www.smdnmra.org/

MADISON, WISCONSIN, April 2, 2017. South Central Wisconsin Division Monthly Meeting at Zor Shrine Center, 575 Zor Shrine Place. Enjoy our monthly meeting featuring clinic presentations, model and photo contests, door prizes, and home layout tours following the meeting. Admission: Free. Contact Kathy Clancy at (608) 831-5357 or visit www.nmra-scwdiv.org

BURNABY, BRITISH COLUMBIA, CANADA, May 5-7, 2017. Railway Modellers Meet of British Columbia at Simon Fraser University - Burnaby Campus, 8888 University Drive. The second annual RMMofBC features operating sessions, layout tours, clinic presentations, model displays and more. Please visit our web site for details and registration. Presented by 7th Division Northwest Region NMRA. Admission: \$60 regular/\$45 NMRA. Contact Brian Clogg, Registrar at (604) 588-2194 or visit www.railwaymodellersmeetofbc.ca

CLUB OPEN HOUSE

SANTA CLARA, CALIFORNIA, April 08, 2017 - April 09, 2017. SBHRS Spring Open House at Santa Clara Railroad Depot, 1005 Railroad Avenue. Enjoy our open house featuring our large HO and N scale layouts depicting California scenes. Visit the Edward Peterman Museum of Railroad History, our OWR&N business car, and tours of our restored Santa Clara Tower and two MOW buildings. Presented by the South Bay Historical Society. Admission: Adults \$5.00, 18 and under free. Contact Bob Bartlett at (408) 243-3969 or visit www.sbhrrs.org

CONYERS, GEORGIA, April 15, 2017. Train Rides with the North Georgia Live Steamers (April 15th) at North Georgia Live Steamers, 1632 Centennial Olympic Parkway. Come out for our first public run day of the 2017 season. This is the club's 39th year and fourth year of operation at the Georgia International Horse Park operating the Conyers & Hightower Trail Railroad. Admission: \$2.00 per person per ride. Contact Robby Mossman at (770) 000-0000 or visit www.northgeorgialivesteamers.org

CONYERS, GEORGIA, May 13, 2017. Ride the Conyers & Hightower Trail Railroad at North Georgia Live Steamers, 1632 Centennial Olympic Parkway. Enjoy our first public run day of the 2017 season. Help celebrate our organization's 39th year, and fourth year of operation at Georgia International Horse Park. Admission: \$2 per person per ride. Contact Robby Mossman at (770) 000-0000 or visit www.northgeorgialivesteamers.org

NORTH Haledon, NJ, April 01, 2017 - April 02, 2017. 6th Annual Spring Model Railroad Show at Garden State Model Railway Club, 575 High Mountain Road. Founded in 1953, the Garden State Model Railway Club has been in North Haledon since 1957. Our club is home to the Garden State Northern, a 1,200 sq. ft. HO scale model railroad, featuring steam and diesel locomotives, freight and passenger trains, rural and urban scenes, and working signals. Admission: Adults \$6.00, Children under 12 Free with Adult. Contact Rob Savino at (201) 387-8716 or visit www.gsmrrclub.org

NORTH Haledon, NJ, April 08, 2017 - April 09, 2017. 6th Annual Spring Model Railroad Open House at Garden State Model Railway Club, 575 High Mountain Road. Founded in 1953, the Garden State Model Railway Club has been in North Haledon since 1957. The Garden State Northern is a 1,200 sq. ft. HO layout, featuring steam and diesel locomotives, Thomas, freight and passenger trains, rural and urban scenes, and working signals, and more. Admission: Adults \$6.00, Children under 12 Free with Adult. Contact Rob Savino at (201) 387-8716 or visit www.gsmrrclub.org

FENWICK, ONTARIO, CANADA, April 23, 2017 - April 30, 2017. Fenwick Central Model Railroad Open House at Greater Niagara Model Railroad Engineers, 1141 Maple Street. Enjoy

our 25x40 HO scale model railroad operating up to 6 trains at a time, using computer control for switching. Some sales tables. Not wheelchair accessible. Sundays only. See web site for details. Admission: Free, donations welcome. Contact Dave Stremmler at (905) 892-2767 or visit www.gnmre.ca

TRAIN COLLECTOR'S MEETS

JOLIET, ILLINOIS, April 1, 2017. Semi-Annual Model Railroad Swap Meet & Open House at Stone City VFW Post 2199, 124 Stone City Dr., Joliet II, 60436. Trains of all scales and gauges, new and used, as well as railroadiana will be available for purchase. Free parking. Refreshments available. Club Open House will be held concurrently and features our operating layout, located at 9 W. Cass. Presented by Will County Model Railroad Association. Admission: \$3.00 adults, youth 12 and under free. Contact Mike L. Smith at (708) 308-9036 or visit www.wcmrra.org

URBANA, ILLINOIS, April 1-2, 2017. Midwest Central Railroad Club 36th Annual Train Show at Urbana Lincoln Square Village, 100 S Vine Street. Enjoy our model train show featuring vendors, operating layouts, and kiddie ride trains by Monticello Railway Museum. Admission: Free. Contact Richard Schroeder at (217) 552-6514.

HUDSON, MASSACHUSETTS, April 2, 2017. New England O Scale Train Show at Hudson Elks Hall, 99 Park Street. Enjoy our train show featuring O scale two-rail and three-rail, sales and exhibits, white elephant table, operating layouts, model display area, and more. Refreshments available. Presented by Metrowest Model Railroad Society. Admission: Adults \$6.00, Family \$8.00, Children 15 and Under FREE. Contact Larry Grant at (508) 337-6661 or visit www.trainweb.org/metrowest

SHIRLEY, MASSACHUSETTS, April 2, 2017. 2017 Railfair Model Train Show & Open House at Ayer/Shirley Middle School, 1 Hospital Road. Now in our 52nd year, enjoy our model train show featuring operating model railroad displays, exhibits, dealers, and modeling clinics. Presented by the Nashua Valley Model Railroad Association. Admission: \$5 Adults, \$4 Seniors & Teens (12-18), Free under 12. Contact Peter Dolimpo at (978) 225-0650 or visit www.nvrra.com

TOPSHAM, MAINE, April 29, 2017. Spring Model Railroad Show at Mt. Ararat High School, 73 Eagles Way. Enjoy more than 100 tables of model trains and supplies for sale in all scales and five operating model railroad displays. Free parking. Refreshments available. Easy to find from I-295. Presented by the Great Falls Model Railroad Club. Admission: \$4.00 adults, youth 12 and under free. Contact Terry King at (207) 576-3788 or visit www.greatfallsmodelrrclub.org

WYOMING, MICHIGAN, April 8, 2017. Grand River Valley Railroad Club Spring 2017 Train Show at Home School Building, 5625 Burlingame Ave. Enjoy more than 210 tables of trains and model railroad supplies in all scales. Operating Layouts in G, On30, S, HO, N and Z Scale; huge LEGO Layout and a LEGO play area for children. Hands on Thomas layout for children to play with. Drawing for Thomas electric train set. Admission: Adults \$5.00, under 12 free. Contact Ken Skopp at (616) 667-9680 or visit www.grandrivervalleyrrc.org

ST. CLOUD, MINNESOTA, April 1, 2017. Granite City Train Show at National Guard Armory, 1710 Veterans Drive. Buy, sell, trade or just view hundreds of trains under one roof. Vendors will be selling and buying trains, accessories, books, videos, railroad collectibles and memorabilia, antique trains and toys, and more! Operating model railroad displays. Kids activities. Admission: \$6.00, kids 10 and under FREE!. Contact Edward Olson at (320) 255-0033 or visit www.GraniteCityTrainShow.com

MONTPELIER, OHIO, April 2, 2017. Model Railroad Show & Swap Meet at Quality Inn Convention Center, 13508 State Rt. 15. Enjoy our train show and sale. Operating layouts and more. Free parking. Admission: \$5.00 Adults, Under 12 Free, Scouts in uniform Free. Contact Jim McPike at (419) 298-2441

HAWLEY, PENNSYLVANIA, April 23, 2017. Model Train Show & Sale at Hawley Fire Dept., 17 Columbus Ave. Enjoy our model train show featuring new and used trains for sale and operating model railroad displays. Test track available. Free parking. Refreshments available. Admission: \$3.00 adults, youth under 12 free when accompanied by paid adult. Contact Bill Delling at (570) 226-3206

MONACA, PENNSYLVANIA, April 2, 2017. Beaver County Spring Model Train Sale at Monca Turners, 1700 Old Broadhead Road. Enjoy our train show featuring many vendors from the tri-state area. Raffle. Refreshments available. Clubhouse tour of model railroad club available. Sponsored by Beaver County Model Railroad & Historical Society. Admission: \$5.00 adults kids under 12 FREE. Contact Walt Steiner at (724) 843-3783 or visit www.bcmrr.railfan.net

NEW BRAUNFELS, TEXAS, April 8-9, 2017. New Braunfels Model Railroad Jamboree at New Braunfels Civic Center, 390 S. Seguin Ave. Enjoy our train show featuring more than 275 vendor tables, silent auction, operating layouts, door prizes, and more. Refreshments available. Admission includes open house at New Braunfels Railroad Museum featuring many train displays and exhibits. See web site for details. Admission: Adults (14+) \$8.00, children (5-13) \$2.00, under 5 free. Contact Kermit Baese at (830) 625-2731 or visit www.nbrrm.org

TAYLOR, TEXAS, May 6-7, 2017. Austin Area Train Show at Williamson County Expo Center, 210 Carlos G. Parker Blvd. Enjoy over 16,000 sq. ft. of model railroading including, operating layouts, dozens of vendors offering new and used trains in all scales, clinics, raffle, self-guided off-site layout tours, and more. Free parking. Refreshments available. Presented by Cen-Tex Division NMRA. Admission: \$7.00 adults; youth 12 and under free with adult. Contact Peter Kazmir at (512) 653-3824 or visit www.centexnmra.org/trainshow

FISHERSVILLE, VIRGINIA, May 7, 2017. 31st Annual Shenandoah Valley Model Train & Railroad Show at Augusta Expo, 277 Expo Road. Enjoy more than 21,000 sq. ft. of model railroading including vendors, model trains, memorabilia, railroad historical societies, large model railroad displays, and more. Free parking. Presented by the Augusta County Railroad Museum and Augusta County Model Railroad Club. Admission: \$5.00 adults, youth under 12 with paid adult free. Contact Bill Kauffman at (540) 248-4143 or visit www.acmrrc.org

CHEHALIS, WASHINGTON, April 1-2, 2017. Lewis County Model Railroad Club Spring Swap Meet at Southwest Washington Fairgrounds, 2555 N. National Ave. Enjoy more than 170 tables of vendors selling model trains in all scales, operating layouts, and more. Free admission to the Lewis County Historical Museum and our 15x54 club layout on Saturday only. Presented by Lewis County Model Railroad Club. Admission: \$5.00. Contact Ted Livermore at (360) 985-7788 or visit www.sites.google.com/site/lewiscountymodelrrclub

PARKLAND, WASHINGTON, April 1-2, 2017. April Fun Fest Train & Hobby Show at Pacific Lutheran University, Olson Auditorium and PLU Field House, our train show and swap meet featuring vendors, operating layouts and more. Find trains, toy and hobby collectibles, railroadiana, and other collectibles. Model contest. Presented by Tacoma Northwestern Railroad Club. Admission: \$6.00, Military in uniform and age 12 and under free. Contact Al Meeds at (253) 326-2531 or visit www.tacomannorthwestern.org/show.htm#ADD

LINDSAY, ONTARIO, CANADA, April 8-9, 2017. The Lindsay & District 43rd Annual Model Railway Show at Victoria Park Armoury, 210 Kent Street West. Enjoy our model railroad train show featuring vendors and layout displays. Presented by Lindsay & District Model Railroaders Club. See web site for details. Admission: Adults \$5.00, Youth (6-12) \$2.00, Under 6 Free. Contact Wayne A. Lamb at (705) 324-5316 or visit www.ldmr.org

RAILFAN EVENTS

CLARKDALE, ARIZONA, April 16, 2017. Easter Bunny Express at Verde Canyon Railroad, 300 North Broadway. Depot guests enjoy hugs, candy and photo-ops with the mischievous hare. See web site for details. Admission: \$9.95. Contact Verde Canyon Railroad at (800) 320-0718 or visit www.verdecanyonrr.com

GRIFFITH, IN, April 2, 2017. Spring Railroad Swap Meet and Penn Central Movie Program at American Legion Post 66, 132 N. Wiggs Street. Enjoy our show featuring railroad collectibles and model train supplies. Buy, sell, and swap meet begins at 10:00 a.m. Chicago time. Movie program featuring Penn Central begins at 2:00 p.m. Presented by the Blackhawk Chapter NRHS. Admission: \$2.00 suggested donation. Contact Bill Molony at (815) 834-0835 or visit www.blackhawknrhs.org

ROCHESTER, NEW YORK, April 15, 2017. Easter Bunny Train Rides at Rochester & Genesee Valley Railroad Museum, 282 Rush Scottsville Road. Enjoy our train ride that tours our museum grounds and visit New York's largest collection of historic trains. Children will take part in an Easter egg hunt and visit with the Easter Bunny for photos. Admission: Adults \$12.00, Youth (5-117)/Seniors (65+) \$10.00, Age 4 and under ride free. Contact RGVRM at (585) 533-1431 or visit www.RochesterTrainRides.com

NELSONVILLE, OHIO, April 15, 2017. Easter Bunny Trains at Hocking Valley Scenic Railway, 33 W. Canal St. Ride our historic train, stop for an Easter Egg hunt with prizes and candy, including a visit with the Easter Bunny. Enjoy a 12 mile round-trip train ride. See web site for details. Admission: Adult \$17.00, Child (3-12) \$10.00. Contact Bob Lennertz at (614) 226-5302 or visit www.hvsry.org

PORT CLINTON, PENNSYLVANIA, April 22, 2017. Budd RDC Fantrip at Reading & Northern Railroad, 1 Railroad Blvd. Ride classic Budd RDCs on a full day trip riding former Reading trackage departing Port Clinton, Pa., and travel to Schuylkill Haven and on to St. Clair, and North Reading. Includes RBMN facility tour at Port Clinton. Sponsored by Lehigh Valley Chapter NRHS. Admission: \$49.00 per person. Contact Jim Daner at (610) 704-7738 or visit www.lehighlines.org

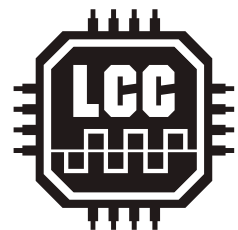
ROCKHILL FURNACE, PENNSYLVANIA, April 8, 2017. Easter Bunny Trolley at Rockhill Trolley Museum, 430 Meadow Street. Ride aboard a historic trolley car to Blacklog Narrows where the Easter Bunny will come aboard to greet each passenger. All children 13 and under will receive a free gift. Balloon creations, face painting and additional activities will be available. Admission: \$8.00 per person. Contact Bill Monaghan at (856) 269-2355 or visit www.rockhilltrolley.org

CHEYENNE, WYOMING, May 19-21, 2017. Cheyenne Depot Days at Cheyenne Depot Museum, 151 W. 15th St. Enjoy our multi-day event featuring access and tours of the Union Pacific Steam Shop and heritage collection, cab tours of UP 844, model railroad open houses, the Cheyenne Depot Museum featuring Harry Brunk's Union Central & Northern permanent display, and more. See web site for details. Admission: \$10.00 adults, children free. Contact Kerry Skidmore at (307) 421-6445 or visit www.cheyennedepotmuseum.org

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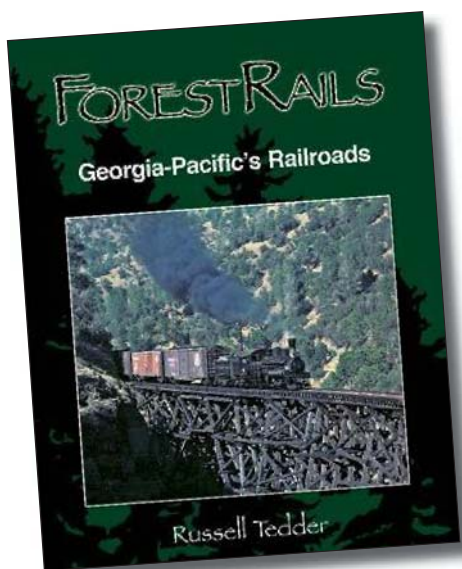
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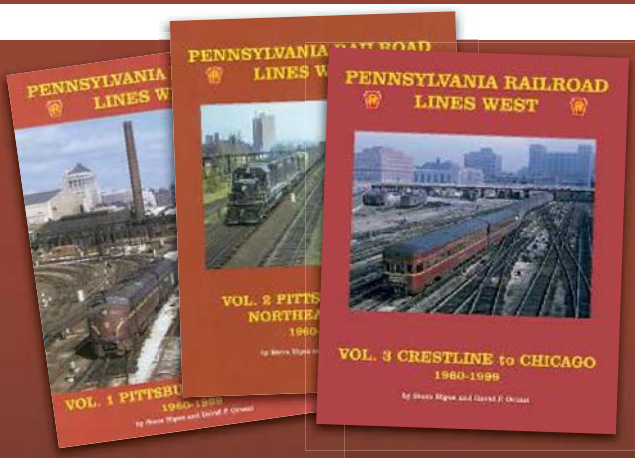
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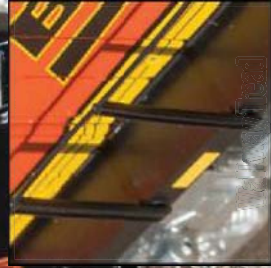
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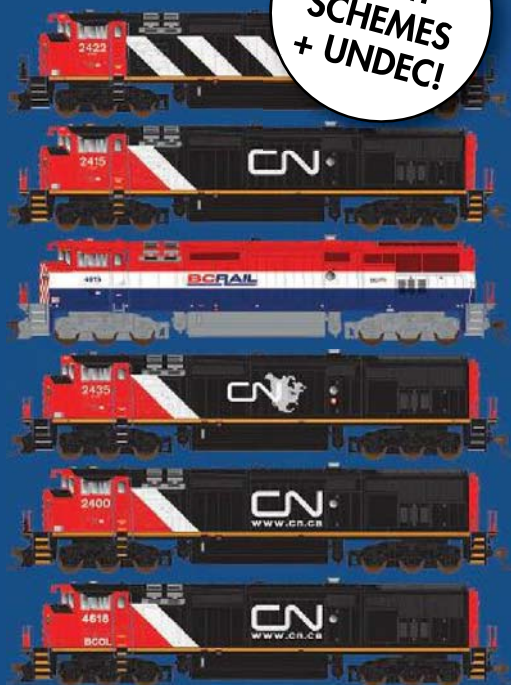
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