

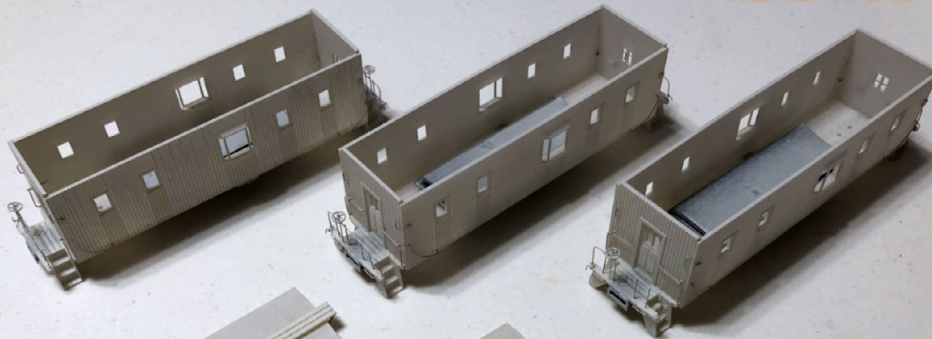


RUNNING EXTRA

Apprentice with savvy modelers

Dave and Doug Forbes: 3D print a C&E caboose

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Finished model



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September
MRH
inside!

ALSO in this month's edition:

- Better styrene supplies storage
- Kitbash a diesel fuel storage tank
- Model railroad photography tips
- Clean paint off railheads more easily
- ... and much more inside!

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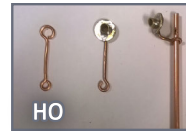
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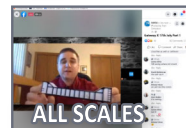
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PUBLISHER'S WELCOME

introduction



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JOE FUGATE ON A BETTER WAY
TO CLEAN PAINT OFF RAILHEADS ...



YOU'VE SPRAY PAINTED YOUR TRACK WITH A WEATHERED BROWN paint and now you need to clean the paint off the railheads. I've seen all kinds of methods listed, but for me, nothing beat using lacquer thinner to just wash the dried paint right off.

But lacquer thinner is nasty stuff and I've been seeking more environmentally-friendly alternatives after suffering health problems from nasty chemical exposure. When you're young, you think you're indestructible, but repeated exposure to nasty chemicals can catch up with you as you get older.

It turns out ethyl acetate (EA) works well as a more friendly replacement for lacquer thinner [1]. I've also mentioned EA as a replacement for MEK as a styrene adhesive, but it also works great as a replacement for lacquer thinner too.

EA is what's in fruity wine that gives it the fruity taste, and it's also added to candy, baked goods, or gum to give them a fruity taste. Your body also makes small amounts of EA as a byproduct of metabolism. Your body considers EA a waste chemical, so it will eliminate it.

Obviously, don't drink pure EA directly! That said, your body doesn't make lacquer thinner, so EA is a lot more natural solvent.

I bought some pipettes and dropper bottles off Amazon [1] and use them to keep smaller quantities of various useful solvents at

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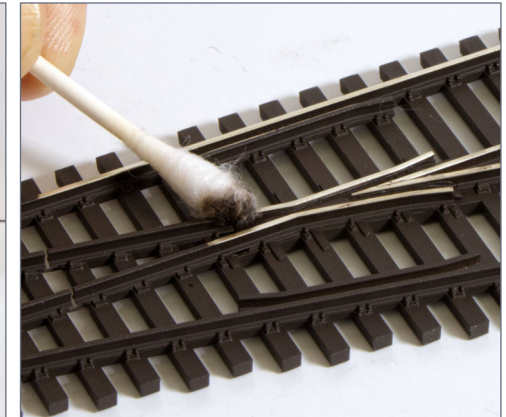
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1. I use a pipette to put ethyl acetate (EA) into a dropper bottle and keep it handy at the workbench or when working on the layout. I can easily add a few drops of EA onto Q-tips when I want to take paint off of painted railheads, for example.

the workbench like EA. The dropper bottles make it super-easy to just apply a few drops of EA as needed for the job at hand. That's far more convenient than having to open the bulky can or bottle of solvent and work with it.

I also like to use an EA soaked Q-tip to clean the paint off a rattle can nozzle [3] after use. This eliminates the problem of dried paint clogging the nozzle, and works a lot better than the old trick of turning the can over and spraying. ☑



2. I put 7 drops of EA onto a Q-tip then rub it against the painted railheads, taking the dried paint right up. After a first pass with Q-tips to remove most of the paint, I then start over with fresh EA-soaked Q-tips until no more paint residue comes off the tops of the rails.



3. An EA soaked Q-tip works great to clean the paint off a rattle can nozzle to prevent clogs. These days, I recommend this as a better option than turning the can over and spraying.



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THE LIMITED MODELER

column

*Images from the author's
collection, except as noted.*



MRH Running Extra | September 2020

JIM SIX works on making
up a complete train ...



RATE THIS ARTICLE

OBVIOUSLY, a key component of model railroading is the train. Everything else is planned and built to support the train. We put together trains then move them about the layout supposedly with some purpose. The types of freight cars that go into a train depend on several things. One is the era or year you are modeling. Contemporary railroading will have a different freight car make up than a train of the 1950s, or a train in the years before the Great Depression.

Since I model the 1920s, my trains include boxcars, ice bunker cars (reefers), hoppers, gondolas, tank cars, and flat cars. All have a purpose for being in the train, but the majority are typically boxcars. In my case, it all depends on which online customers are to be switched. My layout is about operating local trains to set out and pick up freight cars at online customers and team tracks. I don't run through-trains since the layout is an end-of-line terminal.

I have been sharing freight car models and prototypes since the Limited Modeler column started nearly two years ago. Most featured models were boxcars – what else? I also have shown a few Pennsy hopper cars. This month we have a

DOING MORE WITH LESS

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Pennsy-design flat car and general-service gondolas to share. I included a B&O prototype and models, as they followed a Pennsy design. Yes, I am a Pennsy freak, but I have a growing interest in, and need for, B&O prototypes. Do you think my focus on Lorain, Ohio, might have something to do with it?

ROLLING STOCK FOR THE ERA

Freight cars are one of my primary interests in the hobby. I am not as hardcore as Eric Hansmann or Ray Breyer, but most of you probably find me somewhat serious about freight cars. Early freight cars are one of the biggest factors driving me to model the 1920s. I love early freight cars from back when they were made of wood and men made of iron!

The variety of freight car types before the Great Depression offers serious appeal for me. Factor in that most of the boxcars were wood-sheathed before the 1930s, and I can't say no to them. Let me be perfectly clear, I love wooden freight cars – no matter if they are modeled in plastic or resin!

What manufacturer of freight cars do I use? Two primary sources for 1920s freight cars are Accurail and Bowser. While I will use whatever is available that will work for me, the balance of my cars are resin kits – mostly Westerfield Models or Funaro & Camerlengo.

Accurail and Bowser offer really good plastic models of cars that meet my needs. Bowser is a godsend for Pennsy modelers, as they produce many PRR-design freight cars no other manufacturers offer. Accurail kits make up over half my freight car fleet. Their newer 36' boxcars are really nice. I also use some InterMountain/Red Caboose models such as the flat car featured here.

I have included cast resin models built by Bob Chapman and Eric Hansmann, but I am not going to delve into the steps to build resin kits. I will save that for another time. Refer to Eric's



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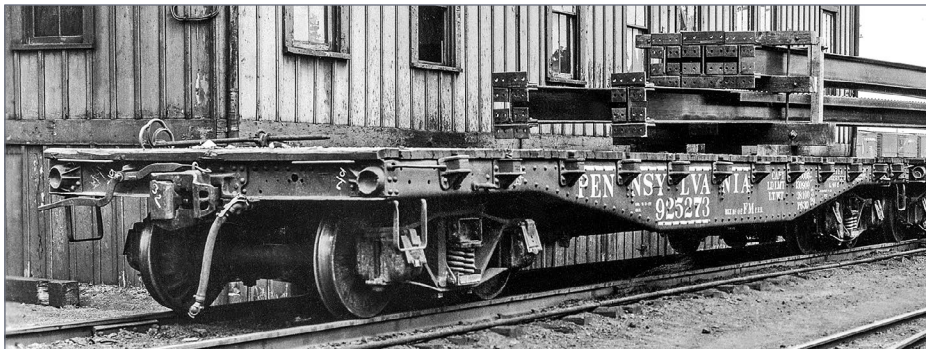
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blog (designbuildop.hansmanns.org) for detail on building resin kits. You can also refer to *B&O Modeler* No. 48 (borhs.org/modelermag/index.html) for Bob's article on building his B&O P-11 flat car model. His work includes many photos and step-by-step instructions for building the kit.

PRR FM AND B&O P-11 FLAT CARS

PRR rostered 3,661 FM class flat cars built between 1902 and 1913 [1-3]. The cars were originally equipped with PRR class 2D-F1 arch bar trucks. Bowser offers an excellent model of this truck.

Growing up a little over a mile from the Baltimore & Ohio Railroad in Lorain, Ohio, I have long viewed the B&O as a profitable and historic railroad. In reality it had its share of hard times and bankruptcies just like most other railroads. As a result, in 1901, just as it was coming out of bankruptcy, the Pennsylvania Railroad gained control of the B&O.



1. PRR 925273 was built in 10/02 as a class FM flat car. The weigh date stencil seems to read 5-29. Weigh dates can help pinpoint the photo date. Steel cars like this flat car were to be weighed every three years, so this photo was taken no later than 1932. Note the brake wheel and staff lying on the deck above the coupler. Do you see the chalk marks on the car end beside the poling pocket? *Eric Hansmann collection*



2. PRR 925187 was also built in 10/02 as a class FM flat car. The weigh date stencil is 6-31. The side sills offered little room for lettering or graphics. While the date is 1931 or later, this flat car still rides on arch bar trucks. The brake wheel and staff are in the upright position at the right. *Eric Hansmann collection*



3. The Pittsburgh, Cincinnati, Chicago, and St. Louis Railroad, known as the Panhandle Route, was a major component of the Pennsylvania Railroad's "Lines West." This is a PRR class FM flat car. In this as-built 1902 image, the early PRR designed FM cars had a brake wheel at each end of the car. *Eric Hansmann collection*



4. PRR 925129 is a factory-painted Red Caboose model sold by InterMountain. It doesn't follow the FM design exactly but can be a decent stand-in model. The color and lettering are close to the prototype appearance. I replaced the trucks with Bowser arch bar trucks.

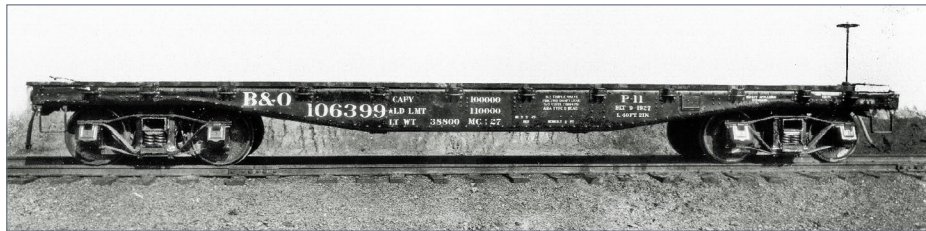


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During this time, the B&O added a few freight cars and 2-8-0 locomotives that followed PRR designs. The B&O P-11 class flat cars followed the PRR FM car design [5-7]. The B&O bought 700 of the P-11 flat cars from American Car & Foundry in 1902-03.

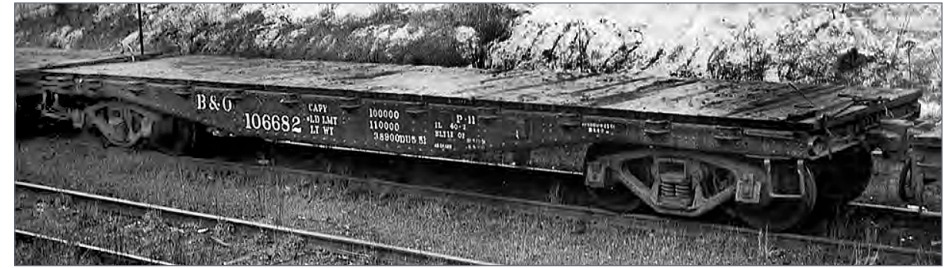


5. Here's an interesting load to model. B&O P-11 flat car #106352 is delivering a streetcar in this photo from the 1905-1910 era. It looks like it's been awhile since it visited the paint shop. There is a paint-out and some chalk marks. *Ray Breyer collection*



6. Here is B&O 106399, a P-11 flat car built in 1902. The car wears a tiny stencil with a rebuilt date of 8-27. Note there is only one tall brake staff. The arch bar trucks are similar to the PRR 2D-F1 arch bar trucks. *Ray Breyer collection*

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7. The deck of B&O 106682 P-11 is in rough shape in this photo taken at Chicago Junction, Ohio. The car has a 5-51 weigh date stencil. It's preceded by DU, signifying the scale location of DuBois, Pennsylvania.



8. Eric Hansmann built this HO scale model of a B&O P-11 flat car (106002-106699 series) from a Funaro & Camerlengo resin kit. He installed Tahoe Model Works arch bar trucks and Hi-Tech Details air hoses. *Eric Hansmann photo*



9. This Funaro & Camerlengo B&O P-11 model was built by Bob Chapman. Bob says that the F&C resin kit of the B&O P-11 is an excellent model to build as your first resin kit. *Bob Chapman photo*



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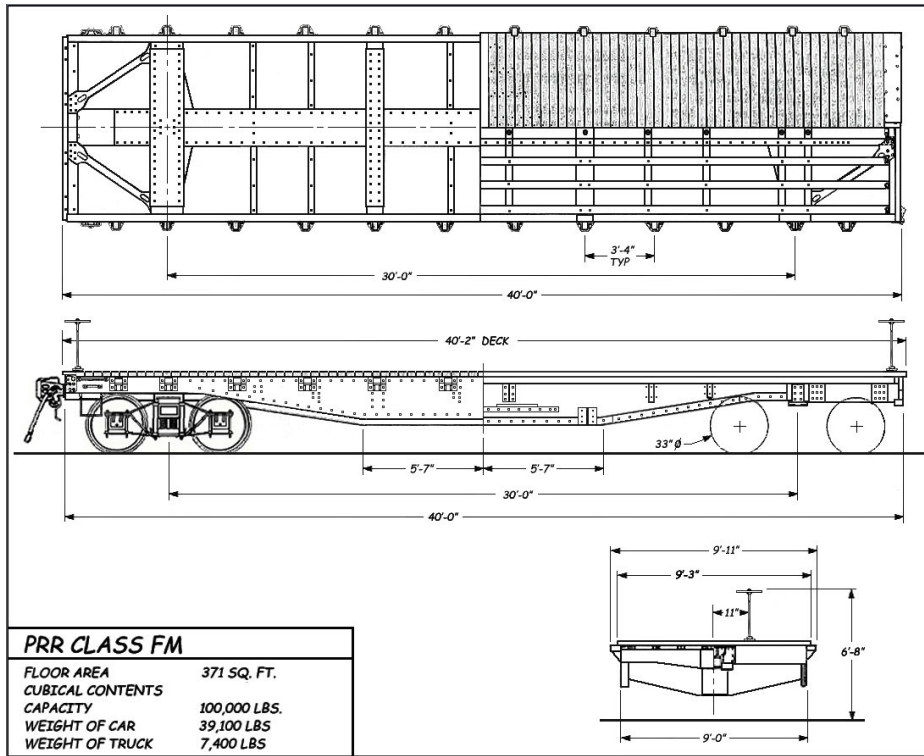
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10. While this is a drawing of the PRR FM flat car, the B&O P-11 was built to this design. *Jim Six drawing*

PENNSY GR AND GRA COMPOSITE GONDOLAS

The Pennsylvania Railroad had more gondola cars than any other railroad. They built thousands of GR [11, 13] and GRA [12] class composite gondolas.

Starting in 1902, the Pennsy added 16,151 GR class gondolas to their fleet. These had drop ends and were vital in transporting steel shapes of all sizes. The GRA design was an improvement on the GR cars, in order to accommodate longer steel components like 39' rails. From 1907 to 1916, 14,126 GRA class gondolas were added to the fleet.

Both the GR and GRA designs proved durable, with many in revenue service into the early 1960s. Many more served as maintenance fleet soldiers into the Penn Central years. Gondolas were the pickup trucks of the rails, and often hauled coal, coke, and iron ore, in addition to steel components and lumber.

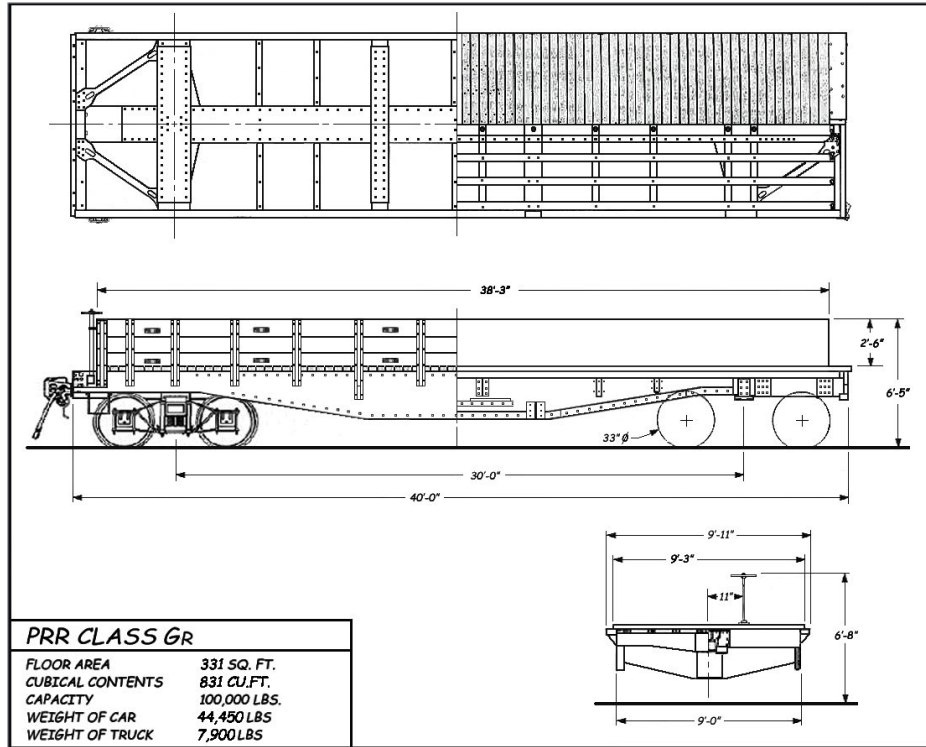


11. PRR 283410 bears a 7-44 weigh date stencil. The GR class gondolas had an inside length of 37'-8" and an outside length of 40'. *Steam Era Freight Cars gallery*



12. PRR 859010 is a GRA class car photographed in June 1939. With a 40'-8" inside length, the GRA design was a stretched version of the GR. More than 14,000 were built through 1916. The original trucks on 859010 have been replaced with PRR 2D-F2 cast steel side frame trucks. These cars also had brackets to support wood stakes for extended height loads. *Hagley Museum collection*



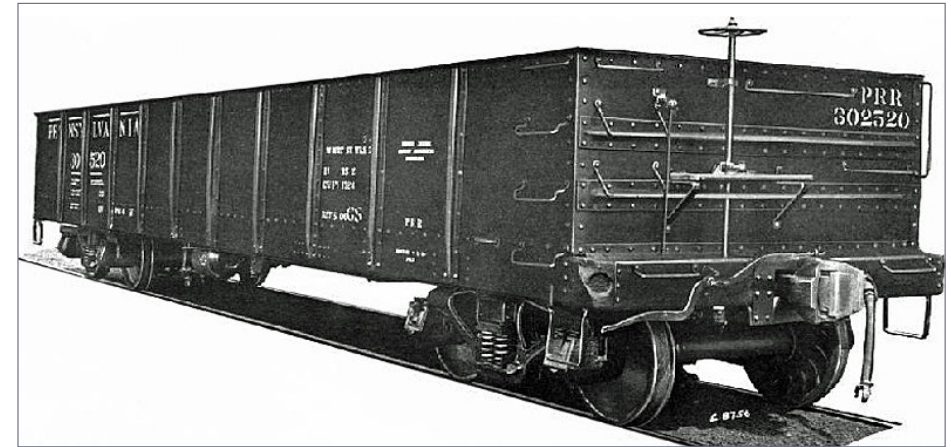


13. Drawing of PRR GR class gondola, based upon the as-built appearance. *Jim Six drawing*

PENNSY GS ALL-STEEL GONDOLAS

As good as the composite gondolas were, the PRR desired an all-steel design. Starting in 1902 the railroad began building GS class all-steel gondolas, adding 32,700 cars between 1902 to 1909. The GS cars had fixed ends and tight steel floors [14]. Approximately 26,000 remained in service in 1945, becoming the most numerous PRR gondolas through WW2. It is interesting that the GS production stopped in 1909 while production of GRA cars continued to 1916. Keep in mind, approximately 30,000 total GR and GRA class gondolas were built.

As with the PRR class FM flat cars, the earlier GS gondolas were built with PRR class 2D-F1 arch bar trucks, which Bowser offers in HO scale. Rebuilt GS gondolas were outfitted with the cast steel side frame 2D-F8 PRR trucks, and some received Pennsy 2D-F2 Crown trucks.



14. This lettering scheme was implemented in May of 1926. The weigh date stencil is unreadable, but this car may have been recently rebuilt. The original arch bar trucks have been replaced with cast-steel side frame 2D-F2 trucks and the brake staff has been repositioned. Many original GS gondolas had the brake staff installed to the right of the coupler, as does the Bowser model. *Hagley Museum collection*

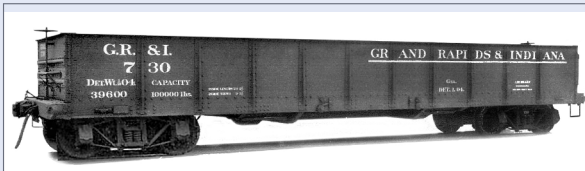


SUBCLASS VARIATIONS BY *ERIC HANSMANN*

Many railroads made modifications to a freight car design to produce rolling stock similar to the original design but with a slightly different class designation, often noted as a subclass. The Pennsy GS gondola is a great example to illustrate subclasses.

Overall, there were eight GS subclasses but only six were produced. GSA cars [15] had drop doors to ease unloading of aggregate materials. Over the years, modelers have referred to the doors on these cars as clamshell doors, as they opened like the shells of a clam. 8,751 GSA cars were originally built.

GSC cars also had drop doors like the GSA gondolas, but they also had drop ends for use in the mill trade. It was a small subclass, with only 101 cars built.



15. The Grand Rapids & Indiana was a subsidiary of the PRR Lines West. GR&I 730 was built

to the GSA design in January 1904. The lettering scheme lasted well into the 1920s on many GR&I cars. The trucks were PRR 2D-F1 arch bar trucks and the car has drop doors. The door-release hardware can be seen on the side sill. The as-built configuration lacks the extra grabs and sill steps mandated by the 1911 amendment to the Safety Appliance Act. Brake wheels at each end of the car are mounted to the right of the couplers. This location was shifted to the left of the couplers as cars were upgraded. *Ray Breyer collection*

The GSD class had fixed ends and drop doors like the GSA cars, but the open area had a slight slope [16]. This was a large subclass with 22,516 cars built. Many of these served as coke haulers with the addition of slatted wood extensions to increase the carrying capacity. These racks were in use until early 1931. The GSD cars were rebuilt to GS or GSH designs.

In the 1940s, the PRR rebuilt GS cars with different features for additional subclasses. A single car was built to the GSG specifications with a wood plank floor. The GSH cars were more numerous with 914 cars rebuilt in 1944 [17].

Subtle hardware details distinguished the subclasses. The GSB and GSF subclasses were designed but not built.



16. This GSD gondola has seen years of service. The photo is dated June 17, 1939, and the car has had a few updates with cast-

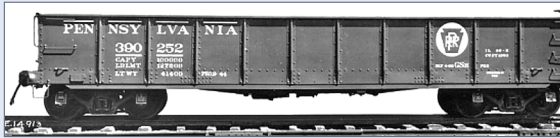
steel side frame 2D-F2 trucks, a repositioned brake staff to the left of the coupler, and the circle keystone emblem applied. The original KD brake components and shallow hoppers remain in place. This version of the GS design had hoppers with clamshell doors. These can barely be seen in the shadow under the car. *Steam Era Freight Cars gallery*

Continued on the next page ...



SUBCLASS VARIATIONS BY *ERIC HANS-MANN* CONTINUED ...

Pennsy car subclasses were used on GL hopppers, X26 and X29 boxcars, and other cars. The B&O also used subclasses to denote differences in several of their car designs.



17. PRR 390252 is a GSH class car and appears fresh out of the shops after

being rebuilt from a worn GS. Reinforcement angles were added along the top and bottom of the car sides. AB brake systems were also installed. This car is an excellent example of the lettering scheme introduced in January 1930 and applied into 1954. ■

MODELING THE GR, GRA, AND GS GONDOLAS

Pennsylvania GS gondola models are available in HO scale. Bowser produces an injection-molded plastic model and Funaro & Camerlengo have HO scale resin kits of the GS and GSH cars. I chose to build a factory-painted Bowser kit. The paint color does not have enough oxide hue to it, but weathering with oxide-colored powder solved this.

The factory paint scheme on my model included the circle keystone scheme that was introduced on January 1, 1930 [19, 20]. Since I focus on 1927, I removed the circle keystones to yield an earlier lettering format that came into use in late 1926. I used a new, sharp, curved X-Acto blade to scrape the emblems off the model.

I decided to carve away the molded-on grab irons and to remove the sill steps. These were replaced with formed-metal steps. Normally I don't do this because a weathered model looks good enough. I wanted to see how much added effort and time this would take. The effort was not a bother and the parts were formed and installed in 30 minutes.



18. Westerfield Models produces HO scale resin kits of PRR GRA gondolas. This nice model features prototype details reflecting a later appearance. I intend to build one to share the construction process. *Westerfield model and photo*



19. The Bowser GS gondola is a shake-the-box kit that includes all parts, wheels, and couplers.



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I wanted the model to be accurate within reason, so I swapped the trucks with Bowser arch bar trucks which follow the PRR 2D-F1 truck design. I installed metal wheel sets and Kadee #153 short-shank scale couplers. The AB brake components were replaced with Accurail K brake castings. After I assembled the gondola, I applied weathering. I also added a few chalk marks that were custom decals I had made from prototype photos. You can see the chalk marks in a close study of my PRR 860083 [21].

My weathering starts with lightly spraying the trucks with PRR Freight Car Color (FCC) then over-spraying with a grimy railroad tie color to leave a little of the FCC showing. Next, the underside of the model was sprayed with this same railroad tie color. I weather the body with a coating of oxide-colored powder applied with a cotton swab dipped in decal setting solution. The powder wipes off like a wash in top-to-bottom strokes on the car sides [22, 23].



20. The body color is a browner shade than the prototype. Newer Bowser releases have a corrected color. I think I purchased the model at least 10 years ago. This model wears the circle keystone that was introduced in January 1930.

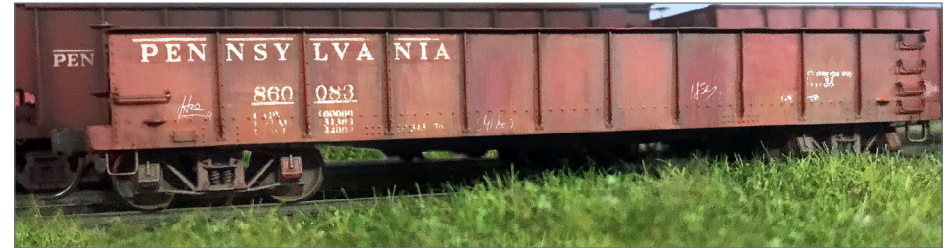


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21. PRR 860083 is the Bowser GS gondola model. The PRR freight car color (FCC) painted onto the trucks is barely visible under the weathering road grime. I added separate grab irons and new sill steps, before applying the weathering. The weathering shifts the Bowser paint color for a used appearance. The decal setting fluid turns the powder into a wash and permanently affixes it to the model.



22. I often keep the factory-painted lettering intact on these Bowser models. After removing the circle keystone, the lettering represents a scheme the Pennsy began using in late 1926. The kit trucks were replaced with Bowser arch bar trucks. I bent my own iron by forming the individual wire grab irons. New sill steps were also installed. Weathering was applied and I added chalk marks. I weathered and shaded the individual side panels for added realism.



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RESOURCES

The Pennsylvania Railroad Technical & Historical Society has published two books on PRR flat cars and gondolas with comprehensive information and photos. These volumes are great modeling resources and were consulted for prototype data in this column. Check the PRRT&HS website for availability (www.prrths.com).



23. Here's the same view as [22] but with all color removed. Since the prototype photos are black-and-white, I thought this would provide a better comparison of the model with the prototype. What do you think?



24. Here is an Accurail gondola factory-painted as a PRR GSH class gondola. Prototype guys will snicker because it is not a PRR GS gondola. Instead, it accurately models ACL, MEC, and W&LE gondolas. Many model railroaders use it as a stand-in for Pennsy GS gons. The length is close and the number of side panels is the same as the GS design, but the inside height is a little taller. I built this model when I was modeling 1954 and was not much of a prototype nitpicker.

Pennsylvania Railroad Flat Cars – Revenue & Work Equipment, 1881 to 1968 by Elden Gatwood & Al Buchan

Pennsylvania Railroad Gondolas – Revenue & Work Equipment, 1869 to 1968 by Al Buchan and Elden Gatwood ☒

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what they're
missing by not
being a Running
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25. A Lorain Ashland & Southern (PRR) train slowly rolls south out of Lorain, Ohio, past Becko's coal yard in 1927. The train has just crossed Broadway Avenue and the locomotive is already alongside Elmwood Cemetery. The cabin car is Walthers, the flat car is Red Caboose, and the hoppers and gon are Bowser models. All the freight cars and the cabin car in this photo have been featured in our Limited Modeler column this year.





1. This is the original storage unit I built in 1982 for a prior workshop to store stripwood and styrene strips. The small stickers listing the sizes were hard to read.

reasonably well there. When I built my current workshop, I bolted that to the underside of my workbench, where it was in easy reach. [1]

But having it under the workbench created several new problems. It was difficult to see the material labels on the sides of each bin from my chair. I needed to get off my chair and bend down to find the size of styrene I wanted. There was no easy way to sort and store cut-off pieces of styrene. Since I only occasionally use stripwood and keep it in its original packaging, I only needed enough openings to organize my styrene strips.

My solution was to build a new plywood cabinet to bolt under my workbench in place of the original, with sliding shelves and organizer bins in place of the pigeonhole openings [2]. I used 1/2" plywood to build the outside of the cabinet box, and used



2. I mounted my current styrene storage unit in place of the old one, under and to the side of my workbench. The gray drawers above the unit are for tools.

Styrene Storage Cabinets

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JACK BURGESS DEMONSTRATES HIS SOLUTION FOR SORTING AND STORING STRIP STYRENE CONVENIENTLY UNDER HIS WORKBENCH ...

BILL OBENAUF HAD AN INTERESTING ARTICLE IN THE OCTOBER 2019 issue of *MRH Running Extra* about his stripwood organizer. I constructed a similar storage cabinet several years ago for both styrene strips and stripwood. I used pressboard to create a grid of 100 pigeonhole openings for those materials. I mounted it on a shelf at eye level in my former workshop. It worked



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1/4" pressboard – one popular brand is Masonite – to build the shelves and supports.

I built shelves 16-1/4" wide by 21" deep and spaced them 2-3/4" apart. I used 2-7/16" strips of pressboard for the shelf supports, which I nailed to the sides of the plywood box. This made for slightly more than 1/4" spacing between the supports to allow the shelves to easily slide in and out. I screwed five Rubbermaid 15x3x2 drawer organizers to each shelf. Five shelves with five organizers each yielded space for 25 different styles of styrene. This was enough to store all the available HO scale Evergreen styrene strips from 1x2s through 6x12s.

I placed labels on the shelf in front of each organizer listing the size of styrene it contained. [3] I put another label inside each

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4. Labels in each drawer organizer show the size of styrene in that tray plus the actual size of those strips.



3. Each pull-out drawer has labels to denote the size of styrene in each drawer organizer.



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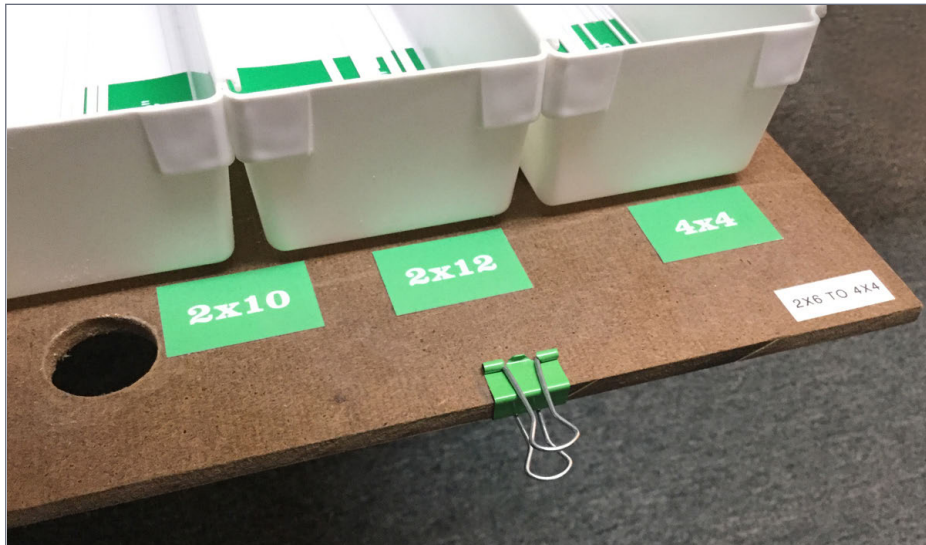
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STYRENE STORAGE CABINETS | 5

organizer to confirm the size of the styrene and to denote the actual strip size as copied from the Evergreen website. [4] I also make it a habit to put cut strips on the left side of the tray and uncut pieces on the right. This makes it easier to pick up the length of styrene I need for a project.

When I am working on a project and need a specific size of strip styrene, I sometimes forget where it came from later on. To help me remember, I added a binder clip on each drawer that I can move to align with the tray from which I removed a particular piece of strip styrene. [5] This makes it easy to put it back in the correct tray.

When I am working on a modeling project, I can now look down and see the size labels for each drawer, making it easy to pull out the correct drawer and get the exact piece of styrene I need. In addition, this system makes it easy to monitor the number of strips in each tray so I can order more as my supply gets low. ☒



5. Each drawer has a binder clip I can move to line up with the size styrene I am currently using.

STYRENE STORAGE CABINETS | 6

JACK BURGESS



Jack Burgess has pursued his passion, the Yosemite Valley Railroad, for more than 50 years and actually finished his HO layout in 2011 after 31 years of effort.

With the layout finished Jack has been working toward a goal of modeling every locomotive, freight car, passenger car, Maintenance of Way car, and caboose on the prototype in August 1939, the month/year that he models. His model of this railroad is known around the world for its dedication to following its prototype as exactly as possible. ■



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1. My above-ground diesel fuel storage tank.



article. This issue got me interested in model railroading. The original article's storage tank was meant for a branch line. No matter; I could update it for a modern big railroading setting. I liked the idea of using an old tank car body.

START WITH A TANK CAR

As with the original *RMC* article, I started with an old Athearn blue-box 40' tank car. I picked up one at a flea market several years earlier for just this purpose. My rationale for a used tank car is that the railway brass felt, why purchase a new tank if a perfectly good used car tank body would work instead?

I removed the following from the car:

- trucks
- couplers
- frame
- expansion dome platform and handrails
- ladder
- handrails
- handrail supports

At this point, I had just the tank left. I filled all the holes with body putty, and sanded them smooth when dry.

I added three new tank saddles and a new platform grate to the stripped tank car [2]. Unless otherwise noted, I used Testors plastic cement.

I glued on three Plastruct VS-36 tank saddles [2]. I made sure to use the correct size for the tank body, since they come in several sizes.

Diesel fuel storage for your loco servicing area

MRH Running Extra | September 2020

JULIUS OLAJOS KITBASHES AN OLD TANK CAR INTO AN ABOVE-GROUND DIESEL STORAGE TANK ...

MY LAYOUT, the Durham & Western, has several diesel locomotives, and I wanted a place to have them refueled. I decided to kitbash an elevated diesel storage tank for my locomotive servicing area.

This service area hosts my home road, as well as the Canadian National and a steel mill on my layout, the Laurentian Steel Co. That makes this a busy location.

The April 1975 *Railroad Model Craftsman (RMC)* magazine inspired this project with a scratchbuilt fuel storage tank



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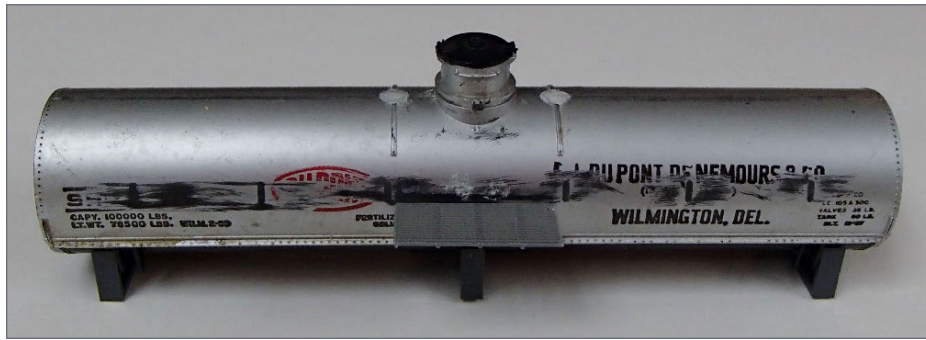
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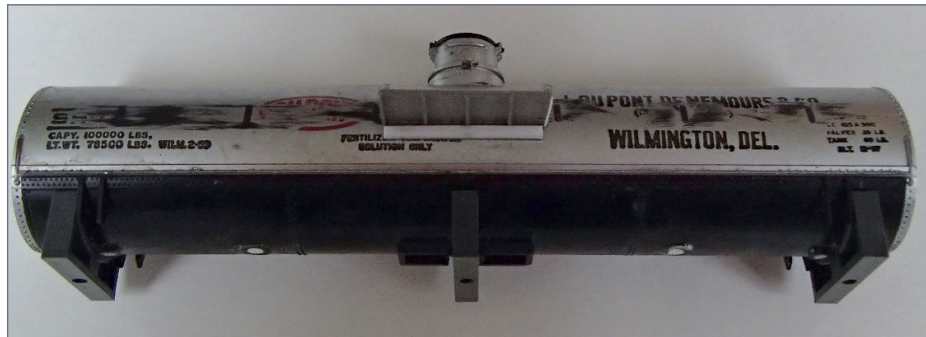
DIESEL FUEL STORAGE | 3

I used epoxy glue for this because Plastruct makes the tank saddles from ABS. I also installed 1" of Tichy open-grate platform material by first gluing a 1" x 0.060" x 0.060" styrene strip for support about 3/4 of the way up the tank side. I just eyeballed the location to what looked good [3].

I also added the handrails from the Tichy grate to the platform – I cut them to fit, and added some ladder and cage that comes with the platform grate. [4].

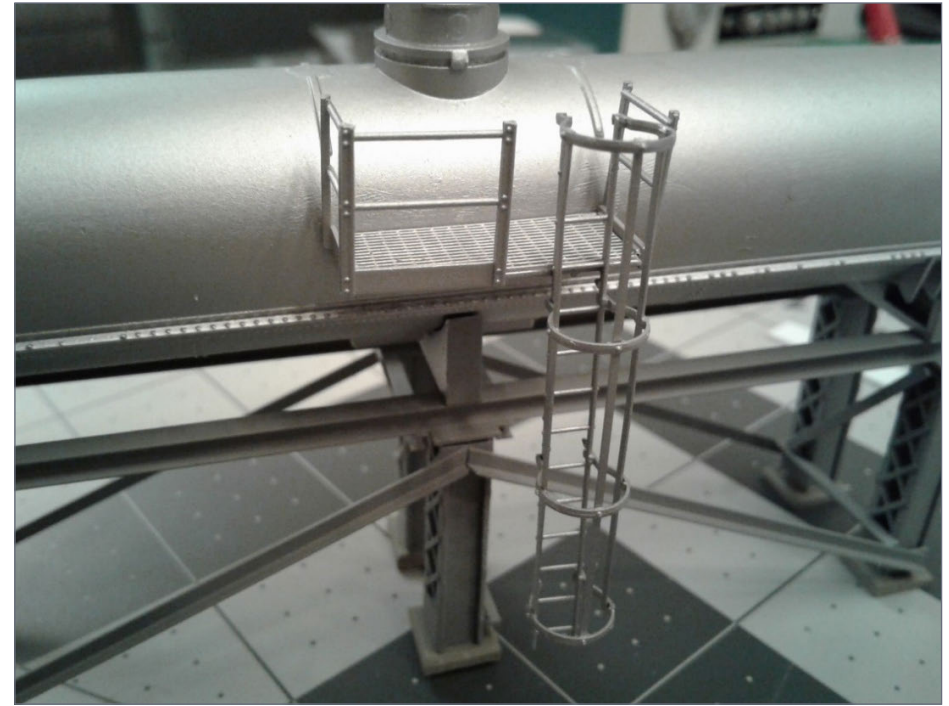


2. My stripped Athearn blue-box 40' tank car with three new tank saddles and a new platform grate.



3. Styrene strip support for the platform grate.

DIESEL FUEL STORAGE | 4



4. Platform details that come with the grate: handrails, ladder, and cage.

THE SUPPORT FRAME

I next turned my attention to the support frame. I made this from several Evergreen styrene I-beam shapes.

For the support legs, I used pieces of Micro Engineering City Viaduct laced bridge girders from my scrap box. I don't believe these are sold separately, but Central Valley does sell laced bridged girders separately, which could be used instead.

I made six 1-1/4"-long support legs.



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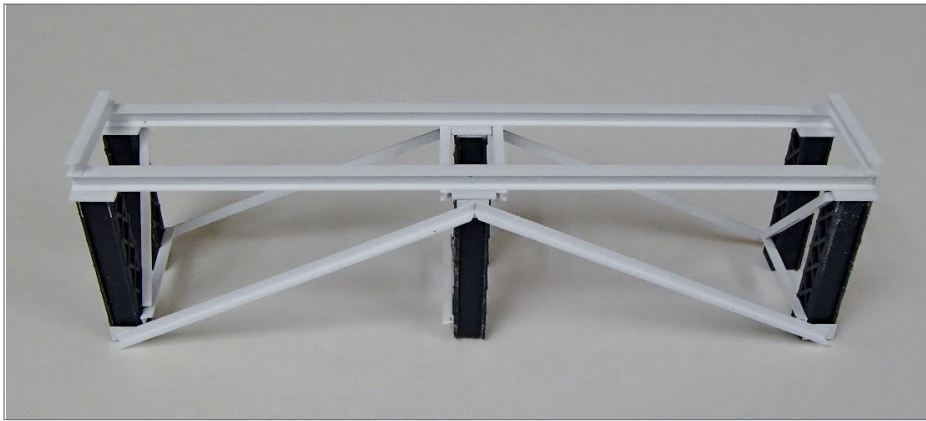
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DIESEL FUEL STORAGE | 5

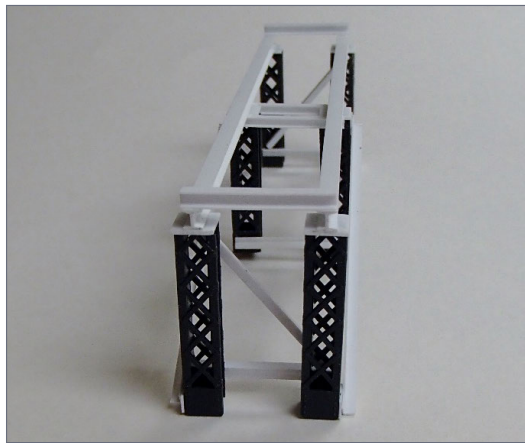
I glued on a piece of $1/4'' \times 1/4'' \times 0.030''$ styrene onto the top of each support leg to act as a mounting plate [5].

Next came the H-beam main frame. I cut two pieces of $0.125''$ H-beam $5-1/4''$ long and glued them to the tops of the support legs [5].

Once this assembly dried, I cut two pieces of $0.100''$ H-beam $7/8''$ long and glued them perpendicularly on top of the ends of the previous H-Beams [6].



5. Tank support frame, side view.



6. Tank support frame, end view.



DIESEL FUEL STORAGE | 6

I next cut three pieces of $0.100''$ angle $1''$ long and glued them crosswise $3/8''$ up from the bottom of the support legs to ensure that the support legs were spaced equally [7].

For extra stability, I added $0.100''$ angles as diagonal braces, both along the length, and also across the width at the legs.

To complete the frame, I cut two pieces of $0.060''$ H-beam $1''$ long to fit crosswise at the top of the middle legs. I glued these underneath the main H-beams [8].

As a result, I had a stable frame for my above-ground fuel tank.



7. Tank support frame, bottom view.



8. Tank support frame, top view.



J. Fugate

JUSTIFYING BRIDGE LACED GIRDER SUPPORTS

At first glance, using laced bridge girder supports may seem like an expensive overkill to support this tank.

But hold on.

My dad ran a scrap-iron business, and he had a big pile of these laced bridge girders in his scrap collection, many still in quite good shape (although they could use fresh paint).

If you think about it, any time an old bridge is replaced, or if a flood takes out a bridge, somebody has to haul off the old bridge members – and my dad was that guy in several cases. So there you go: extra-sturdy tank supports for next to nothing!

I can easily see a super-frugal railroad using scrap laced bridge girders together with an old tank car to cobble together a budget above-ground diesel storage tank just like Julius shows.

FINISHING THE TANK

I added a couple of details to complete the tank.

I added an overflow spout at the top of the tank. I used 1/32" diameter wire 1" long and bent into a gooseneck. I drilled a 1/32" hole in one end at the top of the tank to install it [9].

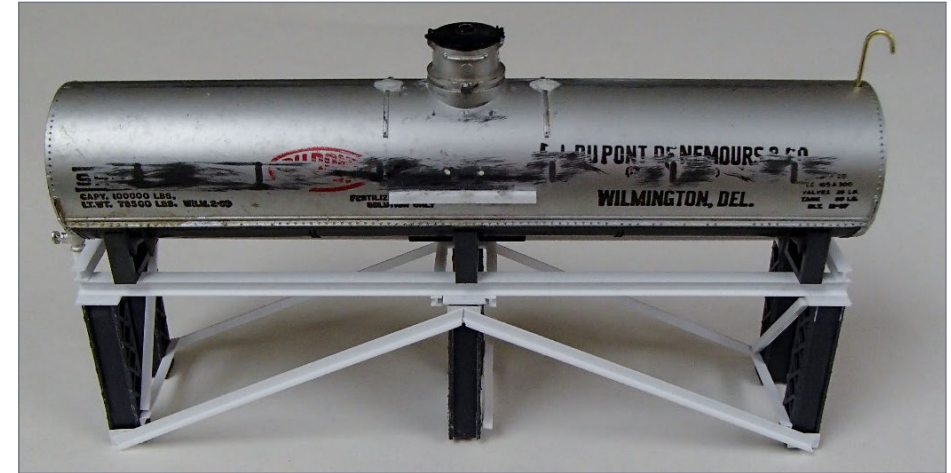
I also added a drain valve at the bottom of the other end of the tank to feed to the fuel dispensing area next to the track.

I used 1/8" tubing and a valve from a Walthers Piping Kit [10].

I assembled the safety cage ladder per the Tichy instructions and glued it to the platform. I cut it 2-1/8" long [11, 1].

I did not add a fill pipe to this model, as I surmised the tank gets filled through the dome next to the platform.

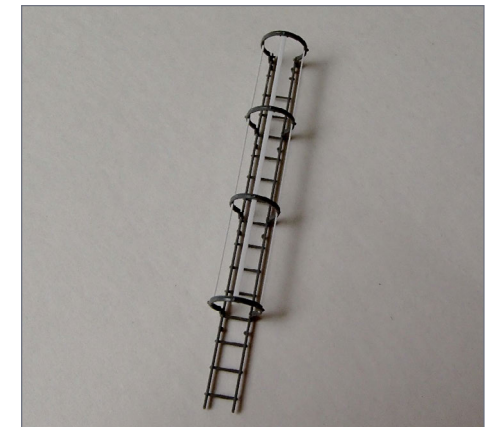
I added concrete footings to the bottom of each support leg out of 3/8" x 3/8" x 0.125" styrene with the edges beveled. I glued one to the bottom of each leg.



9. Goose-neck overflow pipe added at one end of the tank.



10. Drain valve to feed the diesel fuel out to the fueling station next to the track.



11. Assembled Tichy safety cage ladder.



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PAINTING

Next came painting the frame and tank. Older tanks generally were painted black, while modern ones were painted silver to reflect heat from the sun. You can find tanks painted in many different colors if you do a photo search online.

I chose to paint the frame a medium gray and the tank silver. I just used a good quality rattle can spray paint for this.

I also painted the concrete footings a concrete color.

MOUNTING AND WEATHERING

As the final step, I attached the tank to the frame. I centered the tank car body on the frame and attached it using epoxy.

Next, I weathered the tank with powdered chalks to add rust, dust, dirt, and oil stains, followed by a thin spray of grimy black over the entire model.

Lastly, I added decals to complete the model.

I placed the storage tank in the service area of my layout; it still needs finished scenery.

An appropriate detail for a more modern layout would be to make a concrete dam around the perimeter of the tank to hold any inadvertent spills.

This little project made an interesting lineside item that most railways with diesel locomotives require – either underground or above ground. ☑

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J. Fugate
what goes next to the track where the
fueling takes place?

WHAT GOES NEXT TO THE TRACK?

Once you have this
above-ground diesel
storage tank installed,



One detail set that seems like a good fit
with this tank comes from Woodland Scenics.

Visit this link for a shopping list [mrhmag.com/magazine/running-extra/2020-09/diesel-tank] with where to buy this detailing kit.

JULIUS OLAJOS

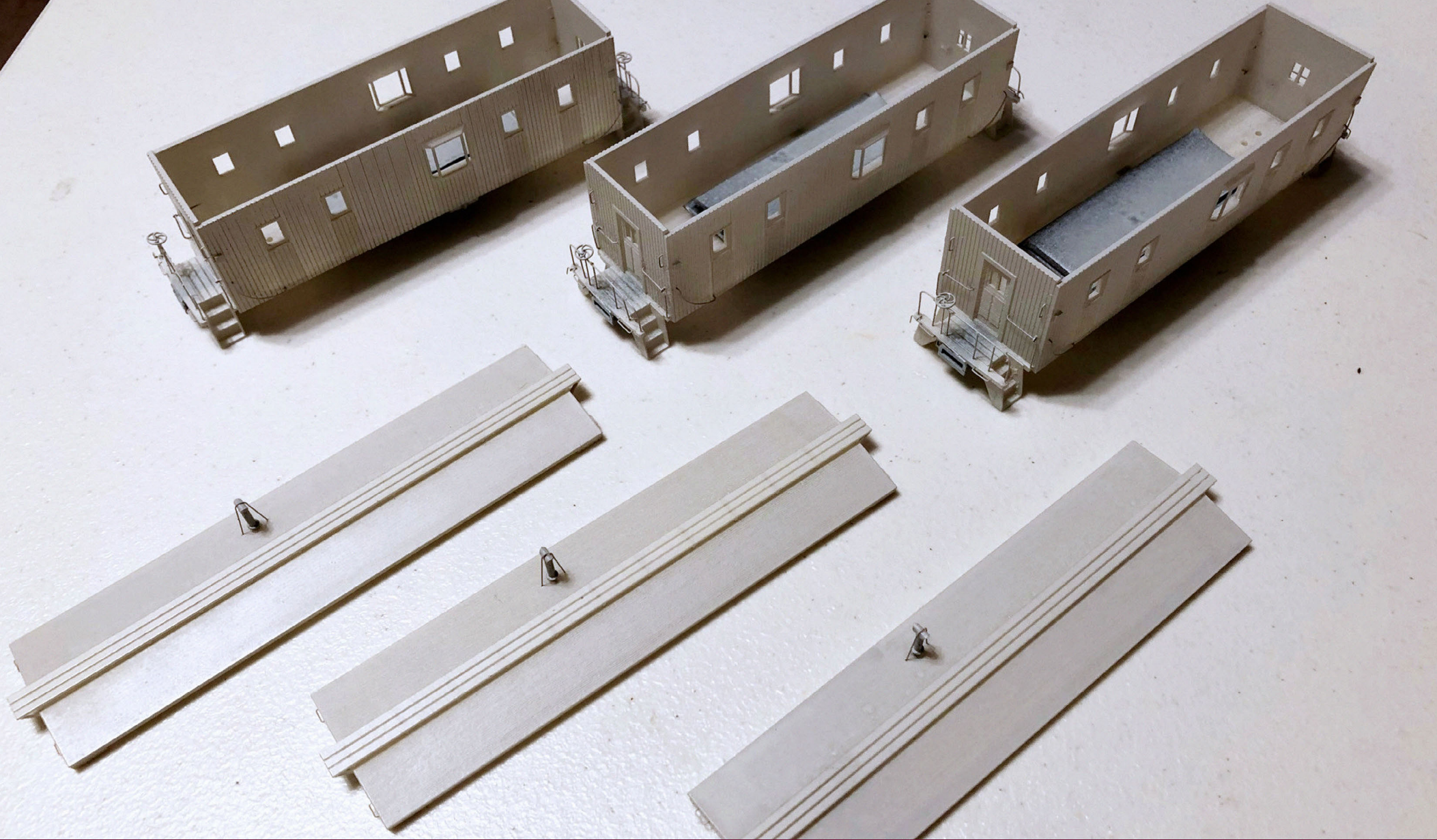


Julius was introduced to the hobby of model trains when his parents gave him a trainset at the age of four. When he was 14 years old, he came across Gil Freitag's *Stony Creek & Western* in the April, 1975 issue of *Railroad Model Craftsman*. He has been captivated by trains, both real and modeled, ever since.

He is building a 13' x 13' layout with a fictional railway theme called the Durham & Western RR. This layout features a steel mill (Laurentian Steel), complete with a blast furnace and Basic Oxygen Furnace. It also hosts Canadian National trains for interchange.

Julius is thinking of retiring from the engineering field so that he can devote more time to his layout and spend more time at the Waterloo Region Model Railroad Club developing their CTC system. ■





3D Printing a signature C&EI caboose

DAVE FORBES AND DOUG FORBES BUILD
THESE UNIQUE CABOOSES USING 3D PRINTING ...



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3D PRINTING A C&EI CABOOSE | 2

MRH Running Extra | September 2020



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EACH PROTOTYPE RAILROAD UTILIZED

EQUIPMENT THAT WAS UNIQUE TO THAT particular railroad. The modeling community often references models of such unique equipment as signature models, which can set the tone for time and place on a model railroad. Most modelers dream of adding such signature models to their layout.

I, Dave Forbes, model the Chicago & Eastern Illinois Railroad in the 1950s. During World War 2, the C&EI rebuilt 21 boxcars into wooden bay window cabooses at Oaklawn Shops in Danville, Illinois. These cabooses roamed the C&EI system, and therefore I wanted to model one for my HO scale layout.

3D printing

Adding a signature model of your favorite prototype railroad can be a challenge. Model manufacturers cannot profit from spending thousands of dollars on injection molds and labor to produce a model for one railroad that very few people model. So, how are modelers to add a signature model to their collection? With the recent developments of 3D printing, any prototype signature model can now be a reality.

3D printing is a relatively new technology that is increasingly being used by model train hobbyists. It has several advantages over scratchbuilding. The first is time savings. While learning the design process and designing a model in 3D CAD program takes time, the savings versus scratchbuilding is enormous. Efficiency is realized when multiple models can be printed in a fraction of the time required to scratchbuild.

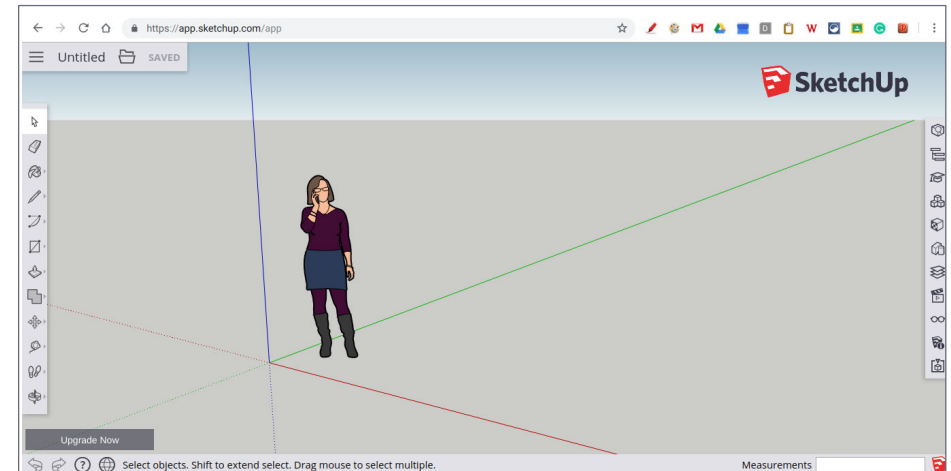
3D PRINTING A C&EI CABOOSE | 3

A second advantage of using 3D printing is to overcome a lack of scratchbuilding skills. While this could be seen as a detriment, modelers wanting a signature model aren't necessarily concerned with how the model is constructed. They want a model for the layout.

The prototype

For me, the signature model of the Chicago & Eastern Illinois Railroad (C&EI), is a war emergency caboose. Numbered in the 490-510 series, these cabooses were built from 1942 to 1944 at the C&EI's Danville Oaklawn Shops. With the wartime restriction on steel, the railroad utilized the 37000 series C&EI boxcars as the core component. Twenty-one cabooses were built in total, with three main variants: a middle bay window, a middle non-bay window, and no middle window.

Fortunately for me, my brother, Doug, had been experimenting with 3D printing!



1. Screenshot from the online SketchUp program at app.sketchup.com/app.



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Doug designs a 3D model

My interest in 3D printing developed when I switched from modeling the Illinois Central to the Illinois Traction System (Illinois Terminal Railroad). While there are many ready-to-run models and kits for the IC, the same cannot be said for the ITS. This was due to their use of unique home-built equipment.

I became interested in 3D printing after researching the ITS and learning about their Rodgers ballast hopper cars. 3D printing became a way for me to create a unique model that is unlikely to be commercially available.

After successfully completing several 3D-printed projects, my brother suggested I design a 3D HO scale model of his signature C&EI caboose [2]. With plans from the C&EI Historical Society archive, the virtual designing could begin.



2. C&EI caboose 510 was photographed by Rick Schroeder in Danville, IL, on July 9th, 1966. Caboose 510 was the last in the series of 21 cabooses and featured the middle bay window.

There are several free 3D modeling programs including SketchUp, Blender, and Fusion 360. SketchUp is the program I'm the most familiar with. There is a free browser version at www.sketchup.com. A free desktop version with more utilities is also available.

SKETCHUP TIPS

Here are some tips I learned while using SketchUp:

1. To scale the actual dimensions in the plans, I used the free Woodland Scenics "Model Scalar App" to convert actual inches to 1:87.1 scale in millimeters.
2. SketchUp doesn't handle curves well so if there are many, I multiply the millimeters by 10 so the circles render better, and then resize the model drawing when finished.
3. A source for learning 3D modeling is YouTube. Search for what you are trying to do, and you can find videos of people demonstrating how to create the files. With the caboose, as with most of my structures, it is a matter of creating a 2D image and then pushing or pulling on it to create a 3D image. ■

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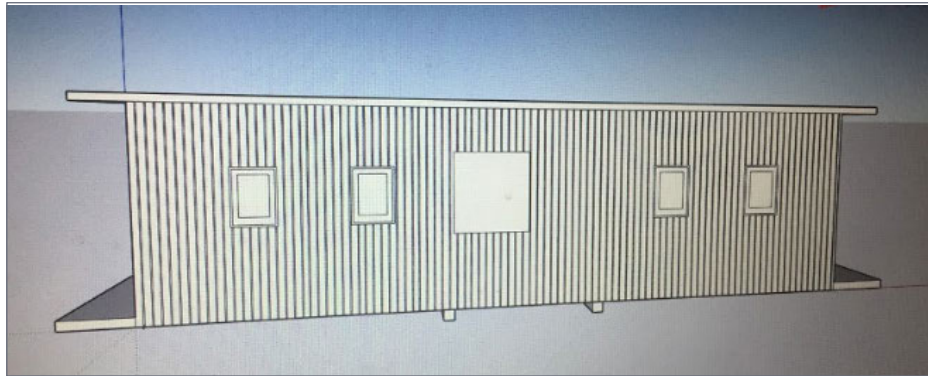
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3D PRINTING A C&EI CABOOSE | 6

The caboose presented a challenge, as we needed either the roof or the floor to be removable for easy interior access to add window glazing, weight, painting, etc. I decided to create a separate roof cap to fit on top of the body as it was easier to design. This way, the same roof can be used to fit all three variants of the caboose.

After the designs were finished, the body and roof files were exported out of SketchUp as .STL files and uploaded to Shapeways. The models can be viewed at Doug's Shapeways store www.shapeways.com/shops/dougforbesshop.

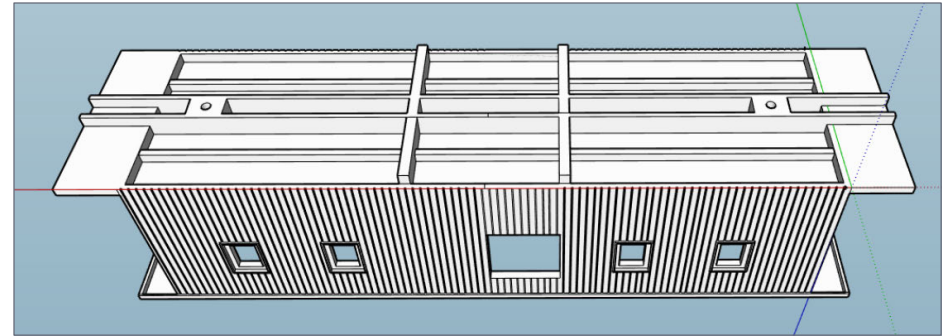
Here's the approximate design sequence we used.



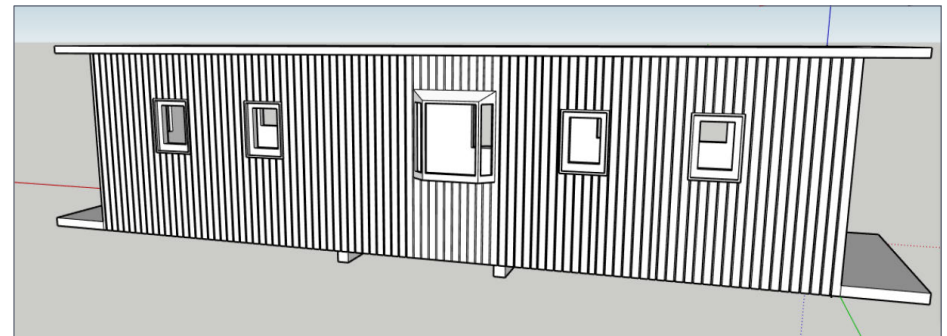
3. The box shape was constructed with the windows and paneling drawn as a flat surface. Then the windows were inserted and the grooves between the boards were pushed in to create the 3D surface.



3D PRINTING A C&EI CABOOSE | 7



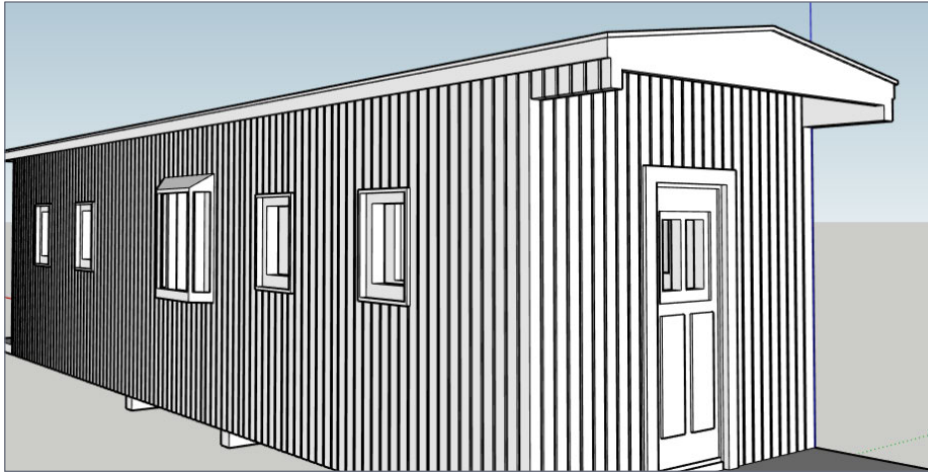
4. The underbody shape was approximated using the prototype that exists at the Westville Depot Museum in Westville, Illinois. Designing the underframe was a simple matter of adding three-dimensional shapes.



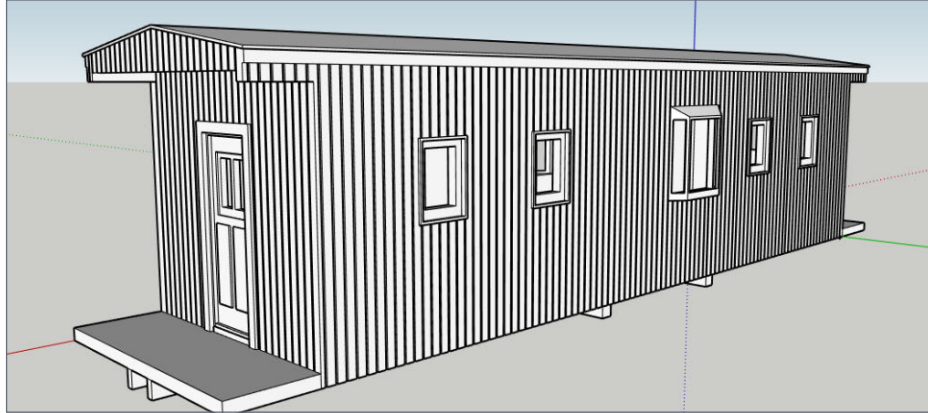
5. The bay window was then drawn in using the minimum thickness of 0.6 mm that Shapeways can print.



3D PRINTING A C&EI CABOOSE | 8



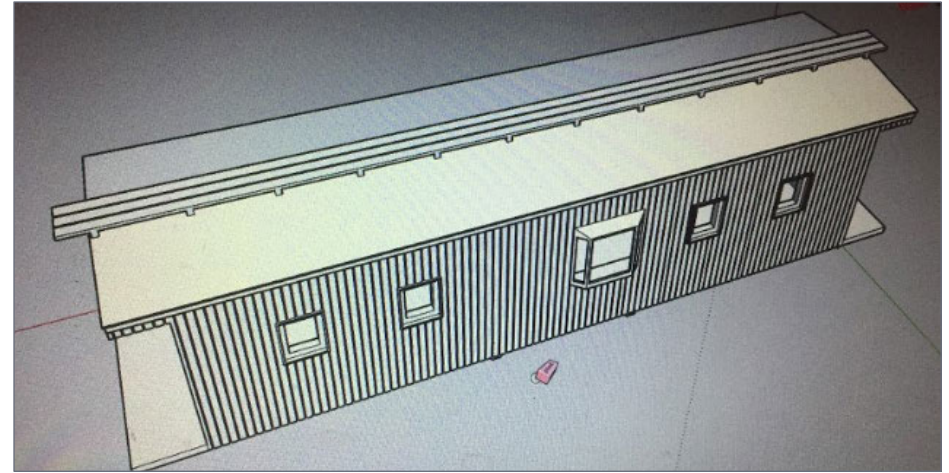
6. The end boards were added with the door. Sketchup has a copy feature that allows for easy design once the utilities are learned.



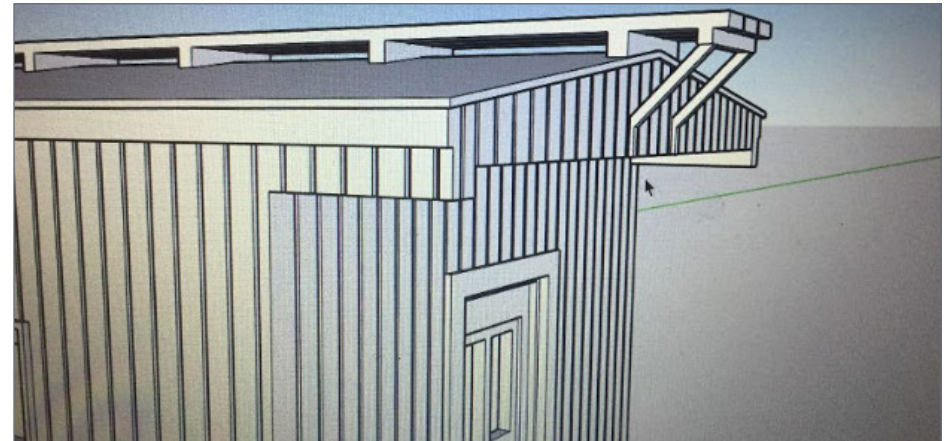
7. The end fascia boards were added separately.



3D PRINTING A C&Ei CABOOSE | 9



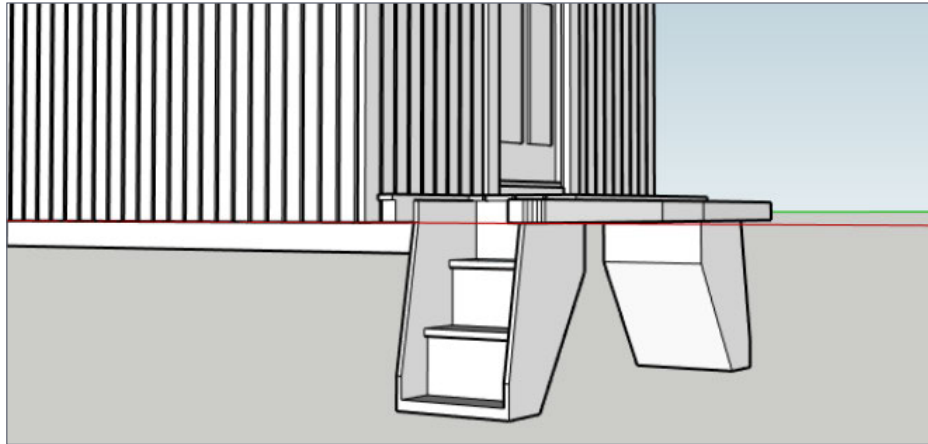
8. The roof walk was added using rectangular box shapes for the supports and the roof walk.



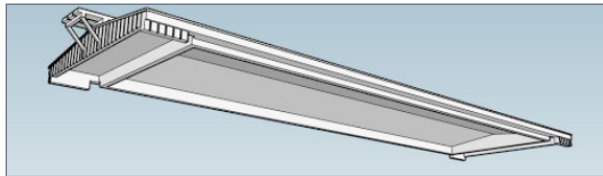
9. The roof walk supports were added. These fine details will print, but you must keep in mind the minimum 0.6 mm printing thickness.



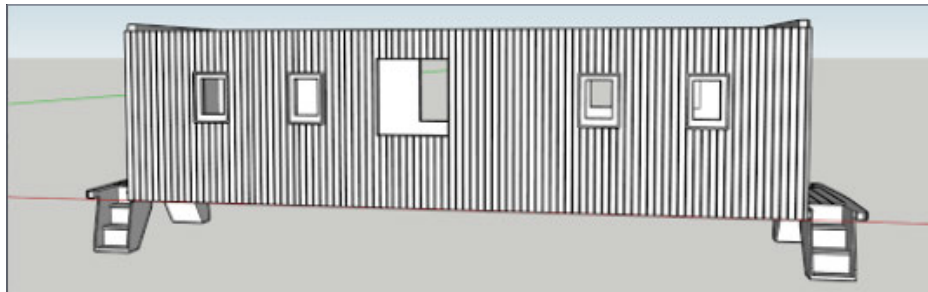
3D PRINTING A C&EI CABOOSE | 10



10. The steps were drawn using dimensional shapes. This is another detail where the minimum 0.6 mm thickness is an important factor.

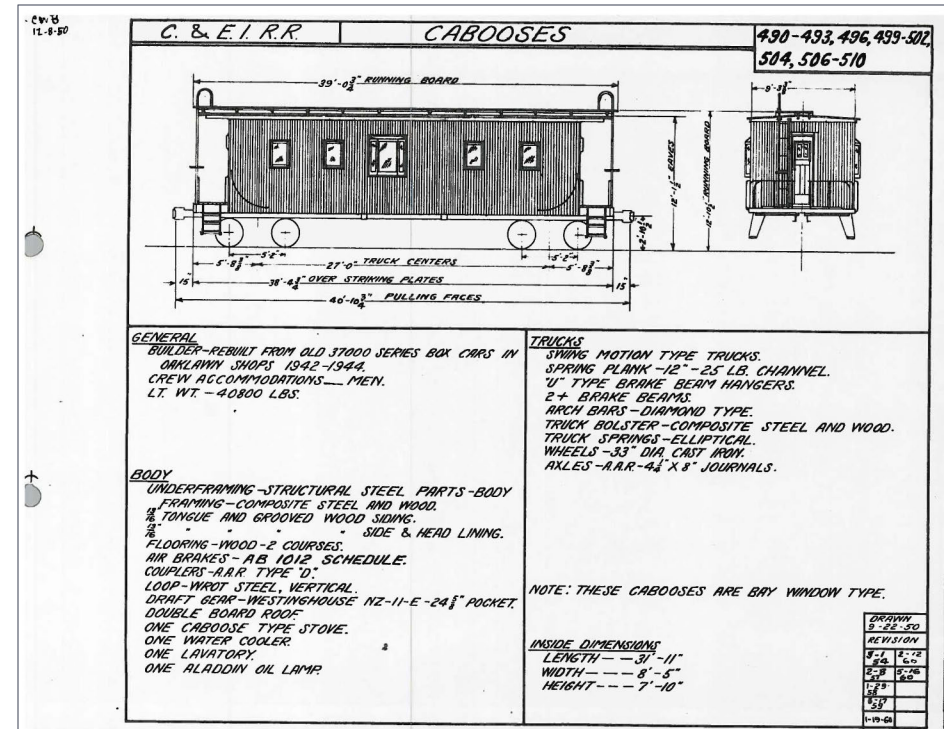


11. The roof was separated from the body and saved as another file so that it could be uploaded to Shapeways as its own product.



12. This is the body drawing with the roof removed. It is easily modified to represent the non-bay window version.

3D PRINTING A C&EI CABOOSE | 11

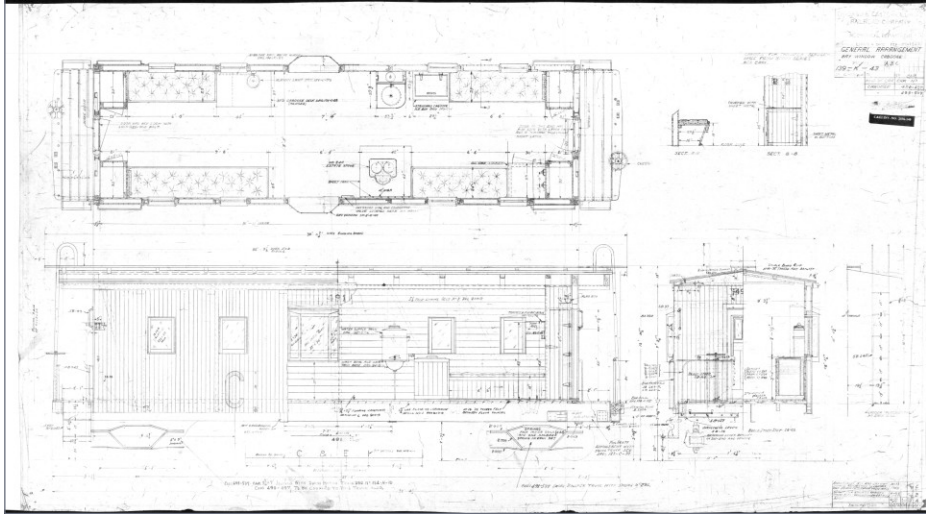


13. The car diagram of C&EI war emergency cabooses 490-510 is helpful for basic dimensions and important prototype hardware, such as arch bar trucks. Railroad historical societies are amazing prototype information resources. This diagram was included in a DVD available from the C&EI Historical Society. It contains almost 900 car diagrams.

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14. This mechanical drawing is also from the C&EI HS. It features more detailed information than the car diagram drawing. Doug used this drawing in creating the files to 3D-print the HO scale model.

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Dave's steps to detail and finish the caboose

STEP 1: WASH THE 3D-PRINTED MODEL PARTS



15. The 3D-printing process leaves a waxy residue film on the model that needs to be cleaned before the model is painted, so the paint will adhere properly. I used Simple Green, a product recommended to clean 3D-printed models. A spray bottle sells on Amazon for \$5.00.



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STEP 1: WASH THE 3D-PRINTED MODEL PARTS



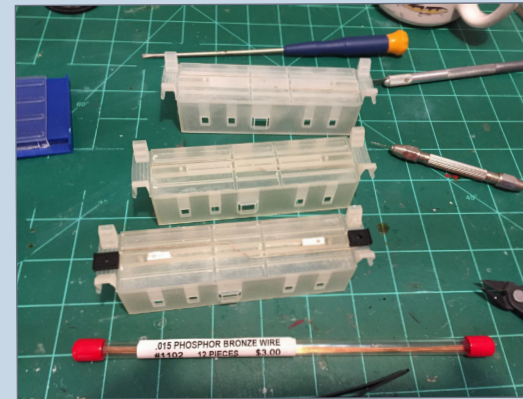
16. The Simple Green product has a green tint. I sprayed the model inside and outside, and let the solution sit on the model for approximately 30 seconds. I used an old toothbrush to scrub the model, making sure to work into all the nooks and crannies. I rinsed the model with warm water and used the brush again to ensure the

model was clean. I followed the same process for the roof.

While the 3D printing process can add fine details, I wanted to add wire grab irons and end railings to ensure the caboose would stand up to the handling that might occur during an operating session. A bill of materials is included at the end of this article.

STEP 2: ADDING UNDERBODY DETAILS

As no known plans for the brake detail of these cabooses exist, a generic AB brake layout was used. From prototype photos, it appears the air reservoir tank was placed under the bay window.



17. The train line was constructed from 0.015" phosphor bronze wire. Holes were drilled through the floor beams to install the wire, and it was secured with cyanoacrylate adhesive (CA).

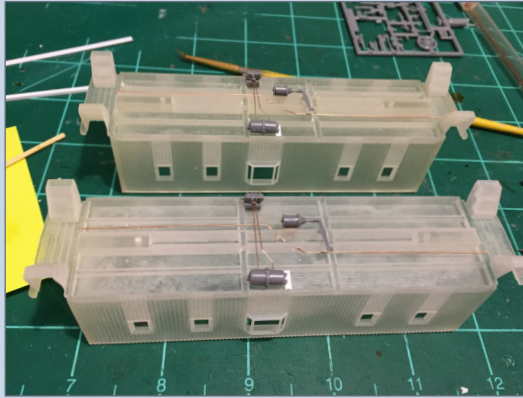


18. The Tichy brake sprue includes castings to recreate prototype brake hardware. Shown here are parts for all three cabooses: brake cylinders are on the left, air reservoirs in the middle, and triple valves on the right.

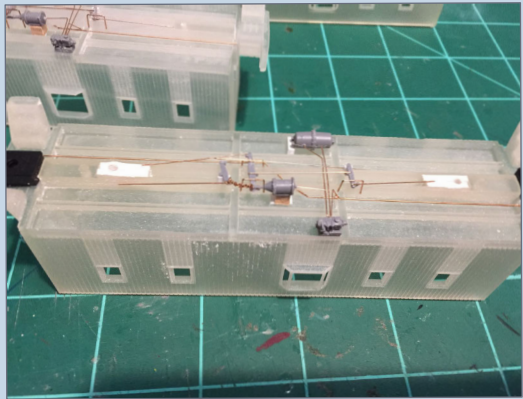
The holes for piping have been drilled with a #76 drill bit. The components were mounted with CA glue. Styrene blocking was used to obtain the proper height.



STEP 2: ADDING UNDERBODY DETAILS CONTINUED ...



19. The brake hardware has been connected with piping using 0.010" wire. This small wire is easy to bend with a pair of pliers, and cut with flush-cutters.



20. The Tichy brake levers' and wire rods were installed on the underframes. I used grab irons to create the brake lever support hangers. The finished brake detail includes a third brake lever that connects to the hand brake wheels on the car ends.



RATE THIS ARTICLE

STEP 3: ROOF DETAILS



21. The next step in my process was to complete the roof. It is included in the 3D print, but I needed to install the smoke jack and supporting cables.

The cast metal smokejacks were prepped to remove the mold lines. These parts and supporting cables were installed on all three roofs [21].

I marked the location of the smokejack holes on the roofs using dimensions from the plans. I used a needle in a pin vise to indent the surface as a starter dimple for the drill bit. I started drilling with small bits and gradually used larger bits until the base of the casting was snug in the hole.

I used a #79 drill for the wire support holes that keep the smokejack in place. Wire from a previous project was used for the supports. I wrapped it around the shank of a drill bit that was about the diameter of the top of the smokejack. I then used CA to adhere both the smokejack and the wire supports to the model.



STEP 3: ROOF DETAILS *CONTINUED ...*

22. The next detail step is to apply the end roof fascia grab irons.

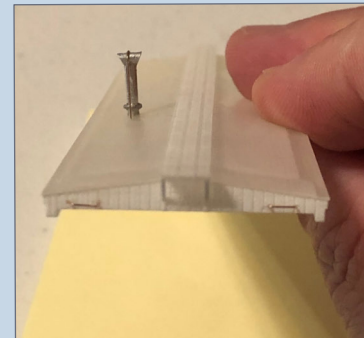
An issue when making homemade grab irons is to ensure they all look the same for a prototypical appearance. I created a drill template to aid in correct grab placement and a uniform look. The end roof fascia grabs in [22] are a non-standard width. The plans indicated these were 11.5", which I scaled up to 12".



23. I used small pliers with teeth in the jaws to bend my own grabs. I found a groove that was a scale 12" grab iron width. Holding the wire firmly, I bent both sides of the grab. Keep the legs of the grab iron parallel and in the same plane. I used flush-cutters to trim the grab iron legs to length.



24. The secret to consistent alignment of grab irons is using a drill template. I glued strips of styrene to form a T-bracket. On the face of the template I marked drill holes using the plans as a guide. The right end of the template fits to the edge of the roof so I can use a needle to mark the drill holes. This jig is reversible and can be used to mark holes on the other side of the end fascia.



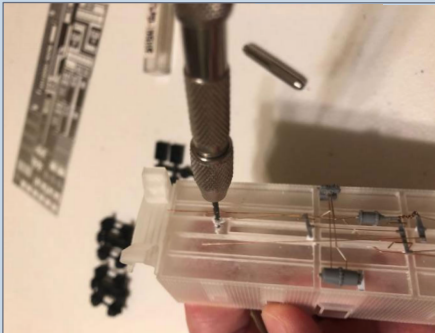
25. Again, I used a needle to mark the holes using the jig. I drilled the holes and attached the grabs with CA. These grabs complete the roof details.



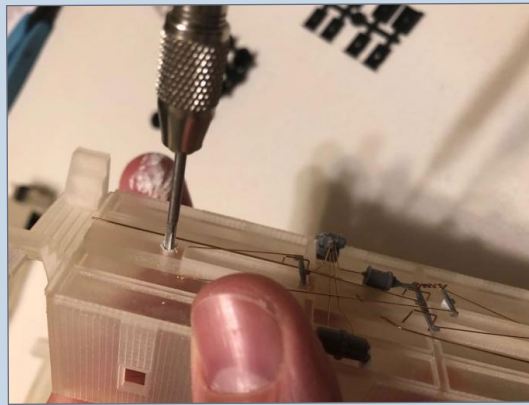
26. Here are the finished roofs, ready for painting.



STEP 4: TRUCKS AND COUPLERS



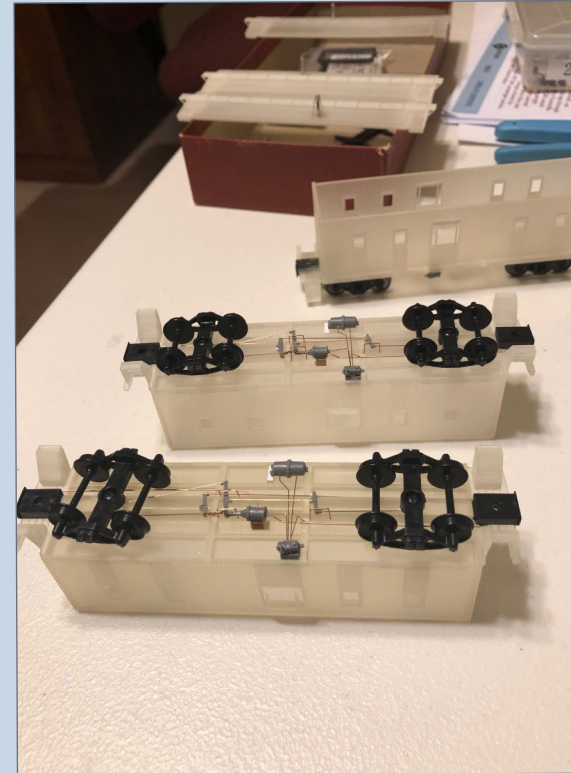
27. I used Tichy caboose trucks, as they seem to match the prototype. A drill cleaned out material in the kingpin hole. 3D-printed material can be drilled and tapped just like styrene.



28. I used a 2-56 tap to prep the hole for a 2-56 screw. The material can build up quickly. I went a few turns in before backing out the tap to clean out the material.



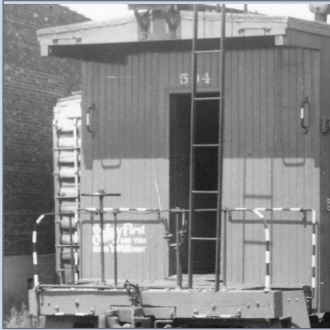
29. The end floor platforms are very thin, so I decided to glue the coupler boxes in place. The model is printed in plastic, so I used Testors plastic cement to secure the coupler boxes. I used clothespins to hold the parts secure while the glue dried.



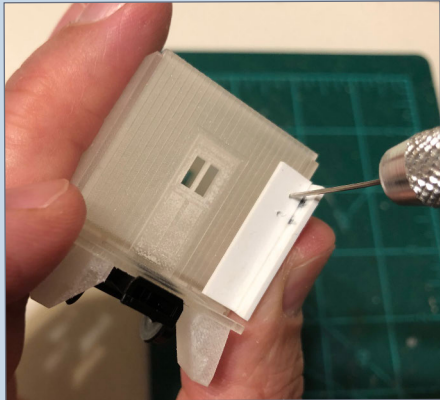
30. The underframe details, trucks, and coupler boxes have been installed on all three cabooses.



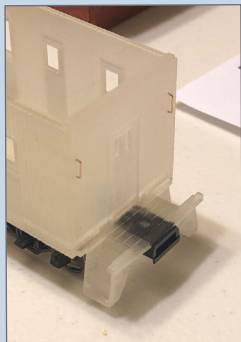
STEP 5: END DETAILS



31. Caboose end details are distinctive. These C&E cars had two small grabs near the end corners. I created another drill template for proper placement of these.



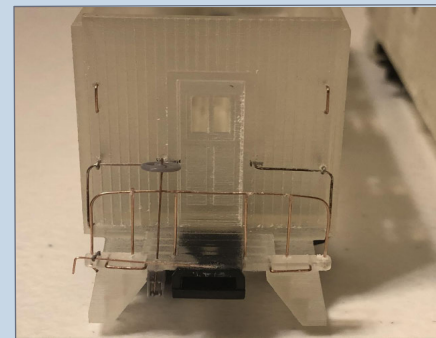
32. I made another T-bracket jig from scrap styrene. The bottom of the jig sits on the end platform, and a needle marks the drill locations. The T-bracket makes it easy to mark the other side of the car end by flipping it over for positioning. This ensures the grabs mirror each other.



33. A few holes were drilled and custom-made wire grab irons were installed and affixed with CA. I used a scrap piece of styrene to keep the grabs at a uniform distance from the wall.



34. The end wall of the caboose has L-shaped grabs. According to the plans, the grabs are installed 34" above the platform deck. Because each of the grabs seems a little different, I did not use a jig. I positioned the grab and marked the hole locations, then inserted the grab to mark a location for an eye bolt to hold the corner of the L-shaped grab. I removed the grab, drilled the hole, added the eyebolt, reattached the grab threading through the eyebolt, and used CA to glue the details in place.

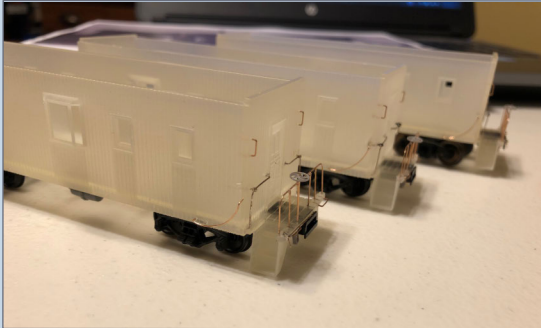


35. The end platform details consist of end beam grabs, a railing with four vertical posts, the hand brake wheel, and the cut lever. I considered making a jig for the end railing holes but found this task was simple enough not to bother.

I formed the railing and support posts from 0.0125" wire. The Tichy hand brake wheel is attached to a 0.0100" wire shaft. The shaft rests in a Tichy bracket below the end sill. The cut lever is secured with an L-shaped etched metal eye bolt from the leftovers box.



STEP 6: FINAL DETAILS AND CAR WEIGHT



36. The last details to add were the curved side grabs. I used Tichy caboose grabs and installed them based on the prototype drawings.

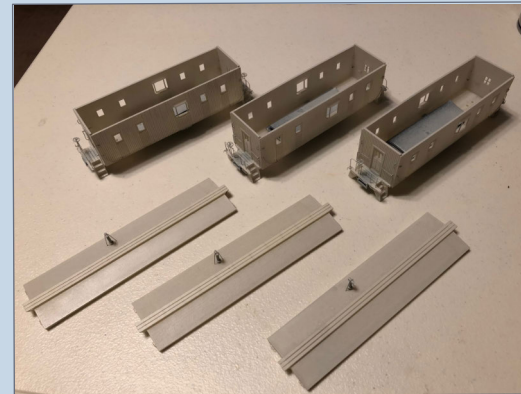


37. I added lead weight for better tracking ability during operations. Years ago, my brother and I split the costs on an order of sheet lead. I use a pair of dedicated scissors to slice the lead into sizes that fit inside cabooses, boxcars, etc. Cutting the lead with scissors causes it to curl. It needs to be flattened with a hammer or other flat tool.

Always use caution when using lead and avoid touching your eyes or mouth. Wash your hands after handling lead.

I attached the lead weights with Aleene's Original Tacky Glue. I haven't had a problem with weights coming free since I started using Aleene's.

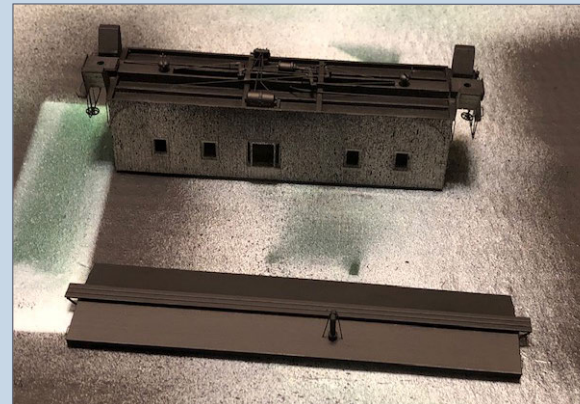
STEP 7: PAINTING



38. I gave the models a light wash with dish soap and warm water. This helps to remove fingerprints before painting.

I primed the models with a Rust-Oleum primer. I painted the inside of the bodies

and the underside of the roofs on the first day and let those dry. I then primed the top of the roofs and the outside of the bodies.



39. I painted the roofs and underframes with Rust-Oleum flat black. I painted the bottom first as I didn't want black overspray on the red body color. It's easier to touch-up red overspray with black paint.



STEP 7: PAINTING *CONTINUED* ...

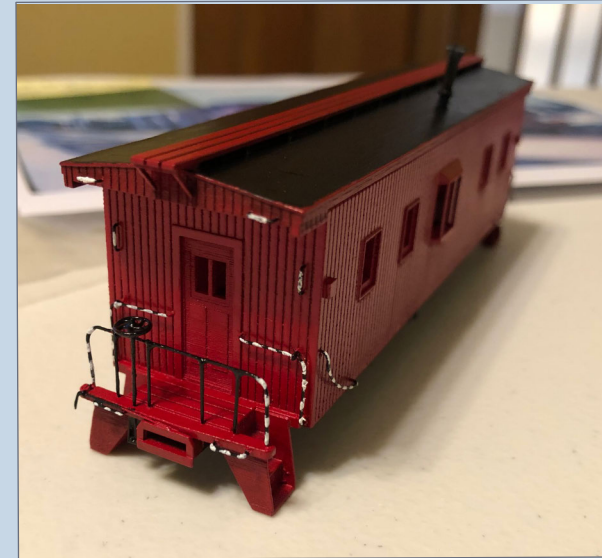
40. I covered the black areas with masking tape, and spray-painted the model red. I use a dedicated box lid as a painting tray to paint my models. Cardboard tubes hold the models while painting. I use gloves to keep overspray off my hands.



41. I painted the model with two coats of red. I did a little touch-up with black craft paint on the underframe and around the roofwalk. The hand railings were painted next. I like to paint these

before decaling so the clear coats will help protect the grab iron paint.

The C&EI painted their grab irons black with white stripes. The vertical posts received four white stripes and the curved grabs received seven white stripes. I applied white craft paint using a size 00 brush.



42. The end grabs and part of the railing were also striped. I keep a micro brush on hand with a small cup of water to remove paint that ends up on the car body.

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STEP 8: DECALS

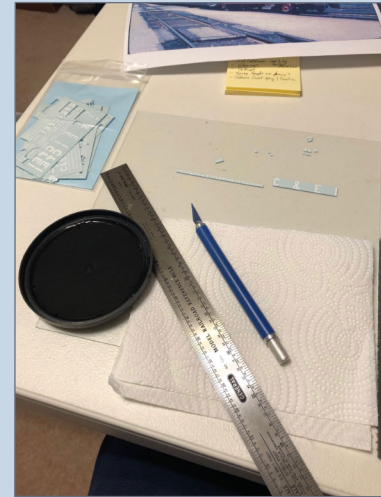


43. I used the C&E Historical Society HO caboose decal set. This set has lots of variations that will letter many different pieces of C&E equipment.



44. Lettering was placed according to prototype photos. I really like the effect of running a knife blade down the boards to make the model come alive. I added the safety warning on the middle step. At this point, the roof is not yet attached to the model.

DAVE'S DECAL PROCESS



45. I use a piece of sheet glass from a picture frame as a cutting surface. A brand new hobby knife blade is used to cut the decals. A new blade ensures the decal paper doesn't tear and ruin the decal. My scale rule guides the cuts.

I use the dark lid of a coffee container to hold distilled water [45]. I place the decal in the water to let it soak. I prep the model area where the decal will sit with Micro Set.

For best results, don't let air get under the decal. I place the moistened decal on the model and use a hobby knife or tweezers to slide it off the backing paper onto the model. I use the edge of a paper towel to wick away excess water.

I let these dry, then apply Micro Sol to help the decal form onto the model surface. I apply several coats. When it is nearly dry, I run the tip of a new hobby knife blade between the boards and apply one last coat of Micro Sol. This process takes a while but works well.

After all the decals have dried, I apply a gloss coat to hide the decal film. Testors Dull Coat is sprayed onto the model as a final step, after the gloss coat has dried.



STEP 9: WINDOW AND LADDERS



46. After the clear coats dried, I installed window glazing using Evergreen Scale Models 0.005" clear styrene. I used digital calipers to measure the bay window openings and cut the styrene to fit. For the other windows, I cut oversize pieces. The glazing was glued in place with Testors Clear Parts cement.



47. I used Athearn aftermarket caboose ladders, as they are a close match to the curved top of the prototype. I modified the ladders slightly to follow the prototype, and trimmed the bottom of the ladders to the same length.

I held the ladders in position, marked the hole points on the roof, then drilled through the roof using a bit slightly larger than the ladder stiles. The ladders installed easily and CA was applied to keep them in place.



48. I am incredibly happy with my finished model and grateful my brother got into 3D printing. The only other way to model this caboose would have been to scratchbuild it, and I am not that skilled. 3D printing offers a method to create signature railroad models that will never be produced by a major manufacturer.

I still need to finish the other two cabooses. I would also like to build two other versions. For now, this project is at a good place. I will post additional photos on the MRH Forum when I finish the remaining cars.

I hope you have enjoyed following the build. I would appreciate any feedback regarding the build. ☑

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STEP 8: DECALS

- Caboose trucks - Tichy Arch Bar Truck 3051
- Curved grab irons - Tichy 3054 curved grab irons
- End L-shaped end grab irons - Tichy 3028 L-shaped grab irons
- End bolster grab irons - Tichy 3015 18" drop grab iron
- End Railings from formed wire - Tichy 1106 0.0125" phosphor bronze wire
- Eye Bolts for L-shaped end grab iron - Tichy 3037 eye bolts
- End Ladders - Athearn 12504
- Smokejack
- AB brake components - Tichy 3013 AB brake set
- Couplers - Kadee 158
- Paint
- Decals - C&EI HS caboose decal set ■

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DAVID & DOUG FORBES



David Forbes is a high school math teacher in Robinson, Illinois. His modeling focus is the C&EI's Salem Subdivision. He is the current secretary for the Chicago & Eastern Illinois Historical Society and writes articles for their publication, *The Flyer*. Find out more at www.ceihs.org.



Doug Forbes is a high school science teacher in Vandalia, Illinois. He enjoys modeling the Illinois Traction System (ITRR) and the Illinois Central. Doug has also 3D-printed IT models available on his Shapeways store that are not available commercially. ■

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our email response ...)**





A Day Working Monsanto

MRH Running Extra | September 2020

**RANDY SEILER DISCOVERS A LAYOUT OPERATING PATTERN
INSPIRED BY HIS PROTOTYPE ...**

**CRISP MORNING AIR GREETES YOU – TYPICAL FOR
CINCINNATI IN THE** early fall. The kind of air you look forward to on a clear September day like this.

There's a hint of winter to come and memories of new beginnings each year that rise up at this time. Or it may just be the relief that the long hot days of another summer have finally ended.

A DAY WORKING MONSANTO | 2

Lead: The Monsanto job crew
contemplates their next switching move.

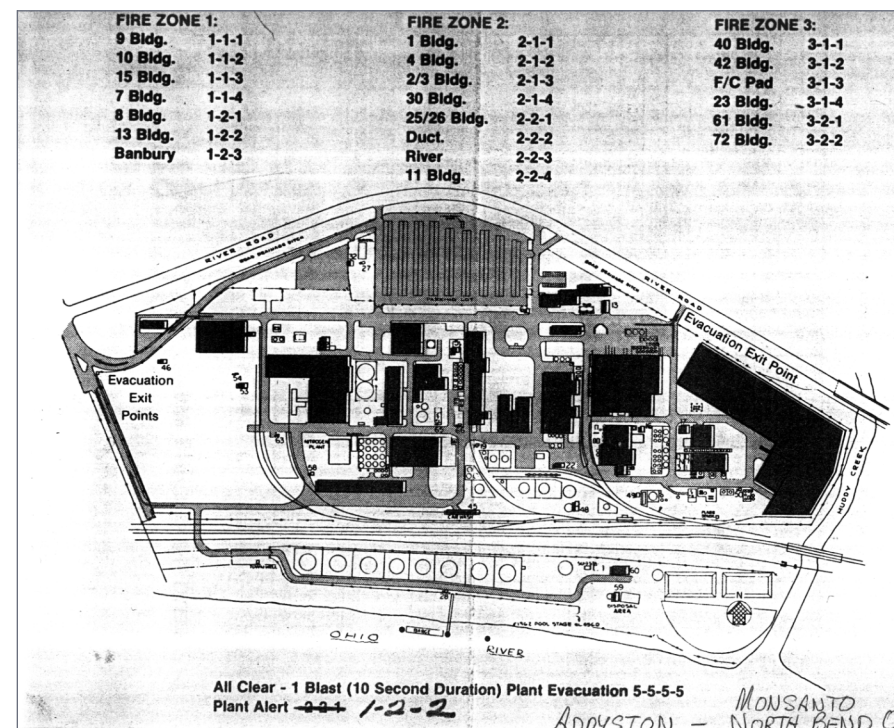
★★★★★
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Whatever it is, you breathe it in deeply and smile to yourself.

YOUR JOB TODAY

You are on first trick today, working the Monsanto Job. You like being the engineer on this job.

Addyston, where the plant is located, is a quick trip from home. The work tends to be pretty predictable – meaning you'll be home in time for dinner!



**1. Overhead view of the Monsanto facility from an emergency
evacuation map from the era.**

A DAY WORKING MONSANTO | 3

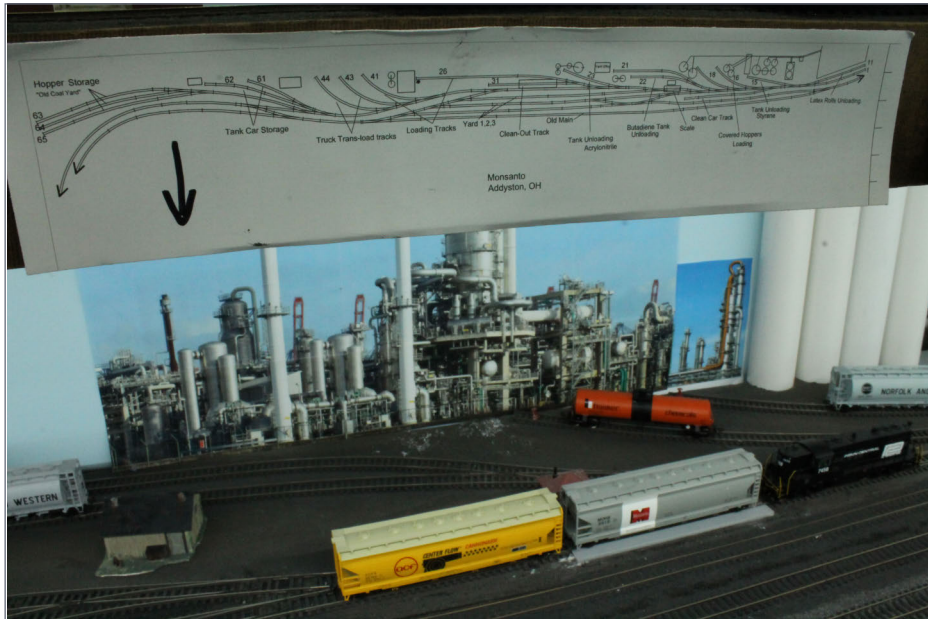
Penn Central keeps a locomotive at the plant, tied-down inside the fenced-in area.

You nod a greeting to the guard in the shack by the main gate. You don't know his name, but you recognize his face. He clearly recognizes your face too. He barely looks up from his hot coffee to nod as you drive through the security gate.

Being on the Wade Extra Board, you get called for the Monsanto switching job regularly – you've lost count over the last few years. You park in the lot near the yard shack, grab your lunch box, and hop out of the car.

PREPARING FOR THE DAY'S WORK

You make your way to your engine: it's the same GP7 that's been here longer than you can remember.



2. Here a Monsanto hopper has been spotted on the scale to be weighed. Above, attached to the fascia of the second level, we see an operator's map for the Monsanto plant showing all the spots.

A DAY WORKING MONSANTO | 4

“You always get the creeps when placing cars on Track 15. All the plant workers wear ‘spacesuits’—full body protection with respirators – when in the area of that tank rack. But the crew on the engine just rolled right up there breathing whatever with no protection of any kind.”

You stop at the mailbox near the yard office, open it, and grab the day's switch list left there by the plant foreman.

At first glance it looks like most of the previous switch lists for Monsanto. Your conductor arrives just a couple of minutes behind you.

“Looks like the usual,” you say as you hand him the switch list.

“We're in luck. No tanks today,” your conductor tells you with a smile after he checks the switch list.

Usually the work at Monsanto included several tank car movements. Styrene, Butadiene, and Acrylonitrile all came in tanks as raw materials for the ABS plastic pellet manufacturing there.

“Must be our lucky day,” you reply with a snort.

You don't like spotting tank cars – some of the stuff in those tanks can be pretty nasty.



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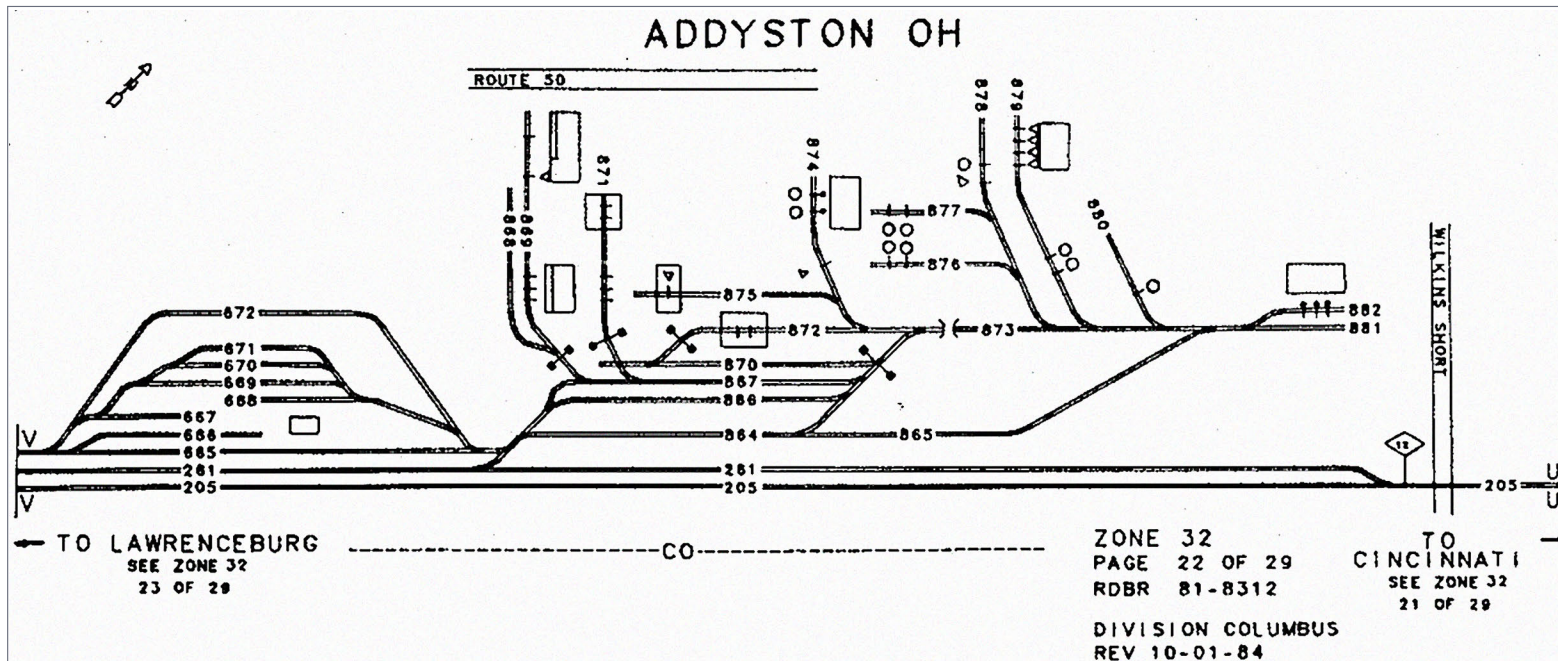
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A DAY WORKING MONSANTO | 5



3. View of Monsanto from the coal yard end (the coal yard is just behind the photographer here). In the distance, the crew plans their next move.



4. ZTS (Zone, Track, Spot). Map of the Monsanto Plant from the Conrail era, just a few years after our story takes place.



A DAY WORKING MONSANTO | 6

You always get the creeps when placing cars on Track 15. All the plant workers wear “spacesuits” – full body protection with respirators – when in the area of that tank rack.

But the crew on the engine just rolls right up there breathing whatever with no protection of any kind. “Oh well, it hasn’t killed me yet,” you think sarcastically.

Once in the chair and ready to start switching, you ask your conductor, “Moving the empties to the rack?”

THE FIRST MOVES

Monsanto work usually starts with spotting the incoming empty covered hoppers to the wash rack.

The hoppers had to be cleaned prior to being loaded with new plastic pellets. Apparently it takes only a few leftover pellets from a previous load in a different color to spoil an entire hopper full of new pellets, so cleaning was imperative.

A DAY WORKING MONSANTO | 7

"Yep," he replies. "Looks like we got five on 26: two outs, two re-spots, and two for the rack."

The GP7 emits a cloud of acrid black smoke as you throttle it up. It crawls slowly forward from its overnight resting place near the yard office.

Your conductor hops off as you pass over the switch frog to track 26. He throws the switch and walks over to the string of five cars. Once clear of the switch points, you reverse into track 26, and listen for your conductor on the cab radio.

"One car...half a car...that'll do 9012," you hear just before feeling the engine come up against the coupler of the first car in the string.

You pull the cord to sound one short blast on the engine's horn to let your conductor know you've stopped the engine.



5. Shoving a hopper onto the scale for weighing. Also see [2, 6].

A DAY WORKING MONSANTO | 8



6. I use a working scale to weigh the cars in Monsanto on my layout.

"A-head 9012," says the conductor over the radio.

He continues, "One and two are our outbounds, three and four go to the rack and five goes to 43. So give me four."

You proceed forward four car lengths and bring your small train to a stop, again hitting the horn.

"A-head 9012." You get your train moving again knowing that you'll be stopping as soon as you clear the switch for the wash rack.

Your conductor has just uncoupled number five, the last car on this string, to leave it on track 26 so that you can shove three and four onto the wash rack track. You stop clear of the wash rack switch and the radio comes alive again.

"Reverse 9012." You shove onto the wash rack track until your conductor gives you a "That'll do," hit the horn, and wait while he uncouples the two cars, 15234 and 15222.



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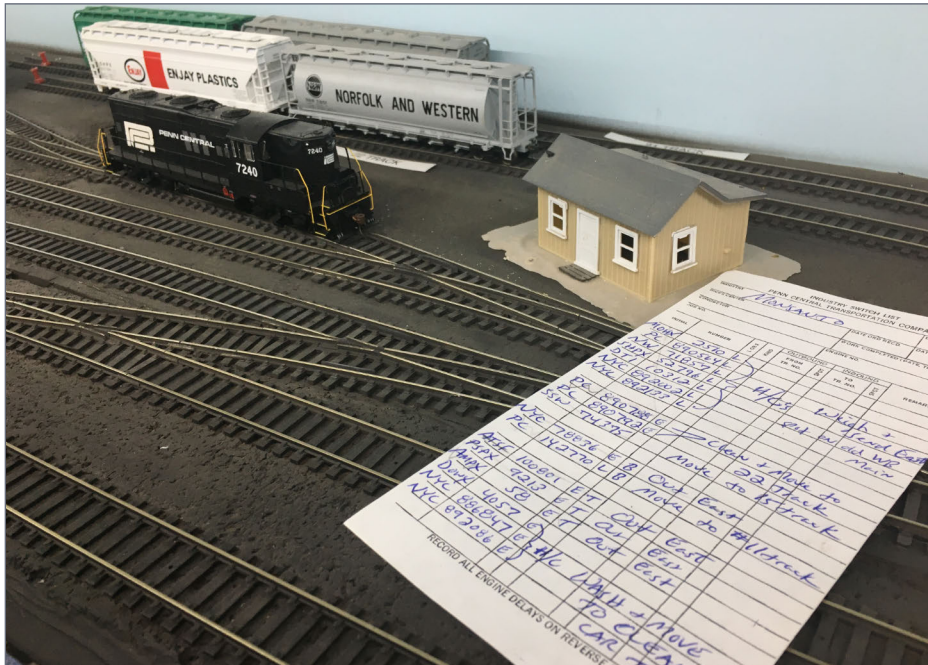
You wait for his command to move ahead, then reverse back onto the number five car and re-couple.

Once your train is back together, only three cars long now, you wait, knowing your conductor will want to ride on the rear car for your next moves.

You know the outbound loaded pellet hoppers have to be weighed, so as soon as you hear “A-head 9012” from your conductor you pull forward over the scale and stop with the first loaded hopper on the scale.

Once both cars are weighed, you’re ready for your next move.

“Reverse, 9012” comes over the radio, so you begin your move toward track 43.



7. The Monsanto Plant Manager leaves a switch list for the crew at the Yard Office.

A DAY WORKING MONSANTO | 10



8. Here is the “old coal yard” on my layout. It’s at the far left end of the Monsanto shelf when facing it.

You take it slow because you know your conductor is going to hop back on the last car when you get to where he is standing by the third switch.

The move to track 43 involves a reverse move via the running track and over three switches that your conductor has lined while you got the hoppers weighed. He then gets you to stop just short of the switch into tracks 43 and 44.

The conductor hops off and throws that switch, walks forward to check the switch into track 43 which, as it turns out, is already thrown that direction. He gives you a reverse command, stands at the plant road to watch for trucks and hops back on the last car, covered hopper MOHX 3518.



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9. Monsanto, now Ineos, as it appears today.



10. Covered hoppers on the 43 and 44 tracks at Ineos today.

THE OLD WESTBOUND MAIN

With the 3518 car now tied down on track 43, the two cars left are covered hoppers loaded with plastic pellets bound for Cincinnati and points east, MOHX 2527 and 5754.

Those cars get spotted on the Old Westbound Main. This track is no longer a main; it is used as a storage track and run-around. It hasn't been used as a main as long as you've been working here, and probably not since the changeover to bidirectional running on just the Eastbound main.

Old names die hard though, especially on the railroad, and everybody still calls it the Westbound Main, or the Old Westbound Main.

Heck, they still call the hopper yard at the west end of the plant the "coal yard," and the coal company has been gone since the fifties.

Your conductor hopped back off the last car as you passed the switch leading into tracks 43 and 44 to re-line them. He now gives you the "proceed" command to move west.



“Old names die hard though, especially on the railroad, and everybody still calls it the Westbound Main, or the Old Westbound Main. Heck, they still call the hopper yard at the west end of the plant the ‘coal yard,’ and the coal company has been gone since the fifties.”

“We gotta grab that MoPac box on 41,” he grunts over the radio as he moves the throwbar for track 41 while giving you the order at the same time.

Once you couple-up to the MoPac boxcar, you reverse back onto the running track with your conductor riding the box. He gets you headed back West, over the switches toward the Coal Yard, then back onto the Westbound Main to drop your three outbound cars.

“We got two for the scale,” the conductor radios after you drop the three outbound cars.

TWO FOR THE SCALE

You turn in your seat to look back over your shoulder and see the end of a covered hopper sitting on your track just east of the crossover.

That’s one of the two loaded cars headed out that need to be weighed.

You wait for your conductor to make the three-car-length walk back to your engine. Once inside, he tells you, “Let’s go get ‘em.”

You continue to reverse on the Westbound Main, through the crossover, and couple-up to the two covered hoppers. Your conductor hops off the engine to line up the crossover and the three other switches you’ll need to get to the scale.

Meanwhile, you proceed west on the same track far enough to clear the crossover, change direction and sit ready to head for the scale track.

“A-head 9012,” comes the order for which you’ve been waiting.

You proceed east past the switch to the scale track where your conductor stands, waiting for you to clear it so he can throw it to the scale.

“Reverse 9012,” and you move slowly toward the scale to weigh the first of the two loaded covered hoppers.

Once both have been weighed, you continue down that track to take the ladder and then change direction in order to push those two cars into the three you dropped there earlier.

With the string of five outbounds tied down and ready to go, you’re ready for your next move.

ON TO THE COAL YARD

“We got cars in the coal yard to move,” says your conductor as he climbs back inside the cab. He rides with you to the crossover into the covered hopper storage yard, known as the “coal yard” from its previous role.

There the conductor hops off the engine to get you through the switch back move into the coal yard and onto your cars.

The cars sit in various places across two tracks, so it takes a few moves to get everything coupled up for the short trip back into the plant tracks.



INSPIRATION FOR THIS STORY

The inspiration for this story came about because of an original switch list from Monsanto provided to me by Dan Macke. Dan worked this job as a conductor for Penn Central and later Conrail.

This article would not have been possible without Dan's assistance and his dedication to preserving and sharing railroad history. I dedicate this story to his memory.

Thanks, Dan. ■

DATE 7/22/81

CITY RAIL
SWITCH LIST
MONSANTO COMPANY
ADUSTON, OHIO

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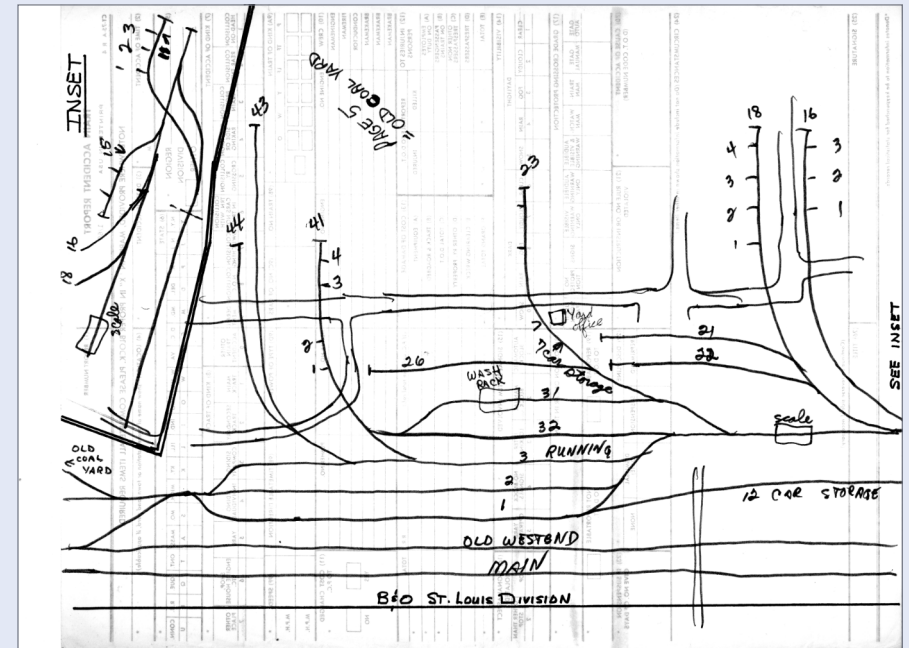
CAR NUMBER	LEAD	NOTES	TRUCK	DISPOSITION	(1) Product Name (2) Hazard Class	(3) Placard Notation	TYPE	MOVT	DDO	DATE	AMOUNT
TOTAL INBOUND 17 H/L'S											
37452	E	✓	41	OUT EAST	(1) TO FRACK WASH PACK	(2) Placarded					
114915	L	✓	41	OUT EAST	(1) B/L RUPPER	(2) Placarded					
2575	L	W	SIDE	OUT EAST	(1) H/L LUSTREY	(2) Placarded					
11084	L	W	26	OUT EAST	(1) H/L LUSTREY	(2) Placarded					
2527	L	W	26	OUT EAST	(1) H/L LUSTREY	(2) Placarded					
5759	L	W	26	OUT EAST	(1) H/L LUSTREY	(2) Placarded					
5222	E	✓	64	WASH RACK	(1) H/L M/T	(2) Placarded					
11084	E	✓	32	44 H/L RUPPER	(1) H/L M/T	(2) Placarded					
3517	E	✓	32	44 H/L RUPPER	(1) H/L M/T	(2) Placarded					
11084	L	✓	66	22	(1) H/L	(2) Placarded					
5300	L	W	SIDE	OUT EAST	(1) H/L LUSTREY	(2) Placarded					
15214	E	✓	26	WASH RACK	(1) H/L M/T	(2) Placarded					
15222	E	✓	26	WASH RACK	(1) H/L M/T	(2) Placarded					
3518	L	W	26	43	(1) H/L LUSTREY	(2) Placarded					

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MONSANTO COMPANY
per:

11. The prototype switch list that inspired this story.



12. Map made by conductor Dan Macke while working for Penn Central and later Conrail at the Monsanto plant. You can see the railroad form barely showing through from the back of the paper on which this map was drawn. Conductor Macke used this map as a switching aid.



Once you have those cars spotted, your conductor instructs you to head back to the Westbound Main to couple-up to your string of five outbounds.

"We got one at Valley to bring back," he tells you on your way to couple-up to the five cars waiting to go out.

VALLEY JUNCTION

The trip to Valley Junction, a small yard about five miles west of the Monsanto plant, takes you onto the main – so you'll have to tack a caboose onto the end of your five car train.

At Valley, through freights make drops and pick ups. The locals get cars to and from Valley. All the locals run out of Lawrenceburg, west of Valley.

The Monsanto plant job often makes runs between the plant and Valley, even though one of the locals, known as the "Monsanto Job," shuttles the bulk of the cars between the plant and Valley Junction.

Since you have a car sitting in Valley that the plant foreman wants you to pick up, you'll be taking the five eastbound cars to Valley for pick up by one of the through freights.

The short trip to Valley goes routinely, you make your drop, and your conductor walks the small yard searching for your pick up.

After he finds the pickup, you dig it out, run around your caboose, and head back to Monsanto with one boxcar of rubber destined for track 43 to be spotted "at the bumper" according to your switch list, which means at the very end of the track, and one caboose in tow.

You check your watch as your small train crosses the Great Miami River and smile, "I like getting called for this job, I'll be home in time for dinner."

Another day working Monsanto. ☑

RANDY SEILER



Randy built his first layout in high school, and operations has always been his main interest in the hobby.

After graduating college, establishing a career, and getting married, Randy's father-in-law showed him the layout that he had built. After ten years, that layout needed a new home. Randy took it, and tore out the original yard, replacing it with a more prototypical

and useful yard. He began drawing plans to extend the layout in both directions along the basement walls. By the time his kids were grown, Randy had become very active in prototype operations. After this Randy planned an entirely new layout.

The new layout depicts the area just West of Cincinnati, to Aurora, Indiana, late Summer of 1975, where the B&O/Chessie and Penn Central ran side-by-side. Its ongoing construction is being well-documented in the forums of *MRH*.

Randy's other interests are competitive shooting, and playing keyboards in a classic rock band. He now works part-time as a firearms instructor, and his full-time job is running his railing fabricating business. He has two grown daughters, a son, one grandson, and a very supportive wife. ■





Enhanced Model Railroad Photography

MRH Running Extra | September 2020

VERRYL FOSNIGHT DISCUSSES CHALLENGES AND SOLUTIONS FOR MAKING MODEL RAILROAD PHOTOS LOOK REAL ...

MY WYOMING DIVISION LAYOUT IS AN IMMERSIVE EXPERIENCE FOR VISITORS and operators. With a 50'x75' layout space and nine long benches ranging from 37'-60' in length, the layout allows long trains to traverse through the vast expanses on the Union Pacific between Cheyenne, Wyoming and Ogden, Utah.

The effect immerses you into the scenery, like you get when standing trackside on the prairie. I have discovered several

ENHANCED MODEL RR PHOTOGRAPHY | 2

1. The Harriman Cutoff (UP Track#3 on Sherman Hill). This bench extends about 60'. The sharpest focus is on the hoppers and coaling tower, but objects in the foreground and background are out of focus because of limited depth of field. The backdrop's edges can be seen, as are the walls of the layout building. Nikon D80 camera at f/5, 1/50 sec, ISO 400.

★★★★★
RATE THIS ARTICLE

challenges to conveying this experience in photography, however. Depth of field limitations made it impossible for a single exposure to capture such long views with every part of the scene in good focus. And it can be nearly impossible to avoid capturing portions of the layout space in frame [1].

In this article, I explore these challenges and share some of the solutions that I have found for creating photos of our model railroads that can trick the eye into believing the scene is real.

Depth of field, defined as the range of a photo that is in reasonable focus, can be the biggest challenge to realistic model railroad photography.

If you take a photo of a real locomotive, you're usually far enough away that other items in the scene are in reasonable focus. But photographing models requires us to be much closer and focus on specific details, so depth of field becomes more of a factor.

On the one hand, if you want to tell a story about the enjoyment of a model train layout, a photo with a good subject but other objects out of focus can tell a good story too, as in the example of a stock photo I found on the internet [2]. On the other hand, if you want to portray the realism of the scene, the out-of-focus portions fall short.

Familiarity with the features of your camera can do much to maximize depth of field and image quality. The four major variables in the equation are *lens focal length*, *aperture*, *shutter*



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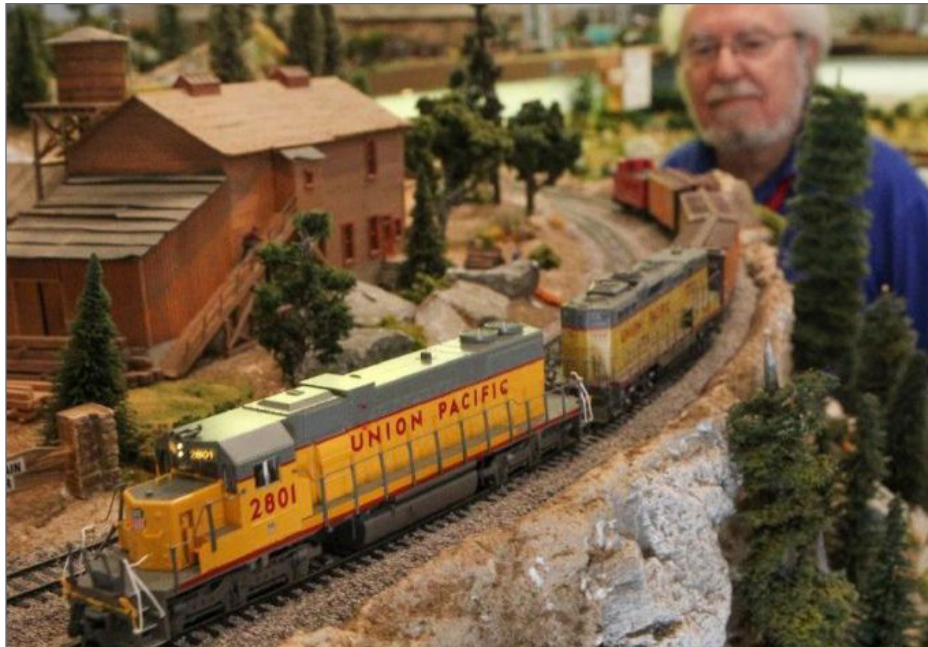
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speed, and ISO. Let's discuss each of these factors and how they affect image quality.

1. Lens focal length is the distance between the lens and the image sensor when the subject is in focus, typically measured in millimeters.

A longer focal length will typically give greater magnification, but the minimum distance to subject is often greater.

Conversely, a shorter focal length will give less magnification and offer a shorter minimum distance to subject.



2. This photo, found online, focuses on the lead unit, with depth of field extending to the front of the building behind. Other elements of the photo are the model railroader, the rest of the train, and part of the layout in the distant background, though they all fade for lack of focus. The image tells a good story but does not portray realism.

Depth of Field Table

Focal Length:

35

mm

Film Format, Digital Camera, or Circle of Confusion:

Nikon D7000, D5100, D5000, D3200, D3100, D3000

Units:

feet, inches

Note how fast DOF narrows as Focal Length

Calculate

Nikon D7000, D5100, D5000, D3200, D3100, D3000

Focal Length: 35 mm

Distance (feet)	f/1.4		f/2		f/2.8		f/4		f/5.6		f/8		f/11		f/16		f/22		f/32	
	Near	Far	Near	Far	Near	Far	Near	Far	Near	Far	Near	Far	Near	Far	Near	Far	Near	Far	Near	Far
1	0' 11.9"	1' 0.1"	0' 11.9"	1' 0.1"	0' 11.9"	1' 0.2"	0' 11.8"	1' 0.2"	0' 11.7"	1' 0.3"	0' 11.6"	1' 0.4"	0' 11.4"	1' 0.6"	0' 11.2"	1' 0.9"	0' 10.9"	1' 1.3"	0' 10.5"	1' 2"
2	1' 11.7"	2' 0.3"	1' 11.6"	2' 0.5"	1' 11.4"	2' 0.7"	1' 11.1"	2' 0.9"	1' 10.8"	2' 1.3"	1' 10.3"	2' 1.9"	1' 9.7"	2' 2.8"	1' 8.9"	2' 4.2"	1' 7.8"	2' 6.5"	1' 6.5"	2' 10.3"
3	2' 11.3"	3' 0.7"	2' 11"	3' 1.1"	2' 10.6"	3' 1.5"	2' 10"	3' 2.2"	2' 9.3"	3' 3.2"	2' 8.3"	3' 4.7"	2' 7"	3' 7"	2' 5.3"	3' 10.7"	2' 3.2"	4' 5.3"	2' 0.7"	5' 6.6"
4	3' 10.7"	4' 1.3"	3' 10.2"	4' 1.9"	3' 9.5"	4' 2.8"	3' 8.6"	4' 4"	3' 7.3"	4' 5.9"	3' 5.6"	4' 8.8"	3' 3.4"	5' 1.4"	3' 0.7"	5' 9.5"	2' 9.4"	7' 1.3"	2' 5.7"	10' 6"

3. This is a portion of a Depth of Field table I found online at www.dofmaster.com/dof.html. It shows depth of field as a function of aperture and focus distance. This one is for my Nikon D7000. I have underlined the setting I normally use of f/16 at a distance of 3 feet.

Focal length can be set or variable, depending upon if the lens is fixed or zoom. Generally, you choose focal length based on the scene's framing, not necessarily for focus.

2. Aperture or F Stop. The aperture is the opening in the lens that controls how much light passes to the optical sensor, and the F stop is a ratio of lens focal length to this opening. Cameras express this as a range of F ratios (focal length/aperture), for example from f/4 to f/32.

As the number increases, the aperture closes, allowing less light through. In our example, a value of f/32 will have the smallest aperture opening. This yields a greater depth of field, but it allows much less light through to the sensor [3].

For a proper exposure, you must compensate for this reduced light.

3. Shutter Speed determines how long a camera's shutter is open, exposing its sensor to light. You can compensate for a closed aperture by slowing shutter speed. Use a tripod to avoid blur for shutter speeds of 1/60-second or longer. A remote shutter button can help avoid blur for long exposures.

4. **ISO** is the sensitivity setting for the light sensor. A higher ISO number means less light needed, so you can use a smaller aperture for a given shutter speed. As sensitivity increases, however, so does the amount of sensor noise.[4]

I favor setting the aperture on my Nikon D7000 to f/16. The depth of field for this setting ranges from 2'-5.3" to 3'-10.7", assuming the subject is 3' from me. While this is an improvement, that depth of field is still insufficient for deeper scenes.

Fortunately, there is software that can compensate for this with a process called "focus-stacking." Helicon is one I find helpful and easy to use. The idea of focus-stacking is to frame the desired photo with the camera on a tripod.

Set up the aperture and ISO to produce good exposures, and then take multiple exposures, adjusting the focus and nothing



4. A focus-stacked image of the Western slope of Sherman Hill. The focus is good, but the high ISO made for a grainy image. Nikon D7000, f/8, 1/200 sec, ISO 1600, Post-processing Luminar 4.



V. Fosnight

CAMERA ADD-ONS FOR MULTIPLE FOCUSES

Taking a series of focused shots that ranges through an image can be more tedious than it might seem.

Each adjustment of the focus ring between shots can be a movement of 1/8" or less, a difficult amount of precision to achieve. I have found several tools on the market to aid in this process.

The FocusMaker is a large open disk that fits around the camera focus ring to allow more precise adjustment. It includes adjustable clips that attach to the ring to mark different focus points to make the process repeatable.[5]

Along with its focus-stacking software, Helicon sells a device called the FB Tube. The FB Tube is a micro controller that mounts between the camera lens and body, much like a macro focus tube.

Using single or continuous shooting modes, the FB Tube automatically adjusts the camera's focus by one step after each exposure, allowing for a focus stack of potentially infinite length that can be rendered into a single, focused image in Helicon.



5. The FocusMaker extends the focus ring's diameter and allows for more precise adjustment. Colored clips help make precise focus points repeatable.



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else ever so slightly with each exposure, working through the range of focus. Once I have all shots from the scene complete, I can upload them to my computer and Helicon will take care of the rest, creating one photo in which everything is in focus.

To see the effects of Helicon, consider another photo [6] of the Harriman Cutoff, taken from the same angle as [1]. This time, I created the image using a “stack” of about eight or nine individual images.

I carefully focused on each of the antique brass handles on the wire tray doors at the top of the yellow bench fascia. The focus moved about four feet with each exposure, which amounted to turning the focus ring about 1/8” per exposure. Setting the rear screen to 3-5x magnification helped with the precise focus points.



6. Harriman Cutoff siding and Harriman Track #3 and siding up the eastern slope of Sherman Hill. This is a focus stack of 8-9 images, focused on each door handle along the layout fascia. Some of the items in foreground are out of focus because there are no door handles there. Nikon D7000, f/8, 1/200 sec, ISO1600 45mm focal length on DF camera.

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The difference using the stacked method was noticeable, even if some of the details in the foreground were out of focus. [6]

With a little more practice, I used multiple exposures and helicon to create a close-up image of Harriman so that everything from Harriman to the rear wall of the building, about 45 feet back, was in sharp focus. Finally, I was getting something close to aerial photos of the prototype. [7]

For my very large layout, I often want images of the long bench or benches to show the layout size, and for those shots I always use photo stacking. Even in a scene of moderate depth, such as a single building, focus-stacking eliminates depth-of-field issues, which results in very realistic photos.

Note the Hanna coal mines a, 4 x 8 foot layout (everyone should have one) tacked on the end of the bench just east of



7. Harriman up close. The distance of camera to wall (upper left) is about 47 feet. Note how the entire image is in focus thanks to Helicon and the process detailed above. Nikon D7000 f/8, 1/200 sec, 38 mm. Post-processed using *Luminar 4*. I love this software!



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V. Fosnight

A CAMERA THAT DOES IT ALL?

The process of compiling a series of images for focus-stacking and combining them in Helicon is time-consuming, and there is a learning curve involved.

At the point that I was getting images such as [4] and [7], I was justifiably proud of my work. I emailed some of my images to my friend and IT guru for the Wyoming Subdivision, Paul Saumure.

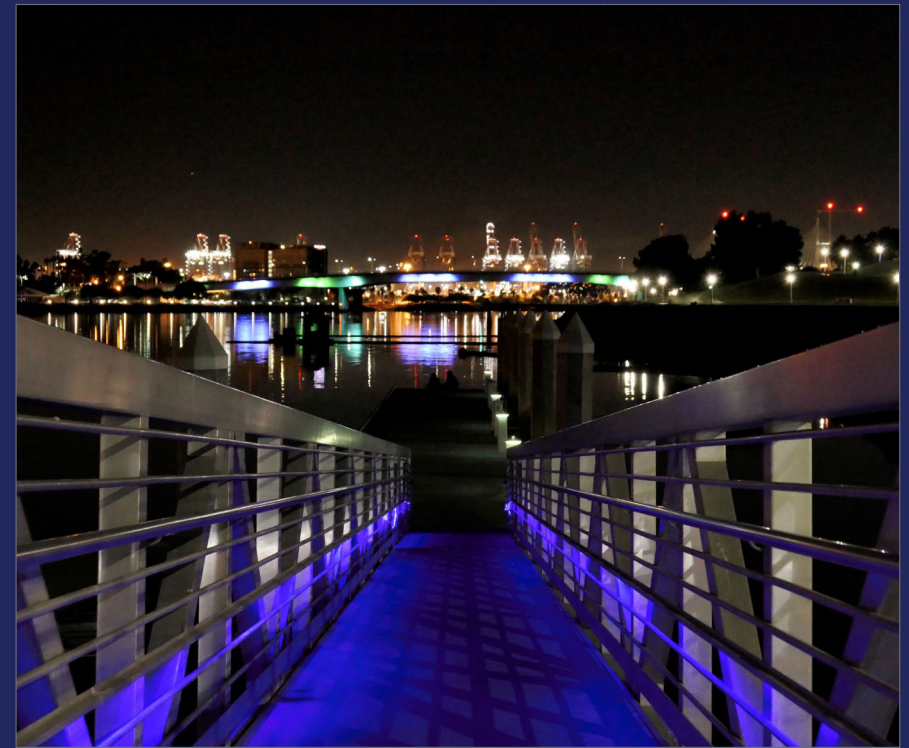
Paul responded right away with a nighttime photo he had recently taken at the Long Beach Marina.[8] Using only ambient light and steady footing (no tripod), Paul had shot a focus-stacked image, compiled from an automatic photo burst of 30 images shot in about a second, with each photo on a different portion of the camera's focus range.

All Paul had to do was set up the function on the camera's touch screen, press the shutter button halfway to calibrate the desired image frame, and press the shutter all the way. The camera took care of the rest, right through to the image stacking, requiring about 45 seconds of processing time to render the image.

Taking a tedious, hours-long process and reducing it to a minute or so seemed like a miracle! I went to my favorite online retailer and bought my own camera.

The camera Paul used was the new Panasonic Lumix G9. The G9 is a 21.77 megapixel mirrorless Micro Four Thirds Camera. It comes with a Leica 12-60mm zoom lens in the package. The camera and lens both have five-axis stabilization.

Typically, this amount of stabilization has been enough so I can shoot a focus-stacked image with solid footing, though on



8. Paul's handheld focus-stacked, one-click shot with his new Lumix G9 camera.

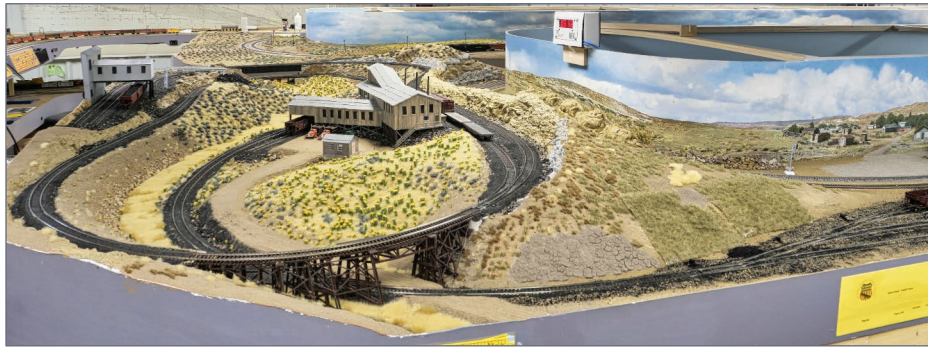
occasion I still find a tripod helpful, particularly if the photo requires an awkward position. The G9 makes the process so effortless that I now almost always shoot focus-stacked images of the Wyoming Division.



Rawlins. The depth of field shows the drawers in front of us to the map on the back wall (about 30' away) in good focus [9].

Next is a photo of the layout in operation, with the benches, from left-to-right of Hanna, Laramie, a tie-treating plant, and the western slope of Sherman Hill, with the eastern slope on far right. Everything in the photo has a clear, sharp focus, including west industrial Cheyenne in the foreground [10].

Not only is stacking useful to bring long scenes into complete focus, I have noticed more compact scenes can benefit, too.



9. A hand held in-camera focus-stacked image from my new Lumix G9 camera: Hanna Coal mines region with coal marshaling yard at right edge. The double mains curve around this bench end cap inside the mines at right-center.

The next bench over is the Red Desert bench, identified by its own backdrop. Everything from front of the bench 4'-5' away to the official UP map of the Ogden yards on the far wall 30' away is in sharp focus.

Camera: Panasonic Lumix G9 mirrorless 4/3 crop factor sensor f/4, 1/60 sec, ISO 200, Focal length 12 mm.

Note how the video frames and stacking allow a much larger aperture (f/4, more light), a lower ISO for less detector noise, and the 5-axis stabilization works well at the slower 1/60-sec shutter speed.



10. Another long-range Lumix G9 focus-stacked image. This is taken from a middle step of the second set of stairs up to the viewing mezzanine. The Cheyenne industrial structures and tracks are perhaps 10 feet away from the camera, and the window and far wall are about 70 feet distant. Post-processing for color, contrast, saturation, structure and other tweaks for this and all images are done using *Luminar 4*.

I noticed fuzzy areas in front of and behind the main subject area even in compact scenes. So I began focus-stacking nearly all scenes. The Rock Springs Union Pacific Coal Mine #4 is a relatively small scene on the lower level.

Using photo stacking, I captured the scene's subject, the tracks near the camera, and the hills and rocks distant are in good focus. The result is a clear, crisp, in-focus photo that gives the illusion of standing across the tracks from the real mine [11].

These photos of smaller detailed areas, in sharp, constant focus, serve to highlight another problem with larger photos that show the size of the layout. The scope of these photos almost always includes the top edge of the backdrops and the upper parts of the layout building, including the yellow railings on the mezzanine.





11. The Rock Springs, Wyoming coal mine UP #4. A focus-stacked image taken with the Lumix G9 camera about 4 feet away from the centerpiece tipple. Other parameters are f/3.5, 1/640 sec., ISO 1600. This image shows good focus all over.



12. Part of Wamsutter, Wyoming. The limits of the backdrop, the ceiling, and the railings of the mezzanine are in plain view. The effect is distracting. Focal length, 30 mm.

If you are trying to show the layout in its space, this might be acceptable. The low backdrops are just high enough to keep operators and visitors immersed in the scene, giving them the feeling that they are trackside, without inciting claustrophobia.

Unfortunately, these low backdrops really detract from this sense of immersive realism in the photos. The yellow railings of the mezzanine detract from some scenes as in [15].

I found the answer to this problem is to replace the sky in post-processing. After adjusting the lighting, contrast, and sharpness settings for an image, you can substitute a photo of the sky for the backdrop and all elements above it.

Sky replacement is possible with most photo editing software, including Photoshop and Photoshop Elements, but the process is complex and tedious. To replace the sky with them, you must first outline the existing sky (and areas of the building above that ought to become sky).

You must be meticulous about outlining such elements as tree branches, radio towers, telephone poles, and chimneys that protrude into the sky so they will be excluded from the sky replacement process. Any such detail not outlined will become part of the sky during the replacement step.

Luminar 4 is a newer software suite that has made the step of sky replacement a snap with artificial intelligence. The software will actually detect what elements of the photo constitute sky, assuming they extend to the top of the photo, and automatically exclude the protruding elements listed above.

For the AI to work, the sky must extend to the top of the image. You can do this simply by cloning an element of sky from the backdrop and stamping it repeatedly until the areas of the photo that reveal the layout building are covered. The sky does not need to look realistic for the AI to recognize it as sky and replace it automatically.



13. The same scene as [12], but with a dramatic stock sky replacing the backdrop and ceiling. Paul Saumure did post-processing, including sky replacement, with *Luminar 4*.



14. Another angle of Wamsutter, again with sky replacement. This photo nearly tricks the eye into believing the image is real. Photo and post-processing by Paul, including sky replacement, with *Luminar 4*.

With the new sky in place, the results are dramatic. You begin to experience the same sense of immersion and realism in the photo that guests do when they visit the layout [13, 14].

Looking at this Rawlins coaling tower photo [15], the roof of the coaling tower nearest the aisle extends above the top of the backdrop due to the angle of exposure.

After post-processing the lighting and contrast of the original photo, I cloned elements of the original backdrop and stamped – or painted, it into the areas formerly occupied by the layout building and the mezzanine.

I carefully cloned sky over the hill in the distant part of the layout where there had previously been no backdrop. Under magnification, I very carefully painted sky in around the peak of the coaling tower.



15. This image presented several challenges for sky replacement besides simply painting over the layout building and mezzanine with clones of backdrop sky. The coal tower sticks up just beyond the backdrop. In addition, the backdrop wraps around the end of the bench, leaving a small section of layout with no sky at all.

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This was an improvement, but still did not look quite right [16]. Some of the clouds obviously looked cloned.

As the final step I used the AI Sky Replacement tool to replace the existing sky. The AI automatically selected the original backdrop and all areas I had cloned for replacement.

I simply clicked the mouse on the stock sky photo of my choice, and *Luminar 4* did the rest. I gave the scene one final touchup for lighting, and it was set. The improvement to the scene gave an end product much more dramatic and immersive than the original [17].

Model railroad photography can be a very rewarding pursuit. With a few tricks such as image focus-stacking and sky



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substitution, you can do a great deal to transform layout photos into stunning images that imply greater realism and provide an immersive experience. With such fantastic results, these techniques are definitely worth a try! ☑



16. The first step of sky replacement. I filled the areas of the original photo that showed the layout building with cloned sky. The sky does not look quite right, but it is ready for the *Luminar 4* AI to take over.



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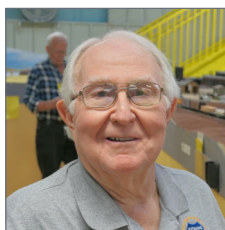
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17. Completed AI Sky Replacement from *Luminar 4*. Note how the sky was replaced even through the ironwork gaps of the coal tower. Compare this result to the two previous images.



VERRYL FOSNIGHT



Verryl lived his early years in Wyoming. His family moved to southern California just as Verryl was entering high school.

After graduating as a physicist from Stanford, he did research on electric propulsion for space use and on RF proton

sources for injection of extremely high density, high energy proton beams into nuclear fusion devices such as tokamak fusion reactors.

Verryl left tech to take over the family real estate business in the late '80s. He later retired and moved to Arizona. He built a house and observatory to do astronomy and astrophotography. He also included model railroading.

Verryl hosts operating sessions on his railroad that draws 20 to 30 modelers from all over AZ. In addition he hosts an annual invitational 3-day session specifically aimed at operators from other states. ■



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THE AH-HAH MOMENT

column



MRH Running Extra | September 2020

JOE FUGATE HAS MORE MUSIC WIRE
CUTTERS WITH EXTRA TOUGH JAWS ...

★★★★★
RATE THIS ARTICLE

LAST MONTH, I PRESENTED SOME GREAT HARD MUSIC WIRE flush cutters. As long as you're cutting the music wire to length at the workbench, the cutters I showed last month work fabulous.

But what about cutting something like an 0.040" music wire throwbar wire? Unfortunately, the way the jaws work on the cutters from last month, you can't get down between the rails, so the wire will stick up above the railhead. And I don't want to drag out the Dremel.

I found these tough cutters [1a, 1b, 2] that *do get down between the rails* and they're less than \$30 (see shopping list link). I own them and they work great for cutting heavy-duty throwbar wire to length just above the throwbar – and well below the railhead. *Ah-hah!*

Note these cutters do not make a flush cut, the cut will be angled from both directions, but the jaws do cut hard music wire without any problem. The handles provide a lot of leverage, making hard wire cuts easy.



1a, 1b. These heavy duty cutters will get right down between the rails to snip off the throwbar music wire as close to the throwbar as you want, with absolutely zero damage to the jaws.

THE AH-HAH MOMENT | 2



2. Ted Pella Inc sells these 9" heavy-duty cutters for less than \$30 (shipping extra). The jaws will cut heavy music wire without damage.

For lighter music wire below 0.030", I found these orthodontic dental hard wire cutters for \$15 with free shipping on Amazon [3].

I like to use these lighter cutters for cutting the 0.015" music wire I use to make my center-over-springs on my turnouts.



However, these lighter cutters only cut up to about 0.028" music wire. You won't damage the jaws on larger wire (yes, I tried), you just won't have the leverage to make the cut.

3. These light orthodontic dental cutters have hardened jaws and will cut music wire below 0.030" without jaw damage.

Remember, neither of these cutters will make flush cuts. The cut will be pointy and sharp, so be careful not to poke yourself. But you won't damage the jaws on these cutters by cutting hard music wire! ☑

To get a shopping list for this article, visit the MRH website at this link: mrhmag.com/magazine/running-extra/2020-09/ah-hah-moment



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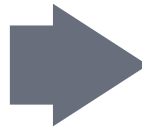
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Bonus section!

Here are all the pages from
the September issue of
*Model Railroad
Hobbyist* magazine
as well!



ALSO:

- Fiber optic structure lighting
- Simple bi-color signal construction
- Weights 200% heavier than lead
- Garden railroading lessons learned

... and more inside!



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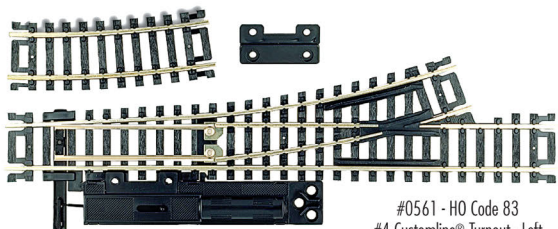
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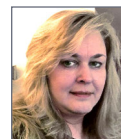
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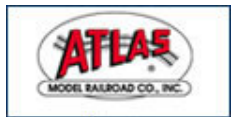
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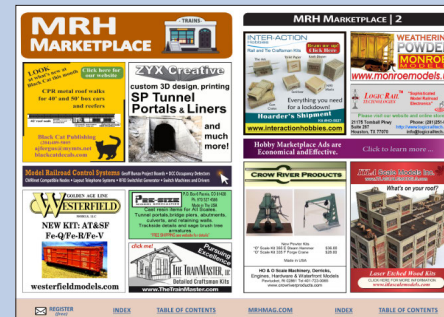


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PUBLISHER'S MUSINGS



Guest editorial | Model Railroad Hobbyist | September 2020

LEWIS PHELPS EXPLORES HIGH DENSITY CAR WEIGHTING ...



RATE THIS ARTICLE

HOW WOULD YOU LIKE TO ADD TWICE AS MUCH WEIGHT to a model freight car in the available space, or add all the weight you need in less than half the space required for lead weights? If so, keep reading!

MRH's recent discussion regarding "lead rot" got me to thinking about alternatives to lead as weight for freight cars and locomotives.

I immediately thought of tungsten, which I had previously used for counterweights in a very different application, so I knew about the element's virtues. Tungsten has three distinct advantages over lead as a material for adding weight to railroad models:

- **It's dense:** The density of tungsten is 19.3 grams/cm³, or 11.13 ounces/in³. That is 1.7 times the density of lead, which is 11.3 grams/cm³, or 6.5 ounces/in³.
- **It's non-reactive:** Tungsten is non-reactive at room temperature, whereas lead reacts at room temperature with oxygen to form lead oxide or, if moisture is present, it can form compounds such as lead carbonates and lead silicates. These chemical reactions have become known overall as "lead rot" – they can damage models when the reaction causes lead to swell.

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- **It's non-toxic:** Partly because it is non-reactive, tungsten is also non-toxic. Although I can't imagine why anyone would wish to do so, you could swallow tungsten powder or tungsten shot and not hurt yourself.

Swallowing lead powder or lead shot could be very dangerous. Lead poisoning kills 500,000+ people per year worldwide and causes brain damage to millions more.

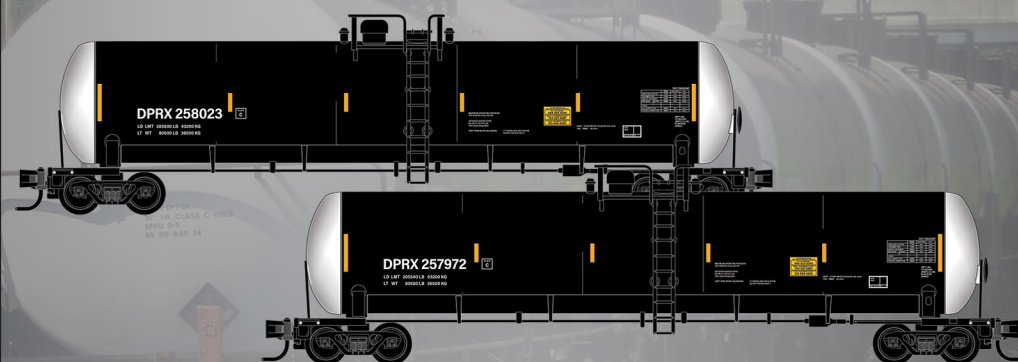
For modelers, tungsten comes in two forms:

- **Shot:** Often used for hunting birds, tungsten shot comes in pellet sizes from 1.78 mm (#10 shot) to 3.78 mm (#2 shot). These ammunition products actually use an alloy of Tungsten made by combining it with small amounts of iron, copper, and nickel. The density of the alloy used for bird shot is 18.0 grams/cm3, almost as dense as pure tungsten.

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PUBLISHER'S MUSINGS | 3

■ **Powder:** Among other things, golfers use tungsten powder to fine-tune the weight and balance of high-end golf clubs. In powder form, packed tungsten powder has a density of 11.4 grams/cm³, about the same as solid lead.

I decided to explore using tungsten to weight my models and allow me to cram the most weight into the smallest space possible. I postulated the best approach would be some kind of moldable weight to allow fitting it into crevices, nooks, and crannies of freight cars.

Pouring molten tungsten into model cavities isn't practical. Using the smallest spherical metal shot possible, mixed with the heaviest "filler/binder" possible seemed like the way to go.

Note that choosing the most dense "filler/binder" material can have a significant impact on the total weight.

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Theoretical possibilities

Mathematical volume computations say that a tightly-packed random volume of spheres will fill 64% of the available space. That means I need to fill the remaining 36% of the air space with the most dense binding material possible.

I analyzed a number of options for the filler/binder:

- Epoxy glue (1.3 grams/cm³)
- Cyanoacrylate glue (1.1 grams/cm³)
- Plaster (Plaster of Paris/Durham's Putty, 2.3 grams/cm³)
- Portland cement (2.4 grams/cm³)
- Tungsten powder (11.4 grams/cm³)

From this, I looked at various binders for tungsten powder. I assumed 5-parts by volume of tungsten powder to 1-part binder/glue.

See [Table 1] for a summary of my computations.

High-density model weighting alternatives		
Material	Density Grams/CM ³	Density ratio compared with lead strips + epoxy
Cut lead strips + epoxy (50% volume each)	6.3	1.0
Lead shot + epoxy	7.7	1.2
Lead shot + plaster	8.4	1.3
Tungsten shot	11.5	1.8
Tungsten shot + epoxy	12.0	1.9
Tungsten shot + plaster	12.7	2.0
Tungsten shot + tungsten powder + ca glue	15.5	2.5
Tungsten shot + tungsten powder + epoxy	15.5	2.5
Tungsten shot + tungsten powder + plaster	15.6	2.5
Pure mercury (for theoretical comparison)	13.6	2.2
Molten lead (for theoretical comparison)	11.4	1.8

Table 1. Summary of Lew's density computations.



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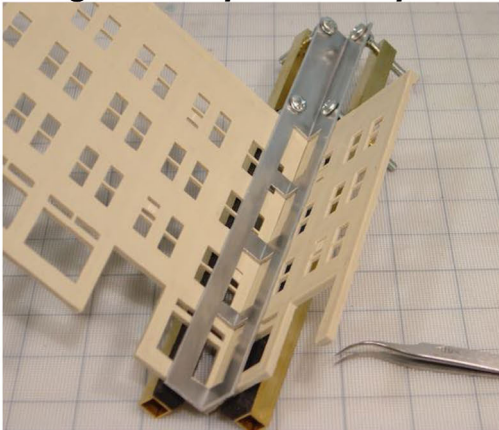
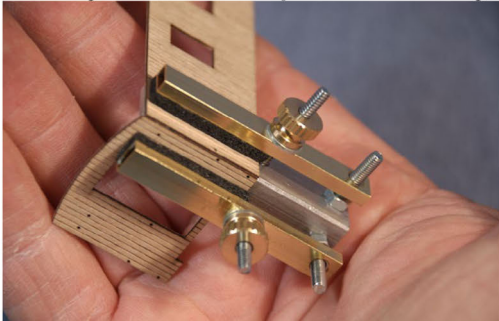
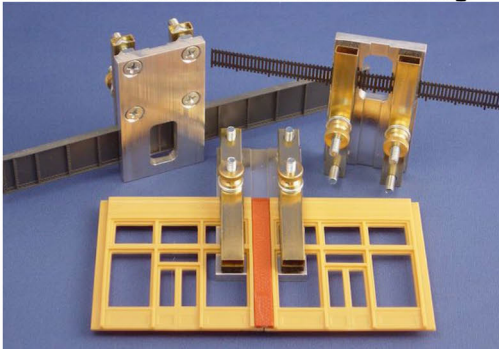
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My analysis shows the best alternative for adding weight to come from a mixture of #10 tungsten bird shot and tungsten powder, held together with any kind of glue.

We get this magic enhanced weight by combining tungsten shot with tungsten powder. The combination of the two produces something more dense than either material alone (due to the losses from air space).

My [Table 1] represents the theoretical maximum densities. In reality, it's not possible to pack tungsten balls and tungsten powder into a perfect mixture that will achieve quite the level of density as suggested in the calculations shown in [Table 1].

Actual results

I conducted an experiment using a 5 ml (1 tsp) measuring spoon and an accurate digital scale. I found that one spoonful of tungsten shot weighed 1.75 ounces, a spoonful of tungsten powder 1.01 ounces, and a spoonful of a mixture of the

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two weighed 2.02 ounces. In theory, a perfect dense mix of tungsten powder and tungsten shot would weigh 2.25 ounces.

But in any mixture, the combination of shot and powder will be more dense than either separately, due to replacing the air space with the more dense tungsten. The combination of tungsten balls and tungsten powder, plus a binder forms the most dense mixture that can reasonably be achieved by modelers.

The glue or binder that you choose, whether CA, epoxy, plaster – or something else, ends up being mostly immaterial.

I personally like Durham's Rock Hard Water Putty for my models, because it forms into a nice putty mixture that sets fairly slowly, giving me some working time.

Do note these materials can be tricky to work with. The tiny #10 shot spheres readily roll off a worktable if not contained, and the fine tungsten powder will disperse with even a puff of air, despite the high density of tungsten.

Since both materials don't come cheap, I recommend working with them on some sort of surface that captures spilled materials – such as a small impromptu tray made from paper with the edged folded up. That way, anything that escapes can be captured and returned to storage.

Do note: a magnet will not attract tungsten, so you can't use that method to "sweep up" spillage.

Tungsten shot and tungsten powder cost a lot more than lead, and you can only buy it in bulk, whether you need a lot or a little.

The ultimate weight kit

To help my fellow model railroaders, I am willing to make a high-volume purchase of the smallest diameter tungsten shot available (#10 shot, which is 0.070", or 1.75 mm diameter), as well as bulk tungsten powder. Then I will assemble these materials into "kits" with enough material to add up to three

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PUBLISHER'S MUSINGS | 6

ounces of weight to three typical HO scale freight cars by taking up as little space as possible.

Each kit contains six ounces of #10 tungsten shot (18 grams/cc alloy) and three ounces of tungsten powder.

I'm offering these kits for sale for \$45 including free shipping in the US and \$45 plus actual shipping cost to other countries.

The very lowest cost you will find to assemble this package on your own would be \$65 plus shipping, and at that price you'd be using larger balls made of less dense tungsten alloy than are included in my kit.

If you're interested in getting one of these high-density weighting kits from me, then fill out this form:

mrhmag.com/magazine/mrh2020-09/weight-kit-query

MRH will email you detailed instructions on how to order one of these kits from me, Lewis Phelps.

To summarize, using tungsten shot plus tungsten powder and a binder/glue gives us a weighting material that's over 200% more dense than lead sheet glued down with epoxy.

For open load cars like flats, gondolas, and hoppers, this allows getting twice the weight into the nooks and crannies of your car underside. ☒

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— **Lew**
(Guest editorial)



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LAST ISSUE'S RATINGS

The three top-rated articles in the [August 2020 issue](#) of *Model Railroad Hobbyist* are:

4.8 August 2020 news

4.7 Dick Elwell's Hoosac Valley

4.4 Upgrade the Badger paint stirrer

Issue overall: 4.6

Please rate the articles! Click the reader comments button on each article and select the star rating you think each article deserves. We depend on these ratings to help us determine which articles to publish, so your rating matters! ■

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Model Railroad Hobbyist | September 2020

Compiled by **JOE FUGATE**

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The fickle fortunes of granger shortlines

MRH forum member **JD.Hill** (Jack Hill) reminds us that during the late 70's and early 80's, granger shortlines came and went with shifts in grain prices, closing of local elevators, and evaporating state subsidies. So it was with the Erie Western and its successor Chicago & Indiana. Blink and you missed them.

Jack shows a bit of the ebb and flow of paint schemes from this time with some of his models.

Read the full thread to get all the details.

[View the full thread on the MRH website](#)

► **MRH'S MONTHLY GREAT MODELER POSTS**

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2020 Layout Update



1. Tim Garland posted a video showing the latest updates to his Seaboard Central layout. Tim posts these updates every month or so, and it's great to see the progress!

Seaboard Central August 2020 layout update

MRH forum member **TimGarland** posted a video going over the latest updates to his layout, the Seaboard Central.

Among other things, Tim shows how he upgraded a new Walther's car to meet his rolling stock standards.

Another of Tim's projects including weathering a Scale Trains bulkhead flatcar. He added a nice worn look on the wood deck including freshly replaced boards on the bulkheads.

Tim also shows off a new dark blue SC paint scheme for his own road on two SD40-2 diesels.

Follow Tim's updates on the MRH website thread link below.

[View the full thread on the MRH website](#)

Floquil/PollyScale stash running out?



MRH has mapped the old familiar colors to readily-available acrylic paints.



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Steam Power Black	MM 4970	VMA 71.027	16-40B	
Grey Black	MM 4972	VMA 71.021	16-40*	
Weathered (Charcoal) Black	MM 4910	ML 29002 VMA 71.024	16-05	
Refrigerator Grey	MM 4887 MM 4961	VMA 71.041	16-04	
Refrigerator White	MM 4872	ML 29004 VMA 71.020	16-02	
Grime Black	MM 4882	ML 29002 VMA 71.020	16-03	
Caboose Red	MM 4882*	ML 29002 VMA 71.020	16-08	

Floquil / PollyScale Color (approx.)	Model Master	Valley Model	Microline	Master
Tussock	MM 4605*	VMA 71.026	16-15	
Refrigerator Orange	MM 4882*	VMA 71.023	16-09	
Refrigerator Yellow	MM 4879	VMA 71.016	16-10	
Rail Brown	MM 4884	ML 29009 VMA 71.049	16-07B	
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2, 3. Rick Sutton uses this styrene mask he cut on his Cricut and a metal cookie sheet underneath with glue dots on it to make grass clumps for his scenery. The impressive result speaks for itself.

Making better static grass clumps

Forum member **Rick Sutton** posted these photos of his clever bunched static grass technique:

"A metal pan from the dollar store. A light coating of Armoral or vaseline petroleum jelly and cut a pattern from a styrene sheet and raise it off the pan. This really helped me. Alligator clip the static applicator to the pan, apply dots of tacky glue or matte medium with a q-tip and go for it."

To read the complete post in context, use the button below.

[View the full thread on the MRH website](#)



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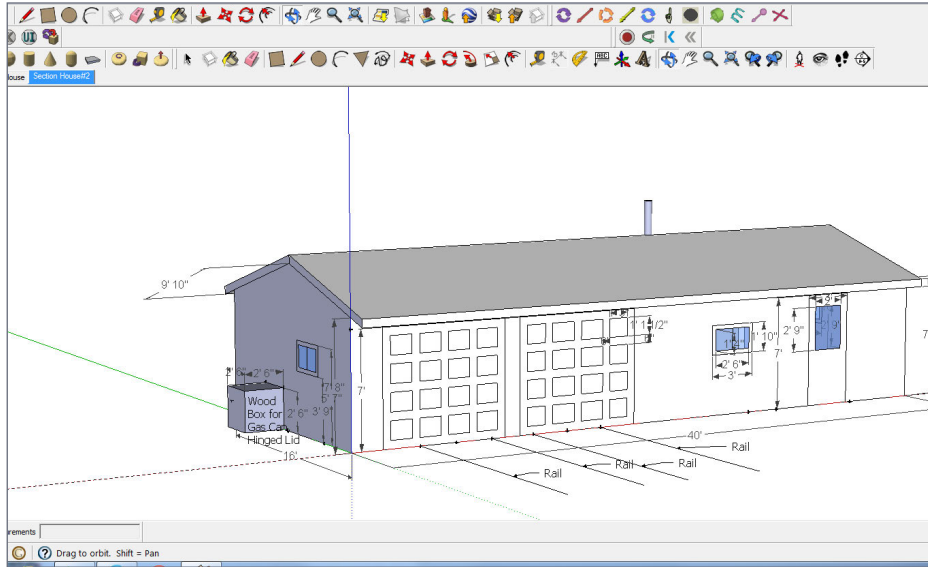
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4. Craig Townsend researched this maintenance-of-way shack and then drew up plans for it in Sketch-Up. With the plans in hand, Craig then built the structure in styrene.

Woodinville, WA MOW shack build

MRH forum member **Craig Townsend** takes us through the entire process of researching and building this MOW structure.

“One of the key buildings in Woodinville was and continues to be a small 40' x 16' MOW shack that was built by the NP. Since, I'm modeling one of the branchlines out of Woodinville (towards Redmond and Issaquah, (east)), I thought it would be fun to model the MOW shack. I ended up with a set of drawings that I could use to build the model.”

Visit the *MRH* website and participate in the conversation with Craig about his structure build.

[View the full thread on the MRH website](#)

Latest MRH “Weekly photo fun” thread

Every so often, some very unique photos show up on the *MRH* Weekly photo fun thread. Check it out!

[View the full thread on the MRH website](#)



5, 6. MRH forum member Rick Sutton posted these photos about an intriguing static loco project he's doing for his layout. His post shows a few of his modeling secrets in making this loco.



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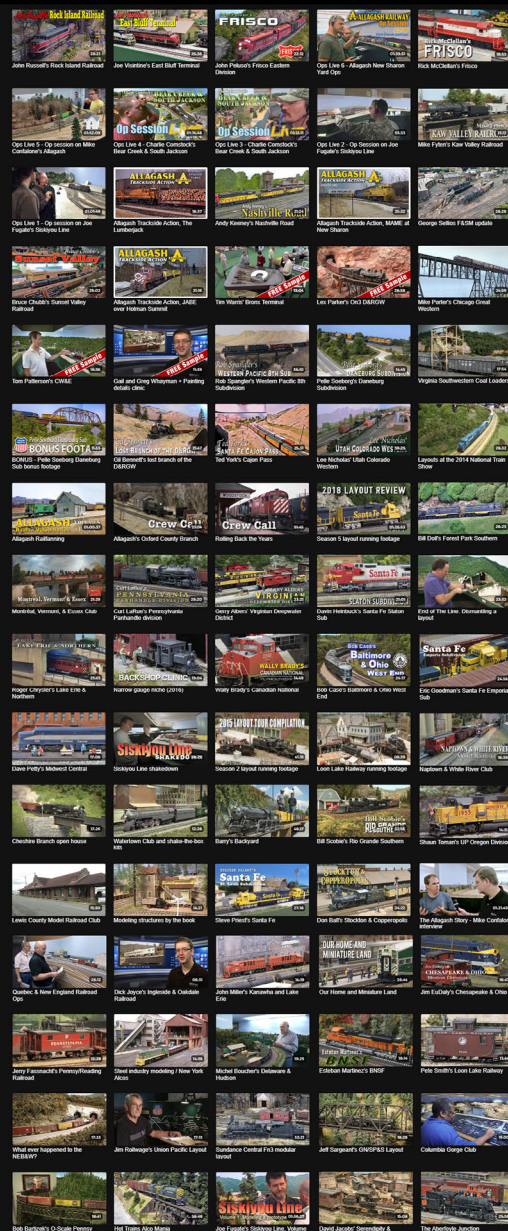
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PHOTOS AND VIDEO OF SUPERB MODELS

THIS MONTH KEN EXPLAINS SOME OF THE LESSONS LEARNED FROM his 19 years of maintaining a garden railroad in his back yard; George Bogatiuk demonstrates the use of a programming track to simplify programming DCC decoders; and Stephen M Conroy chases an Amtrak passenger train through the California hills from above.

Garden Railroading – Concrete roadbed



1. Ken started his garden railroad in October 2001, building a dogbone across his 200-foot wide back yard.



Also see the “What’s neat this week” weekly video podcast!

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2. The layout was originally ballasted with two tons of “quarter-inch minus” crushed limestone rock. Quarter-inch minus, as the name suggests, consists of pieces of rock ¼” in size down to powder. Here he spreads it between his Micro Engineering track ties with a broom.

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3. Since the limestone ballast was subject to vegetation growing through it, moles displacing the ground under it, and the weather shifting it, Ken replaced it over a period of two years with concrete roadbed, using 120 bags of concrete to complete 350 feet of mainline. Concrete was not needed on the end loops since one is built on a wooden deck, and the other was a 35-foot long trestle.



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4. Ken’s 35-foot trestle was five feet tall at its highest point. While it is very scenic, the wind off the Mississippi River up the 200-foot bluff in the distance is nearly constant. When it blew over 12mph, it could knock entire trains off the trestle.

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5. The wind, combined with the wear and tear on the 14-year old cedar trestle, led Ken to decide to use the prototype practice of replacing it with a fill. Completing this over a two-year period, he waited six months for the fill to settle.

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6. Ken uses the existing concrete roadbed and an 8-foot level to pound wood stakes around the curve level to the height of the roadbed.

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7. Forms for the concrete roadbed are made from $\frac{1}{4}$ " lauan plywood ripped into strips from 2 $\frac{1}{2}$ " to 5" in width. The strips are stapled to the inside of the stakes with the tops of both even.



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8. The concrete forms for the 5" wide roadbed are in place. Note the differing heights of the forms to compensate for settling in the fill. The 10'-radius curve required 23 feet of forms for this pour.

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9. Ken mixed two 90lb bags of concrete at a time in a wheelbarrow, for a total of eight bags over a period of four hours. He filled the forms level with the tops of the stakes.

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10. The concrete is then leveled with a cement trowel. Since the stakes and the top of the forms are even, Ken can run the trowel straight across the top without catching on anything. He let the concrete cure for two days before removing the wood forms and replacing the track around the loop.

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11. A few days later Ken added 45-degree concrete shoulders to his roadbed, increasing the width of the roadbed by six to eight inches. This prevents weeds from encroaching on the track and keeps Ken from damaging his track with a string-type weed trimmer when cutting the grass along the mainline.

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12. The concrete shoulder also provides a more prototypical roadbed profile. While spray painting the cement helps it blend into the surrounding scenery, the paint usually weathers off within a season.

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Modeling ideas from above



13. Steven M Conroy chases a long-distance Amtrak passenger train through the California hills from above with his drone. Note the variety of color textures in the browns, greens and grays of the scenery.



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Why and how to use a programming track



14. George Bogatiuk of SoundTraxx uses his home layout to explain how a programming track can simplify programming locomotives as well as how his NCE DCC command station uses it to determine what settings are already on a decoder. Watch the video to see how he does this as well as for other good reasons for using a programming track.



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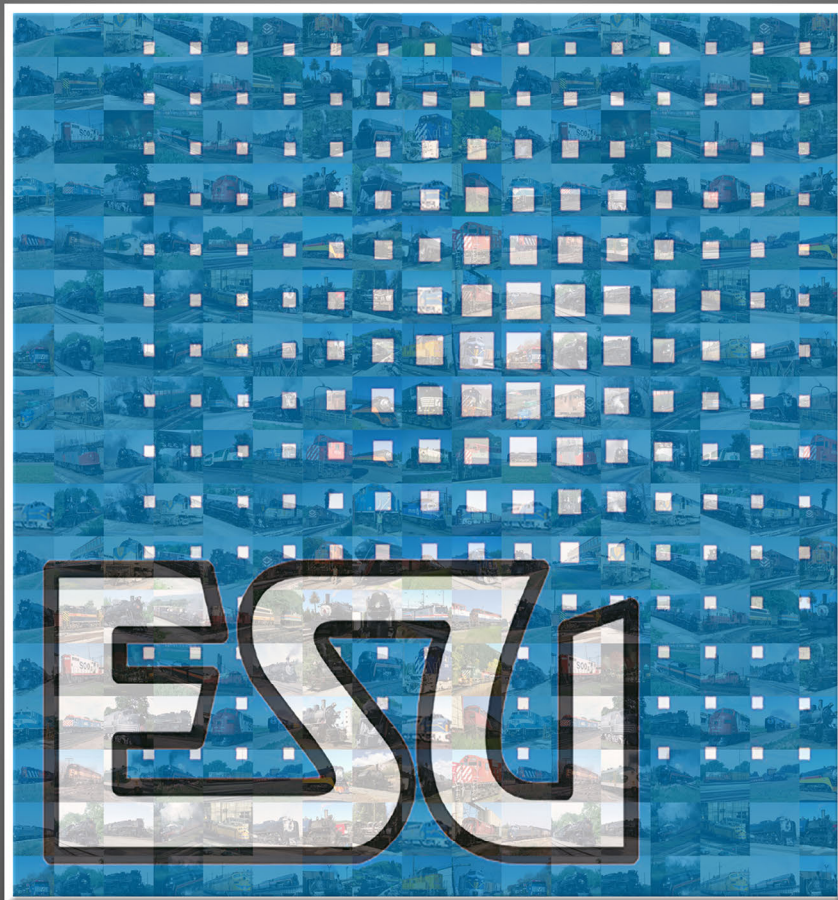


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Lighting effects using fiber optic strands



Electrical
Impulses

1. My industrial structure modeled using ITLA
[\[ITLAScaleModels.com\]](http://ITLAScaleModels.com) modular wall sections.

Model Railroad Hobbyist | September 2020

STEVE JURANICS EXPLORES USING FIBER OPTICS INSTEAD OF
LEDs TO LIGHT A STRUCTURE ...

**OVER THE LAST FEW MONTHS I'VE BEEN
WORKING ON AN** industrial structure [1]. The structure
uses ITLA industrial wall sections sold as individual four-story
sections – they're configurable in any way your imagination
can dream up.



I wanted something substantial (30" long) that fits the "worn industrial" feel of my early '80s-era layout.

I traveled to Trainfest in Milwaukee as part of the NMRA Niagara Frontier Region group – we do an annual pilgrimage to take part in the Modeler's Corner. While there, I attended a clinic by Michael Groves from Dwarvin.com where he demonstrated his fiber optic lighting product, the Lamplighter 1, see [2].

Michael convinced me to try fiber optic strands instead of LEDs for my structure lighting after outlining the advantages:

- Cheaper: Can cost less than using commercial LED-based systems
- Faster: Add lighting to structures quickly
- Simpler: No rat's nest wiring
- Safer: No heat is dissipated in or near the buildings being illuminated
- More flexible: Lighting effects limited only by your imagination

So I decided to try the Lamplighter 1 to add lighting to my structure with fiber optic strands.

The Lamplighter Starter kit cost just under \$100 CDN at the show. A single 12V wall wart powers the Lamplighter.

Below, I discuss the three different techniques I used on my structure:

- Over-door lights
- Interior section lighting
- Adding a lit sign.

OVER-DOOR LIGHTING

While Dwarvin provides industrial building lamps using optical fiber, they're designed for an older era. I prefer something more modern, so I custom-built some lights [3] using little sections of plastic C-channel to hide the ends of the 1mm fibers.

I used a #60 bit to drill 1mm (0.040") holes through the 3mm (1/8") wall sections and pushed the fibers through the holes until they barely protruded. The C-channel with a styrene end cap shields the end of the fiber.



2. The Lamplighter 1 has the capacity for numerous fiber strands to be inserted into a single port for distributing light to 20 - 30 points, depending on the size of the fibers.



3. I added lighting over the doors as shown here.



4. Here are the lighted doors, effectively representing these industrial lights in HO.

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LIGHTING EFFECTS WITH FIBER OPTICS | 5

The width of each light is 4-5mm (0.15"-0.20"), representing a real-life 18"-wide industrial light in HO [4].

LIGHTING THE BUILDING

I used a mixture of end fiber light as well as nicks in the fiber. Nicking the fiber allows light to leak out of the side. While this never provides the same intensity of light as light from the end of an "end-glow fiber" it does allow a single fiber to light various objects along its way.

For this I used mainly 1.5mm (0.060") fiber. In order to obscure any unwanted light from the fibers, I sprayed Dullcote on the window interiors, and covered some strands with heat-shrink tubing. The shrink tubing hides the strands where I don't want any light - and it serves to bundle the fibers together for easier routing [5, 6].



5. I routed the fibers throughout the structure, adding shrink tubing in places to block unwanted light.

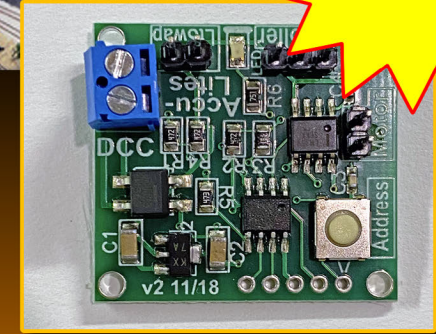
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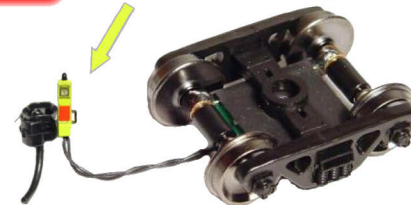
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LIGHTING EFFECTS WITH FIBER OPTICS | 6

LIGHTING THE SIGN

As a big experiment, I elected to light a sign on the front of the building. I am not sure how well this would have worked using traditional LEDs.

I used 1/8" clear Lexan, then printed the logo on basic printer paper and glued it to the front of the Lexan [7]. Next, I glued five strands of 1.5mm (0.060") fiber to the back of the Lexan, nicking the fibers in a number of places.

Finally, I put some black backing on the sign. The final effect was very acceptable and did a good job of replicating a sign with fluorescent tubes for illumination. I would have liked the printing on the sign to be more saturated. Also, I think if I had used a reflective foil backing, the illumination may have been more even.

When putting these techniques together, I found the final result to be quite satisfying.



6. By not covering and selectively “nicking” the fibers, I got the effect of several lights from a single fiber, as can be seen along the top floor illuminating the windows.

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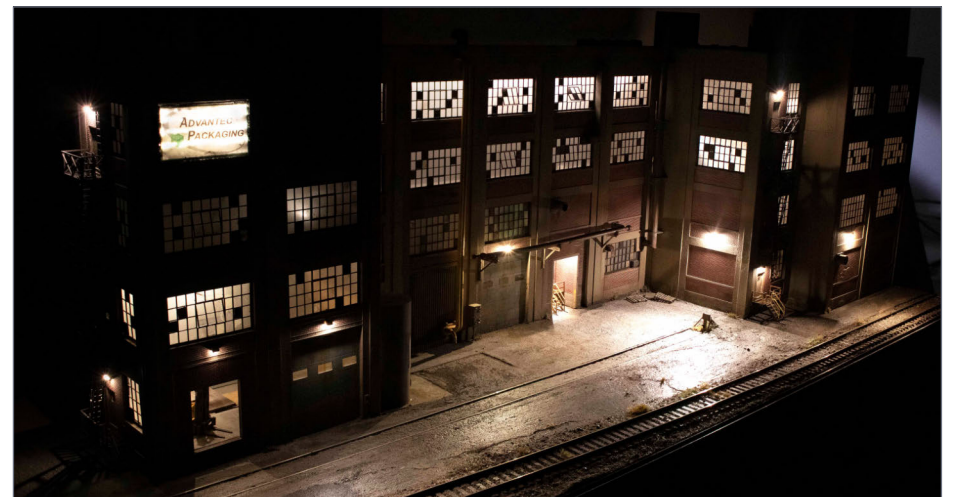
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7. I glued a paper sign to 1/8" clear Lexan, then ran five rows of fibers behind the sign to light it. Before gluing the fibers behind the Lexan, I nicked the fibers in several places to simulate florescent tubes behind the sign; also see [8].



8. The lighted sign.



9, 10. Here's how my fiber optics lighting project turned out. I'm quite happy with the results!



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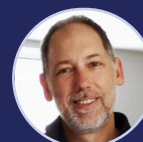
CONCLUSION

I found the fibers quite easy to route, and very effective at distributing the light throughout the structure. I also could change the color of the light by dabbing a marker or paint on the end or along the fiber.

One caveat: watch out for the glow that comes from the fibers along their run, and mitigate that using black shrink tubing. It's also not a good idea to kink the fibers or try to bend them at a sharp angle.

I reached the system's capacity with the amount of fibers I inserted into the unit for this one structure. But the alternative would have been to use about 25 - 30 LEDs and route a whole lot of wiring. That's over \$300 worth of LEDs and hubs on something like a Just Plug lighting system.

I have found fiber optics to be an effective way to light my structure interiors. ✓



S. Juranics

MORE MODELING TECHNIQUES

You can find more of my modeling techniques on my YouTube channel under "Muskoka Steve". Now that I'm getting back to the basement after a couple years of constructing my 1:1 scale residence, I hope to be posting some new videos soon.



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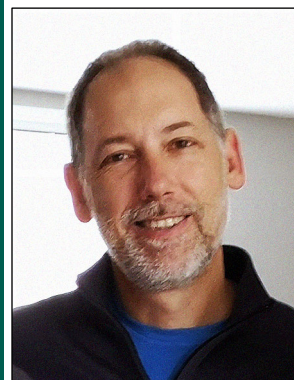


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LIGHTING EFFECTS WITH FIBER OPTICS | 10

STEVE JURANICS



Steve started modeling at an early age, and after a 30-year hiatus to take care of life, he jumped back into the hobby in 2010.

He has published many videos as Muskoka Steve on YouTube and appeared on the pages of *MRH* three times in the "Yes, It's a Model" feature.

Steve lives in Cambridge, Ontario and is about to embark on his third major

layout in his recently completed house. ■

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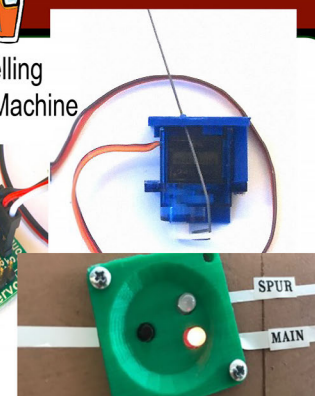
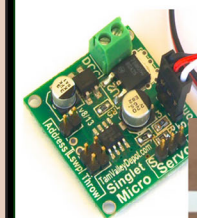
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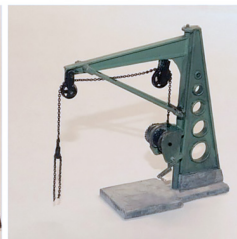
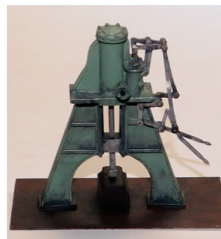
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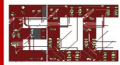
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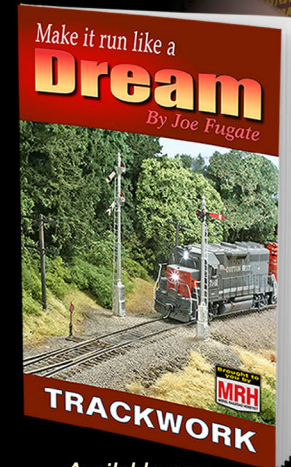
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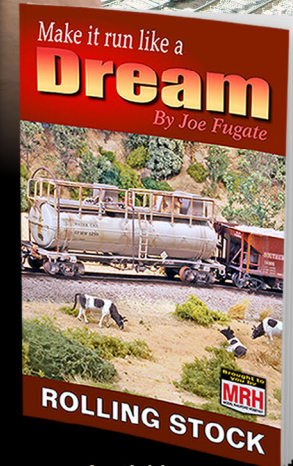
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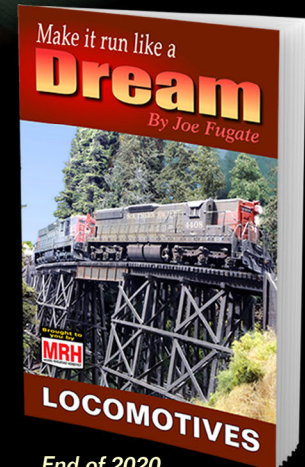
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Setting up operations



1. Watching your railroad come to life as it is operated by a few of your friends gives many of us great satisfaction. On this day Dr. Jim EuDaly (back), Dr. Lon EuDaly (side), Keith Robinson (on the phone to DS) and Ruth EuDaly (front) try to find out how three trains came to be in Walton all at the same time with only a short passing siding.



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Model Railroad Hobbyist | September 2020

MARK JUETT DISCUSSES CONSIDERATIONS NEEDED TO GET REALISTIC OPERATING SESSIONS UNDERWAY ...

WHERE DO I BEGIN? WHAT DO I NEED TO CONSIDER? How do I build on what I have? Many have these frequently spoken or unspoken questions as they contemplate setting up and starting realistic operation on their railroad.

At the NMRA National Convention in Salt Lake City in 2019, Joe Fugate asked if I would write this article based on the clinic I gave there and the previous year at Kansas City. I am pleased to do so and honored to be asked.

GOAL 1: REALISTIC OPS

For me, the ultimate outcome in building a model railroad comes from it springing to life with a few of your friends in a realistic operating session [1].

I am thankful that Floyd Britton gave me the opportunity to learn about operations several years ago [2]. Several other owners have allowed me to operate on their railroads, and added to my experiences and enjoyment.

Hopefully you have designed your railroad in such a way that it works much like a full-size railroad. Modeling a specific prototype and reproducing towns or sections of the railroad on your layout takes you a long way towards realistic operation. Tony Koester coined the term Layout Design Elements (LDE) to describe this.

By observing and copying the prototype, we have a great start in building a model railroad that operates realistically and can be quite satisfying to operate.

GOAL 2: RELIABLE PERFORMANCE

Second, nothing goes further towards enhancing your operations enjoyment than highly reliable performance. Detailed scenes can be nice, along with highly detailed equipment and structures – but if you constantly are plagued with derailments, accidental uncoupling, and other problems, that will greatly diminish the quality of the run.



2. The late Floyd Britton gave me my first opportunity at operations, and I will be forever grateful.

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Take your time and do a proper job in laying out and installing the track. Likewise, be sure that your rolling stock has properly fitted wheels and trucks, properly adjusted couplers, and weighted to at least the NMRA RP20.1 standard. Many have weighted their cars above this RP, myself included.

I admit that my railroad suffered reliability issues in the rush to be ready for the NMRA National Convention – and even with a host of volunteers helping me, some things were not as they should have been.

My crew and I have gone back to many of these areas and made corrections, improving the reliability over time. Joe Fugate's "Make It Run Like a Dream" series is a great place for you to start. It is filled with a wealth of information to help you attain reliable operation.

To quote my friend Joe Casper, "Build it and they will come; build it well and they will come back."

FIRST THINGS FIRST

Assuming that you have finalized the design and track plan, and you've built at least a portion of the railroad, let's get into a few things that can enhance your op sessions and increase your enjoyment.

First, your railroad does not need to be completely finished with detailed scenery to start operations. You can begin before you have weathered and ballasted the track. You can even start to hold op sessions before all track has been laid. Just a couple of towns can be enough to start.

A regular schedule for your sessions is helpful to keep you building progress moving in the right direction. It also goes a long way to help keep enthusiasm up. With a set date, your operators keep the date open.

"Build it and they will come; build it well and they will come back."



3. Keeping a regular date for your operation will help in your progress on the railroad and operators will keep the dates open. However, a landslide of plaster rock work or Covid-19 can impact the schedule.

Choose a day and keep the schedule – first Saturday of the month; second Friday; whatever it is. Until the call for social distancing this year, we operated the second Friday of every month with few exceptions.

One time when casting rocks near tunnel #4, my track became blocked when some castings fell loose, and we could not operate [3]. Yes, there will be family events, travel, and even construction on the railroad that may impinge on the schedule – but try to keep the schedule.

With a schedule, you will push to get projects completed by the next op session. You will also work towards having the railroad ready, with the construction mess picked up and cleaned up, track cleaned, and every aspect ready to operate.

FINDING OPERATORS

Where will you find operators? If you are fortunate enough to live in an area where there are several operating model railroads you can draw from that group [4]. Perhaps there are people that are helping you construct your railroad.

You may have to reach beyond the boundaries of your town, or you may have to generate the interest where none existed before. I am fortunate to have several operating railroads in my area, and several people helping me build.

I keep a seniority list on a spreadsheet. Those that are here more often and help build and operate gain a higher seniority on the crew list. Most hosts send out the crew call in a group email or group text. I use email.

CONTROLLING THE TRAINS

Digital Command Control (DCC) goes further towards enhancing realistic operations than almost anything. I have a



4. If you are fortunate enough to live in an area with several operating railroads, finding a place to operate or crews to operate your railroad can be relatively easy. If not, you may have to get creative to find crews. Here the late Wes Rupe, late Paul Evans, and Larry Diehl operate on Floyd Britton's Midland RR.



Railroad Interface to control switches, yard ladders, signals, and a CTC machine (yet to be built) and more.

5. I designed L&N as a DCC railroad from the beginning. Also as part of the original design, I included Dr. Bruce Chubb's Computer Model

friend that has a DC railroad and holds op sessions, but it could be a lot better with DCC, in my opinion.

I designed my current railroad to use DCC from the very beginning [5]. DCC allows the crew to concentrate on running the engine and not flipping block toggle switches.

DCC loco lighting effects have become very realistic and enhance realism. Sound-equipped locos add even more to the enjoyment. Seeing trains meet with multiple lighting effects, dimming the headlights, and horn signals adds a great deal to the enjoyment and realism.

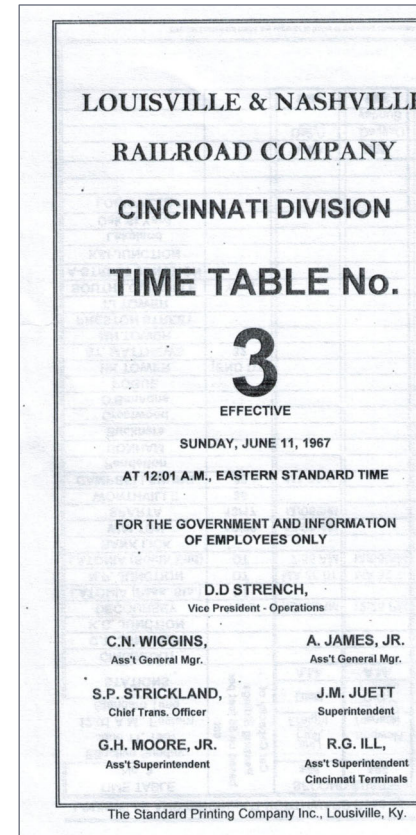
You do need to decide how you will control the traffic on the railroad. How will trains be dispatched? Installing a fully functional signaling system with a dispatcher's Centralized Traffic Control (CTC) board is not a trivial pursuit.

Full CTC control will take a lot of research, design, materials, and labor. Building a fully functional CTC signal system could take nearly as much time as building the rest of the railroad. However, some of us are dedicated to that idea.

In the interim one can implement any number of dispatching methods until a fully functional CTC system can be implemented. The most common options include: Timetable and Train Order (TT&TO), Track Warrant Control (TWC), and Direct Traffic Control (DTC).

Regardless of the method you select, you may find it useful to develop a timetable to schedule trains and manage the ebb and flow of traffic [7]. If more than one train will be on the line at any time, you should have a timetable.

If you model a specific prototype, you may be able to find a copy of a timetable for your railroad and modeled time period. Just look for it at a flea market, swap meet, railroad show, online (eBay), or through your railroad's historical society.



6. A timetable may very well be the first paper form for your railroad. Most word processors have typefaces (fonts) that can closely replicate the original. You can also name yourself as Superintendent on the form!

An old timetable can be a useful historical document. It can include things like a record of how many were trains scheduled to run on any given day, the number of first class, second class, and third class trains, the types of trains, and a hint of traffic density. Of course, unscheduled extras would not be shown.

Because we do not have the same distance between stations as the prototype, reproducing the schedule exactly to match your prototype is not possible. You can make the schedule fit at some key location such as at a division point, and modify the arrival/departure times for the other stations. You will have to fiddle with it a bit.

A spreadsheet can be an excellent tool for this. Set up the rows and columns to develop the schedule, stations, mileage from the main terminal, length of passing sidings, and so on.

You can also easily modify the front and back outside pages of your timetable to match your favorite prototype. Most word

processor programs have a variety of typefaces and font sizes that will closely match your prototype [6]. Some can even add a bit more by replacing the name of the Superintendent on the timetable with your own name.

Once you have a draft of the timetable, you can test it against how long it takes on the fast clock to run between stations. I suggest you time your first-class trains, making note of the departure time at all stations along the route.

From there you know the time it takes to travel from one station, make any required stops, and depart the next station. Now you can put the first-class trains on the schedule. Then repeat the exercise with second-class trains while padding the schedule a bit for meets with the first-class trains.

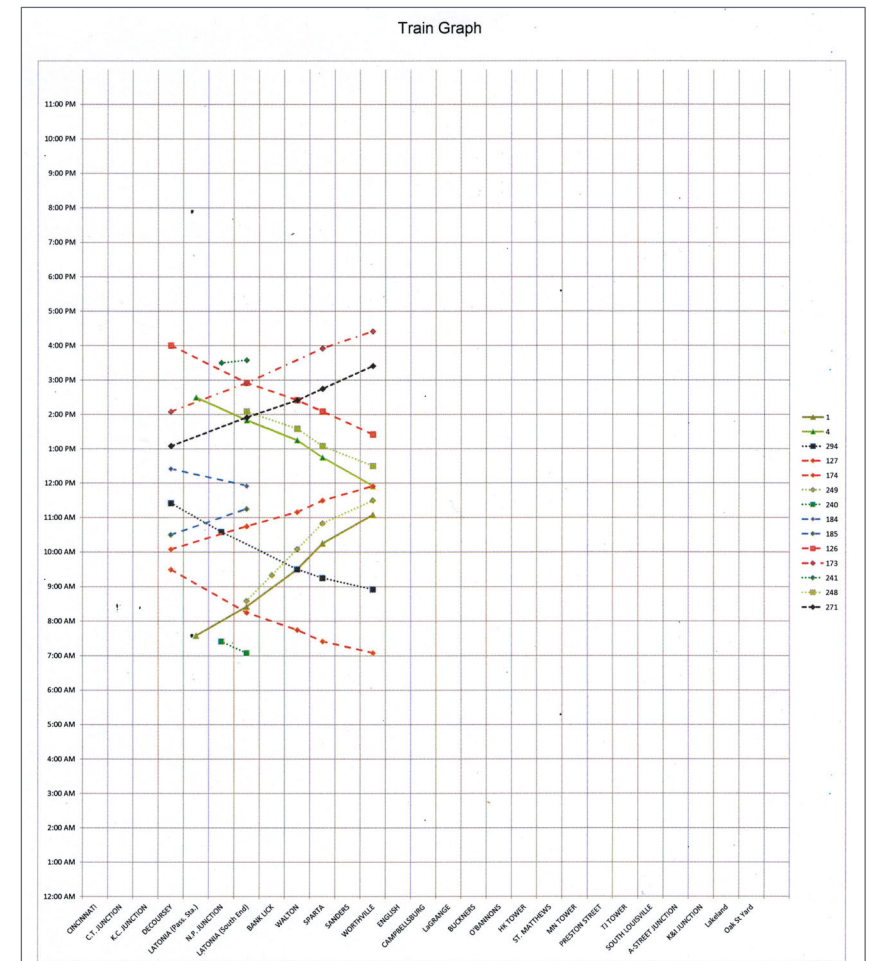
ND LOUISVILLE-SOUTHWARD Read down					LOUISVILLE AND CINCINNATI-NORTHWARD Read up									
SECOND CLASS			FIRST CLASS	Distance from Louisville	TIME TABLE	TIME TABLE	Capacity of cars based on 400 lbs per car	SECOND CLASS			THIRD CLASS			
185	127	1	No 5		No 5	4		174	184	126	240	294	248	
DeC Transfer	T.O.T.E	Local- Passenger		Effective Sunday, January 8, 1967	Effective Sunday, January 8, 1967			Local- Passenger	Fast Freight	DeC Transfer	T.O.T.E	Newport Local	Unit Coal	Worthville Turn
Daily	Daily	Daily		12 01 A.M., Eastern Standard Time	12 01 A.M., Eastern Standard Time			Daily	Daily	Daily	Daily	Daily ex Sunday	Daily	Daily ex Sunday
A.M.	A.M.	A.M.						A.M.	A.M.	A.M.	P.M.	A.M.	A.M.	P.M.
				113 20	CINCINNATI	CINCINNATI								
				112 45	C.T. JUNCTION	C.T. JUNCTION								
				110 21	K.C. JUNCTION	K.C. JUNCTION								
M	10 30 AM	10 05 AM		109 81	DECOURSEY	DECOURSEY	Yard		9 30 AM	12 25 PM	4 00 PM		11 25 AM	
			7 35 AM	108 57	LATONIA (Pass. Sta.)	LATONIA (Pass. Sta.)	DT	2 30 PM						
				108 11	N.P. JUNCTION	N.P. JUNCTION	DT							
M	11 15 AM	10 45 AM	8 25 AM	107 54	LATONIA (South End)	LATONIA (South End)	DT	1 50 PM	8 15 AM	11 55 AM	2 55 PM	7 25 AM	10 35 AM	2 05 PM
				95 62	BANK LICK	BANK LICK								
				91 26	WALTON	WALTON	10 20	1 15 PM	7 45 AM		2 25 PM		9 30 AM	1 35 PM
M		11 10 AM	9 30 AM	87 26	SPARTA	SPARTA	13 17	12 45 PM	7 25 AM		2 05 PM		9 15 AM	1 05 PM
		11 30 AM	10 15 AM	62 15	SANDERS	SANDERS								
				58 67	WORTHVILLE	WORTHVILLE								
M		11 55 AM	11 05 AM	49 17	ENGLISH	ENGLISH	13 32	11 55 AM	7 05 AM		1 25 PM		8 55 AM	12 30 PM
				43 97	CAMPBELLSBURG	CAMPBELLSBURG	20							
				31 33	LAGRANGE	LAGRANGE								
				25 33	BUCKNERS	BUCKNERS								
				12 33	O'BANNONS	O'BANNONS								
				15 53	HK TOWER	HK TOWER	(END DT)							
				7 49	ST. MATTHEWS	ST. MATTHEWS	32							
				4 98	MN TOWER	MN TOWER								
				3 64	PRESTON STREET	PRESTON STREET								
				2 19	TJ TOWER	TJ TOWER	Yard							
				1 69	SOUTH LOUISVILLE	SOUTH LOUISVILLE								
				1 40	A-STREET JUNCTION	A-STREET JUNCTION								
				1 17	K&I JUNCTION	K&I JUNCTION								
				0 95	Lakeland	Lakeland								
				0 50	Oak St Yard	Oak St Yard								
				0	LOUISVILLE	LOUISVILLE								
	A.M.	A.M.	A.M.					A.M.	A.M.	A.M.	P.M.	A.M.	A.M.	P.M.
Daily	Daily	Daily						Daily	Daily	Daily	Daily	Daily ex Sunday	Daily	Daily ex Sunday
185	127	1						4	174	184	126	240	294	248

Regular southward trains are superior to trains of the same class moving in the opposite direction.

7. Setting up a timetable is easy to do on a spreadsheet, thanks to the built-in columns and rows.

Last, add in the third-class trains using the same method. After you have held a few op sessions, take a look at the dispatcher's train sheet and you will know what adjustments you need to make to the train times.

Do not overlook creating a train graph [8] from the schedule to verify that the meets will take place at the desired locations.



8. From the spreadsheet, you can easily make a train graph to see where meets take place and to identify congestion points.

You want to ensure that traffic does not become too congested in some locations.

MATERIALS FOR THE TRAIN CREW

Create a description of the work each train will perform for your train crews. Many owners refer to this description as a train order (not to be confused with a Form 19 or 31 train order, more about that later).

Typically, this description runs about half a page, and can be laminated to protect it. giving the train number, the name of the train, station where it originates / terminates, and a brief description of the work it performs. This document guides the crew as to the work they need to do [9].

240 Newport Local

Originates 7:05 AM from Latonia

See yardmaster to pick up your train and switch list.

Couple to train. Lace up air hoses and connect air hoses to engine. Pressurize air lines. Inspect train. Test brakes.

Call Dispatcher, "At Latonia, Train 240 is ready to depart with ____ loads and ____ MTs. Crew is ____."

The dispatcher will align switches on south end of Latonia yard and signals will clear when you are cleared to depart. Back train onto passing siding. When clear of arrival/departure track Dispatcher will align switch to the passing siding and align the crossover. Proceed to N.P. Jct. Stop short of switch. Align switch to Newport. When clear of main, stop and return switch to normal. (You will complete this move before #174 arrives in Latonia.) Proceed with your work according to the switch list.

You will become train 241 for the return to Latonia.

Turn this card over for Train Order 241.

9. Laminated train orders give instruction to the crews about the work they will do and when and where they will start.

Many of us have found it useful to create engine cards, also laminated to protect them. The card gives the unit number, reporting marks, model number, DCC address and a map of what function buttons control what functions [10].

Try to maintain consistency. If F0 controls the headlight on one loco, it should be the same on all. Many people have remapped frequently used functions to lower buttons for easier access. Your functions might not be mapped the same as your friends, but you should be consistent within your fleet. Some of us have additional info on the back side for less-experienced operators, such as whistle signals and line side signals [11].

253 L&N	
RS-3	
DCC Address:	253
Function	Effect
0	Lights
1	Bell
2	Horn
3	Short Horn
4	
5	
6	Air Brake
7	Dim Headlight
8	Mute
9	Ground Lights
10	
11	Compressor
12	Fans+
Tonnage Rating	

I have sound car decoders in my cabooses. This adds a bit of animation, sound, and lighting effects. I have flashing end-of-train lighting on each end, plus interior lighting and stove , in addition to wheel and flange squeal. So the train crews need a bit of additional instruction to set up. For this, caboose cards fill the bill [12].

10. An engine card helps the crews know the DCC address of the loco if different than the unit number. It also tells them which function keys control which outputs (horn, bell, lights etc.)



Horn Signals

STOP	0
PROCEED FORWARD	--
BACK UP	000
GRADE CROSSING	-- 0 --
APPROACHING STATION, TUNNEL OR BRIDGE	-

Trackside Signals

G	CLEAR	PROCEED
G/R	CLEAR	PROCEED
R/G	DIVERGNG CLR	20MPH
Y/R	APPROACH	STOP NEXT
R/Y	DIV APPROCH	20MPH& STOP
R W/#	PERMISSIVE	STOP PROCEED
R/R	ABSOLUTE STOP	

11. The back side of the engine card has a few whistle signals on it and lineside signal aspects.

6197 L&N	
Caboose, Bay Window	
DCC Address:	6197
Function	Effect
0	Flashing EOT
1	
2	Whistle
3	Short Whistle
4	
5	Uncoupling
6	Brakes
7	Coupling
8	Mute
9	Interior Light
10	Stove Flicker
11	
12	
To change Flashing End Of Train Device and link this caboose to your loco; see instructions on reverse side of this card.	

12. A caboose card performs a similar function to the engine card. All our cabooses have sound car decoders for end-of-train flashing lights, interior lights, brake sounds, and wheel noise from the caboose.

You can make a loco or caboose card easily using word processing or spreadsheet software.

MOVING A TRAIN

Before a train may depart, the crew needs a clearance form from the dispatcher [13]. You can often find one for your prototype with an online search – download it and format a version in a word processing program.

Usually you can fit four clearance cards to a page, then cut them apart.

Your dispatcher will need to complete the card before handing it to the train crew. The dispatcher needs to note if there have been any train orders written that affect this train.

639-4-11-74	
Louisville & Nashville Railroad Company	
CLEARANCE FORM A	
Station	_____
Date	_____ 19____
C&E	_____
I have	_____ orders for your train.
Nos.	____ _
On account of a preceding train do not leave this station until _____ M	
1 To be used only when necessary to comply with Rule 91.1	
Time	_____ M _____ operator
If no orders write "No" in space provided for number of orders.	

13. A clearance form must be issued before the crew may move onto the road. An online search for your prototype and "clearance form" will likely turn up an original you can model.



The dispatcher can also note at what Station the crew should receive this clearance card, as well as the date and time the clearance becomes effective.

Once a train gets out on the railroad, it may be necessary to issue train orders to keep things moving, protecting extras, or giving rights to one train over another should the superior train become delayed for some reason.

Again, an online search for such a form for your prototype railroad will likely turn up an example. Then back to the word processor to create a Form 19 and Form 31.

These two forms look just alike except the 19 or 31 at the top [14]. The difference is a train crew must stop and sign for a Form 31, whereas a Form 19 may be passed up to the crew on an order hoop. Hooped-up, in other words.

14. Form 19 (and 31 which looks identical except for the 31) will be needed if your dispatcher will issue train orders. Just lay out one in word-processing software based on your prototype's form.



15. Some bad order Forms for your crews may help them report problems so you can correct them later.

Some of us create bad order forms [15] to encourage our operating crews to help identify problems in rolling stock, locos, track, or anything else that diminishes the operating pleasure.

For my first attempt, I just did a quick creation on the computer with no research online for a prototype form. My NW car knocker friend Jerry has not criticized the appearance of the form, so it has never been researched and upgraded for more prototype accuracy.

If you have a dispatcher (DS), he or she will need an office [16]. Jim EuDaly has an addition to his 50x80-foot Butler building for a dispatcher's office. Some have put the DS office under the stairs, inside a helix, in a spare bedroom, or as I did, in a closet [17].

The dispatcher needs a flat work surface (a table) to write train orders, log trains on the train sheet, and to complete other forms. They will need a comfortable chair, good lighting, and a



stack of forms, plus a writing instrument and some system to keep the blank forms organized [18]. A file folder organizer or a custom-built cabinet to hold the forms, take your pick.

The DS also needs a means to communicate with the train crews and yard crews. Many have installed a party line phone system [19]. Some have gone authentic with a telegraph, but most of us have forgotten Morse code or never knew it.

Those modeling modern periods use short-distance two-way radios. Several companies sell two-way radios. Model Railroad Control Systems sells components for a complete phone system. They also sell telegraph keys and sounders. You just need to choose between being accurate for the period versus the difficulty of installation and use.



16. A place away from the railroad for a dispatcher's office adds to the realism.

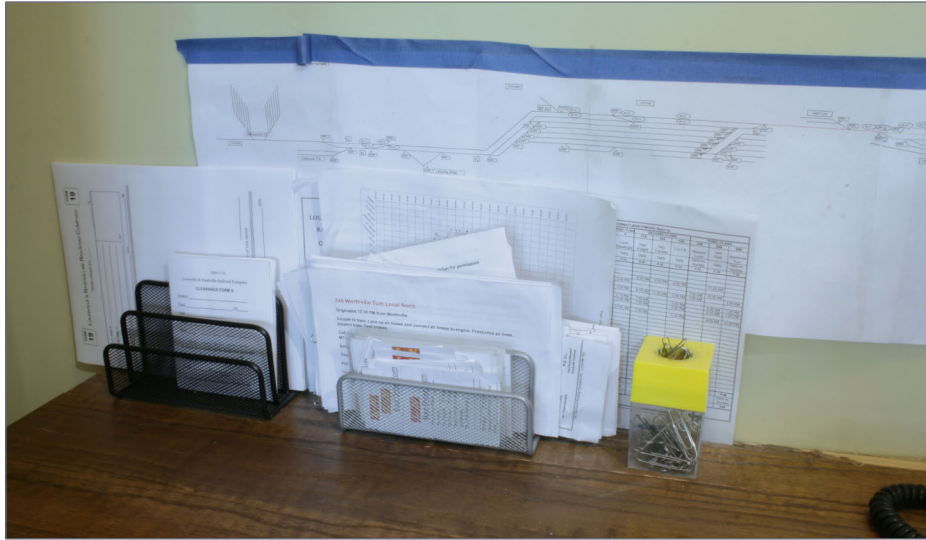
Keeping time with accurate clocks is important to railroad operations, particularly with timetable operations. You can find a number of options on the market for clocks: I use Logic Rail repeater clocks on the throttle bus [20].

Logic Rail makes models that work on NCE or Digitrax. I have one over the Dispatcher desk and another in the crew lounge. My crews use the clocks on the NCE Pro Cab throttles to watch the time.



17. I placed our dispatcher's office in a closet along one wall of my basement office.





18. A desk for writing, good lighting and the needed forms properly stored and organized increases the enjoyment.



19. A means to communicate between the dispatcher and operators or train crews will be needed. This vintage Western Electric 58 headset remains as uncomfortable as it was originally in 1967.



20. Clocks that keep time together will be needed for most operations (especially timetable operations). Several throttles have displays with fast clocks. I mounted this repeater clock in the DS office, with a larger clock in the crew lounge.

THE DISPATCHER

The dispatcher keeps track of the trains on the train sheet, protects extras, and issues orders as needed to keep things moving should a superior train be delayed significantly.

If you have CTC instead of train orders, the DS controls signals to get trains over the road.

The dispatcher can also hand out train packets, file returned paperwork, and/or generate a switch list for new trains. It depends on the density of traffic and how involved the operation gets. In short the DS controls the railroad.

OPERATIONAL AIDS

You might want to consider some additional operational aids. Many of us have found a lanyard attached to our throttles helps

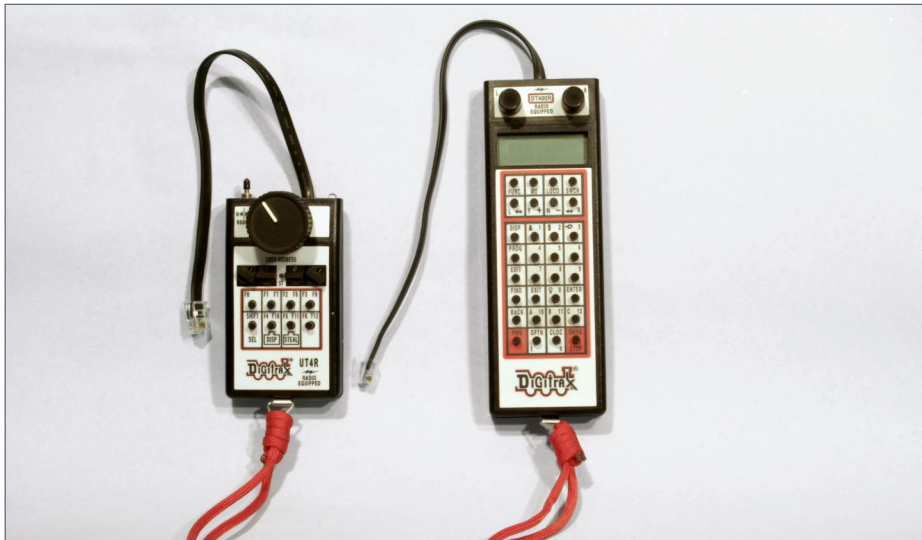


safeguard against damage by being dropped to a concrete floor. The lanyard can really help when the operator tries to handle paperwork, uncoupling tools, and a throttle all at once [21].

Several of us have attached large paperclips to the back of the throttle [22] to hold loco cards, train orders, etc.

An idea that I picked up from Bill Scheerer is to hand everyone a nail apron [23] to store paperwork, uncoupling picks etc. They are available from home-improvement stores for under \$1. At the end of the session you can find lost forms and uncoupling tools there. The incidences of operators taking paperwork and uncoupling picks home is reduced.

Even with aprons, it can also help to have large spring clips attached to the fascia [24]. The crew can put the switch list there for easy referral without digging it out of the apron or a pocket.



21. Attaching a lanyard to your throttles prevents damage from drops to the concrete floor.



22. Attaching a large paper clip to the throttle can help hold train orders and engine cards in plain view.



23. I got the idea of using nail aprons from a home-improvement store from my friend Bill Scheerer. The aprons holds the paperwork, uncoupling tools, and keeps them handy.



When selecting throttles, maybe you can get by with tethered throttles and have operators plug in. You will need a lot of throttle panels, sometimes more than one at each location. When there are too many in one area, the cords can become a tangled mess.

I equipped my entire railroad with radio throttles. Yes, they cost more, but they allow operators to remain free to move where they need, and not become entangled. With radio, you don't need as many throttle panels or throttle pockets – just a radio antenna.

With Digitrax, the throttle panel also acts as the radio receiver/transmitter. The NCE system has a radio antenna that plugs into the throttle bus. I mounted my radio antenna on the ceiling above everyone for better coverage [25].



24. Large spring clips attached to the fascia provide a convenient place to hold the switch list, making it easy to see and read.



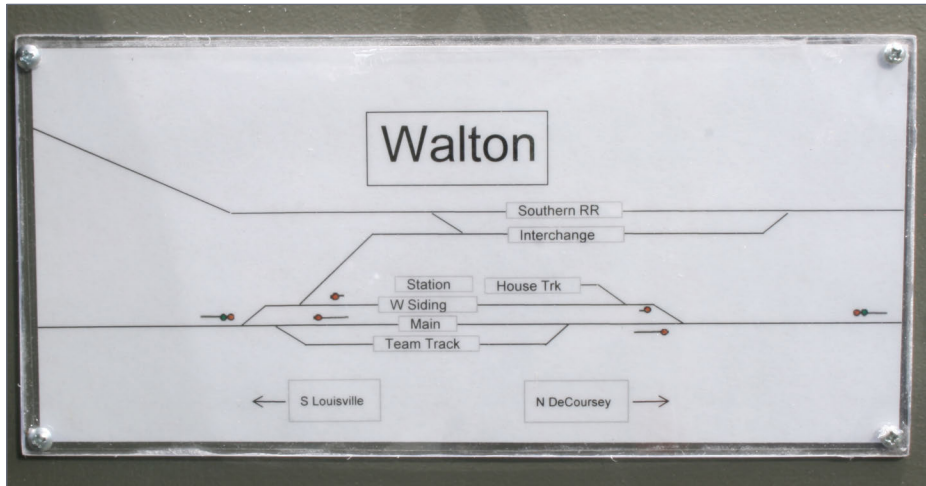
25. I mounted the NCE RB02 radio antenna on the ceiling for better coverage. I also installed a radio repeater to cover my zig-zag basement space.

LABEL EVERYTHING

Everything and every place on a railroad should have a name. It eliminates confusion when referring to a place, a track, an industry, etc. A small track diagram with the name of the location and labels for each track [26] make it much clearer where Newport Mills track #2 is. Cars have a better probability to be in the right place at the end of the session. Also, having the names of businesses displayed where they are easy to read is helpful, and putting signs directly on the building makes it clear [27].

However, this scrap yard needs no sign [28]. It is very clear that this siding serves the scrap yard. If you don't have structures

and scenery in place, simply writing the name of the business nearby works as a temporary solution [29].



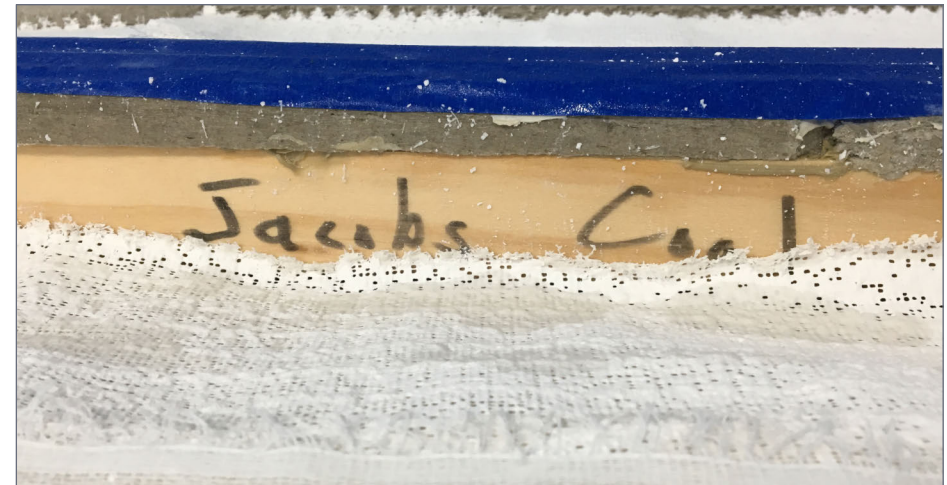
26. Maps on the fascia with all tracks names and identified helps crews navigate and place the right car in the proper location.



27a, b. Having the name of the business on the building makes it easy for a new crew member to identify the rail-served customer.



28. Obviously, this is a scrap yard, even without signs.



29. If you have not built a structure yet, marking the location with a marker helps operators. [Or just add a cardstock tent sign – ed.]

TURNOUT CONTROL

Switch locks provide an additional opportunity to slow people and add operating interest. These were designed and fabricated from Lexan, and use decal paper printed backward on a laser printer [30].

A key switch and toggle switch are controlled by Computer/Model Railroad Interface (C/MRI). Detection circuits determine if the switch interlock is clear and safe to operate the switch. The software also checks that blocks leading to the switch are clear, and if not, delay opening the switch, allowing enough time for an approaching train to get close enough to be seen by this crew. Once the CTC machine is built, the Dispatcher will have control over this, and allow the local crew to put the switch in Hand mode.



30. Switch locks and software timers can add realism and extend the duration of the run for crews.



31. Grinding down the end of an inexpensive small screwdriver to a point makes a handy uncoupling tool. I glued a small rare-earth magnet on the handle to activate a caboose sound car decoder for coupling/uncoupling.

UNCOUPLING CARS

As you plan your railroad, you might consider what method you will use to uncouple cars. Many prefer magnets on or under the track. Some object to the appearance of a magnet between the rails, and go for a magnet below the ties.

They will then install a painted post or paint a spot on the rails to help locate the magnet now invisible under the ballast. I have had some issues with unintended uncoupling with magnets beneath the rails. Usually it is related to the slope at the point creating slack which allows cars to uncouple.

Using an uncoupling pick reduces unintended uncouplings. It allows you to uncouple any place that you can reach. Extended reach is a good reason to use a magnet.

I ground-down the point on some screwdrivers to make uncoupling tools [31]. A magnet on the other end is handy to trigger the reed switch in the sound car decoders in cabooses and refrigerator cars.

Others have used commercial products, bamboo skewers, and any number of homemade tools. If you are holding night operating sessions, consider providing a small flashlight so crews can read car numbers. A clever idea I once saw was the flashlight and uncoupling tool taped together to make one tool.

YARDS AND INTERCHANGES

Every railroad (model or prototype) will likely have a major classification yard where trains are made up and broken down. Latonia Yard [32] serves that purpose on our version of the L&N.

From there trains go in three directions. They will need destinations beyond the visible portion of the railroad. Interchanges to other roads give us the opportunity to move



32. Latonia yard bustles with activity. Many trains originate or terminate here. Several trains drop or pick up cars, and a few trains just pass through.



33. Interchanges with other railroads give the cars a place to go beyond your visible railroad to the outside world.



34. The Pennsylvania interchange at Newport extends into my office on a drawer with six tracks. An interchange with the CNO&TP goes beneath a large hill.

cars off our railroad and receive cars from foreign roads. We don't get bored seeing the same cars at the same industries every session.



We have interchanges with the C&O, PRR and CNO&TP [33]. Two of these are in the Newport Covington area, and the third is at Walton. Two are interchanges where cars go away for three sessions before returning. The CNO&TP interchange at Walton is a three-track yard 42" long in a drawer. Cars are exchanged with each track in turn over the course of three sessions.

35. As Superintendent, you will decide if Rule G is enforced.



36. Regardless of the beverage, drink holders conveniently placed reduce the spills and add to the enjoyment.



37. You will decide what types of trains will run such as this Trailer On Train Express (TOTE), unit coal trains, auto carriers, auto parts, strings of refrigerator cars, manifest freight, and crack passenger trains.

OTHER CONSIDERATIONS

As the superintendent, you need to decide if you will enforce Rule G: no consumption of alcohol while operating. We model 1967 and we're pretty relaxed about having a beer or two during an Op Session or work session.

Regardless of your stance on Rule G [35], providing a nice crew lounge and places to hold beverages while operating will reduce spills and enhance the enjoyment [36].

As you decide on your operating plan, you will need to decide on the types of trains you are running, local switchers, out-and-back turns, unit coal trains, trailer-on-flat-car, manifest, mail trains, passenger trains etc.

Will you have a run-through by a foreign road with trackage rights or an emergency due to a track washout? As you design, you get to decide what to implement from the prototype and what adds interest [37].

CONCLUSION

This article covers my approach to realistic operation. There certainly can be more things to think about and other ways to do operation.

I hope this has given you useful things to consider when setting up operations on your model railroad. ☒



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MARK JUETT



Mark has been involved in model railroading for over 50 years. Like most, it started with a train set at Christmas.

Much of the intrigue of model trains for Mark came from the mechanical and electrical/electronic control aspects. This interest in things mechanical and electronic led to an Associate Degree in Electronic Engineering Technology, and later a BS in Ag Engineering. Seven years after college he returned to

school and obtained an MBA from Rockhurst College in 1987.

Mark converted to DCC early on and writes the monthly column "The Pulse of DCC" in the NMRA Magazine. In addition, he is the manager of the NMRA DCC Working Group. Mark also became an early adopter of Dr. Bruce Chubb's Computer/Model Railroad Interface.

Mark has shared his experience with others through clinics and presentations at NMRA Division, Regional, and National Conventions. He served as Clinic Chairman for the NMRA 2018 National Convention in Kansas City.

After years in the corporate world, Mark now builds and maintains custom model railroads (he took over Miles and Fran Hale's business), and does other custom model railroad work in addition.

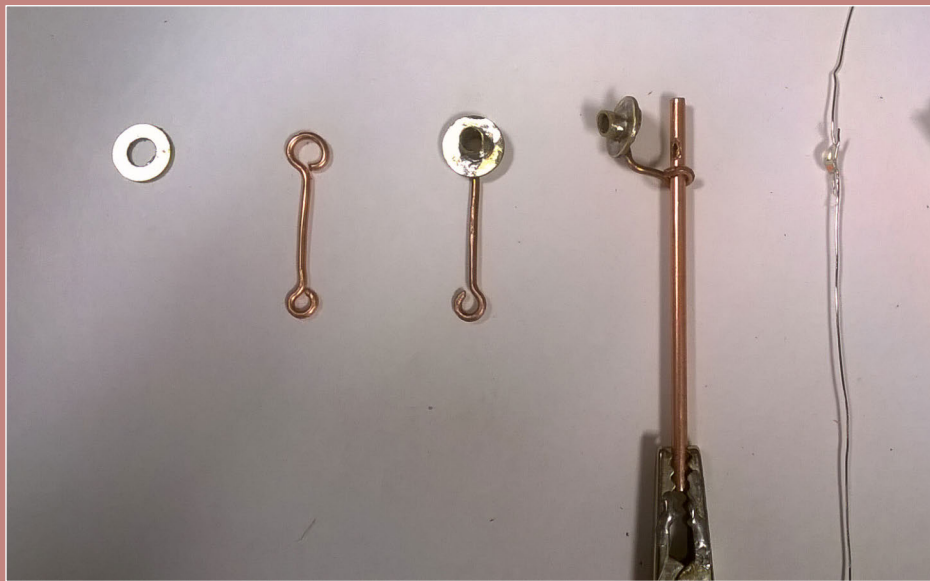
Mark currently holds the following National Model Railroad Association Achievement Program certificates; Engineer Electrical, Engineer Civil, Model Railroad Author, Master Builder Scenery, Chief Dispatcher, Association Volunteer and Master Builder Structures. He is two scratchbuilt cars away from Master Builder Cars and Master Model Railroader. ■

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Scratchbuild simple bi-color signals



Model Railroad Hobbyist | September 2020



RATE THIS ARTICLE

PETER FRIEDRICH ON MAKING SEARCH LIGHT SIGNALS WITH AN UNUSUAL LED SOURCE ...

AS SUMMER STARTS TO WANE, Christmas will be here before we know it, and thoughts turn to model trains around the tree.

Last Christmas I found a red-green light string [1] and immediately thought of signals!

SIMPLE BI-COLOR SIGNALS | 2

Sometimes, as things go, a popular seasonal item like this sells out before the season reaches its zenith. I did not wait – I acted immediately and bought a string.

As I examined them closely, I found the “dewdrop” encased two LEDs wired to illuminate depending on polarity. When powered with DC current one direction, the string illuminates the green LEDs, and reversing the polarity illuminates the red LEDs. Simple enough.

Better still, it’s done with two wires, instead of the three used with common-anode bi-color LEDs. Yet another advantage to this string is these small LEDs are pre-wired and the wires are insulated. Quite the bonus when handling miniature LEDs.



1. The red-green Christmas LEDs that inspired this project.

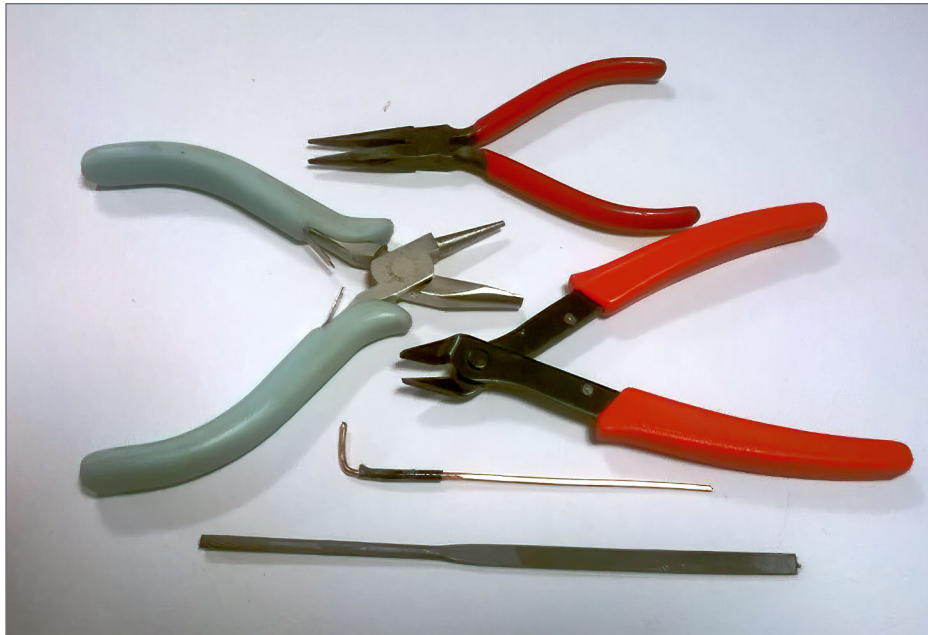
BUILDING THE SIGNALS

A photo of tools employed does not include a Dremel motor tool or soldering iron [2].

I carefully removed the light string from its packaging [3].

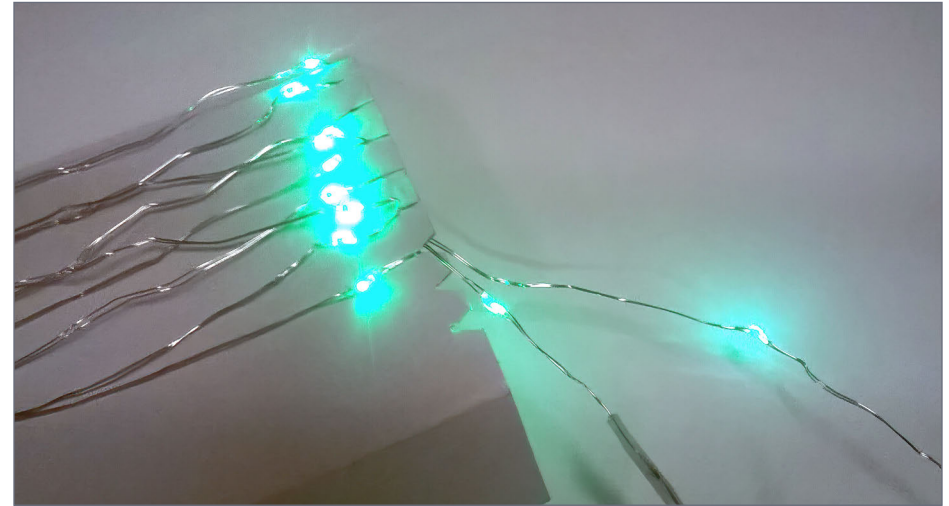
SCRATCHBUILDING THE SIGNAL MAST

I decided to scratchbuild a signal that looks like a single-head searchlight signal from Azatrax [6] [azatrax.com/ho-searchlight-block-signals.html]. I chose a robust and simple method for a basic solid HO signal mast that I could then detail.

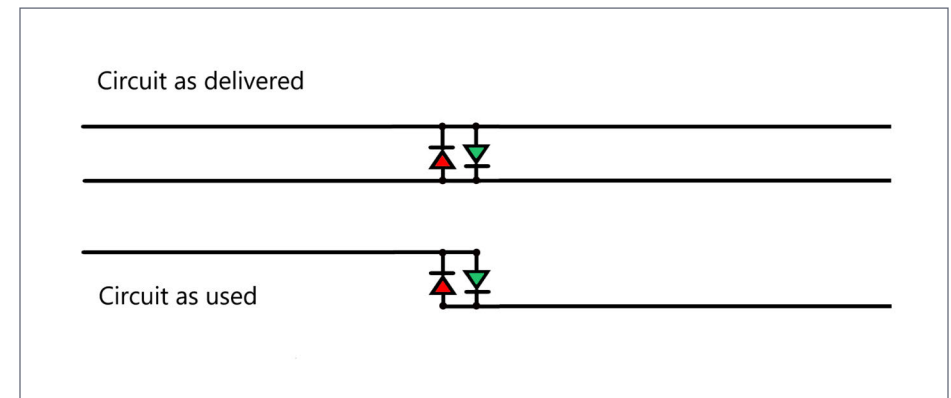


2. Tools used in this project (top to bottom): Needle nose pliers, round-flat nose wire looping pliers, lightweight diagonal cutters, #16 tube support wire, and a flat needle file.

My goal here is to show you how to get the basic mast signal with working green-red LEDs using just two wires. I leave the final signal detailing and mounting to you.

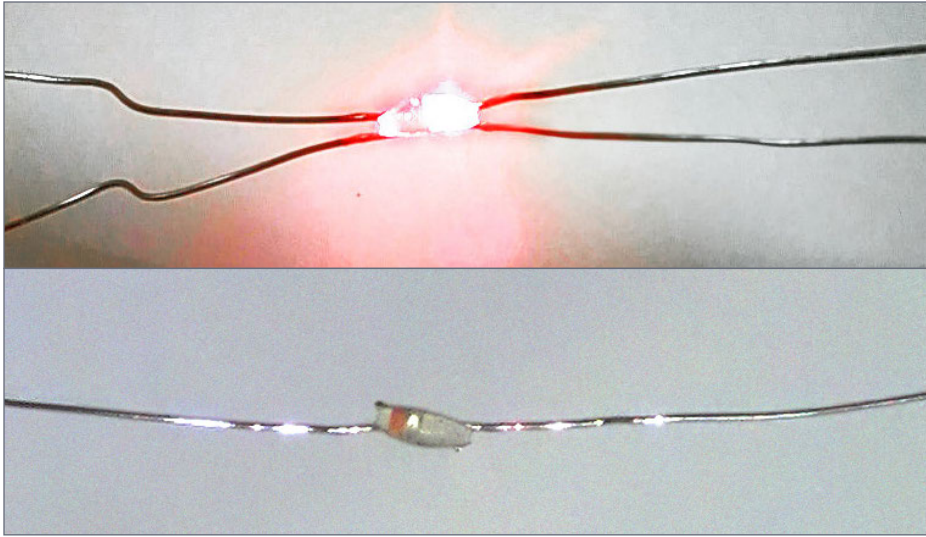


3. Carefully unwrap the dewdrop lights from their packaging.



4. As delivered, there are four leads to each LED pair, but I cut off two to yield just two leads per red-green LED set.

SIMPLE BI-COLOR SIGNALS | 5



5. As delivered (top) and leads trimmed (bottom) – just make sure you orient the red-green LED pair with the red on the left and then trim as shown. Also see [4].



6. My inspiration for a simple signal mast is this nice search-light signal from Azatrax.



SIMPLE BI-COLOR SIGNALS | 6

I started with 3/32" brass tube for the main mast and cut it to a scale 15-foot length. Signal masts typically support the signal head at an elevation of 12 feet, but I chose to leave extra length to give me more mounting flexibility later.

To cut the tube quickly, I used diagonal cutters and supported the interior of the tube with solid wire – #14 or #16 depending on the inside diameter of your tube

After cutting the tube, I used a needle file to deburr and smooth the ends.

Next, I used the narrow edge of a needle file to open a small hole in the signal mast tube about 1/4" from one end. A motor tool will also work. Make sure to not leave any burrs, as one LED wire will pass through this opening [7].



For the signal head disk, I used a #8 brass washer and a 5/32" diameter brass tube cut on a bevel to form the signal lens hood. I soldered the tube in place onto the brass washer.

I bent one end of #14 wire to fit the signal mast using wire loop pliers. I bent the other end to fit the signal head and shade made from 5/32" tube [8]. I kept the loops on the same plane.

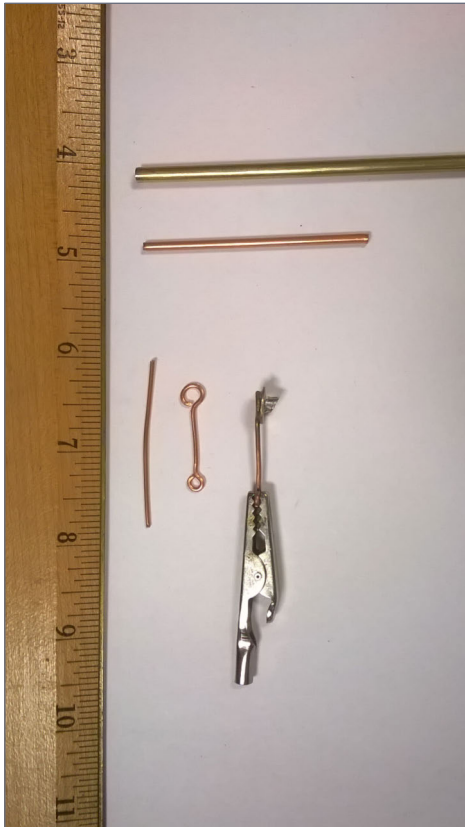
7. I used a needle file to file a hole in one end of the 3/32" brass tube 1/4" from the end.

While assembling, I cleaned up excess or out-of-place solder.

I assembled the signal head parts as shown in [9] with the support bracket behind the signal head shield. I chose not to cut the hood to size until the support was properly soldered. Once soldered, I cut the back of the lens hood tube flush with the back of the support arm holding the signal head.

Then I dry-fitted the finished signal head on the mast as shown in [10]. The cut in the mast must be behind the signal head. Once I was happy with the placement, I soldered the support arm to the mast.

Then I bent the support arm to point the signal head outward.



8. Forming the signal head support using #14 copper wire. The 3/32" mast and the 5/32" tubing for the lens hood are at the top.



9. Soldering the signal head to the support arm.



10. Dry-fitting the signal arm assembly onto the mast, making sure to align the back of the signal head with the notch in the mast.

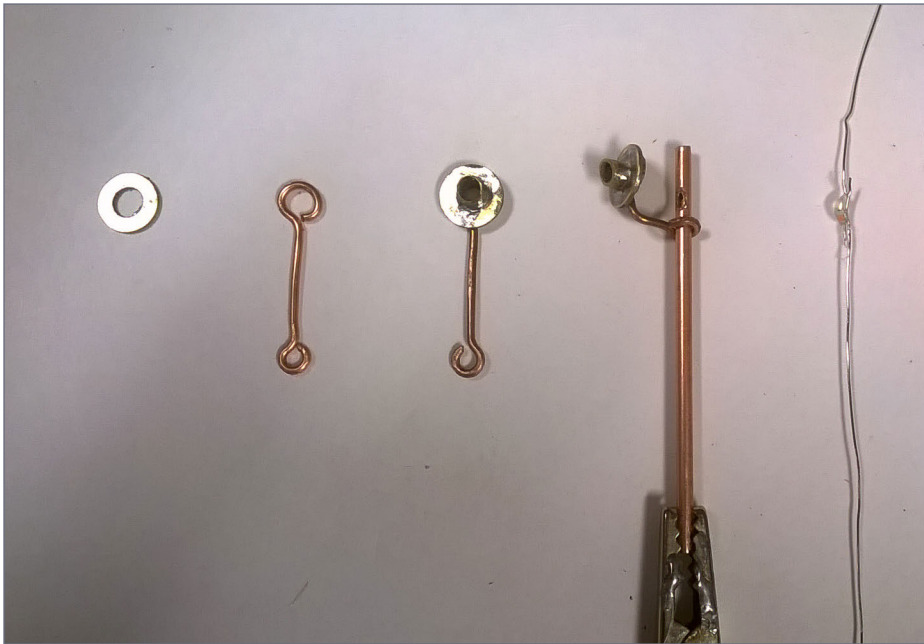


FITTING THE LED

To get the LED to fit, the “dewdrop” plastic covering needs to be trimmed with a sharp X-Acto knife.

Note where the green and red LEDs are so you consistently mount them the same into each signal. Otherwise, they will look slightly different. I mounted the green LED on the top in the signal head housing.

I fed the wire from the red side down the signal mast (remember, it's insulated). Once the wire was fully threaded through, I scraped insulation off its end.



11. After soldering the supporting arm assembly in place on the signal mast, I bent the signal head outward. This photo summarizes the entire assembly process.

I scraped the insulation coating off the wire next to the green LED, and trimmed it to about 1/2" – then bent it at a right-angle 1/4" from the end. I inserted the LED into the lens hood from the back, and soldered the part of the lead closest to the green LED to the back of the signal head, using the other 1/4" of this short lead as a handle. Once I had completed this job, I trimmed the excess green lead flush with the back of the signal head.

To get the signal to operate, I just soldered a lead to the bottom of the mast. Then I connected power to the two leads – the one soldered to the mast and the one threaded through the mast shaft from the red side of the LED. But add the proper resistor before first applying power – more about that below.

Make sure your signals each have the same LED wiring – reversing these will reverse the color response when energized!

Reverse the polarity to change color as desired, red or green.

Remember that LEDs require a current-limiting resistor in series. The resistor value will vary depending on the brightness you want and the voltage supplied. For 12VDC I added a 470-ohm half-watt resistor. Pay attention to this wattage, as I found a quarter-watt resistor got hot and my first LEDs burned out. It does not matter which wire is attached to the resistor.

GOING ON FROM HERE

This gets the basic signal mast structure built and operational.

From here you can solder a brass ladder to the mast. The base can be shaped from styrene sheet and tubing, tapering the base sleeve and adding some bolt detail.

Styrene can also be used to fashion a proper box to cover the back of the signal head and to fashion a suitable mast cap. The one lead from the red side of the LED can be shaped to look a lot like the prototype signal head cable.

Then just apply some silver paint to the signal mast and black paint to the signal face, and mount the signal on the layout. Wire them up (see the following pages for details on some circuits to use to drive these signals) and enjoy these simple but virtually indestructible signals as you run your trains. ☑

PETER FRIEDRICH



Peter Friedrich's railroad interests began as a child with the Erie Railroad across the street.

The hobby's many facets likely can be implicated in his choosing a career as an industrial designer. His modeling was interrupted for several decades, resuming again so he could pass down the fun and skills to his sons. He lives with his family in New Jersey. ■

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WIRING BACK-TO-BACK LEDs CONTINUED ...

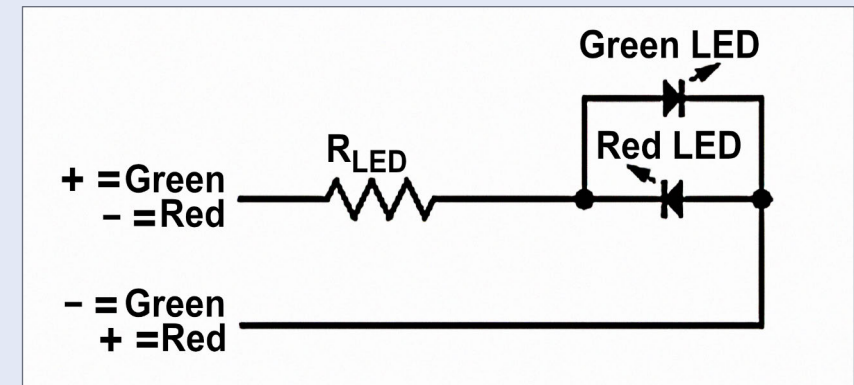
By Mike Dodd

“Back-to-back” wiring means connecting the anode of one LED to the cathode of the second, and then connecting the anode of the second to the cathode of the first [1]. The benefit of this is that only two wires are needed to the circuitry that “drives” (powers) two different colored LEDs. As with any LED circuit, a resistor is needed in series to limit the current. This is designated R_{LED} in the circuit drawings.

But wiring LEDs this way means you need to *reverse the polarity* of the voltage to control the color. Refer again to [1]. When the voltage across the two wires is +/- the green LED lights. When the voltage is -/+ the red LED lights.

USE A TOGGLE SWITCH

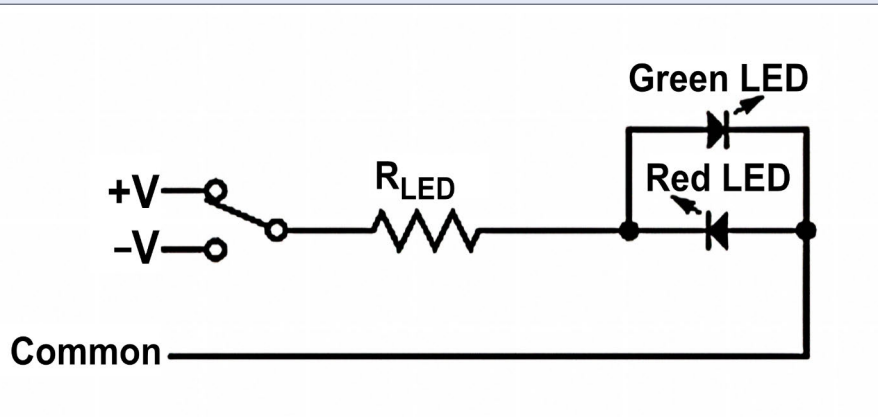
You can use a single-pole-double-throw (SPDT) switch and two DC power supplies to manually control the



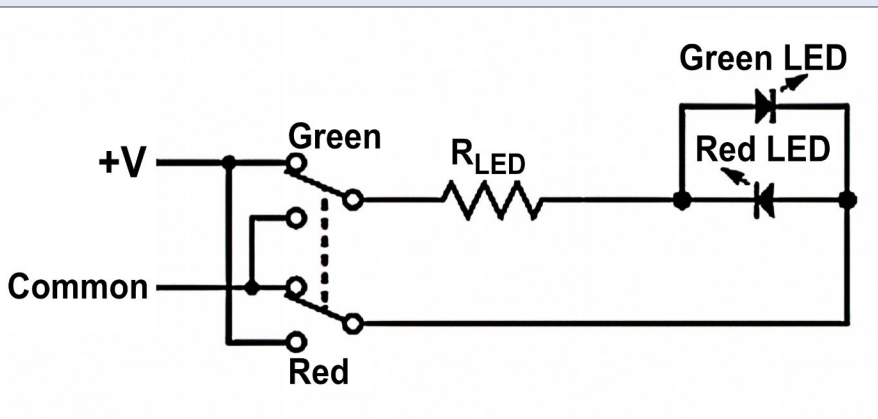
1. Basic bi-directional LED circuit.

WIRING BACK-TO-BACK LEDs

LEDs' color, as seen in [2]. But what if you have only one power supply? Then use a double-pole-double-throw (DPDT) switch, as [3] illustrates. This switch works just like the switches used in the "old days" (before DCC auto-



2. SPST switch, two power supplies.



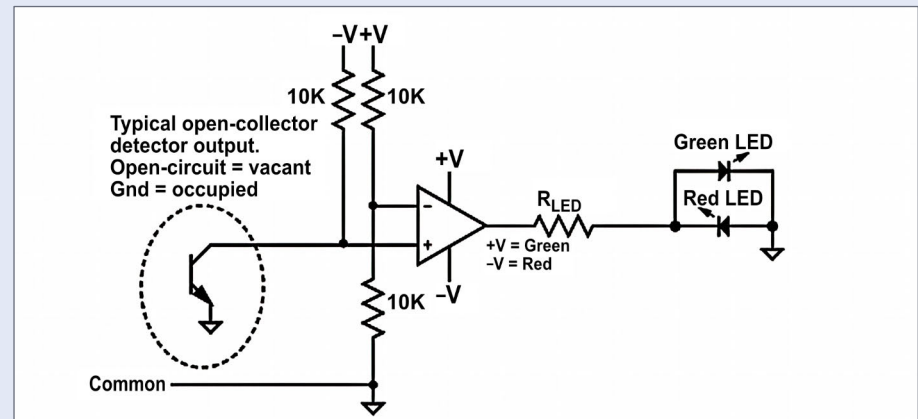
3. DPDT switch, single power supply.

reversers) to reverse track polarity when a locomotive runs around a reversing loop, or on a turntable bridge.

WHAT ABOUT OCCUPANCY DETECTORS?

Maybe it's OK for someone to manually throw a switch to change the LEDs' color. But what if you want electronic devices like an occupancy detector or an Arduino microcontroller to drive the LEDs? Then things become a bit more complicated.

Usually these devices have "open-collector" transistor outputs that are open-circuit in one state (e.g., unoccupied), and connected to ground (circuit common) in the opposite state (e.g., occupied). Only one of the LEDs will light with this type of output, so all you get is off/red or off/green. These outputs do not produce any voltage themselves, and they work only with positive voltages from external devices like signals.



4. Open-collector connection, two power supplies.

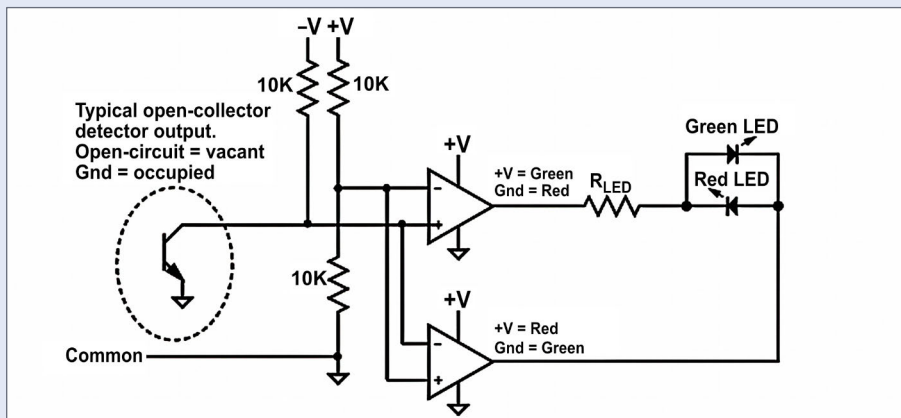
WIRING BACK-TO-BACK LEDs *CONTINUED ...*

OP-AMPS TO THE RESCUE

The solution is to use an operational amplifier (op-amp) to detect the detector's open/grounded signal, and then convert it to a positive or negative voltage to drive the LEDs. Again, you have two options: Use two power supplies [4] or use one power supply. [5]

Two power supplies: In [4] an op-amp powered by two supplies (+V and -V) is wired as a voltage comparator. The detector's output is connected to the op-amp's plus input and pulled up to +V with a 10K resistor. Two other 10K resistors form a voltage divider to apply half of +V to the op-amp's minus input to act as a reference. When the detector's output is grounded ("occupied"), the op-amp's plus input is less than the reference voltage, so its output produces -V to light the red LED.

Conversely, when the detector's output is pulled up to +V (vacant), the op-amp's output produces +V to light the green LED.



5. Open-collector connection, single power supply.

One power supply: This is the most straightforward way to connect an open-collector output to control back-to-back LEDs. It needs only a single power supply, but two op-amps, which is not a problem since you can buy a single DIP package that contains four op-amps. In [5], just like in [4], the detector's output is pulled up to +V and two 10K resistors produce a reference voltage.

But in this case the reference voltage is wired to the plus input of one op-amp, and the minus input of the other one. This causes one op-amp to produce +V on its output while the other grounds its output. Current flows through one LED. When the detector output changes, the op-amps reverse their states – the first grounds its output while the second produces +V, and current flows through the other LED. Read the notes in [5] and trace the circuit to see how this works.

BOTTOM LINE

Back-to-back diodes are great for making realistic two-color signals, but they require thought about how to drive them. Fortunately, it's easy to build a simple interface between them and common open-collector outputs from other signal circuitry. ■



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TRACKSIDE ACTION 

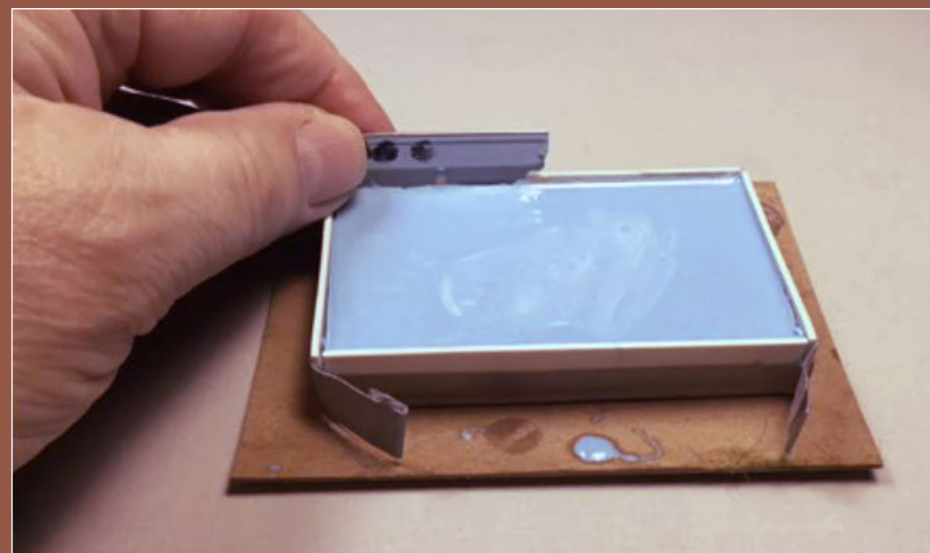
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Virtual hobby events



Model Railroad Hobbyist | September 2020

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ERIC HANSMANN HAS GONE ONLINE FOR INSPIRATION ...

2020 WILL BE REMEMBERED AS A YEAR TURNED UPSIDE-DOWN. Our hobby has experienced the cancellation of nearly all face-to-face events since March. These include train shows, NMRA division meetings, NMRA regional and national conventions, railroad historical society meets, and Railroad Prototype Modeler (RPM) meets.



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GatewayX Timetable

All times in EDT effective 00:01 July 12 2020 until 23:59 July 18 2020

07.12.2020

08:00	How to run a scenery clinic for kids	Gerry Hopkins, MMR®
09:00	N-scale Trees	Jonathan Small
10:00	The very first introduction to an Arduino	Michael Hill
11:00	Woodland Scenics Realistic Water	Don Fowler
12:00	Model Railroadng 101 Clinic*	Clark Kooning, MMR®
13:00	That town at the end of the line - Coal Patch Communities	Edward Koehler
14:00	Ballasting	Eduardo Becherell
15:00	PVC Terminal Strips for Insulation Displacement Screws	Carl Blum
16:00	Model railroad photography	Dan Munson
17:00	Roundtable – Building your first layout	Gordy & Guests
18:00	Weathering, we don't know what yet it's a surprise!!!	Ralph Renzetti
19:00	Realistic base level scenery for your model railroad	Perry Lamb
20:00	San Antonio and Northern Railroad – Layout Tour	John Lowrance, MMR®
21:00	Touring the Michigan Interstate St. Clair Subdivision – Layout Tour	Greg McComas
22:00	Portland and Western, Free-Mo-N	Ed McNamara

07.13.2020

08:00	Track building with Fast Tracks*	Kevin Marks
09:00	Scratch Building in Wood	Peter Bowen
10:00	Drawing for 3d printing	David Hager
11:00	Getting a Pro Look with a Simple Camera	Bob Feuerstein
12:00	Modernization of Main St. and How It Affects Our Modeling	Jim Sacco
13:00	Building Rooftop details	Mike Corley
14:00	Photo Editing Programs and Efficient Workflow	Bob Feuerstein

5

1. NMRax produced a PDF event guide for the GatewayX virtual convention. This screenshot illustrates a portion of the multi-day event.

A couple months after the pandemic kept many of us at home, tech-savvy modelers turned to software for online virtual meetings. Business conference options include Zoom, Google Meet, Google Hangouts, GoToMeeting, Skype, WebEx, Microsoft Team, and more. These options enable real-time discussion and presentations from your computer and comfy chair.

Other delivery avenues use YouTube and Facebook to focus on delivering presentations. The NMRax Conventions Clinicians Group formed in April to organize online presentations for clinicians using Facebook live for NMRax events. The international group has coordinated several day-long virtual conventions with full clinic schedules.

One of their major virtual achievements was held in July. GatewayX, a National Virtual Model Railroad Convention, featured a week of presentations [1, 2]. Many clinics featured in the NMRax group events are available on the NMRA YouTube channel. www.youtube.com/channel/UCHw-7-1FWB5zQgTM0ZVY-Yw.

OTHER EVENTS

I participated in Hindsight 20/20 Virtual RPM in June. I had planned to attend several RPM events this year but all have been canceled. This Hindsight event stretched across eight hours with a wide variety of presentations.

The organizers asked for shorter presentations than what I usually see at RPM meets. Rather than a 45-60-minute clinic, the time was shortened to 30 minutes for each. A few extra minutes afterward allowed for Q&A and leg stretching. I liked the shorter format as a viewer and as a presenter.

A second Hindsight 20/20 RPM was held in August [3] with additional events set for coming months. Organizers are planning Wednesday-evening events to feature longer clinics. A



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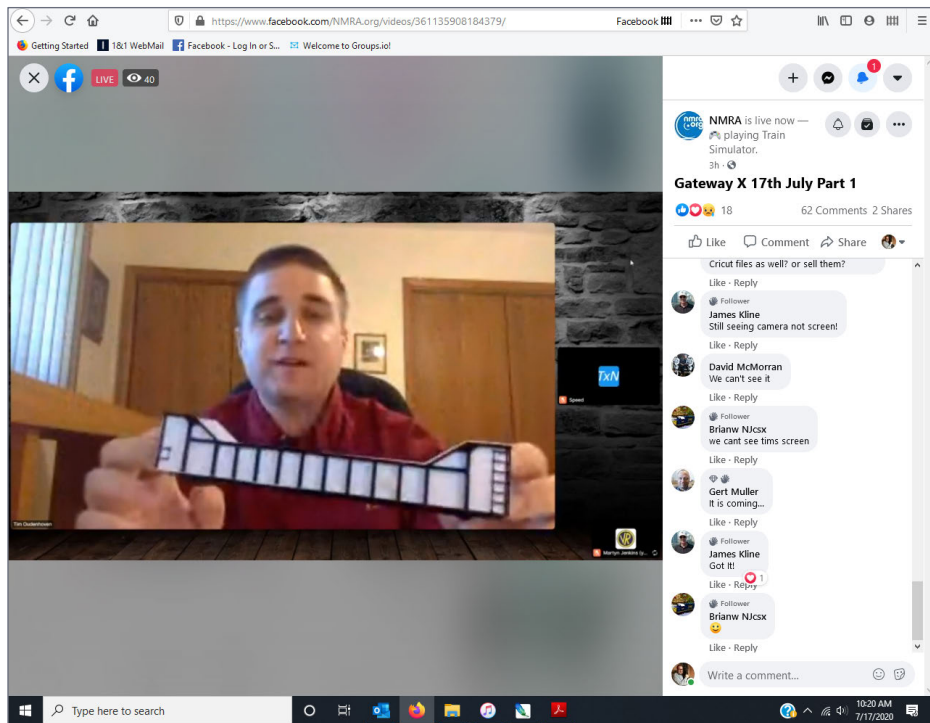
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Flickr site was also available for participants to display their model work. www.flickr.com/groups/14711992@N20/pool.

The Hindsight 20/20 RPM events have been free, but registration is required to participate. Speedwitch Media has been hosting the registration details on their website. speedwitchmedia.com.

The Operations Special Interest Group (OPSIG) has been hosting virtual meetings to share details to improve model railroad operations. Some meetings have included a layout tour. Many of these meetings can be accessed via the group's website. www.opsig.org/Virtual/Past.

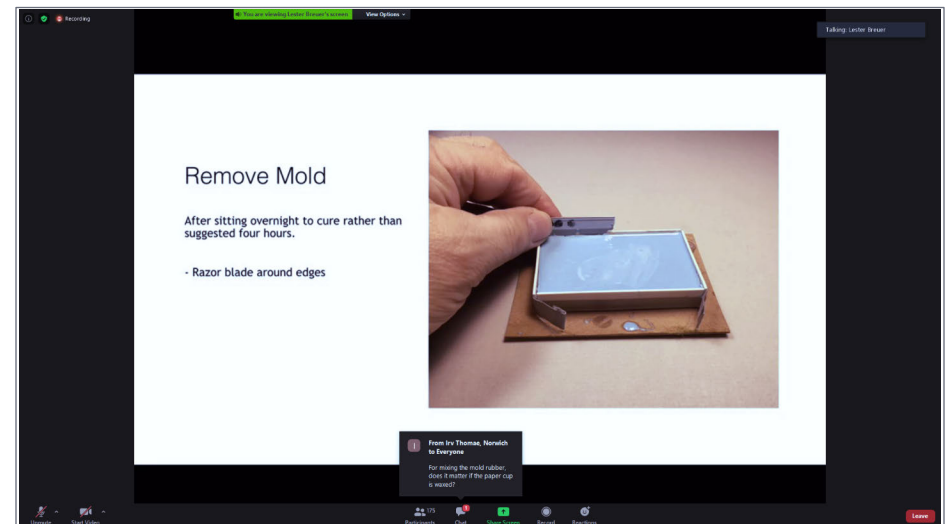


2. Here's the screen as Tim O presented his Cricut Styrene clinic during GatewayX. People could leave comments via the Facebook chat area during Tim's clinic.

OTHER EVENTS

Virtual meetings aren't only for national audiences. Many NMRA divisions have been organizing online gatherings to keep local members informed and inspired. Some model railroad clubs have held occasional online chats to share updates.

I plan to present at upcoming virtual events for NMRA divisions and a modeling special interest group. It might be several months before our favorite events start up again. Take advantage of these virtual meetings. The clinics I've seen are top-notch and it's great to see friends in the virtual crowd. ☒



3. The Zoom format is a bit different from Facebook. This is a slide during Lester Breuer's resin-casting presentation. It's easy to share a PowerPoint presentation using the conference meeting software. A chat square pops up when someone posts during the presentation. The chat can also appear as a rectangular box on the right side of the screen.



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SAVVY MODELER *Online*



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Structure modeling selective compression: 1

We captured the late Earl Smallshaw's superb clinic on Selective Compression in 2009 on video and posted it on our website. More than a few of you may not know about this video, so here it is again, and real blast from the past!

This is one of four parts. Put together, all the parts show Earl's full clinic – a most delightful clinic at that. Earl was one of the real master modelers in the hobby. ■



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By Joe Fugate



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SEPTEMBER NEWS

column



Model Railroad Hobbyist | September 2020

RICHARD BALE AND JEFF SHULTZ
REPORT THE LATEST HOBBY
INDUSTRY NEWS ...



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NEW CLUB CARS



The **Central Ohio Model Railroad Club** is selling a 40' CCC&StL double-door steel automobile boxcar.

Two road numbers are available for the Cleveland, Cincinnati, Chicago and St. Louis Railway, also known as the Big Four line. Proceeds from the sale of the HO scale kit help support activities of the long-standing club. The kit, which includes trucks and couplers, was produced for COMRC by Accurail. For ordering information visit www.comrc.club.

NEW PRODUCTS FOR MULTIPLE SCALES

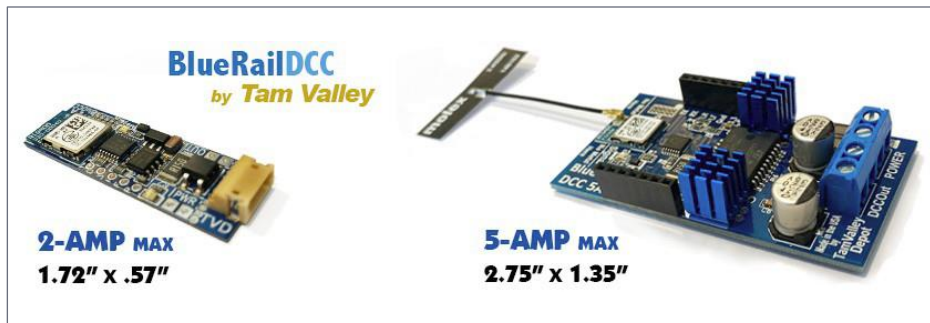
BlueRail Trains and **Tam Valley** have released new compact circuit boards that allow any DCC decoder to be controlled by a smart device using the BlueRail Trains app. The boards are

THE LATEST MODEL RAILROAD PRODUCTS, NEWS & EVENTS

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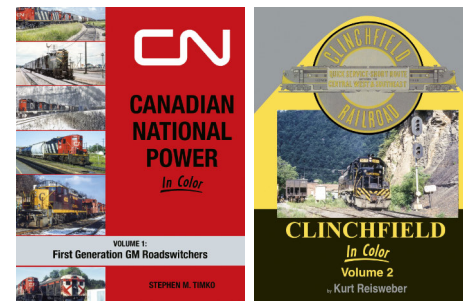
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available in 5 amp and 2 amp versions that can be controlled at a distance of up to 75', and up to 150' with optional external antenna. Power supply options are DCC, battery, or track power. The boards also offer a basic mode which will control the motor and lights of a loco without the need for a DCC decoder.

The popular BlueRail Trains app (available free for Android and iOS) allows an operator to control a train's speed, direction, lights, and sound; trigger all functions, and edit CVs. The app also has an easy-to-use consisting utility that simplifies speed matching. The system is compatible with Bachmann E-Z Apps and previous generation BlueRail boards. The new boards are available at www.DeadRailInstalls.com. For installation details, more technical information and a user guide visit www.BlueRailTrains.com.

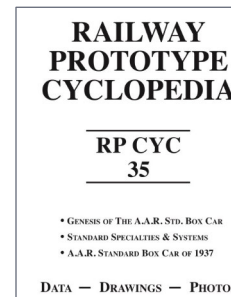
New publications from **Morning Sun Books** include *Canadian National Power in Color* by Stephen M. Timko. This initial volume covers CN's first generation GM road switchers including GP7s, GP9s, and Canada's own GMD-1s, all in



multiple paint schemes from delivery to retirement in over 300 color photos. An October release is scheduled.

Volume 2 of *Clinchfield in Color* by Kurt Reisweber, revisits the glory years of an Appalachian coal hauler that

incongruously also handled perishables from Florida. This second volume features a combination of scenic views, diesel locomotives, and freight cars ranging from the 1960s to the 1980s. The volume concludes with CSX images illustrating the post-merger period. Track charts and maps are included. For additional information contact a dealer or visit www.morningsunbooks.com.



***Railway Prototype Cyclopedica*, Volume 35**, by Pat Wider, is scheduled to be published next month by Silverlake Images. This super-sized edition of RPC is a 385-page study of the 1937 A.A.R standard 40' boxcar including its genesis and numerous improvements over its 1932 predecessor. In his usual

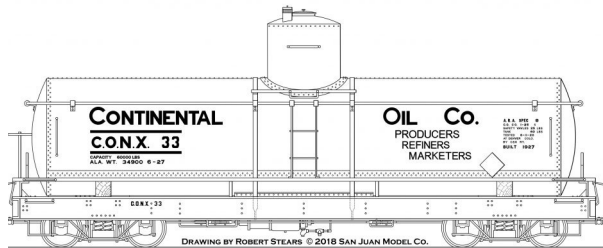
meticulous style, author Wider reviews each improvement including the cars increased inside dimensions, better riding trucks, standardization of vendor-supplied car body components, improved friction draft gear and automatic air brake systems, longer-lasting wheels, stronger floors, and safer, easier to operate power hand brakes. The book includes

72 diagrams and 428 B&W photographs. Reservations are being taken by Ron's Books at www.ronsbooks.com.



San Juan Model Company is accepting reservations for models of narrow gauge tank cars with outside frames and distinctive tall domes. The painted

and lettered models will be available in both HOn3 and On3 scales. Decorating schemes include a 1940-era black car with white CONOCO lettering (above), and a similar scheme on a 1935 CONOCO car with green lettering on a silver tank.



Additional schemes include a 1926-era black car with white sans serif lettering, and similar wording in serif lettering on a 1930 car.

Completing the decorating options is a car with a silver tank decorated for Mexican National. For additional information visit www.sanjuanmodelco.com.

O SCALE PRODUCT NEWS

Atlas O is booking advance reservations for a Trinity 25,500 gallon general-purpose insulated tank car. The O scale model is based on a prototype introduced in 1986. The ready-to-run



limited-edition car will be available decorated for Louisiana Hot Sauce, and Kung Fu Fighting graffiti.



Atlas O models are available for either 3-rail or 2-rail operation. For additional information

contact a dealer or visit atlaso.com.

HO SCALE PRODUCT NEWS



Accurail has released kits for a 40' Pennsylvania Railroad X29D steel boxcar in three road numbers. The HO scale

model represents a prototype built in 1955. It is decorated with a shadow keystone herald and PRR's *Don't Stand Me Still* slogan printed in yellow.



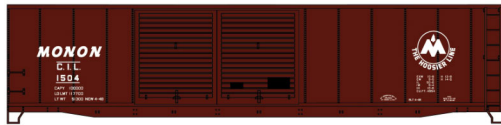
Also new from Accurail is an HO scale kit for an Erie 40' wood refrigerator car. Data printed on the

car side indicates it was built in July 1925, and is fitted with permanent floor racks. Routing instructions state *Return to Jeffrey City for Banana Loading*.



AC&F built the prototype of this Western Pacific 55-ton USRA twin-bay hopper in 1927. The yellow WP lettering on Accurail's

HO scale version includes a Feather River Route herald.



This 50' Monon-Chicago, Indianapolis & Louisville steel boxcar features double

Youngstown sliding doors. Accurail's HO scale kit displays a Hoosier Line herald and an April 1948 built date.



The prototype of Accurail's HO scale 36' Montreal & Atlantic (Canadian Pacific) Fowler wood boxcar was fitted with grain doors.



Accurail's HO scale kit for this 36' Bangor & Arroostook double-sheathed wood boxcar is based on a real car built in 1914.



This 70-ton Southern Pacific class H-70-13 triple-bay open hopper car with offset sides had a

capacity of 2773 cu. ft. Accurail's HO scale kit is based on a prototype built in the summer of 1953. All Accurail kits come with Accumate knuckle couplers and appropriate trucks with plastic wheels. For additional information contact a dealer or visit www.accurail.com.



R. Bale

DASH 9 C44-9W LOCOMOTIVE

General Electric introduced its C44-9W demonstrator in 1993. Dubbed the Dash 9, the 4,400hp six-axle diesel road switcher proved to be a major success with more than 3,500 units being built through 2004. A new alternator resulted in 4,400hp – thus determining the locomotives designation. The Dash 9 was the first production locomotive to have a wide North American Safety cab as standard equipment. While similar in appearance to its C40-8 predecessor, the C449W was built on a slightly longer platform to accommodate a massive 5,000 gallon fuel tank. Another spotting feature is the thicker radiator wings at the rear of the car body. Improvements over the C40-8 include a more reliable braking system, updated electronics, a larger engine radiator cooling system, and improved high-adhesion trucks. The Dash-9 was superseded in the early 2000s by GE's Evolution Series locomotives.



Athearn has announced plans to deliver a Genesis 2.0 model of a GE Dash

9-44CW diesel locomotive next July. In addition to the usual high-end Genesis features, this Genesis 2.0 model will have etched see-through walkway steps, illuminated number boards, illuminated ground lights on the forward trucks, illuminated front and rear walkway lights, and working classification lights. Road names will include the BNSF No. 977 as shown above in its 2010 to present day scheme. No. 977 is the only BNSF Dash 9-44CW to wear the GN-inspired Heritage 1 livery.



Athearn's HO scale 9-44CW models wearing BNSF's



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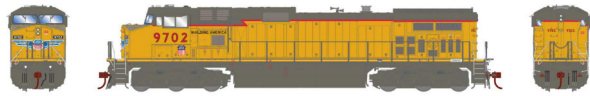
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Heritage 2 scheme will have a poly bag of optional modeler-applied details including a long PTC skate antenna and an air dryer.



Chicago & North Western 9-44CW locomotives can be

spotted by the unique CNW roof vent, the lack of vents on the A/C cabinet, and early tabbed dynamic brake intake panels. Less obvious are the 40" wheels on units delivered early and the 42" wheels on high-adhesion trucks on later units.



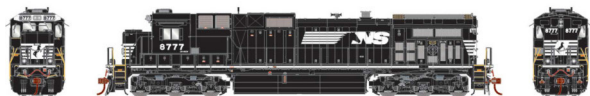
Athearn's Genesis 2.0 models of Union Pacific 9-44CW will

reflect the prototype's 2012 appearance as repainted with lightning stripes but without the American flag on its flanks.



Athearn Dash 9-44CWLs decorated for Canadian

National and BC Rail will have a Canadian-style safety cab with a four-piece front windshield, unique Canadian anti-climbers, and a walkway with continuous etched snow grates.

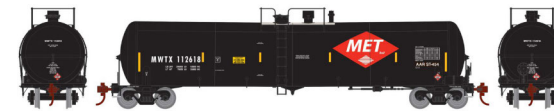


Completing this release are Dash 9-40C models

decorated for Norfolk Southern in the 2013 to 2018 Thoroughbred paint scheme. NS units will have a standard cab, a curved engine compartment hood profile, and 40" wheels with struts vertically mounted on the truck side frames.

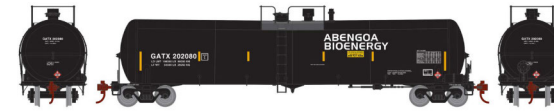
In addition to the Genesis 2.0 details mentioned above, all Athearn 9-44CW models will have coupler cut levers, flexible rubber MU and trainline hoses, see-through cab windows with cab interior, walkway tread, Celcon handrails, windshield wipers, lift rings, wire grab irons, detailed fuel tank with fuel

fillers, fuel gauges, and breather pipes; sander lines, all-wheel drive and pickup, and LED lighting.



Athearn has scheduled the release of a 30,000 gallon Ethanol tank car

for next July. The HO scale Ready-to-Roll model will be available in three-packs with different car numbers. Two schemes will be available for MWTX-Midwest Ethanol Transport. Additional road names include GATX-Abengoa Bioenergy, ADMX, Union Tank Car, Celtran, and CTCX.

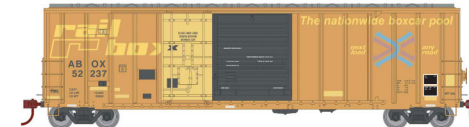


The models will have photo-etched metal walkways and end platforms, wire safety

rails and end handrails, and 100-ton roller-bearing trucks with 36" machined metal wheels. A 22" minimum track radius is recommended for reliable operation.



Athearn plans to release 50' FMC combination door boxcars decorated for Railbox in both fresh and Primed for Grime paint schemes.



Additional road names include Canadian National, BC Rail, and Minnesota, Dakota & Western.



The HO scale Ready-to-Roll model will have individual wire grab irons, etched metal end platforms, and

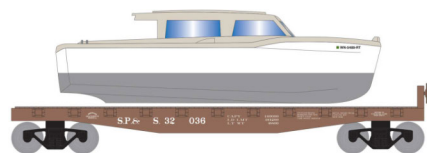
appropriate trucks with machined metal wheels.

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A 54' FMC 4700 cu. ft. triple-bay covered hopper is included in Athearn's July

2021 production schedule. Road names will be Union Pacific/DRGW, Burlington Northern, Chicago & North Western, Klemme Coop Grain Service, Western Pacific, BNSF, and BNSF Buffer Service. Separately applied details include brake wheel, chain, and housing; brake lever, air reservoir, brake cylinder and triple valve, wire grab irons, see-through etched metal end platforms, and two outlet gate variations. The model will have 100-ton trucks with 36" machined wheels.



Roundhouse Brand models coming from Athearn next July include a 40' flat car with a removable small cabin cruiser. Road names with boats in

different color combinations include Chicago & North Western, Spokane, Portland & Seattle; Southern Pacific, Texas & Pacific, New York Central, and Florida East Coast.



DODX flat cars in olive drab will be available with boats specially decorated for United States Coast Guard, United States Air Force Rescue, United States Army

COE, and United States Navy.

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Also coming next summer under the Roundhouse brand is an HO scale ready-

to-run model of a 50' boxcar with double Youngstown sliding doors. Road names will be New York Central, Illinois Central, Southern Railway, Baltimore & Ohio, Soo Line, Great Northern, and Gulf, Mobile & Ohio. For additional information on Athearn and Roundhouse products contact a dealer or visit www.athearn.com.



Atlas is selling two versions of an ACF 11,000 gallon insulated tank car. The HO scale model is available with and without a top loading platform and railing.



Decorating schemes include Warren, Shell Chemical, Shamrock, Foley Butane, Tidewater Associated, and Mississippi Chemical. The Master series model comes with

50-ton Bettendorf-style solid-bearing trucks and AccuMate knuckle couplers.

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3D printing a signature C&E caboose

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Atlas has released its new HO scale Gunderson Multi-Max auto rack. Features of the new accurately scaled model include a newly-tooled flat car and body structure, and

trucks with 28" metal wheelsets.



Road names in this initial production run are CN-GTW, Kansas City Southern, CSX (CTTX), Norfolk Southern (TOCX), and Union Pacific (Building America slogan). An

undecorated version is also in this release. For additional information contact a dealer or visit www.atlasrr.com.



R. Bale

SIEMENS ACS-64

The Siemens ACS-64 electric locomotive was designed specifically for use on the Keystone and Northeast Corridor (NEC). Amtrak and Siemens unveiled the first three completed locomotives on May 13, 2013. The design is based on locomotives Siemens created for Europe and Asia, but with numerous changes to comply with tougher American standards. The ACS-64 has several advanced safety systems including specialized couplers designed to keep trains from rolling over, jackknifing, or derailling during a collision. The ACS-64s develop 8,600hp and are able to accelerate up to 125 mph with eight Amfleet cars in a little over two and a half minutes. The locomotives are compliant with the Buy America Act and were assembled at the Siemens factory near Sacramento, CA.



Bachmann is selling an HO scale version of the Siemens ACS-64 mainline electric locomotive. The HO scale DCC sound-equipped model comes with a TCS

WOWSound 16-bit 44,100Hz decoder with Audio Assist sound package that includes horn, bell, cooling fan/power inverter, pantograph extension and retraction, coupler close/release, brake release and application. Additional sounds include crew alert, departing and arriving station announcements, and grade crossing quill. The ACS-64 also has a Keep-Alive system for uninterrupted operation on dirty track and a selector switch for either rail pickup or pantograph operation. A 22" minimum track radius is recommended for reliable operation.



Also new from Bachmann is an EMD GP38-2 diesel locomotive. The DCC-ready HO scale model comes with a factory-installed 8-pin socket ready for an aftermarket decoder.



Road names include CSX, GMTX Locomotive Group, Norfolk Southern, Rail America, Alaska Railroad, and CP Rail. For additional information contact a dealer or visit www.bachmanntrains.com.



Berkshire Valley Models has released a kit for an HO scale Watkins Delivery Wagon. The kit is composed of laser-cut wood and white metal castings. An illustrated

instruction sheet is included. The signage provided gives an option of using decals or paper signs. The horse and driver are sold separately.



Also new from Berkshire is a small ore bin loading platform that is available with a truck/wagon loading

ramp, or with a railroad mine track. All components in the HO scale kit are laser-cut wood. The assembled ore bin measures approximately 2.125" x 1.85". For additional information visit www.berkshirevalleymodels.com.



Bowser is preparing to release HO scale models of GMD SD40-2F diesel

units decorated for CP Rail. The models are based on a 3,000hp locomotive General Motors Diesel built in 1988-89 exclusively for Canadian Pacific Railway. Variations in the bright red CP models include units with a round porthole and either white stripes or white dashes at the sill, and a similar unit with a rectangular porthole.

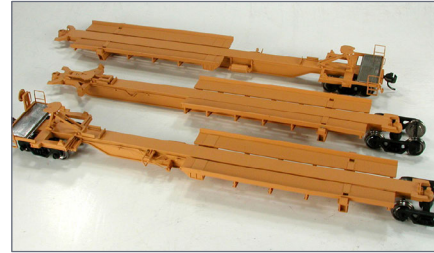


Also coming soon from Bowser are HO scale Alco C628 and C630 diesel

locomotives. The visually similar units differ primarily in their power rating with the C628 listed at 2,750hp and the C630 at 3,000hp. Road names will be Duluth, Missabe & Iron Range (ex UP); Delaware & Hudson, Reading, and L&N with a yellow nose.

Features common to Bowser's SD40-2F, C628 and C630 HO models include individual air hoses, windshield wipers, wire grab irons, uncoupling bars, operating headlights, and glazed

windows. Models ready for standard DC operation come with a 21-pin plug for installation of an aftermarket decoder. Bowser's DCC sound models come with a LokSound Select decoder.



Bowser is working on a new production run of Trinity 53' spine cars for release next summer. Both three-unit RAF 33C and five-unit RAF 53C spine cars will be included in the release. The HO scale

models have die cast metal frames and feature positionable hitches, chemically etched walkways and 70-ton trucks with 33" metal wheel sets. For additional information contact a dealer or visit www.bowser-trains.com.



R. Bale

UP BIG BOY

Union Pacific's Big Boy is a simple articulated 4-8-8-4 steam locomotive built by the American Locomotive Company between 1941 and 1944. The initial group of 20 locomotives was delivered in 1941, followed by five more in 1944. The Big Boys were designed to eliminate the need for double heading on the UP mainline climb eastward from Ogden into the Wasatch Range with the ability to pull long freight trains at a sustained speed of 60 mph once past mountain grades. They more than met the goal and remained in service until 1959. Scheduled to be named Wasatch, the locomotive acquired its nickname after an unknown worker scrawled "Big Boy" in chalk on the front of No. 4000, then under construction at ALCo. Specifications include 68" drivers, 23.75" x 32" cylinders, a weight of 762,000 lbs, and an overall length of 85' (plus the tender). Peak horsepower of about 7,000hp is attained at 41 mph.



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Broadway Limited plans to release a new run of Union Pacific 4-8-8-4 Big Boy locomotives this month. The HO scale versions of UP No. 4006 and 4018 will be available as-delivered in 1941 with an aftercooler and

25-C-100 coal tender, as well as unlettered and unnumbered. Big Boys No. 4020 and 4023, upgraded with a Wilson aftercooler and 25-C-400 coal tender, are also in this release. Big Boy No. 4014, modernized with a Challenger excursion tender, will be available in both standard and glossy paint finish. Completing this release is No. 4021 in two-tone gray with an aluminum Wilson aftercooler and a 25-C-400 tender. Broadway Limited's HO scale models come with Paragon3 sound with Rolling Thunder that functions in both DC and DCC environments.



Broadway Limited plans to release a series of AC&F 6,000 gallon Type 27 tank cars this fall. The HO scale models are based on

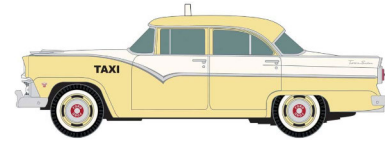
insulated high-pressure cars built from the late 1920s through the post-war era. The ready-to-run models have a die cast chassis and plastic body with separately applied hand rails, ladders, brake wheel, and walkway.



The HO scale models will be available in two-packs for SACX-Columbia

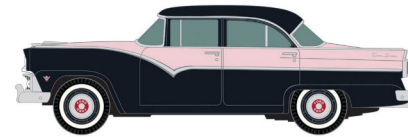
Southern, GWEX-Dow Chemical, EBAX-Ethyl Corporation, HOKX-Hooker Chemicals, TELX-Penn Salt, SHPX-Stauffer Chemical, and SHPX-Wyandotte. Two-packs with mixed road

names will also be available. For more information contact a dealer or visit www.broadway-limited.com.



New **Classic Metal Works** Mini Metal Models this quarter include a 1955 Ford 4-door sedan in three paint schemes. In

addition to the yellow and white taxi version, the 1:87 scale vehicle will be available in two-tone Pinetree green, and in the decidedly 1950s combination of black and Coral Mist.



For additional information contact a dealer or visit www.walthers.com.

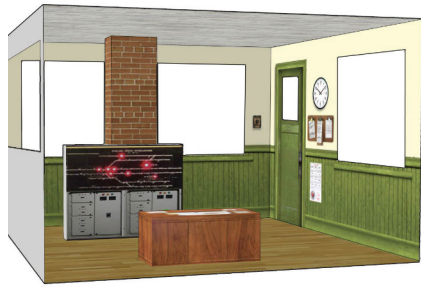


The Electric Wallpaper Co. has released ten new Roomettes laser-cut cardstock kits to fit Atlas, Woodland Scenics/DPM, City Classics, Rix Products, and Walthers HO scale buildings. Roomettes offer

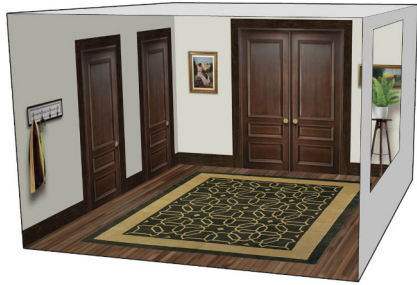
a fast way to bring the illusion of 3-D detail to the inside of model structures. The kits include LEDs with plugs that are compatible with lighting systems from Woodland Scenics Just-Plug, Model Train Technology and NCE.

The new releases include Fallow Feed Mill (above) with four interior rooms for Walthers Sunrise Feed Mill kit. Also new is Sporto's Outdoor & Athletic with four window displays, a foyer, and three offices that fit Woodland Scenics/DPM's JC Nickels store.





New Roomette interiors are available for the Atlas Signal Tower (left), Passenger Station, and Trackside Shanty.



New Roomettes for residential houses include Parker's House for City Classics Railroad Street Company House, Whelan's House fits Walther's American Bungalow or Updated American Bungalow kit; and Millie's House offers a suitable period

interior for Woodland Scenics/DPM Victorian Cottage. Additional residential Roomettes include Oliver's House interior for Rix Maxwell Avenue Home, while Chrysler's House and Carlson's House bring life to Atlas's Barb's Bungalow and Kim's Classic American Home, respectively.

Roomettes are made by The Electric Wallpaper Co. For additional information including ordering instructions visit www.roometteslighting.com.



ExactRail has completed another production run of its HO scale 67' 11" bulkhead flat car. The HO scale model is an accurately scaled version of a group of cars built for TTX in 2000 by Greenbrier at Trenton Works Ltd., in Nova Scotia.

The HO scale model consists of molded plastic, etched metal, laser-cut fiber board, and formed brass and wire parts. Details include separate air hoses, brake rods and brake appliances,

photo-etched stainless-steel brake platforms, and Kadee #156 whisker couplers in a narrow-style draft box. The models ride on ExactRail's equalized 100-ton ASF Ride Control trucks with machined metal wheels sets.



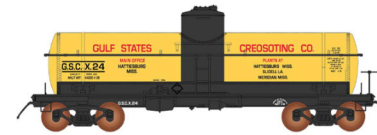
The ready-to-run TTX bulkhead flat cars will be available in multiple numbers in three decorating schemes including as-delivered, patched with TTX's new logo, and stenciled with DO NOT WELD TO FLOOR. For additional information visit www.exactrail.com.



InterMountain is taking reservations for an HO scale ACF Type 27 riveted 8,000 gallon tank car. Production is on hold until sufficient quantities have been booked.



Hobbyists interested in this model are urged to place a pre order either direct or with a dealer.



A list of tentative road names include Robeson Process, Spencer Kellogg, Harbor Tank Line, Hercules Powder, Bell Oil & Gas, Wolf's Head Oil, A.E. Staley, Union

Tank Car, Mobilgas, Wobirm Degreasing, King Taste Products, Stauffer Chemical, Canadian General Transit, Gulf States Creosoting, Silver Fox Lard, Everett Distilling, Mobile Rosin Oil, North American Car Corp, Mathieson Alkali Works, and Union Pacific.



Also on hold at InterMountain pending receipt of sufficient pre-orders is an HO scale USRA

gondola. The model will have laser-cut wood for the sides and floor.



Tentative road names include Nashville, Chattanooga & St. Louis; Chesapeake & Ohio, Louisville & Nashville,

Wheeling & Lake Erie, Kansas City Southern, and Frisco. Contact a dealer to order or visit intermountain-railway.com.



Kadee is selling an undecorated HO scale AAR twin-bay open hopper car with offset sides. The ready-to-run model is available in black or BC red, and with a choice of Enterprise or Wine discharge doors and hardware. Features include scale grab irons,

ladders, and brake rigging, Kadee metal knuckle couplers, and Kadee self-centering equalized trucks. For additional information contact a dealer or visit kadee.com.



Monster Model Works is selling a kit for Bonded Warehouse &

Storage, a flat background structure that is less than 2" deep. The dimensions of the assembled structure are 15" long x 2.5" high x 1.75" deep. Contents of the kit include 3D laser-engraved old brick sides and corners; 3D printed drain spouts, loading dock and wall anchors; block glass, peel & stick laser-cut windows and doors, and laser-cut sign stencils. The kit comes unbuilt and unpainted. For additional information go to www.larkspurlaserart.com.



New from **Oxford Diecast** is this 1:87 model of a 1959 Bonneville Coupe in what Pontiac sales literature called Seaspray Green. For additional information

contact a dealer or visit www.walthers.com.



Rapido will continue to accept advance orders through September 15, 2020, for an upgraded EMD SW1200 switch engine. In addition to Southern Pacific, road names for the HO scale diesel equipped with Type A trucks will be Conrail, Milwaukee

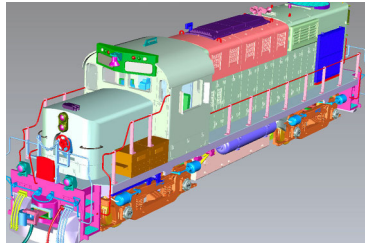
Road, Missouri Pacific, Northern Pacific, Pennsylvania, Denver & Rio Grande Western, and Chicago, Burlington & Quincy. Road names with Flexcoil trucks will be Rock Island, Chicago North Western, Grand Trunk Western, Burlington Northern, Great Northern, New Haven, Penn Central, and Soo Line.



Features of Rapido's SW1200 model include complete underbody piping and conduit detail, full cab interior, and separate handrails including crash bars inside the cab. Lighting features include headlights, number

boards, classification lights, inspection lights, and interior cab lights. Road specific details include working drop steps, and Type A or Flexicoil trucks. The model will be available for basic DC (silent) operation and with DC/DCC/Sound featuring an ESU Loksound decoder with recordings from a full size 567 prime mover. Reservations close September 15, 2020.

Rapido has released this computer image showing progress on the revised RS-18u locomotive currently under development. Rapido's design team based the HO scale model on a 3D scan



of a real RS-18 and measurements from an active RS-18u. Features include completely redesigned chassis and shell access, operating headlights, rear lights, ditch lights, operating tri-color front and rear classification lights, and an illuminated cab control stand.



Canadian road names for the RS-18u will be CP Rail with and without multimark, New Brunswick East Coast, Ontario Southland, and Ottawa Central. US-based roads will be Bath & Hammondsport, Minnesota Commercial, and Western New

York & Pennsylvania Railroad. The HO scale model with the chopped nose will incorporate several important upgrades over Rapido's earlier model that suffered from motor and motherboard problems. Rapido reports these problems have been fully resolved including a greatly simplified method for removing the body shell. Rapido's RS-18u will be available for basic DC (silent) operation and with DC/DCC/Sound featuring an ESU Loksound decoder with recordings from a full size Alco 251B prime mover.



Rapido has announced plans to produce an HO scale version of the Canadian National RSC-14 diesel switcher. In need of replacements for its aging and underpowered fleet of RSC-13s for its Maritime branch lines, CN

found an easy solution by retruckng MLW-built RS-18s with six-wheel trucks from expired RSC-13s. Early reports indicate that the Rapido design team is applying its usual attention to detail in



developing this HO scale model including completing a 3D scan of a full size RSC-14 to develop the nuances of the exterior.

Preorders are being booked now for the HO scale RSC-14 which will be available decorated for Canadian National in multiple numbers in both the noodle and striped schemes.



R. Bale

CANADIAN COMFORT CAB

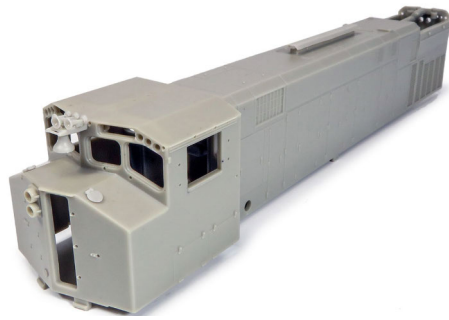
(aka wide-nose safety cab, North American safety cab)

Beginning in the early 1970s, design engineers from Canadian National Railway began working with Montreal Locomotive Works in developing a safer locomotive cab for road locomotives. The result was a specially reinforced wider nose sheathed with .375" thick steel plating. In addition the cab met tougher regulations that required windows to withstand the impact of a cinder block or 22 caliber bullet. The wider cab also had significantly more interior space for crew members to move about. As the design continued to evolve cab doors were fitted with improved weather stripping, electrically heated windows were installed, and the cab itself was acoustically isolated from the rest of the locomotive.



Photo courtesy Ken Goslett

Rapido is finalizing production details on an all-new HO scale MLW M420 diesel locomotive with delivery planned for early next year. The prototype, built by Montreal Locomotive Works from 1973 to 1977, was the first locomotive to be delivered with the wide-nose Canadian comfort cab.



Rapido's HO scale version is based on a 3D scan of a full size M420. Features include straight metal side handrails with plastic stanchions, complete underframe detail including traction motor cables, detailed cab interior with optional open front door, operating headlights, rear

lights, tri-color classification lights, an illuminated cab control stand, and a die cast chassis with the same 5-pole skew-wound motor used in Rapido's FA-2 and FB-2 models. Rapido originally planned to use a large coreless motor in the M420, however, none of the Chinese coreless motors tested met all Rapido's specifications.



Rapido's CN M420 diesel road engine will be available in ten road numbers

plus undecorated. Models offered will include silent DC operation and DCC sound with the new Rapido-TCS decoder

Rapido has released a new video on its HO scale F59PH diesel locomotive. It can be viewed at www.youtube.com/watch?v=Oiw_e65EKYw&feature=youtu.be.



Beginning in 1972 Canadian Pacific's Angus Shops in Montreal built over 300 wide-vision vans. Rapido is preparing to make another release of its highly-regarded HO scale version of the

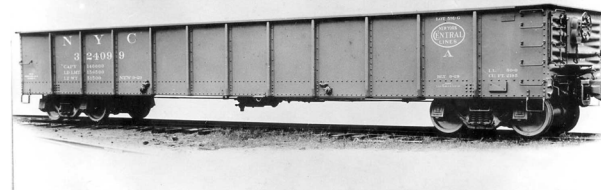
modern Angus caboose. The model will be equipped with

Barber-Bettendorf caboose trucks with metal wheels and all-wheel electrical pick-up.

Special features include full underbody detail including all air and brake piping, multi-colored interior with proper floor texture, interior handrails, positionable cupola windows, etched metal end platforms and steps, interior lighting, and operating marker lights.



Decorating schemes will be Canadian Pacific, CP (white), CP (maroon), Algoma Central, Ontario Northland, Ontario Northland (chevron scheme), and Toronto, Hamilton & Buffalo. An undecorated version will also be available in this release. For additional information contact a dealer or visit www.rapidotrains.com.



Resin Car Works has released a new HO scale kit that builds into a prototypically accurate New York

Central 50' 70-ton steel gondola built by Pressed Steel Car Company in 1929. The model replicates cars rebuilt in the mid-1940s with wood floors. The drop-door hardware was removed and the cars were renumbered into the 751000-751999 series. The kit features a one-piece cast resin car body, several detail parts, and accurate decals. Trucks and couplers are not included. For additional information including ordering instructions visit resincarworks.com/kits.htm.





R. Bale

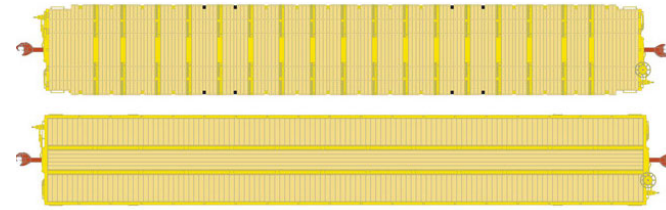
F68 SERIES FLAT CARS

Bethlehem Steel Co. (BSC) introduced a new generation of flat cars in late 1969. Measuring 68' over the end sills, the new design was given the simple designation of F68. BSC began delivering the general service F68CH version to Trailer Train in 1970. It had a wood deck with integral tie-down channels and was equipped with 36" wheelsets in 100-ton trucks with hydraulic snubbers at opposite corners of the car. All were delivered in the bright yellow "Trailer Train" scheme introduced earlier that year. The F68DH version was equipped with a beefier deck intended for heavy-duty service. To handle heavy-duty chocks and chains, the F68DH had tie-down tracks that extended the full length of the car at the centerline and at the side sills.



ScaleTrains.com is booking reservations through August 24, 2020, for HO scale Rivet Counter models of both the F68CH general purpose and F68DH heavy duty variant of the Bethlehem flat car, with two different paint schemes for each version. Early cars feature the as-delivered appearance while later versions include the Speed Logo which was introduced in the early 1990s. When Trailer Train changed their logo, they also changed the shade of yellow for their equipment, so some cars were completely repainted while others were simply patched out.

Modeler applied details in the ScaleTrains.com model include a laser-cut wood deck and optional ACI plates. Additional features on the Rivet Counter model are recessed deck tie-down details, H-shaped jacking pads, metal grab irons, coupler



cut levers, trainline hoses, and die-cast metal Type E couplers. Brake details include

full underbody linkage, triple valve, cylinder, actuator, and a vertical handbrake staff with brake wheel. The 36" machined metal wheelsets have a .110" wide tread. The 100-ton trucks are detailed with hydraulic snubbers, rotating bearing caps, and truck-mounted brake beams. For additional information visit www.scalettrains.com.



Tangent Scale Models has added a Greenville 86' high-cube double plug door boxcar to its

lineup of accurately scaled freight cars. The HO model replicates a series of 4,400 prototype cars built in the late 1960s by Greenville Steel Car Company.



Special features include Kadee couplers with EOCC (end of car cushioning) or COCC (center of car

cushioning) draft gear, flexible rubber air hoses, brake system details, and etched metal crossover platforms. Depending on the practice of the railroad being modeled the brake wheel and gear box will be Ajax, Universal, Equipco, Miner 6600, Champion-Peacock, Elcon-National, or Peacock. Road names include the distinctive Southern Pacific scheme from 1969, and a more sedate Canadian Pacific CPAA with bare aluminum doors.



Additional road names include DT&I in an original 1971 scheme with bare aluminum doors, New York Central in jade green, Conrail, and Southern Railway with a green dot inside the O of Southern. Undecorated kits are also available. The models come with Tangent's new 70-ton Barber S-2A or 100-ton low-profile Barber S-2-C roller-bearing trucks with machined metal wheelsets. A minimum track radius of 24" is recommended. For additional information visit www.tangentscalemodels.com.

in jade green, Conrail, and Southern Railway with a green dot inside the O of Southern. Undecorated kits are also available. The models come with Tangent's new 70-ton Barber S-2A or 100-ton low-profile Barber S-2-C roller-bearing trucks with machined metal wheelsets. A minimum track radius of 24" is recommended. For additional information visit www.tangentscalemodels.com.

www.tangentscalemodels.com.



Walthers is including a special 3-car deluxe edition of the Santa Fe's Denver Connection in its combined Super Chief/El Capitan name train project (See MRH August for details). The consist of the HO scale Denver-La Junta connection includes steam generator car #134, baggage car #3817, and Budd 46-seat coach #2842 with LED interior lighting and 18 Preiser figures installed.

Although not part of the deluxe set, appropriate motive power will be available in WalthersProto EMD F7A and F7B diesel units decorated in Santa Fe's red and yellow Warbonnet scheme. The HO scale diesels feature LokSound 5 Sound and DCC. They will be available next February.

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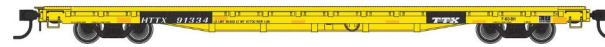
Models making up the deluxe set will also be available individually. They include a 74' Pullman-Standard baggage car, and an 86' Budd-built 46-seat coach. The ready-to-run cars will include modeler-installed extended drawbars for operation on curves under 24" radius.

include a 74' Pullman-Standard baggage car, and an 86' Budd-built 46-seat coach. The ready-to-run cars will include modeler-installed extended drawbars for operation on curves under 24" radius.



Features include separate grab irons, prototypical window tinting, sprung operating diaphragms, and appropriate trucks with electrical pickup and machined metal wheel sets.

windows, sprung operating diaphragms, and appropriate trucks with electrical pickup and machined metal wheel sets.



Walthers is quoting a November release date for a group of 60' Pullman-Standard flat cars based on a series of some 4,000 prototypes P-S launched in the mid-1960s. The cars were designed to handle all types of freight including 20' and 40' containers, and 45' or 48' trailers. Features of the Walthers Mainline series model include a realistic board deck pattern with wood grain and bolt details, brake gear piping and brake wheel cutout, and 70-ton roller-bearing trucks with 33" machined metal wheelsets.

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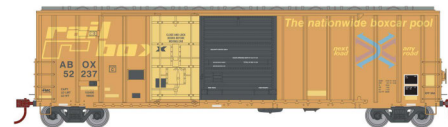
Variations will include a Trailer Train HTTX car equipped for heavy duty loading, Trailer-Train MTTX flat car for general loading and TTX VTTX for container loading. For additional information contact a dealer or visit www.walthers.com.

Train HTTX car equipped for heavy duty loading, Trailer-Train MTTX flat car for general loading and TTX VTTX for container loading. For additional information contact a dealer or visit www.walthers.com.

N SCALE PRODUCT NEWS



Athearn plans to release an N scale 50' FMC combination door boxcars decorated for Railbox in both fresh and Primed for Grime paint schemes.



Additional road names include Minnesota, Dakota & Western; Canadian National, and BC Rail.

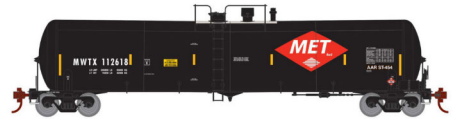


Features include screw-mounted roller-bearing trucks with machined metal wheels, and body-mounted knuckle couplers.



Also coming next summer is an N scale model of a 50' box car with double Youngstown

sliding doors. Road names will be New York Central, Illinois Central, Southern Railway, Baltimore & Ohio, Soo Line, Great Northern, and Gulf, Mobile & Ohio.



Athearn has scheduled the release of a 30,000 gallon Ethanol tank car next July. The N scale model will be available

decorated for MWTX-Midwest Ethanol Transport, GATX-Abengoa Bioenergy, ADMX, Union Tank Car Co., Celtran, and CTCX. Features include separately applied photo-etched metal walkways and end platforms, outlet valves, ladders, brake rigging, safety rail supports, tank saddles, and printed placards. The models will have screw mounted 100-ton roller-bearing trucks with 36" machined metal wheels, and body mounted knuckle couplers. For additional information contact a dealer or visit www.athearn.com.



Atlas has released an N scale ready-to-run model of a 50' General American Corporation RBL bunkerless refrigerator car. The model represents an RBL car

introduced in the early 1960s with a welded body capable of holding a temperature within a few degrees for several days while in transit.



Atlas' N scale version features etched metal running boards and crossover platforms. Road names are Milwaukee Road, Missouri Pacific, Delaware & Hudson, and Conrail.



Also new from Atlas is a 40' stock car. The N scale model represents a prototype with wood sides and steel Dreadnaught ends. In addition to the Union Pacific

version shown, the N scale Trainman series model is available decorated for Chicago & North Western, Great Northern, and Denver & Rio Grande Western. For additional information contact a dealer or visit www.atlasrr.com.



R. Bale

THE N&W J CLASS 4-8-4

The Norfolk & Western J class was a group of 14 steam locomotives built from 1941-1950 at N&W's shops in Roanoke, Virginia. The 4-8-4 J class locomotives were designed for N&W main line duty between Norfolk and Cincinnati, and between Monroe, Virginia and Bristol, Tennessee. The Js continued in revenue service until the late 1950s. The locomotives had 70" drivers, which were considered small for a locomotive that was intended to pull trains at over 100 mph. The Js' streamlining look was designed by N&W's Tool Supervisor, Franklin C. Noel. Due to the wartime limitations on the use of strategic material, the second batch of five locomotives were delivered in 1943 without streamline shrouding. One locomotive, No. 611, survives at the Virginia Museum of Transportation.

★★★★★
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Bachmann is selling an N scale version of a Norfolk & Western Class J 4-8-4 steam locomotive. The model is equipped with a SoundTraxx Econami steam package with a choice of 16 whistles, multiple variations of six bell types, four prototypical exhaust chuffs, five air pumps, and four dynamos. Additional sounds include cylinder cocks, grade crossing signal, blowdown, brake squeal & release, coupling/uncoupling, water stop, and a conductor calling *All Aboard*. The model is available in three N&W road numbers. For best performance a minimum track radius of 11.25" is recommended.



Also available from Bachmann is an N scale 40' steel gondola. In addition to Pennsylvania Railroad with a circle keystone, road

names are Santa Fe, Burlington Northern, and Denver & Rio Grande Western. For additional information contact a dealer or visit www.bachmanntrains.com.



Jacksonville Terminal Company is releasing 40' high-cube containers this month in 11 new paint schemes. The N scale models feature IBC connecting pins, multiple door styles, and JTC's magnetic connecting system. Carrier names include NYK Logistics and Hyundai.



Additional carriers are MSC MEDU (beige version), and a gray MOL unit with an alligator logo.

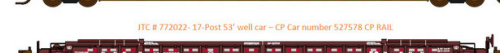


Containers decorated for Hamburg Sud, HMM (blue on orange), and Safmarine are included in this release.



Additional decorating schemes include TEX-TGBU, Transamerica

TRLU (ex-MOL Patch), Evergreen, and CMA/CGA. The N scale containers will be available in two-packs.



Jacksonville Terminal Company has scheduled a fourth quarter release for a group of N scale 17-post NSC well-cars. For additional information contact a dealer or visit www.jtcmodeltrains.com.

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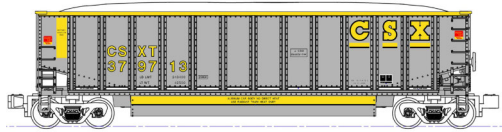




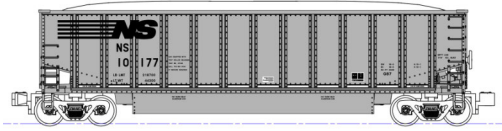
R. Bale

BATHTUB GONDOLAS

Unit trains of specially designed gondolas began to replace conventional coal carrying hopper cars in the 1970s. The new gondola design replaced moving hopper doors and high-maintenance locking mechanisms with long tubs on either side of the cars center sill. Eliminating the slope sheets and hopper outlets provided additional coal-carrying capacity in a car of the same length. One of the most popular of the modern coal gondolas is Johnstown-America's BethGon Coalporter. In production since 1978, these cars are distinguished by their angled end slope sheets and two lengthwise tubs below the frame levels. Gondola cars dedicated to coal hauling have rotary couplers allowing them to be emptied by a rotary car dumper.



KatoUSA is preparing a new release of Bethgon Coalporters for February 2021. The model is based on a prototype bathtub-style rotary dump coal gondola built by Freightcar America. Road names for Kato's N scale version will be Union Pacific, CSX, BNSF (Swoosh scheme), Canadian National, and Norfolk Southern.



Each road name will be available in eight-car sets with each car having a different road number. The road numbers do not

duplicate those issued on previous releases of Kato's Coalporters. Each model comes with a removable coal load. For additional information contact a dealer or visit www.katousa.com.



R. Bale

SCALE TEST CAR

Freight hauling railroads earn their keep based on the weight of the freight they transport. Loaded freight cars are weighed on track scales to determine the overall weight of the loaded car. The difference between the total and the cars known weight determines the weight of the load. The track scales must be kept accurate and since they take a beating they must be periodically checked for accuracy. An odd looking two-axle car called a Scale Test Car (STC) of known weight is used to calibrate the accuracy of the track scale. A compartment on the side of the STC holds lead weights that may be added or removed when the car itself is calibrated on a master scale. To eliminate possible variables that could alter their weight most STCs do not have brakes. The poling pockets on many STCs still in use today gives away their age.



Micro-Trains Line is selling a 13' two-axle scale test car based on a prototype built during WW-I. The N scale model is available decorated for Chesapeake & Ohio, Milwaukee Road, and CSX.



The ducting added to the clerestory roof of this Denver & Rio Grande Western heavyweight

business car indicates that it has been upgraded with air conditioning. Micro-Trains N scale model rides comfortably on six-axle Pullman passenger trucks.

New N scale freight equipment from Micro-Trains includes this 60' Norfolk Southern excess height boxcar. The N scale model is based on a prototype built in 1970 for Norfolk & Western.



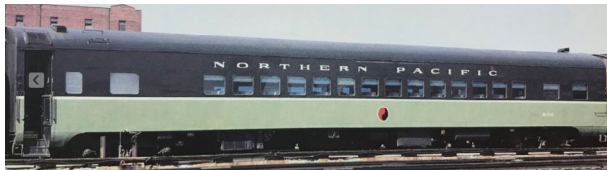
It retained its NW reporting marks when repainted for NS in the early 1990s.



Also new from Micro-Trains is a 50' D&RGW steel gondola that comes with a load. The N scale model represents a car built in the late 1960s with fixed-ends and fishbelly sides.



Completing Micro-Trains list of recent releases is a 39' 10,000 gallon tank car decorated for MEC-Maine Central Railroad. For additional information on Micro-Trains models contact a dealer.



RailSmith Models is bringing out a newly tooled Pullman-Standard coach in N scale

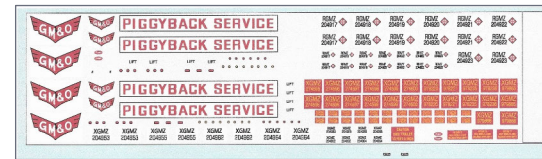
that follows plan 7510. Planned in both skirted and unskirted versions as appropriate, the first release is planned for January 2021. That release will include Northern Pacific, Great Northern, and Spokane, Portland & Seattle painted versions, as well as "close" Union Pacific and Southern Pacific paint schemes. These cars were part of the Northern Pacific North Coast Limited, Mainstreeter, Alaskan, and Coast Pool Trains #407 and #408, and lasted into the Amtrak era. Paint schemes

under consideration include GN Empire Builder and Big Sky blue; Illinois Central, Northern Pacific Two-tone green and 1947 'Pine Tree'; SP&S Broad Stripe, Four Stripe, and Empire Builder; Union Pacific yellow and gray and possibly 'Challenger'; and Southern Pacific yellow and possibly General Service 'silver and red.' RailSmith Models is also judging the interest in an Amtrak version. For more information as well as to indicate which paint schemes you would be interested in, visit lowellsmith.net.

NEW DECALS, SIGNS AND FINISHING PRODUCTS



Mask Island Decals offers a variety of water slide decals for decorating HO scale trailers, including a set for this Rock Island Intermodal Service trailer.



Ohio Piggyback Service trailers.

Depending on the prototype scheme being modeled, this lettering set will decorate two or more Gulf, Mobile &



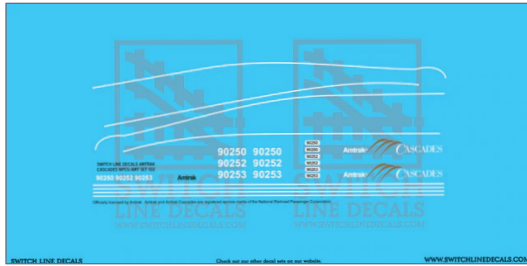
The lettering set for this Chicago & Eastern Illinois Railroad trailer includes oval end logos and the slogan Route of the Piggyback Flyer. For additional information visit www.maskislanddecals.com.

Switch Line Decals has released new HO and N scale water



NEW DECALS, SIGNS AND FINISHING PRODUCTS | 38

slide decals for Amtrak's Cascade and Pacific Surfliner trains.



Individual lettering sets are available for Cascade F40PH NPCU, passenger cars, car end stripes, and passenger car logos.



Lettering sets are available Pacific Surfliner cars, car names, and F40PH locomotives. For additional information visit www.switchlinedecals.com.

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! BRIEFLY NOTED AT PRESS TIME ...

Accurail is expanding its selection of HO scale Milwaukee Road rib side cars with the addition of a double-door version. Tooling is currently being prepared with the initial release expected to be a Route of the Hiawatha car with a 1942-1957 era Pacific Herald ...

Atlas has purchased the tooling for several models from True Line Trains of Canada. The acquisition includes a slab side covered hopper which Atlas will release as a Master series model during the second quarter of 2021. Additional models in the transaction include TLT's HO scale C-Liner and RS18 locomotives, 50' newsprint boxcar, Fowler stock car, bulkhead flat car, CN/CP caboose, and 40' AAR boxcar. Atlas also acquired TLT's N scale C424 and GP9 locomotives. Formerly known as Life-Like of Canada, True Line Trains was started in 2003 after the purchase of Life-Like by Walthers ...

Late word from **ExactRail** confirms the HO scale coil cars announced at the West Springfield Train Show in January, should be ready for release in October ...

InterMountain plans to produce N scale Superdome passenger cars in 14 decorating schemes. We'll have full details next month ...

In response to the financial difficulties caused by Covid-19, **ScaleTrains.com** is offering customers the opportunity to purchase through Affirm which allows consumers to buy now and make easy monthly payments. For details call 844-987-2467 ext 1, or send an email to Sales@ScaleTrains.com. ■



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SEPTEMBER

Due to COVID-19 restrictions, please check with any organization hosting an in-person event for the latest status of the event. ■

Ongoing

ONLINE, Zoom, dates vary, see website. Operation Special Interest Group Meetups – limited attendance available. For more information visit www.opsig.org/Virtual. Past meets are available online at www.opsig.org/Virtual/Past.

September 2020, by location

ONLINE, Zoom, September 2, New Tracks Meetup, ongoing series of meets hosted by Jim Kellow, MMR. For more information visit www.facebook.com/pg/Jim-Kellow-MMR-107123997469688/events.

ONLINE, Zoom, September 5, Virtual National Narrow Gauge Convention part 3. Recordings of clinics and layout tours available on YouTube. For more information visit <http://40nngc.com>.

ONLINE, Zoom, September 18-20, Reading Railroad Prototype Modelers Meet-VIII Virtual. For more information visit www.readingrrmm.com/index.html.

ONLINE, Zoom, September 19, New Tracks Meetup Train Show. Multiple vendors presenting. For more information visit www.facebook.com/events/339809083701676.



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ONLINE, Facebook/YouTube, September 26, NMRAX Virtual Model Railroad Convention. For more information visit www.facebook.com/groups/nmraxgroup or email nmrax@nmra.org
Note: Past NMRAX presentations can be viewed on the NMRA YouTube channel at www.youtube.com/playlist?list=PLBbDHVLodgxn8otpnudMsHdQMucCzcTWD.

October 2020

OHIO, CAMBRIDGE, October 18, Division 6 Model Railroad Train Show, presented by the MCR Buckeye Division, Pritchard Laughlin Center, 7033 Glenn Highway. For more information visit div6-mcr-nmra.org/trainshow.html.

ONLINE, 19-24 October, NMRA British Region – Virtual Convention 2020. Membership in the NMRA British Region required. For more information visit convention.nmrabr.org.uk.

November 2020

CANADA, ONTARIO, FENWICK, November 14-15, 21-22, Greater Niagara Model Railroad Engineers Open House, 1141 Maple Street. For more information visit www.gnmre.ca.

INDIANA, DANVILLE, November 21, Danville Train Show, presented by the Central Indiana Division of the NMRA. Hendricks County Fairgrounds, corner of E. Main St. and County Road 200 E. Due to COVID-19 restrictions, Masks will be required, hand sanitizer stations provided, and contact tracing in effect. For more information visit www.cidnmra.org/services.

Future 2021-2022

CALIFORNIA, SANTA CLARA, July 4-11, 2021, Rails By the Bay, 2021 NMRA National Convention and National Train Show. Santa Clara Marriott Hotel. For more information visit www.nmra2021.com.

INDIANA, NOBELSVILLE, January 31, Noblesville Train Show, presented by the Central Indiana Division of the NMRA. 2003 Pleasant Street. For more information visit www.cidnmra.org/services.

INDIANA, FRANKLIN, May 15, Franklin Train Show, presented by the Central Indiana Division of the NMRA. Johnson County Fairgrounds. For more information visit www.cidnmra.org/services.

MISSOURI, St. LOUIS, tentatively September 2022, NMRA National Convention and National Train Show. ■

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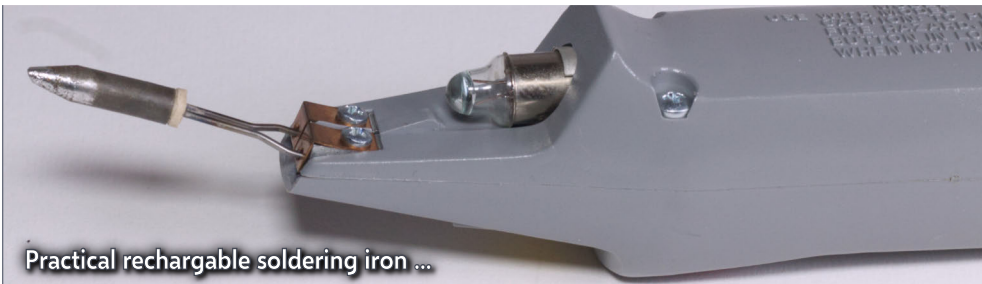
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Coming next month in MRH ...

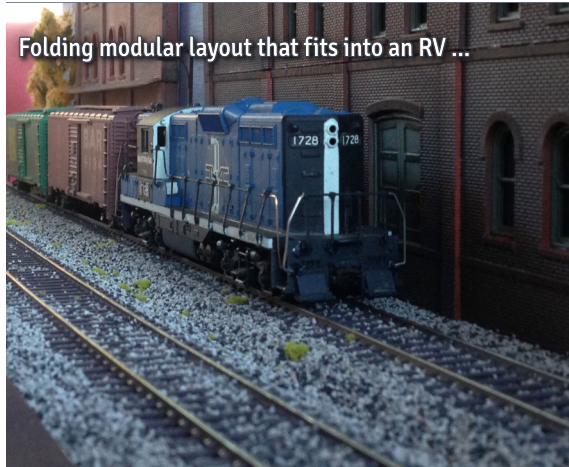
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