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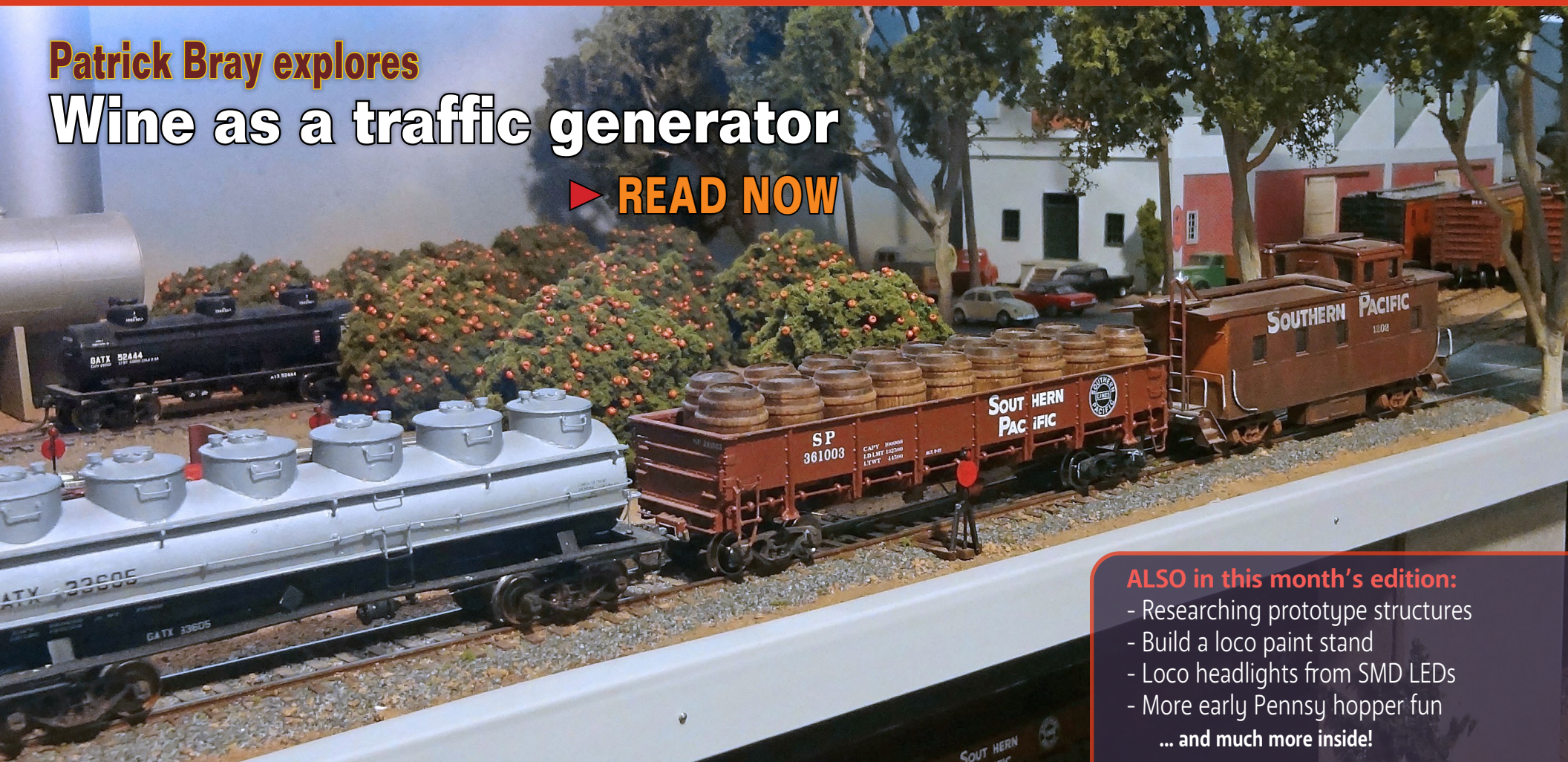
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- ... and much more inside!

LANDSCAPE EDITION

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[INDEX](#)

[TABLE OF CONTENTS](#)



TABLE OF CONTENTS | RUNNING EXTRA

April 2020



RATE THIS ISSUE



Publisher's Welcome: SMD LED loco headlights ...

JOE FUGATE



Limited Modeler: More Pennsy hopper fun

JIM SIX



Getting Real: Researching prototype structures

MARTY MCGUIRK



Building locomotive paint stands

NORMAN REID



Wine as a traffic generator

PATRICK BRAY



Virtual model railroading, part 2

CHARLIE COMSTOCK



Ah-Hah Moment: Safer model storage

V. S. ROSEMAN

TABLE OF CONTENTS | MRH

April 2020



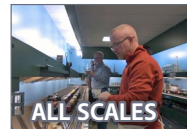
Publisher's Musings: A completely different world

JOE FUGATE



MRH Website this month: Painting a backdrop, and more ...

Compiled by JOE FUGATE



What's Neat: Designing a layout ops plan, and more ...

KEN PATTERSON



DCC decoder plugs and sockets

JOE FUGATE



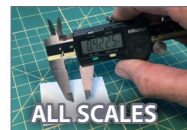
Joe Visintine's East Bluff Terminal

The MRH STAFF



Walthers track cleaning car upgrade

STEPHEN KAY



Digital calipers for modeling

JACK BURGESS



Savvy Modeler online: Painting realistic rocks

Compiled by the MRH STAFF



April 2020 news and events

RICHARD BALE and JEFF SHULTZ

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[INDEX](#)

[TABLE OF CONTENTS](#)

PUBLISHER'S WELCOME

introduction



MRH Running Extra | April 2020

JOE FUGATE: MAKE LOCO HEADLIGHTS FROM SMD LEDs ...



IN THE DAYS BEFORE DCC, I OFTEN WOULD SIMPLY install MV lenses in my loco headlight castings and call it good.

Now with DCC, I want working headlights and gyralights in my locos. I now prefer tiny warm white 402 SMD LEDs because they almost never burn out, unlike 1.5v micro incandescent bulbs.

I make my own headlights by sanding the silvering off the back of [MV lenses](#) and gluing the 402 LEDs to the back with CA.

I use double-sided masking tape on a paint brush handle to more easily handle the MV lenses with precision [1].

I press the lenses down into double-sided foam tape because that holds them firmly in place. Then I sand the backs with a sanding stick or an emery board, removing the silvering in a large round spot [2].

Once I'm done with the sanding operation, I move the MV lenses to double-sided masking tape for the gluing operation [3].

I do this because when embedded in the foam tape, the MV lenses can be hard to get out and I don't want to risk breaking off the LED wires! I use a dental pick or small screwdriver to carefully "unembed" the MV lenses from the foam tape, then use the brush handle [1] to move them to the double-sided masking tape.

I prefer using thicker gap-filling CA to glue the 402 LEDs to the back of the MV lenses. Being able to stick the LED leads to the double-stick tape can be handy for positioning. I find I can work the leads around

PUBLISHER'S WELCOME | 2



1. I apply double-sided masking tape to the end of a paint brush handle and use that to work with the MV lenses.

on the tape until the LEDs sit exactly where I want them on the back of the MV lens.

I put a puddle of CA onto a scrap of plastic, then use a toothpick to transfer a drop of CA to the back of the MV lens where the LED makes contact.

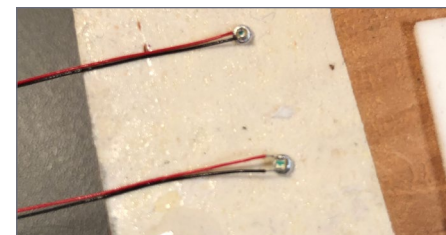
Then I spray the lens+LED combination lightly with CA accelerator to set up the CA.

A few moments later, I can remove my new LED headlight from the double-stick tape and test it. I've had no LED fail so far!

I glue the lenses into the loco casting using a dab of clear silicon caulk and I let it set up. You can see the result in [4]. Looks just like micro bulbs! ☑



2. I sand the back of the MV lens with a sanding stick (220 grit) or an emery board to remove the silvering.



3. I move the sanded MV lenses to double-sided masking tape, then glue the 402 LEDs to the back with gap-filling CA.



4. I install the altered MV lenses into my loco's headlight castings, wire them to the decoder, and voila! Great looking headlights!

THE LIMITED MODELER

column

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

JIM SIX CONTINUES HIS PENNSY
HOPPER ADVENTURE ...



MRH Running Extra | April 2020



LAST MONTH'S "LIMITED MODELER" ADDRESSED early two-bay gondola cars – hopper cars to us model railroaders. Now it's time we look at the Pennsylvania Railroad's four-bay hopper cars. These are the PRR H21, H21a, H22, H22a, H25, and H25a class cars. I spent time creating drawings of these hoppers to illustrate this column. I based the drawings on information compiled from internet resources.

John Teichmoeller's book, *Pennsylvania Railroad Steel Open Hopper Cars: A Guide for Enthusiasts*, is an excellent guide to understanding the Pennsy hopper class developments. John notes that the H21/H21a classes of four-bay hopper cars were mammoth car classes, peaking at over 39,000 cars. The quantity includes original builds, conversions, and secondhand acquisitions. Many H21 variants continued in service into the early 1970s.

The H21 was originally designed as a 50-ton coke car. It was not designed to haul coal. Construction of H21 cars ran from May 1909 to February 1914. They were built by several companies: the PRR Altoona Car shops, Pressed Steel Car Company, Cambria Steel Com-

► DOING MORE WITH LESS



1. Several Pennsylvania Railroad coal hoppers were captured in this January 1941 photo of Conway Yard. A pair of H21a cars are on the foreground track and an H22a is behind those and to the right. *Railroad yards, Conway, Pennsylvania. Photograph by John Vachon, FSA. Retrieved from the Library of Congress, <www.loc.gov/item/2017811811>*

pany, American Car & Foundry, and Standard Steel Car Company. A total of 21,738 cars were built as 50-ton H21 class coke cars.

It didn't take long for the railroad's operating folks to decide that the H21 would make a great coal-hauling hopper car. Experimenting began soon after the first H21 cars were built. The railroad's engineering department determined that the H21 was not capable of hauling a full load of coal due to the 50-ton arch bar trucks.

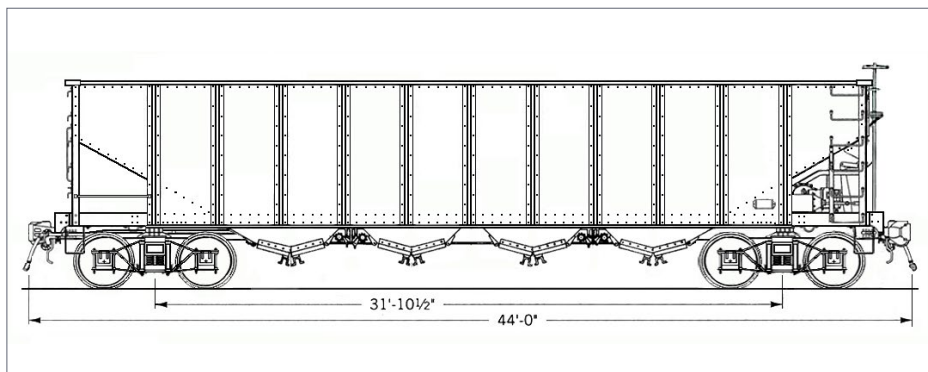
In 1911 the first H21a hopper cars were produced by converting H21 cars. By 1925 all original H21 hoppers were converted to class H21a coal-haulers. The 50-ton trucks were replaced with 70-ton capacity Crown trucks [2-5]. The truck conversion allowed the cars to haul a full load of coal. Problems surfaced as the body structure

THE LIMITED MODELER | 3

was not quite strong enough for rough handling when the car was fully loaded. Under those conditions structural problems were noted in the car frame and side walls. Under normal handling the H21a did not experience structural issues.

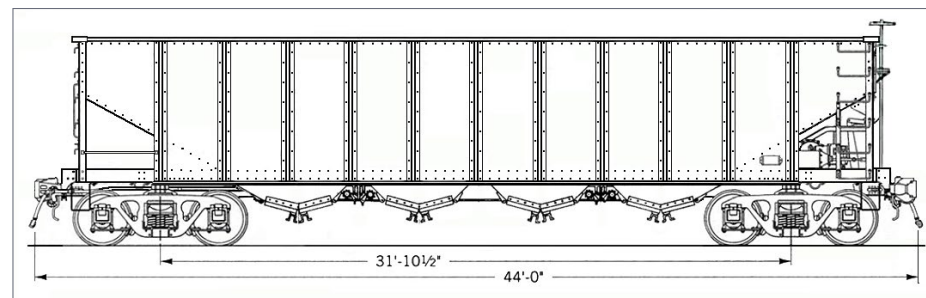
To solve the structural issue, the railroad issued a freight car repair instruction in June 1919 to install a chord reinforcing angle along the top of the car sides. This angle ran horizontally from truck center to truck center. Starting in the early 1920s, H21a cars visited RIP tracks for the reinforcing angle installation. Note though that only about half of the H21a cars received this change and the rest lived out their freight car lives without ever receiving the modification.

To accurately represent the Pennsylvania hopper car fleet, you will need some cars with and some without the reinforcing angles. Fortunately for those of us modeling in HO scale, Bowser produces these cars in both versions! We Pennsy modelers should be thankful. If you have only models without these angles, a few pieces of styrene strip will solve the problem.

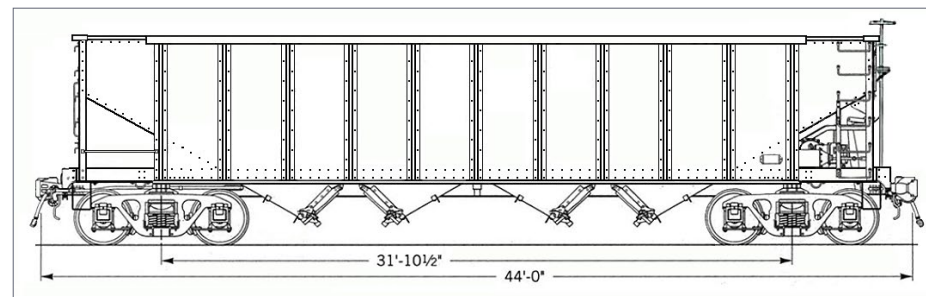


2. The H21 class were built as a 50-ton capacity car for hauling coke. These early hoppers had arch bar trucks and flat-bottom clamshell hopper doors.

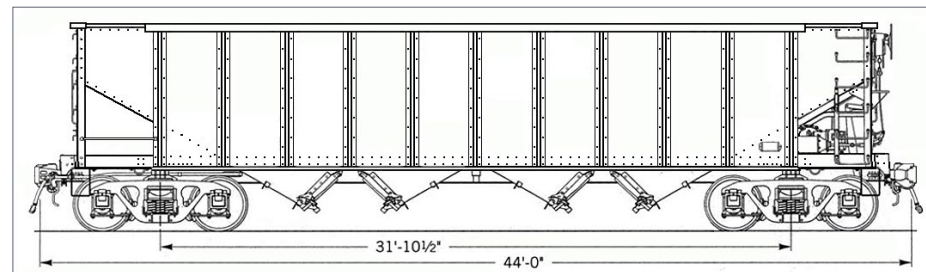
THE LIMITED MODELER | 4



3. The H21a class were built with a 70-ton capacity car for hauling coal. These hoppers had 70-ton Crown trucks and clamshell hopper doors.



4. Many H21a car were rebuilt in the 1920s with a reinforcement angle along the top of the car side. The clamshell hopper doors were replaced with sawtooth hoppers.



5. Additional upgrades were added when H21a car were rebuilt in the 1930s. AB brake systems and geared hand brake wheels were the main spotting features.

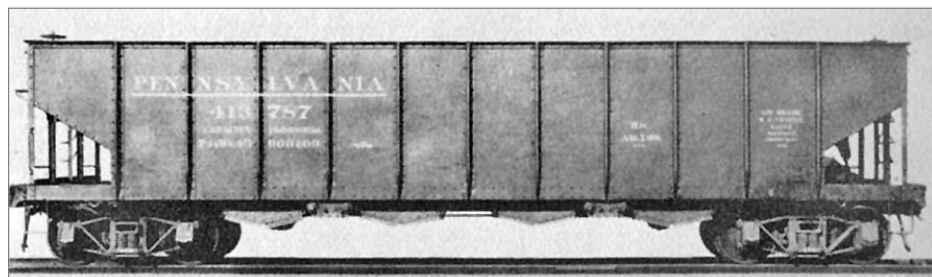
THE LIMITED MODELER | 5

From 1915 through 1918 the Pennsylvania Railroad built an additional 14,270 H21a cars. The Ralston Steel Car Company of Columbus, Ohio, was added as another builder. Production was completed on all H21 hoppers in 1923, with a total of 39,622 cars constructed.

The H21 and H21a cars were originally built with flat-bottom hoppers that hobbyists have named clamshell doors. The change from clamshell to sawtooth hoppers became standard in December 1926. Some cars still had the clamshell doors into the late 1940s. I can have both versions for my 1927 layout, though I should probably have more clamshell than sawtooth hoppers.

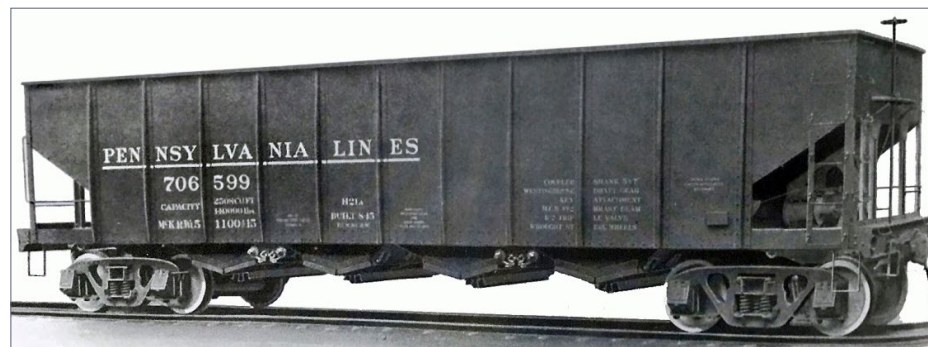
LETTERING

The earliest cars had a spartan lettering arrangement with minimal weight and car data [6]. Additional weight data was added in the 'teens with a hardware inventory added to the right end of the car side [7]. New guidelines for weight stencil presentation made an appearance in 1926 [8]. The circle keystone emblem began



6. PRR 413787 is an as-built H21 with clamshell hopper doors and 50-ton arch bar trucks. These cars were first built in 1909. The end ladders can be seen on this car with the rungs installed between the end posts. There are no ladders on the car sides.

THE LIMITED MODELER | 6



7. PRR 706599 is pictured in a 1915 builder photo with 70-ton Crown trucks. Compare the lettering and end ladder locations with the 1909-built car [6].



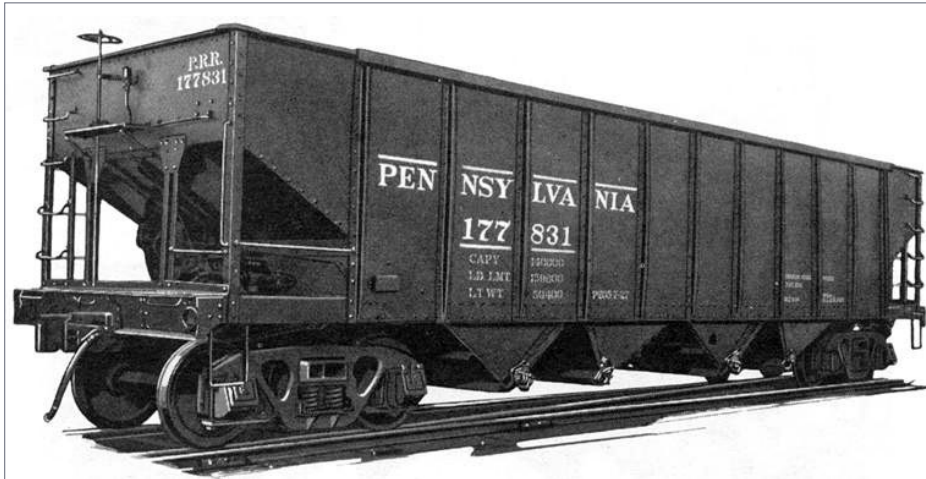
8. This H21a has lettering following guidelines from the spring of 1926, very close to the 3-26 weigh date. The American Railroad Association (ARA) updated the weigh data presentation to display separate load limit (LD LMT) and light weight (LT WT) figures. The cubic capacity detail was also moved with the lettering on the right side of the car. Compare with the data in previous photos [6, 7]. Note the addition of the reinforcement angle along the top of the car side.

appearing in January 1930 [14, 15]. In June 1954, the shadow key-stone lettering was applied. All cars were painted freight car color to this point. The plain keystone on black cars was applied starting in July 1956, and PRR initials only started in early 1960s.

As car production began in 1909, not all the H21 cars were compliant with the Safety Appliance Act amendment of 1911. The earliest H21 cars [6] did not have ladders, grab irons, and hand holds in familiar places. These cars were upgraded as repairs were needed.

H25 CLASS

In addition to the H21 and H21a cars, Pennsy added 3,000 H25 hopper cars in 1919. The Pennsy convinced the USRA to allow the H25 cars to be built instead of a large assignment of USRA

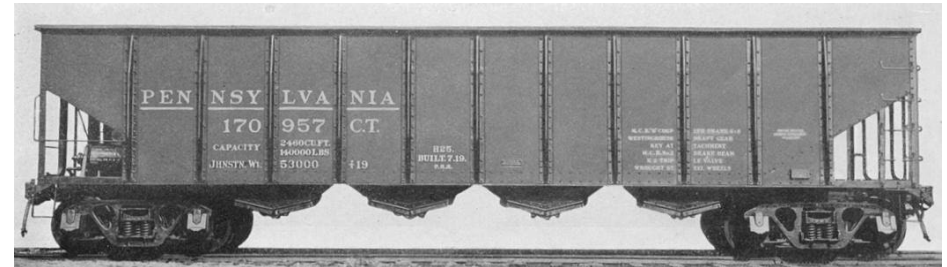


9. PRR 177831 displays another lettering scheme for Pennsy H21a hopper cars. There are now two lines, one above the railroad name and one below the car number verses one line between them in [7, 8]. This scheme was adopted on May 14, 1926.

twin hoppers. The railroad wanted cars with the capacity of the H21 but with an updated design following nearly a decade of H21 experiences.

At a glance, the H25 cars seem identical to the H21a. There are slight visual differences between the two car designs. Compare the ends sills and the steel sill between the car end and the bolster. The H21 car design used heavier components for those features [9] compared to the H25 [10, 11].

The side stakes are also different. The H25 side stakes have slopes at the top and bottom that are equal in distance [11]. The H21 cars have side stakes that have a short taper at the bottom of the stake and a long taper at the top [15]. H25 cars did not have the reinforcement angle at the top of the car sides.



10. A builder photo of PRR 170957 shows the new H25 car with 70-ton Crown trucks and clamshell hopper doors. The C.T. stencil marks the car as Columbia Trust, a financier of USRA car construction. Many USRA cars wore this stencil until USRA control was relinquished in March 1920. Railroads quickly painted over this stencil when they regained ownership.

THE LIMITED MODELER | 9

The Pennsy bought 2,287 used H25 hoppers from private coal and steel companies through the 1920s. By 1930, the H25 class had grown to 5,287 cars.

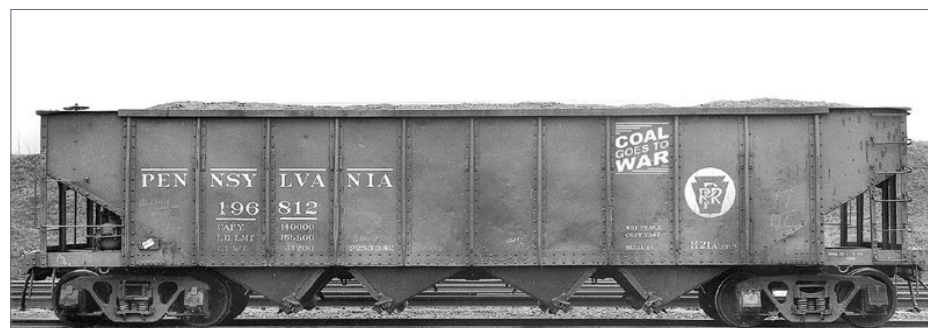


11. PRR 677216 is a class H25 car with an 8-30 weigh date stencil and rebuilt with sawtooth hoppers. It may have just received the circle keystone emblem. This was the longest-lasting paint scheme for Pennsy hopper cars. It was introduced in January 1930. Note the lack of the reinforcement angle. H25 cars did not have this feature.



12. PRR 249898 is a class H25a 70-ton hopper. The car has heavier side and end sills like the H21a cars. These components were added after being rebuilt in the late 1940s and early 1950s. The car has a 7-53 weigh date stencil and has been upgraded with an AB brake system.

THE LIMITED MODELER | 10



13. PRR H21a 196812 displays the lettering adopted in 1930 but with the addition of a COAL GOES TO WAR stencil on the car side. This car has the distinctive reinforcement angle.



14. PRR 136933 shows the final variation of the H21a with a heavier angle installed along the top of the car side. Note how the angle is notched for clearance above the ladder grab at the right end. Hoppers were frequently rebuilt and upgraded to meet the latest requirements. This car rides on Crown 70-ton trucks, has sawtooth hoppers, and a geared hand brake wheel. The circle keystone is on the second full panel from the right end of the car. Some applications placed the circle keystone in the third panel from the right [11].

★★★★★
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15. PRR 677025 is an H21a hopper with and the lettering scheme before the shadow keystone replaced the circle key-stone in 1954. It is in shabby condition with peeling paint and rust splotches. All four truck bearing journals on this side of the car are filthy and soaked with lube oil. This appearance is typical of many PRR hoppers.



16. PRR 194796 is a preserved H21a at the Railroad Museum of Pennsylvania in Strasburg, Pennsylvania. The car is clean and the color is a faded shade of freight car color. The paint used in the 1910s and 1920s had more of a deep orange-peel color. Paint formulations changed over time to this reddish-brown tone. This is the cleanest Pennsy hopper I've seen. It needs to be weathered! Note the geared hand brake wheel on the car end.



17. I think too many model railroaders believe that only gondolas and two-bay coal cars delivered to coal dealers. This photo proves that is not so. The Pennsy H21a is delivering coal to Castle Coal Co. Don't you just love those coal delivery trucks? I can see one backing up to my aunt's house delivering coal for the furnace back when I was a kid.



18. I love this photo! Note the word COKE is spelled out in large letters on the Pennsy hopper. It's an H21 class car with arch bar trucks and a reinforcement angle to strengthen the car's structure. I imagine the N&W hopper at the left and the NYC drop-bottom gondola at the right may have delivered coke along with the Pennsy hopper.

PRR H22 AND H22A HOPPER CARS

The Pennsylvania Railroad's H22 coke cars were a variation of the H21 design and built for coke service [18, 19]. Production began in 1914. The H22 cars were built with clamshell hopper doors and 50-ton arch bar trucks [22]. Some cars received a reinforcement angle along the top of the side stakes [19].



19. H22 class coke hoppers are seen in this image. They followed the H21 design but had different sides. The slatted openings were on each side of the car and known as coke gates. The openings came up almost even with most coke oven wharfs. A wood plank or two was placed from the wharf to the car. The gates could be moved aside so workers could push wagon loads of coke across the planks to load the car. Coke is less dense than coal. The H22 cars were rated at 50-tons, and equipped with 50-ton arch bar trucks.

In converting cars to the H22a class, the coke gates were replaced with solid panels [23, 24]. Many H22 cars also received 70-ton Crown trucks. The H22a cars were converted for coal service with capacity increased to 140,000 pounds. Many cars received reinforcement angles along the top of the car sides and above the side stakes [24]. Conversions were begun in 1923, with the last completed by 1930. After 1930 the H22 cars were scrapped instead rebuilding or upgrading.

As for lettering, the H22 cars followed similar lettering practices that were applied to the H21 cars. Very few H22a cars lasted into the 1950s. There has been no evidence of any being repainted in the shadow keystone scheme.

COKE

Coke is a gray, hard, porous solid fuel with a high carbon content and few impurities. It is made by heating coal in the absence of air, a destructive distillation process. Coke is an industrial product primarily used in iron ore smelting. It is also used as a fuel in stoves and forges when air pollution is of concern. The term coke refers to the product derived from low-sulfur bituminous coal by coking.

In the early 20th century, coke was produced in batteries of coke ovens close to mining operations [20]. These were frequently called beehive ovens. An electrically operated car, often called a larry, was loaded at the coal tipple with coal to charge an oven. The larry cars ran on tracks on top of the oven complex and would dump the coal into the oven via a portal on top [21]. A fire was started in the oven and the oven door was sealed for the coking process.

Continued on the next page ...

COKE *CONTINUED* ...

Once the process was completed, the oven door was knocked open and the coke was removed to load into awaiting hopper cars. Pulling coke was done using long rakes and shovels in the early days. Machines with mechanical arms were developed to sweep the coke through the oven door onto a conveyor belt for transport to hopper loading.

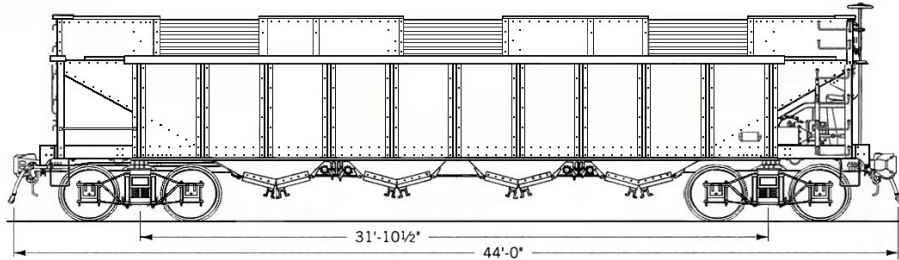


20. The retired coke ovens and wharf of the Shoaf Mine & Coke Works in Shoaf, Pennsylvania. Coke would be pulled from the ovens onto the wharf to cool. Hopper cars would be spotted in the channel for coke loading. *Historic American Engineering Record, Creator, et al., photograph by Jet Lowe. Retrieved from the Library of Congress, <www.loc.gov/item/pa2761>*

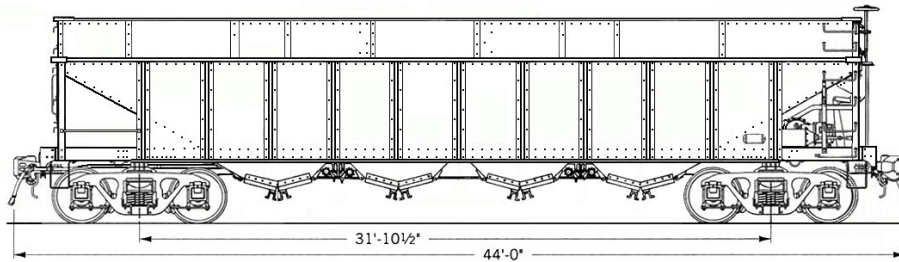
These early coke oven operations were known for casting a red-orange glow into the night sky and billowing black smoke into the air. An industrial process came into use before World War One that streamlined coking and captured many by-product chemicals the beehive ovens released into the air. Companies often made more profit from the byproducts than from the coke. The newer operations were typically located closer to the end user of the coke to minimize long distance travel damage. Some coke oven operations lasted into the mid-1960s.



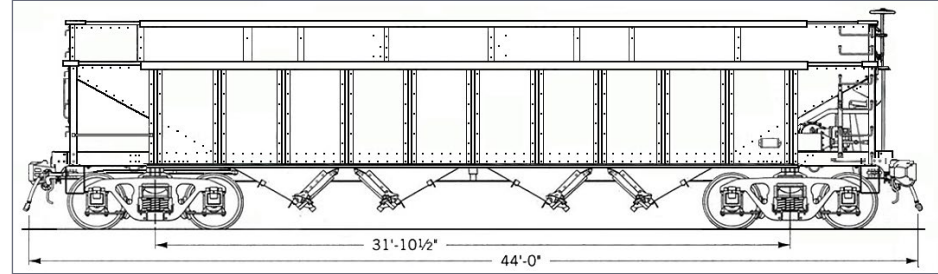
21. Larry cars sit on the coke oven battery at the retired Shoaf Mine & Coke Works. This operation was among many that were common in the Connellsville coal and coke region of southwestern Pennsylvania. *Historic American Engineering Record, Creator, et al., photograph by Jet Lowe. Photograph. Retrieved from the Library of Congress, <www.loc.gov/item/pa2761>. ■*



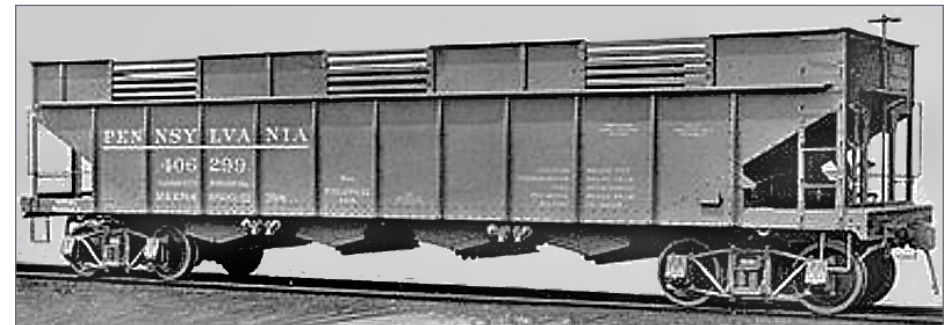
22. The H22 class were built as a 50-ton capacity car for hauling coke. These hoppers had arch bar trucks, flat-bottom clamshell hopper doors, and coke gates that slid open for loading.



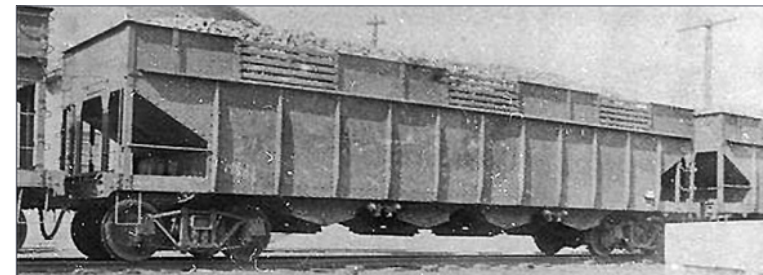
23. The H22a class were rebuilt H22 cars for coal hauling. These hoppers had 70-ton Crown trucks, flat-bottom clamshell hopper doors, and steel plates that replaced the coke gates.



24. Many H22a cars were updated again for the coal trade. These hoppers had reinforcement angles installed along the top of the car sides and just above the side stakes. Sawtooth hoppers replaced the clamshell hopper doors. Cars retained the 70-ton Crown trucks.



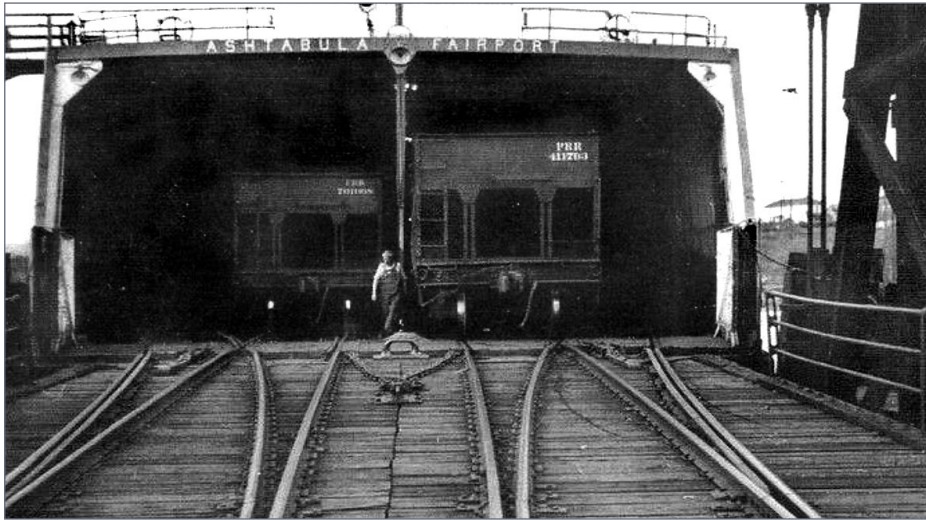
25. PRR 406299 is a H22 coke car with 50-ton arch bar trucks. Bowser has offered this car in HO scale.



26. The car number cannot be read but it is loaded with coke, probably bound for a steel mill. Note the 50-ton arch bar trucks.



27. This late 1930s photo shows an H22a hopper. Note that there are two reinforcement angles. One is along the top of the car side, and another is just above the side stakes. The top reinforcement angle is heftier than the lower one. *R. Biddy photo*



28. This is another view of [27]. The reinforcement angle does not continue around the ends of the H22 hopper car. *R. Biddy photo*

MODELING THE LARGER PENNSY HOPPERS

Now that we have examined the Pennsylvania Railroad's prototypes, let's model them. Bowser has produced the H21, H21a, H22, and H22a as HO scale plastic, injection-molded models. They have also produced the H21a in N scale. The H25 car is available as a resin kit with a one-piece body in the Funaro & Camerlengo line.

Bowser offers their H21 models in a few variations.

- H21 with clamshell hoppers and 50-ton arch bar trucks
- H21a models with clamshell hoppers and 70-ton Crown trucks
- H21a cars with sawtooth hoppers and 70-ton Crown trucks
- Parts had been included to model vertical staff and the end mounted geared hand brake wheels

These models have been offered in various paint and lettering schemes following prototype practices [29]. The H21a models have also been made with and without the reinforcement angle.

These have been available as shake-the-box kit sets with knuckle couplers. I replaced the plastic wheel sets and the couplers. The Kadee No.153 short-shank scale couplers drop right into place.

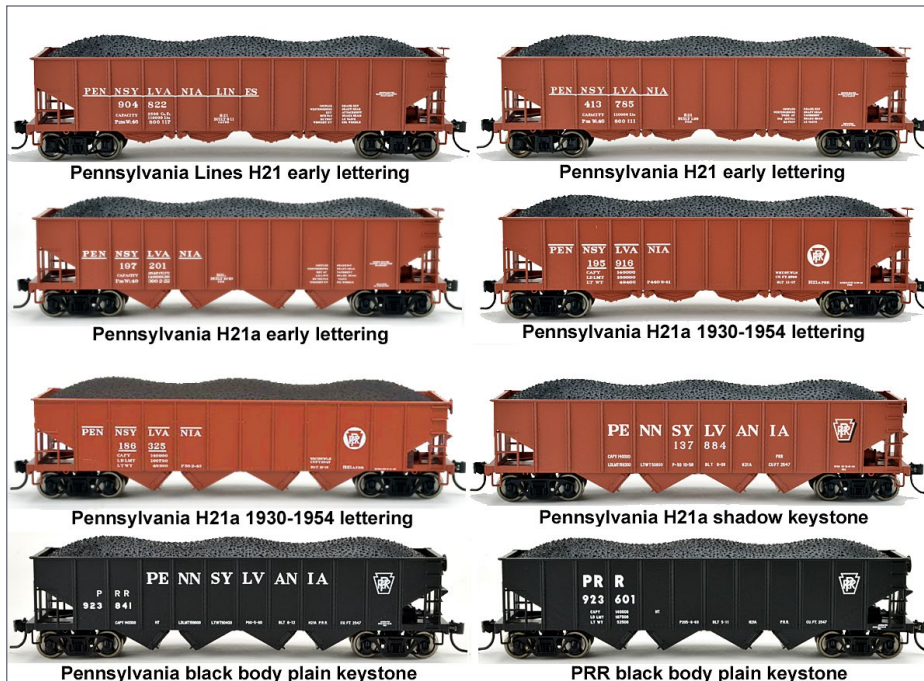
Many of these models came with the circle keystone herald. This was first applied in January of 1930, three years after my 1927 setting. I sand off the keystones using 1000-grit wet/dry sandpaper then brush-paint the sanded areas. That's all I do before weathering these models.

Bowser has offered the H22 and the H22a in two versions.

- clamshell door hoppers and with arch bar trucks
- sawtooth hoppers with Crown trucks
- Parts had been included to model vertical staff and the end mounted geared hand brake wheels

Several prototype lettering schemes have been applied to the H22 and H22a models [30]. Bowser originally sold these as kits, and many can be found in hobby shops, on eBay and in the secondary market. Current Bowser production has focused on ready-to-roll models. I acquired half of my Bowser hopper fleet second-hand.

★★★★★
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29. Here are the basic versions of the H21 and H21a Bowser has offered. There are other versions for the Pennsy, including ore service and MoW. The only version missing is a model with the 1926-1930 lettering scheme. Hopefully we will see it as a future release. There are also versions for other railroads such as B&O, PC, N&W, and VGN.



30. Here are six versions of the H22 and H22a that Bowser has offered. As with the H21/H21a, the H22/H22a is also available undecorated so you can letter to suit your needs.

MY MODELS



31. PENNSYLVANIA 413785, is a Bowser RTR model sold as an H21 coke car. I changed it to an H21a coal hauler by replacing the trucks with 70-ton Crown trucks.



32. Another view of 413785 offers a better view of the Kadee No. 53 scale short-shank couplers. I weathered the model, but not as heavily as some of my other coal cars.



33. The foreground hopper cars were just emptied at the Sturgis Edison powerhouse. A powerhouse on the layout generates plenty of coal traffic. A PRR GLA hopper is spotted at the local coal dealer at the right.



34. This pastoral scene catches PRR 746464 as it waits to be picked up for a trip back to the coal mines. A reinforcement angle was probably installed when the car was converted from clamshell to sawtooth hoppers. This lettering scheme was applied starting on May 14, 1926 and was standard until January 1930 when the circle keystone was added. The model is factory-painted by Bowser, but I removed the circle keystone. This car is not heavily weathered or beat up. It was recently shipped and repainted within the past year for my 1927 focus.



35. This is an older Bowser model of a H22a. The prototypes were originally built as a coke car. The Pennsy converted many for hauling coal. In addition to covering the original slatted coke gates, the car has been updated with 70-ton Crown trucks. I remember seeing these cars among H21a hoppers in the Pennsy's Sandusky, Ohio yard in the 1950s.

Preparing model freight cars is only part of the battle to have a well-operating, realistic model railroad. Another part is building an integrated freight car fleet of freight cars that work well together. This much means having the proportion of each car type similar to the prototype proportions.

In these last two columns, I pointed out the car quantities of each class the railroad had. The Pennsy had about 40,000 H21a cars, 30,000 GLA types, and 20,000 GL types, along with lesser classes. The PRR was assigned only 300 USRA twin hoppers, which originally went to the Long Island. While USRA hoppers are common in the hobby, pre-World War Two modelers don't need any lettered for the Pennsy.

Another aspect of building an integrated car fleet is deciding how many of each type of freight car for your fleet. I like coal hopper cars more than any other type of freight car. So, do I prepare and have more hopper cars than other types? No. I'll need about 150 freight cars to support operation on my layout. I think about 40 hoppers are needed. The rest of the fleet will have about 50 boxcars, 20 gondolas, 10 or 12 ice-bunker cars, and about 10 each of tank and flat cars.

As I build up my freight car fleet, I'll keep these numbers in mind so I don't build more of any car type than I need. This will lead to a balanced freight car fleet that will work for me.

FUTURE COLUMN

I feel the freight cars in my fleet need to have an operational reason to use on the layout. My hopper cars can have an assortment of destinations to local coal dealers and factories for their steam boilers. Industry demands create the need for deliveries and empty pickups. The biggest industry for coal delivery will be my Sturgis

Municipal Power generating plant [36], which supplies electrical power to Sturgis and the surrounding areas.

The two boilers at the plant are hungry and require regular deliveries of coal. This 75MW power plant would typically burn up to 1000 tons of coal per day. Since the hopper car capacities are 50



36. Here's the Sturgis Municipal power plant, a work in progress. I photoshopped the image to show how it may look when completed. This 75MW power plant elevated trestle as modeled holds five H21a 70-ton hopper cars or seven 50-ton two-bay hopper cars delivering coal. It could be an assortment of both types of hoppers. This will be a fun industry to switch. I plan to feature more on this facility as it is completed.

and 70 tons, this translates to about 20 daily car loads. While modest by modern standards, this is great for my model railroad.

During an operating session, my crews will deliver 20 coal loads and pick up 20 empties. A plant switcher will shuttle the cars to the plant's raised trestle for unloading, and position empties back in the industry storage yard for pickup. I think the plant switcher can be a full-time job for one or two operators. Another pair of operators runs the coal train bringing loads and pulling empties.

This job can focus just on the power plant and not need to work other industries. Other local jobs can handle the needs of Sturgis industries. I'll have a busy one-town operating session with a



handful of two-man jobs – the local freight, the coal train, and the power plant switcher.

I plan to feature the power plant later this year with construction and operating details. Stay tuned!

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- Hansmann, Eric, many one-on-one discussions ✓

★★★★★
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37. While most of my layout photos depict a bright blue sky, I decided to use this photo to close out the April column. I photoshopped a stormy sky into the photo. It makes a dramatic background as a few empty Pennsy hoppers await the southbound local to take them to Ft. Wayne on a trip back to the coal fields. I am contemplating a stormy sky like this for the backdrop of my new layout.

GETTING REAL

column



MRH Running Extra | April 2020

MARTY MCGUIRK RESEARCHES PROTOTYPE STRUCTURES ...



APPROPRIATE, ACCURATE STRUCTURES ARE perhaps the best way to effectively let visitors know you're modeling a prototype. Although thousands of kits have been made over the years, there is far more variety in the real world.

For those of us not modeling today, or perhaps the last two decades, it's a challenge to figure what a particular structure looked like, how big it was, and where the doors and windows were located. Once we determine the answers to those questions, we can decide the best approach to modeling it. In this column, I'll focus on how I answer some of these basic questions before I start building.

WHY NOT KITS OR KITBASHING?

Yes, you can use some kits. For one thing, kits are useful for standardized or somewhat standard buildings – gas stations come to mind. For example, I am certain that by the early 1950s most every town and city in North America has or had at least one gas station that looked a lot like the City Classics or Walthers kits.

► **MODELING REAL RAILROADS AND WHAT THEY DO**

GETTING REAL | 2

But face it, there will never be enough kits to completely populate a prototype layout because of the tens of thousands of buildings that have existed.

Another approach is kitbashing. Taking components from several kits and combining them to produce a totally unique building is a viable approach. I was privileged to work with and get to know Art Curren, the true master of this art, which he preferred to call "kitmingling."

While I've tried kitbashing over the years, and I have ideas for some kitbashing projects on my current layout, I'm no Art Curren. But it's a valid approach. Frankly, I find it easier to scratchbuild than combining kit parts. If kitbashing works for you, go for it!

Many prototype modelers save time and energy by using kits for generic or typical structures, allowing them to devote more time or attention to true signature buildings. In my case, I haven't changed my prototype or region, but have changed the towns I'm modeling. I had modeled the Central Vermont Roxbury Subdivision until May 2017. After moving to a new home, I changed my modeling focus to the Central Vermont's Richford Branch, which was described in the June 2019 *Running Extra*.

I certainly plan to use some typical New England buildings (ironically most of them kits) left over from prior layouts on the Richford Branch. As I know little about the actual structures in a few of the towns I'm modeling, these leftovers serve as semi-permanent stand-ins.

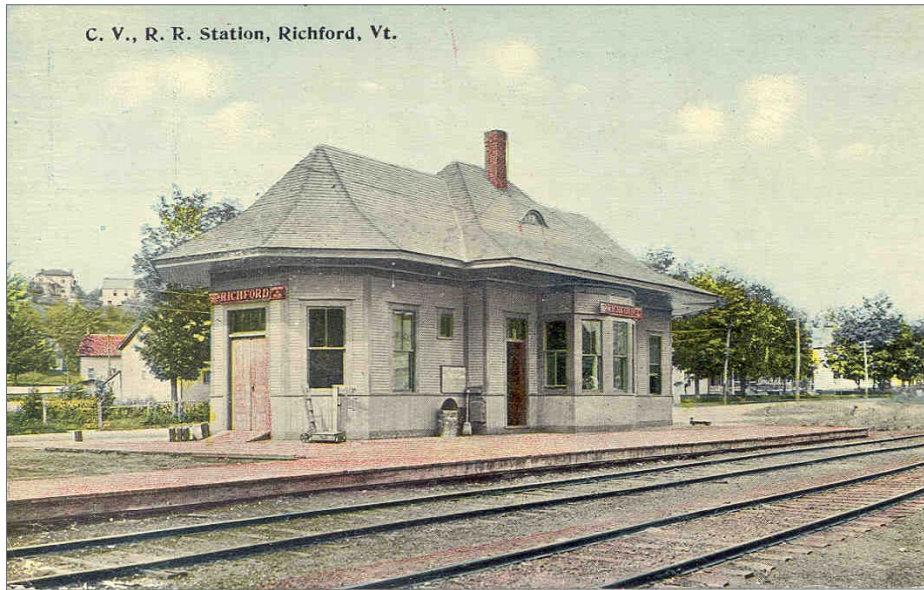
In some cases, I've opted to include structures from other locations since I simply prefer how they appear. But they're all from my modeled region and time period, so they look as if they belong. Perhaps this may be described as the Greenfield Village approach to prototype modeling? Simply put, if you're going to build a prototype-based model railroad layout then you will have to scratch-build some or all the structures.

THE STARTING POINT

The starting point for most of these projects is a prototype photo. There's an almost limitless variety of photos in books, magazines, and of course the internet. If you're looking for photos of a specific town or industry, expand your horizon beyond the obvious sources such as railroad history books, railroad historical societies, and the like.

A MORE DETAILED SEARCH

Let's face it, unless it's a railroad building, or perhaps a building shown in the background of a train picture, most railroad histories aren't terribly useful for figuring out the details of commercial or residential buildings. You need to expand the scope of your search.



1. If you're looking for images of railroad stations and large commercial buildings search online auction sites for postcards. Just remember the colors shown are often not accurate!

There are some easy places to start. Search sites such as Shorpy or even eBay by town and/or industry name. I've located several postcards for towns along my prototype branch line on eBay, such as one of the Richford, Vermont station [1] in the days before it was converted to a gas station.

Don't overlook the Library of Congress website (loc.gov). A few months ago, I entered "Photos, Railroad, Vermont" in the search window and up popped a single Jack Delano photo taken in September, 1941 in Sheldon Springs, Vermont [2] – at the very paper mill I planned to include on my new layout.

If the photographer's name sounds familiar, you've likely seen some of his photos. He was a one of a number of photographers employed by the Farm Security Administration, and later the Office of War Information, to document everyday life in the US during the 1930s and 1940s. He also took color photos of railroad and other subjects during the war.

Since there was one photo, I thought there might be more. On a hunch I entered "Delano, Vermont" in the search box and found literally dozens of photos.

As it turns out, he spent a considerable portion of September 1941 in northern Vermont, documenting industries and towns along the branch line I'm modeling. And all those photos are free on the internet.

Another obvious source of information are photo books, such as the hundreds of small-town photo histories published by companies like Arcadia.

A less likely source are histories of small towns often published by local historical societies. Some are better than others for our purposes, and yes, you'll likely skip over the chapters on the local

high school's 1930s-era basketball team and the like. Most will have sections called "Where we worked," and "How we Traveled" that will often include photos of the industries and railroad station and facilities in town.

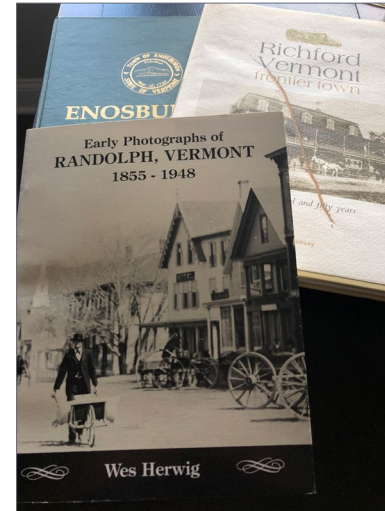
I've located these histories for several of the towns on my prototype [3]. The one on Enosburg Falls cost me all of \$7.00 on eBay. It is simply the best bang for the buck I've ever gotten as it has dozens of useful photos.

Vintage photos may not be all that beneficial to modelers who model more modern eras, after all they have the option



2. I read somewhere that shots of NYO&W wood gondolas away from the home road are rare. Well, here's one in Sheldon Springs, Vermont. *Jack Delano, Library of Congress*

of in-person visits and even online sources like Google Maps Street View [4]. But for historical prototype modelers, these older images are a godsend when it comes to determining what things looked like back then [5].



3. Small town histories are published by many town historical societies. Some are better than others. These Enosburg Falls and Randolph histories have inspired many of my layout projects over the years.



4. In this contemporary Google Maps Street View, I could tell this was the former Enosburg Falls creamery. Building a model that looked like this wouldn't have come close to capturing the prototype look in my era [5].

HOW BIG IS IT?

Before you start building a model you need to figure out some basic dimensions. Of course, if the structure is still standing, hasn't changed much since your modeling era, and is accessible to you, you can measure it.

If that's not the case, you're going to have to do more research. There are several options.

(1) You can determine the basic footprint of the building from fire insurance maps, such as those published by Sanborn.



(2) You can scale the photo to determine the basic dimensions.

Let's look at these options.

5. The Enosburg Falls Creamery in September 1941. While I can tell this is the same building in [4], obviously there's a lot more detail visible in this photo. Jack Delano, Library of Congress

SANBORN MAPS

You won't be a prototype modeler for long before you'll discover Sanborn Maps. You can find online color images of most of these on the Library of Congress web site. Search loc.gov for "Sanborn_TOWN NAME" and some maps should come right up.

When considering these as resources, it's important to realize what they're good – and not so good – for. First, to say the railroad tracks and sidings shown are not accurate is an understatement. These are fire insurance maps, designed for use by insurance companies to assess relative risk of fire. The maps were never drawn to show details of railroad tracks except how it relates to fire insurance.

What Sanborn Maps are good for is showing some details of the building's construction. You can use a black-and-white map version for most details, but it really helps to have color-coded maps. Some basic information (whether a building is frame, brick, or stone construction for example) is color-coded and often not noted any other way. But there are more details shown inside the outline of the structure, as noted in the Sanborn Map of the L. L. Marsh Grain Co. [6]

SCALING PHOTOS

Let's look at a case study. One of the buildings I wanted to include in Enosburg Falls on my layout was a somewhat unusual structure with an angled front door and three large garage doors. [7]

I first encountered this building when it appeared in an early issue of the Central Vermont Railway Historical Society's quarterly newsletter, the *Ambassador*.

A quick wander around the streets of Enosburg Falls on Google Maps Street View show the building still stands and is remarkably

Interpreting Sanborn Maps

Yellow = Frame Building

Gray Outline = Iron clad

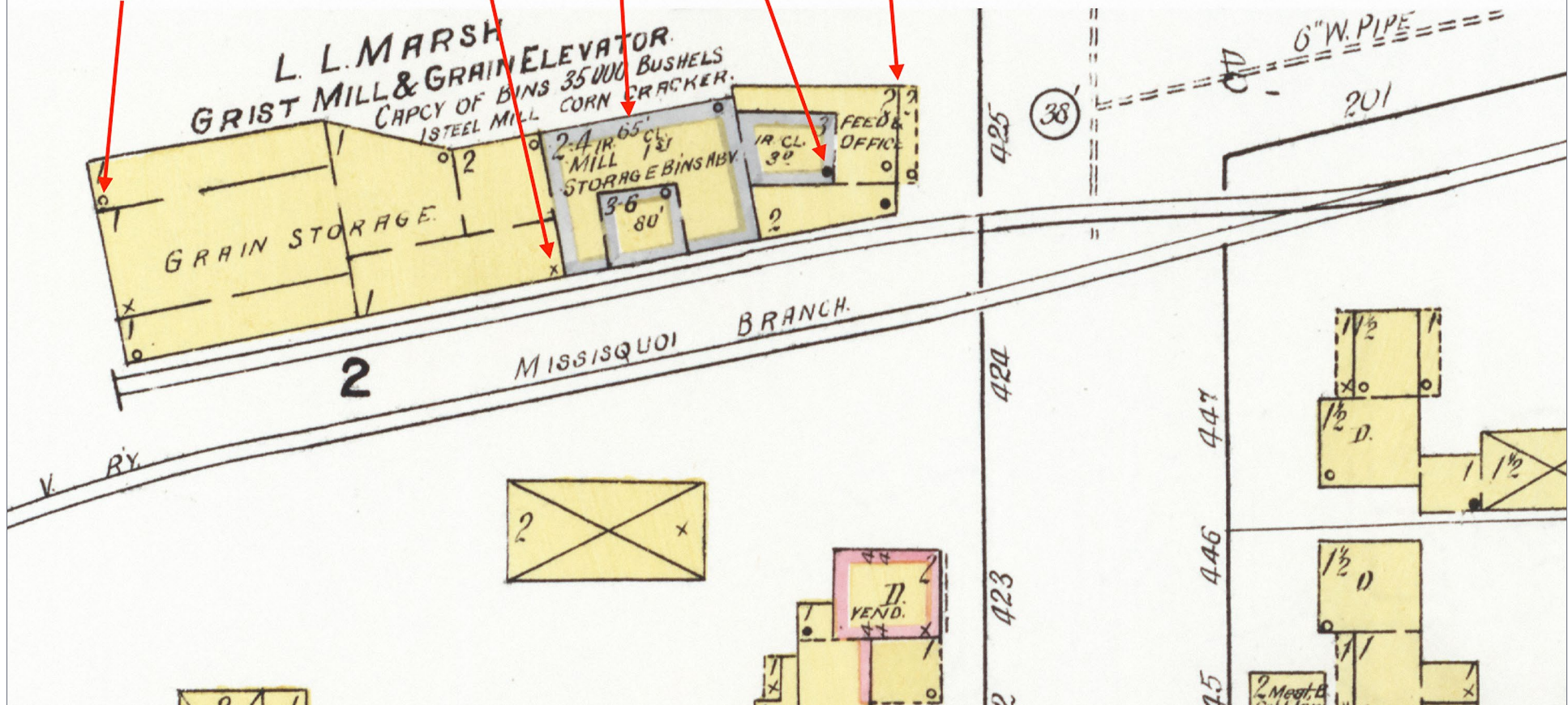
Metal, Slate, Tile or
Asbestos Shingles

Asphalt Shingle

Composition Roof

Height to Eave

Stories



6. All those little circles and lines on the buildings in a Sanborn Map reveal a great deal about how the building was constructed and how it looked.

unchanged. Some places change radically from year to year, but I can model a building relatively unchanged from the 19th century. This is rare in some areas. Luckily, rural Vermont is not one of those! [8 & 9]

Now I knew the structure still existed, and I had several photos that showed how it looked after my modeling era. The next step was the Sanborn Maps. The Sanborn Map from 1920 [10] labeled the structure as “Agricultural Implements, Carriages & Auto Supplies.”

Reviewing the maps over the years show the building in 1920 was originally L-shaped with peaked roofs. At some point between 1920 (the date of the latest Sanborn Map [10]) and 1990 or so when [7]



7. An Enosburg Falls prototype building after the rails of the CV's Richford branch had been removed, dating it to the early 1990s.

was taken, the building received a flat roofed addition that converted the footprint to a rectangle.

Luckily for me, a friend of mine was vacationing in Vermont last summer and was kind enough to take some photos of the building. I asked him to try and measure it, but he got enough funny looks from the locals while taking photos that he opted not to dig out a tape measure.

So now I had some good photos and a Sanborn Map of the building. Rather than delay starting the model until I have an opportunity to measure it, which considering my friend's experience, seemed unlikely, I opted to scale the building from the photos I had.



8. Compare this Google Street View with [7] to see how little the building has changed.

SCALING FROM PHOTOS

[10] shows a dimension of 26' on one of the gable walls on the structure. It's impossible to get precise dimensions of a wall from the scale on the maps, but the dimensions are accurate enough for our purposes.

If you don't have a map, and all you have is a photo, use the dimensions of a door for a starting point to scale the rest of the building. Window sizes are all over the map, but for the most part door sizes have remained fairly constant over the years.

Average door sizes -

- 84" tall / 36" wide for commercial (old Main Street style buildings typically had much taller doors, but they usually weren't much wider than 36")
- 80" tall / 32" wide for residential

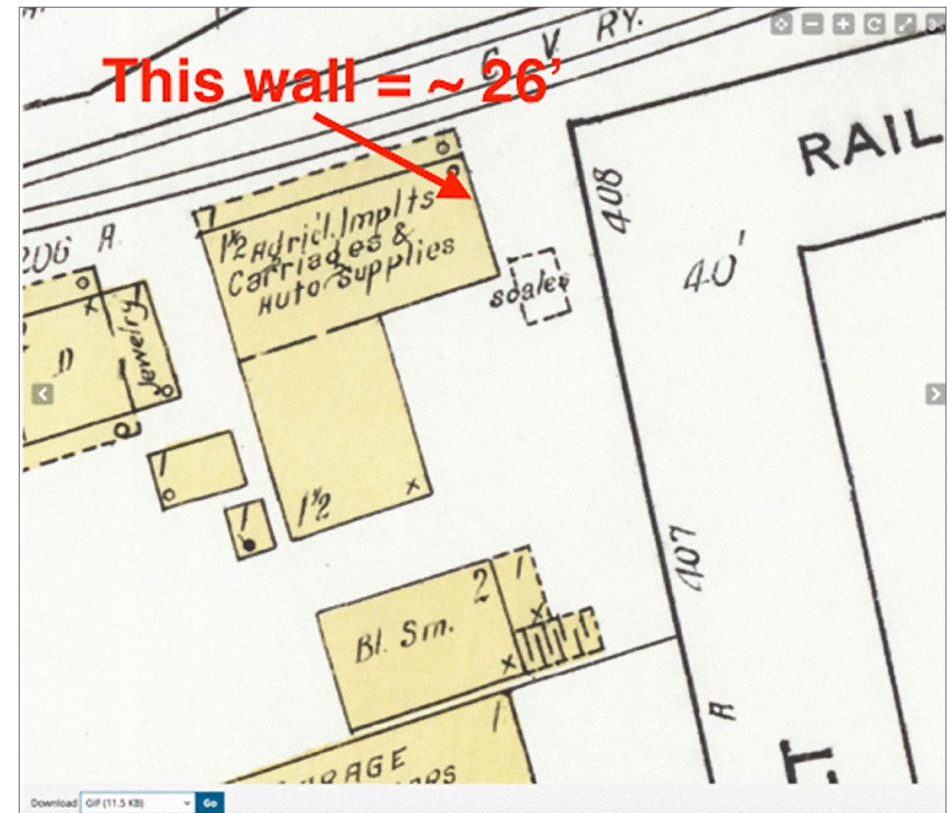
The key is to get one dimension you feel relatively confident of and one relatively straight-on photo with that key dimension.



9. The building was located directly alongside the Richford Branch mainline, so this is the trackside perspective. The angled front door is visible to the left.

Then you can use the photo and basic math to determine the dimension of any element in the photo.

You can use the dimensions to develop working scale drawings of the building. In my case, I plotted the footprint of the model. I made minor adjustments to the length and depth of the building to make it fit my layout better [14].

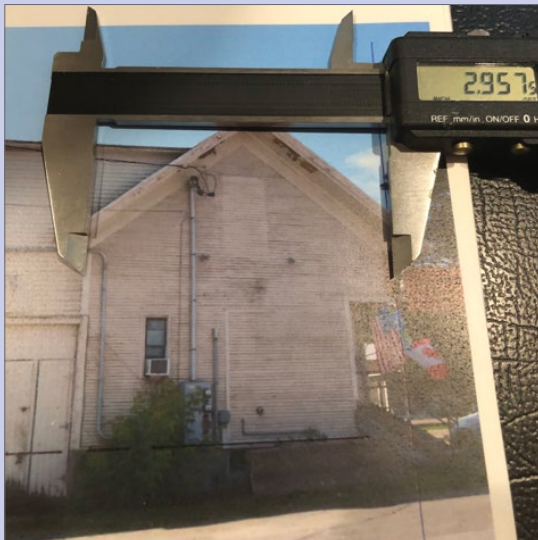


10. The building seen in [8 & 9] is labeled "Agricultural Implement, Carriages and Auto Supplies" on this portion of a 1920 Sanborn map from the Library of Congress website. What the name lacks in pizzazz it makes up for in specificity!

DETERMINING THE SCALE DIMENSION FROM A PHOTO



11. A straight-on image of one side of the structure was taken last summer.



12. Print a clear image of the building to use for measurements.

Measure the known dimension on the image using the actual distance.



STEP 1: Find a key dimension

- Once you have an actual dimension of the prototype object (or something you can estimate) then measure the dimension on an image of the building.
- I used a caliper to measure the actual dimension [12] of the gable wall on the old part of the building, which I've estimated from the Sanborn Map to be 26'.

You can do this on your computer monitor. But remember if you resize the photo, you'll have to start again by remeasuring the known dimension.

STEP 2: Calculate scale factor of your photo

The next step is to determine the scale factor, or proportion, of your photo. This factor will be specific to that photo. If you're doing this on your computer screen, be sure to recalculate this if you change the size of the image!

Find the actual dimension (in inches) on the photo of the known dimension [12]. In this case it's 2.957". The formula is straightforward:

Photo Dimension / Known Dimension (KD) = Scale Factor

Remember to keep the units of measure the same!

$$PD / KD = SF$$

$$2.957" / 321" (26 \text{ ft}) \times 12 = 0.009$$

I used this scale factor, 0.009, for all measurements I made from this image.

DETERMINING THE SCALE DIMENSION FROM A PHOTO *CONTINUED ...*

STEP 3: Calculate prototype dimensions

The outline of an old, closed up gable window measures 0.4685" on the printed photo. Since I zoomed in on this picture [13] before printing it, a different scale factor was calculated for this printout (0.013 instead of 0.009).

Let's calculate the width of the window opening, which was obviously sealed-up at some point on the prototype.

To calculate Actual Dimension (AD) of any element on the prototype picture:

The formula is Photo Actual Dimension / Photo Scale Factor = Dimension:

For this example, that's $0.4685" / 0.013 = 36.038"$
Divide that by your modeling scale ratio to get the actual dimension of the opening. In this case, for HO scale that would be $36.038" / 87 = 0.414"$ ■



13. Specific modeling dimensions can be pulled from photos once a scale factor has been calculated.

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14. I used the dimensions of the building to draw a footprint on a piece of paper. I made minor adjustments to the prototype dimensions to create a footprint that better fit the space on my layout.

Then I noted the wall heights on a very rough sketch and used those measurements to develop a three-dimensional mockup of the structure [15]. After living with the mockup for a couple of weeks to make sure I liked how it looked, I transferred the dimensions of the mockup to styrene as I built the model.

The structure footprint and dimensions determined from the photos were used to create a mockup of the building [15]. I left the mockup in place for a several days to make sure it looked “right” and the finished structure wouldn’t seem too large or too small for the scene. Once I was felt it was a good size, I took the mockup to my modeling desk and carefully cut it apart, using the walls as templates to cut out the basic walls from Evergreen clap-board sheet.



15. The structure footprint and dimensions determined from the photos were used to create this mockup of the building.

At this point the I have the basic structure put together [16]. It's entirely made from Evergreen styrene – even the metal raised-seam roof. While the building or the surrounding scenery obviously aren't completed yet, I think it already captures the look of the prototype. Once finished, it will go a long way to setting the scene in Enosburg Falls on my Richford Branch. ✓

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16. The model is 100% styrene, including the roof. It's in-progress with more tasks to complete. Note the windows and doors are propped in place, the foundation is obviously not painted, and steps need to be added to the front door. The three garage doors had to be scratchbuilt, as no commercial castings worked. The large windows over the garage doors on the left are modified from Grandt Line storefront windows. Compare the model with the prototype image [7].



I purchased a 36" steel bar measuring $\frac{1}{2}$ " wide by $\frac{1}{8}$ " thick from Tractor Supply (also typically found in hardware and home-improvement stores). The bar thickness gives the stands a lot of strength, though it requires muscle power to bend it into final shape. Brass bar stock would have worked and been easier to bend, but I didn't have a ready supply. For the bases, I cut several 5" sections of 2x4s.

I marked the bend locations and the length of each stand on the bar stock before cutting [1]. Each segment has three sections, divided by two bends. The base bend, which attaches to the 2x4, was set at 3" long, as was the ascending section.

The top sections lie horizontally and hold the locomotive parts. These will vary in length depending on the function they serve. For locomotive boiler shells, I made the section 2" long to

Building locomotive paint stands

MRH Running Extra | April 2020

NORMAN REID builds a helpful tool for the paint booth ...

I'M PAINTING A SET OF BRASS STEAM LOCOMOTIVES for my model railroad, the North Fork & Crooked Run Railway. Although I have a spray booth equipped with a turntable, I wanted a method to suspend the boiler assembly, tender shell, and other parts. I wanted to have better access when airbrushing the models. I also wanted access from the top and underside. I'd seen an idea on Jeff Johnston's DVD set, *How to Paint a Steam Locomotive*, and decided to build my own stands borrowing from his design. Here's how I did it.



1. I marked the bending locations on the steel bars before cutting them into lengths with a hacksaw.

BUILDING LOCOMOTIVE PAINT STANDS | 3

accommodate boilers with the weight still enclosed. For tender shells, it can be a bit longer; I made mine 2 ½". I made a third stand the same as the second one to hold the tender floor. A fourth stand, for the wheelbase and running gear, has a 1 ½" horizontal bar, since it will attach only to the short section underneath the gearbox.

These stands will work well for diesel locomotives or rolling stock. You may want to make longer horizontal bars to fit the models you're working on.

DRILLING AND BENDING

Once the sections were marked on the bar stock, I cut them into final lengths with a hacksaw. Using a drill press and a 7/32" bit, I drilled two holes into the bar stock that will be screwed to the



2. I drilled two mounting holes on the drill press using a 7/32" bit. Drill slowly, retracting the bit occasionally to cut clean holes without jagged edges.

BUILDING LOCOMOTIVE PAINT STANDS | 4

wooden bases [2]. I drilled slowly and withdrew the bit often to clear the debris. I ended up with even holes without jagged edges.

Using moderate pressure on the drill press is key to clean work. A hand drill would work with the bar stock held securely in place. Keep a block of wood underneath to absorb the bit when it breaks through the bar stock.

Once the bar stocks were drilled, they were ready to bend into shape. With the bar stock held securely in a heavy metal vise [3], I slowly bent it into shape [4]. The 90° bend for the upright section was done first, then the second 90° bend that creates the model platform. The final shape resembles an elongated C.

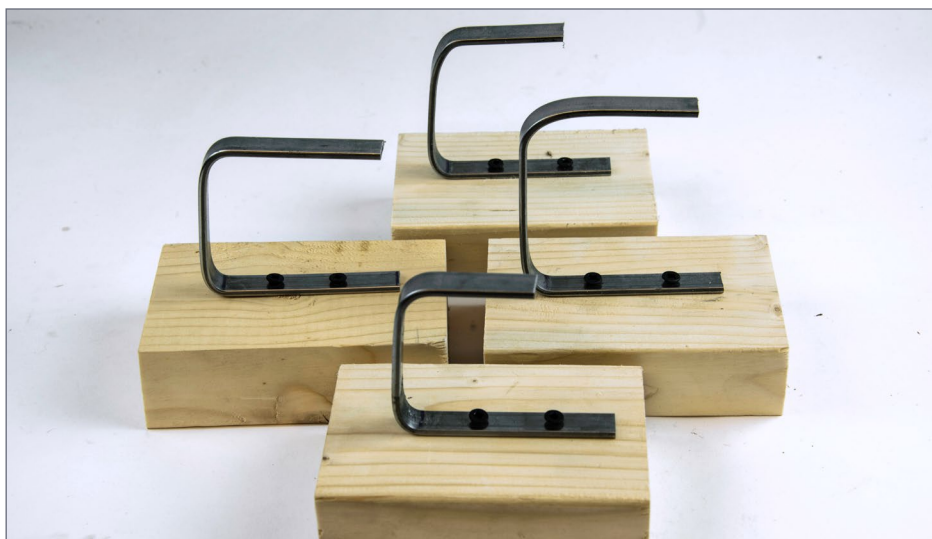


3. I secured the bar stock in a heavy vise with the bar positioned at the first bend point.





4. Using hand pressure, I made the first bend in the bar stock. The second bend was made in the same manner.



5. The finished paint stands, ready for use.

The final step was to attach the metal stands to the 2x4 bases. I used #8 1" square-drive screws for a firm connection. The resulting stands were ready for me to paint my models [5].

HOLDING MODELS

To use them, I wrap the horizontal support bars with duct tape to create a large bulk to fit the boiler and tender shell. I add another wrap of duct tape with the sticky side out so it adheres to the models and holds them securely. The stands for the boiler assembly and tender shell fit inside the hollow cavities of these parts.

For the tender base, less duct tape is required. It is mounted upside-down with the inside, which won't get painted, facing the tape. The fourth stand, for the wheels and running gear, uses the short horizontal bar that mounts under the gear box and holds the model in an upright position so the side rods don't drop out of position.

For the cost of a \$5, a length of bar stock and a scrap 2x4, I fashioned tools to help me with my model railroading. The stands give me full access, so I can paint parts without handling them.

I applied primer to the USRA 0-6-0 [6] with little difficulty. I concentrated on applying an even coat, rather than struggling to hold the model in a series of awkward positions.

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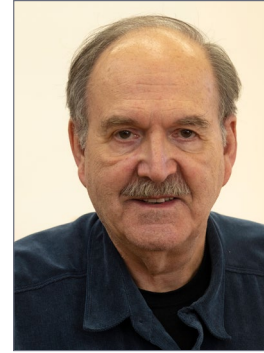
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6. The boiler assembly after I sprayed a primer coat. The paint stands allow access to the model from all angles without holding it by hand. ☑

NORMAN REID



Norman grew up in a series of small Ohio towns that were always within sight of a major railroad. For much of his growing up years, the Nickel Plate, New York Central, Pennsylvania, and Baltimore & Ohio were part of his childhood. A bit of a daredevil, Norman played in the local NKP yard, crawling under the couplers

while keeping a keen eye out for those big steam locomotives and freight cars in motion.

His model railroading began with an American Flyer set at the age of six. It served Norman and his brothers for years. After marriage, he built an S scale empire in the attic. The project lasted until he relocated to a home without space for the S scale layout. An N scale layout followed.

Currently, Norman is building an HO scale layout in the corner of a friend's workshop. While he has focused on scenery and structures for the layout, his attention has shifted to restoring brass locomotives and making DCC conversions. ■



Wine, a traffic generator for your railroad



RATE THIS ARTICLE

MRH Running Extra | April 2020

PATRICK BRAY describes a winery on his layout ...

A WINERY IS A RARELY MODELED INDUSTRY YET can generate a variety of car movements. Let's look at wineries and wine-related traffic. Today there are more wineries than ever, but few ship by rail. Into the mid-1960s and the 1970s, wine and related traffic was commonly shipped by rail.

I've found great information regarding wine and rail service on Tony Thompson's very informative "Modeling the SP" [modelingthesp.blogspot.com] blog. Tony has several chapters on wine as an industrial commodity. His knowledge of the wine industry was very helpful to me for my understanding of the industry's relationship with railroads.

Even a small winery can generate an interesting mix of inbound and outbound carloads. Inbound traffic could be boxcar loads of bottles, wood barrels, and other packaging materials. Bulk wine could be brought in special wine tank cars for fermenting or blending with local grapes for eventual bottling. On my

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[TABLE OF CONTENTS](#)

layout, I have an inbound gondola load of wooden casks for the aging process [1].

Outbound traffic would be cases of bottled wine and possibly wooden barrels of finished wine. These would be shipped in reefers or insulated boxcars. As Tony notes in his blog, some wineries would press more grapes than they needed for their own bottling and would sell the excess. These shipments would be in special wine tank cars [2]. This gives me at least three different car types for this one little customer.



1. This load generates many comments. The barrels are billed to the winery for use in the aging room. The gondola model is a heavily modified old Ulrich all-metal kit. The reefer will be spotted at the winery to load cases of bottled table wine.



2. The afternoon Southern Pacific grape switcher shoves one of Pat's wine tanks to a spot.

A WINERY

Wineries come in many styles and sizes. They are constructed of a variety of building materials, and there isn't a standard design. Before mechanical climate control became practical, wineries could be housed in wooden buildings, however temperature extremes are not good for aging wine. Ideally, wineries would be constructed with thick walls of stone, brick or other masonry material [3, 4] to moderate temperature changes. The DiGiorgio Family Wines company has a large modern winery in California's Central Valley constructed with modern poured concrete walls.

MODELING A WINERY

My small HO scale winery [5] is a creation from my imagination. The theoretical location is California and I thought a mission style structure would reflect an operation in one of California's wine regions. A few characteristics of the style include thick



3. This is one of the aging rooms of the old Brookside Winery in Guasti, California. The building is constructed with thick walls of field stone. The rails in the foreground were the SP, and there was a spur into the large facility.



4. The other end of the Brookside Winery aging room offers a better view of the Spanish mission architectural details. This operation was so large it featured its own village to house vineyard and winery workers. The village had a school for the worker's children and even its own church.



5. Pat's Old Mission Winery is at the end of a branch line and it can use at least three types of freight cars. It generates a lot of switching for crews for such a small industry.

white or light tan walls that represent the whitewashed adobe used to construct the original California missions. Red Spanish tile roofs are another style element.

To represent the thick adobe walls, I used 1/8" foam core board, but you could use 3/16" to represent thicker walls. Foam core is a little tricky to work with, especially when doing curved shapes. A hobby knife with a sharp blade is a must. I use an X-Acto with their No. 11 blade. Even a slightly dull blade will gouge the foam. With the basic shape and windows and doors cut out, I used wallboard mud (joint compound) on an inexpensive plastic artist's palette knife to fill the open cells on the foam edges. Wallboard mud is formulated to sand to a smooth surface. It's available in small containers and has several scenery uses on your layout.

Sheets of Spanish tile roofing are available from several model building materials companies. As they come, the tile sheets need adjustments to add a sense of depth to the tiles. I apply a wash mixture of black and brown acrylic paints. Once the acrylics are nearly dry, I use a small piece of cloth lightly dampened with a mixture of alcohol and water to remove the paint from surfaces. The wash stays in the crevices. I use a similar technique to quickly weather freight cars.



6. The tasting room of Pat's Old Mission winery. Because of the overwhelming temptation for crews to check the product quality, Trainmaster Hardast has laid down the law stating, "Train crews switching Old Mission are prohibited from going into the tasting room."

I found a couple of sizes of miniature wooden barrels [6] in the wooden shapes rack at a crafts store to use for wine barrels. The larger size represents the aging casks in the winery. Smaller barrels are loaded in the gondola [1].

I do not have drawings of my winery as I discarded my original sketches long ago. The basic HO scale footprint dimensions for the fermenting and bottling warehouse are 9x5", with the tasting room 4x4". The height of the warehouse at the eaves and ridge are 2-1/2" and 3-3/4" respectively. The tasting room height is 4-1/2" at the eaves and 5-3/4" at top of the bell arch.



7. The hills surrounding the winery are planted in vines but don't produce enough grapes to meet the needs of the winery. Bulk wine is shipped in via tank cars to blend with the vineyard harvest.

SHIPPING WINE ON THE RAILROAD

Wine that is aged and/or blended for consumption would be bottled or stored in barrels for aging and later bottling. Excessive heat and cold are not friendly to finished wine. Outbound table-ready product would travel in insulated boxcars or refrigerator cars [8-10]. Reefers could be supplied by Pacific Fruit Express, Santa Fe Refrigerator Despatch, Railway Express Agency, and others. Some wine companies had their own insulated cars to ship their product. Very little table-ready wine was shipped in tank cars.

WINE TANK CARS

Almost all table wine was shipped in insulated box cars or reefers [8-10], but a large amount of wine was shipped in tank cars [11-13]. Bulk wine was not something most people would choose to drink. Some wineries had no vineyards of their own, or the right grape varieties for what they wanted to produce, so they would import bulk pressings from growers.



8. Workers roll barrels of wine into a PFE reefer.

The pressings can have some low percentage of alcohol as grape juice will naturally ferment. Insulated cars help keep the product cool retarding further fermentation. Most of the proper



9. A CDLX car is leased to the Bear Creek Vineyard Association. It appears to be an insulated wood reefer but appears to lack ice hatches and compartments. The car was painted orange with a Bear Creek color logo.



10. It was hard to miss Chateau Martin cars as they were rolling billboards. In its previous life, this car was in milk service. While this looks like an express reefer, it lacks ice hatches. A large tank was mounted inside the car to ship bulk wine. Chateau Martin used wine-colored cars well into the 1970s.

WINE, A TRAFFIC GENERATOR FOR YOUR RAILROAD | 11

fermentation and aging needs to be done at the wineries. A lot of wine, particularly inexpensive wines, have their product fortified to increase the alcohol level. This straight grain or fruit alcohol could also be shipped in tank cars giving even another inbound product for your winery.

When the subject of wine tanks is brought up, most people think of small tanks with numerous domes and compartments, and colorful graphics. A lot of wine cars fit that image, but wine tank cars came in several designs.

A Google or Bing Image search of wine railroad tank cars will show a large variety of wine tank cars. Wine tanks could have a



11. Southern Pacific's Fresno, California yard illustrates how important bulk wine shipments were to the SP into the early 1960s. Notice the different dome configurations. None of these cars have the large colorful graphics and specific winery lettering as seen on wine tank car models. The train in the foreground is the San Joaquin Daylight. *Bob Morris photo*

WINE, A TRAFFIC GENERATOR FOR YOUR RAILROAD | 12

single dome or multiple domes. Some cars featured an odd larger center dome. A common feature was their overall size. Wine tank cars were typically small capacity cars, around 6,000 gallons, with the vast majority painted a light color.



12. GATX 410 is in wine service. The small pipes with the round caps sticking out the side of the domes are expansion vents. While there were a number of design variations, most wine tanks shared some basic design features: small capacity of about 6,000 gals, insulated, with multi compartments.



13. SHPX 6614 is another insulated six-compartment wine tank car. A couple of minor detail differences from the GATX car: this car features larger insulated domes and single off set side ladder. This car also has expansion vents but they are the small apertures on top of the domes.

The number of tank car domes indicates the number of separate compartments in the tank cylinder. While not likely, a six-dome wine car could theoretically contain six varieties of wine.

Even if you don't have a winery on your layout, a wine tank car is an interesting addition in a train or on a storage track. If there was a quintessential wine tank car, the six-dome version [12, 13] is the one I would nominate.

WINE TANK CAR MODELS

I model in HO scale and have been waiting for a correct massed-produced multi-dome model for wine service. Years ago, Thomas Industries manufactured a six-dome car with dimensions close



14. The Thomas Industries model represents an insulated car with unjacketed domes. Thomas produced these cars 40-50 years ago.



15. I scratchbuilt this version of a six dome tank with jacketed domes. The tank body is a piece of 3/4" copper pipe wrapped with 0.010" styrene sheet. The domes were made from an aluminum cigar tube. On my list of projects is a four-dome version.

to a 6,000 gal. car. They are not up to the quality of today's models but are about all we have. They occasionally come up on eBay.

The only other correct HO scale six-dome car was imported by Precision Scale in brass. These are very nice but rare, so be prepared for sticker shock. The other option is to scratchbuild your own car.

For my fleet of wine cars, I have a mixture of kit, kitbashed, and scratchbuilt cars [15]. I confess I'm not as true to prototypes as Tony Thompson. I have a few cars on my layout that look good but are off the accuracy mark. I'll have to hide some of my cars if Tony shows up for an op session!

AHM offered a six-dome tank car years ago that was painted in several schemes. These cars are relatively easy to find. However, as Tony Thompson points out in his blog, these models are about 12,000 gallons capacity, twice the capacity of most prototype wine car designs.

WINE, A TRAFFIC GENERATOR FOR YOUR RAILROAD | 15

I do run a couple of the old AHM cars. One is shown earlier in this article [2]. Could you tell it wasn't correct? I did some detailing, painting, and decaling to upgrade the model. I avoid spotting the cars at the winery or running them with more accurate cars, as the excessive size is evident.

Red Caboose lettered their single-dome 10K gal. tank [16] for a couple of wineries. The model is slightly oversized, but I can live with the discrepancy as they are very nice looking cars.

Many of the model wine cars are painted with large colorful graphics for wineries such as Roma, Ambrose, Gibson, etc. Other wine tanks, while less bold, were lettered to show the car was leased to a specific winery. Photo research shows that most cars, especially in the later years of operation, were not painted for a



16. The Santa Fe High Grove Switcher heads for the barn with a couple of empty wine tanks and a load of boxed table wine in a reefer. The six-dome tank car is one of the old Thomas Industries wine cars lettered for Roma Wine. Coupled to it is a Red Caboose 10,000 gallon car lettered for Ambrose Wine.

WINE, A TRAFFIC GENERATOR FOR YOUR RAILROAD | 16

specific winery but were plain with just initials (reporting marks) and numbers. I suspect the colorful cars were disproportionately photographed, misleading us to believe all wine cars were so decorated. Photographers capturing freight cars may have been more inclined to snap a tank with an interesting paint job than a plain GATX or SHPX car.

★★★★★
RATE THIS ARTICLE



17. The DiGiorgio winery in California's Central Valley is constructed with modern poured concrete walls. A variety of wine tank cars await loading or unloading.

One thing the wine cars seem to have in common is that nearly all were painted silver. This was done to reflect as much sun as possible. After a few years of service, the silver would lose its shine and have a light gray tone.

I schedule the switching of the Old Mission Winery sometime in the middle of my op sessions. With the work done, the crew's switch list shows the next move is to open a bottle of the real stuff and we all take a wine and cheese break. Rule G on my pike is more of a guideline than a hard rule.

I hope you have been inspired with the opportunities the wine industry can generate rail traffic. Perhaps this will encourage you to add a winery to your layout, or at least run a wine tank car or two. ☒



18. This Roscoe Snyder & Pacific car is the most modern wine car I have come across. It's in the foreground in the previous image [17]. The tank is painted white and is one of the few wine tank cars I have seen with a safety railing around the domes.



19. A Baldwin AS616 switches some of my wine car fleet at the Links end of Bullring Yard.

PATRICK BRAY



Patrick's interest in railroading and modeling is in his genes as he's the son of a railroad switchman.

In the mid-1960s, Patrick hired out on the SP in train service and advanced to Conductor. He worked freight, the last of SP's passenger service, and early Amtrak trains. Later, he took a promotion to SP rules instructor and continued working in that capacity for the Union Pacific. He was lucky enough to work the Freedom Train. He retired after 45 years of railroading.

He models in HO scale in the mid- to late-1960s.

Patrick has been married for over 50 years. He and his wife enjoy travelling and have two daughters and two granddaughters. ■



Virtual Model Railroading is Here Part 2!

MRH Running Extra | April 2020

CHARLIE COMSTOCK shares virtual construction techniques in part two ...

IN FEBRUARY I PRESENTED AN OVERVIEW OF V scale model railroading and the Trainz 2019 software. There have been a few updates to Trainz 2019 in the little over a year I've been using it. Several bugs have been squashed and the Trainz Plus version has been brought out.

Trainz 2019 uses two different user cockpits. The first is Surveyor, which is used for route (layout) construction. The second is Driver, which is used for driving trains around either

free-running or in a "session." The new Trainz Plus version allows switching seamlessly between these cockpits using Ctrl-F1 (for Surveyor) and Ctrl-F2 (for Driver). I personally attest this is a wonderful addition, especially when working on tweaking scenery.

Now I can drive a bit until I find a place not to my satisfaction. Then Ctrl-F1 instantly puts me in Surveyor where I can wreak havoc on the offending bits of scenery. Ctrl-F2 puts me back in Driver to get a convenient view of my new changes. The Trainz Plus feature is currently available only to Gold and Platinum level subscribers. I subscribe at the Gold level at a cost of about an Accurail boxcar kit per month.

Let's dig in deeper on building a virtual railroad.

USING SURVEYOR TO BUILD A ROUTE

NEWS FLASH! While the construction and driving aspects of Trainz 2019 currently use two different programs, Surveyor and Driver, N3V Games has introduced the Trainz Plus version that allows seamless switching between these interfaces, a major step forward in usability. Details on YouTube (youtu.be/bN7Hea2x5qo).

The Surveyor interface has a learning curve, but help is available. With help from websites, YouTube videos, and people on the Trainz Discussion Forums, it took me a few days to get started and about a month to become proficient with Surveyor and perform decent terraforming. Of course, the learning process continues and elapsed time to proficiency will vary depending on the user.

Here are a few Surveyor basics.

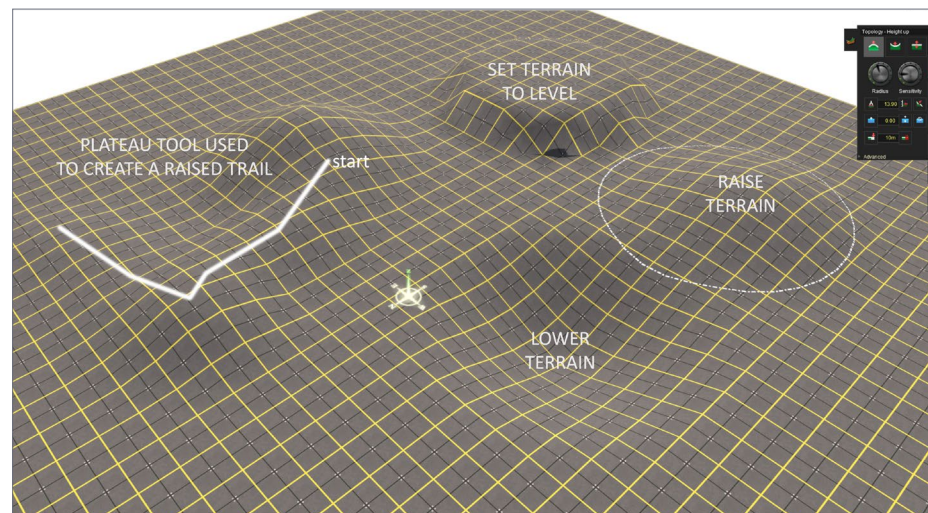
TOPOLOGY EDITING

While in Surveyor press F1 to enter Topology (terrain) editing mode. Trainz builds topology on one or more 720x720-meter “squares.” I suspect that using squares helps with optimization or rendering and terrain editing. If a square is distant from where one is active, the objects attached to that square can safely be ignored. This is an important optimization as route size increases.

Trainz provides four basic topology-editing tools [2]. A circle on the displayed topology shows where the selected tool will take effect.

- **Use height** - Sets the height of a topology patch to a specified elevation. All points within the radius except for a narrow buffer zone around the edge are set to the specified elevation.
- **Height up** - Raises a topology path's height. The height increase depends on how long the mouse button is depressed and, the sensitivity setting, and edges are smoothed to the pre-existing topology.
- **Height down** - Lowers a topology patch's height. The height decrease depends on how long the mouse button is depressed and edges are smoothed to the pre-existing topology.
- **Plateau** – Gradually brings a topology patch to a certain height. The target height comes from where the mouse pointed when the left mouse button was depressed.

Radius and **Sensitivity** knobs respectively specify the size of the topology patch (white circle) and how forcefully the topology will be altered. Unfortunately, there is no averaging or smoothing tool. Although the plateau can be used as a work-around, it doesn't average or smooth rough terrain. Instead, it tries to set the terrain to the existing terrain height where the left mouse button is pressed.



2. Four basic topology modification modes are seen here. The Height Up tool is currently active. Note the white circle delineating the area which will be affected by this tool. Also note how the Plateau tool was used to grab an elevation and drag it around (the white line).

Other tools available in F1 mode are

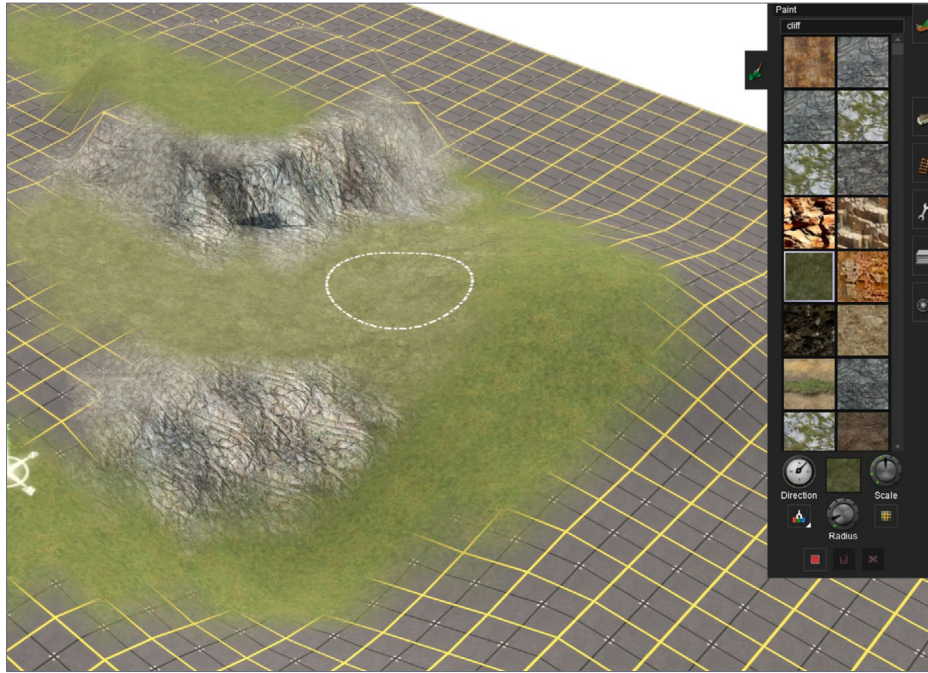
- Create or delete the terrain squares.
- Add, change-height-of, or erase flat water.

There are also advanced tool modes to apply grass or clutter or apply height-mapping using an image..

PAINTING TEXTURES ON THE GROUND

Once a route's terrain has been contoured, it's time to paint it with some textures [3]. The Trainz default gray/yellow grid is somewhat like a model railroad built on undecorated plywood.

While in Surveyor, press F2 to enter the Paint mode [3].



3. The basic grid has been partially over-painted with three texture maps. The rocky areas are a PBR texture which is rendered in 3D, as opposed to the grass textures which are flat. I've found it best to avoid extremely sharp/abrupt edges in the terrain when painting with detailed textures. Keeping the terrain smooth avoids the rendering artifacts caused by sharp terrain edges.

ADDING OBJECTS

To add objects to a scene, press F3 in Surveyor. There are two types of objects, simple and spline.

- Simple objects have a fixed size.
- Spline objects have an undefined length, and are things such as roads, fences, bridges, hedgerows, etc. Spline objects can be straight or smoothly curved.

The Content Manager program (started by pressing the Manage Content button on the Trainz Launcher window) is used to view and organize the vast selection of objects available to a route builder [4]. It lists buildings, trees, rocks, cars, trucks, people, animals, roads, fences, road lettering, track, track signs, switch-stands, track bumpers, locomotives, rolling stock, and commodities (to create visible loads in open-top cars) and this just scratches the surface of the assets listed [5]. With hundreds of thousands of assets available, a new-hire Trainzee really must spend time learning how to use this program and exploring the available assets. A Pick List feature in Surveyor lets you organize frequently used objects/assets for easier reference.

Content Manager						
File Edit Developer Content						
Filter: Installed		bridge				
Type	Name	Status	Asset ID	Installation Date	Upload Date	Modification
Bridge	1 Track Bridge Plate Girder	Installed, Payware	<kuid:453099:100409>	20-DEC-2018 17:29:31	-	-
Bridge	2 Track Bridge Plate Girder	Installed, Payware	<kuid:453099:100410>	20-DEC-2018 17:29:31	-	-
Bridge	3ft 6in BrickSteel Bridge 1T	Built-in	<kuid:2:192605:100292:1>	24-DEC-2018 14:14:15	23-JAN-2015	-
Bridge	A small railroad bridge 750 mm ver 2	Installed from DLS	<kuid:2:564419:1145:1>	20-DEC-2018 09:13:58	04-JAN-2012	-
Bridge	Beam Bridge	Installed from DLS	<kuid:2:1942:38120:2>	20-DEC-2018 09:15:59	15-JAN-2015	-
Bridge	Beam Bridge 1t	Installed from DLS	<kuid:2:1942:38121:1>	20-DEC-2018 09:16:01	07-JUN-2011	-
Bridge	Bridge 100' Deck Plate Girder, Wood Handrails DES	Installed from DLS	<kuid:101046:104666>	30-JAN-2019 10:25:52	28-JUN-2016	-
Bridge	Bridge Plate Deck 1 Track II	Installed, Payware	<kuid:523:19723118>	16-AUG-2018 21:37:52	-	-
Bridge	Bridge Plate Deck 2 Track II	Installed, Payware	<kuid:523:19723119>	16-AUG-2018 21:37:53	-	-
Bridge	Bridge Shaughnessy West Portal	Built-in	<kuid:2:39134:100394:1>	26-DEC-2018 13:55:41	05-FEB-2012	-
Bridge	Bridge Trestle std	Installed from DLS	<kuid:2:63290:38073:1>	24-DEC-2018 10:10:27	20-JAN-2015	-
Bridge	Bridge, RR, Truss, Old, Rusty, 1T	Installed from DLS	<kuid:2:101046:102774:1>	24-DEC-2018 10:28:36	09-MAY-2014	-
Bridge	Bridge, RR, Truss, Old, Rusty, Taller Supports, 1T	Installed from DLS	<kuid:101046:100965>	24-DEC-2018 10:28:39	03-JUL-2014	-
Bridge	Bridge, Truss, Steel RR DES	Installed from DLS	<kuid:101046:104879>	24-DEC-2018 10:28:57	03-AUG-2016	-

4. The Trainz Content Manager window makes it convenient to organize assets by name, description, or kuid (a unique asset ID tag issued to each object when it is created), either installed (locally) or on the Download Station. Searches may be performed in the assets you currently have installed, or those available for download, and any of several other categories. Results can be sorted by name, type, asset ID, etc.

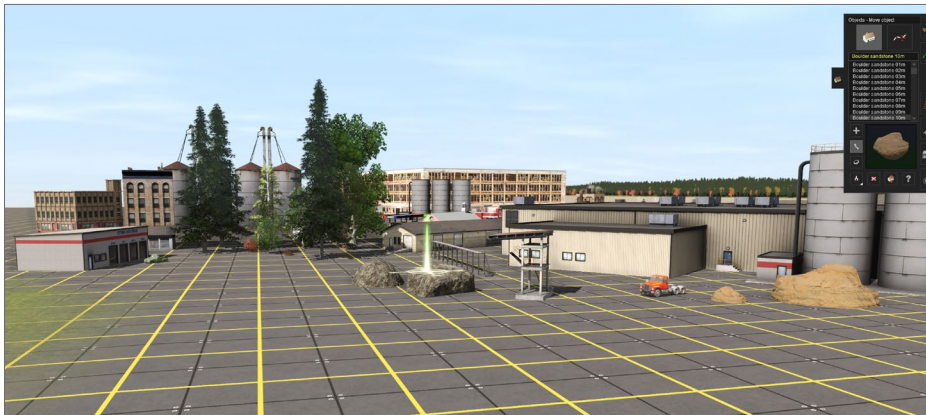
Given the overwhelming number of assets, I found it useful to watch YouTube Trainz construction videos, pausing the video and zooming in when an interesting asset/object is placed, to see the asset's name.

Spending time walking through the lists of objects on the Download Station will usually turn up items of interest, too.

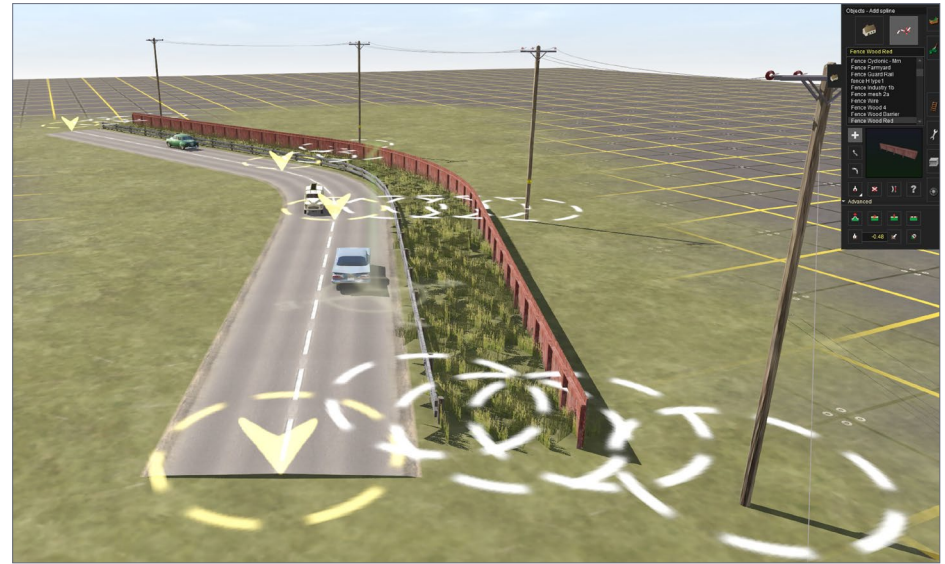
When placing rocks, trees, stumps, or random garbage, Trainz provides an option to place each successive object with a random rotation (about the vertical axis) [6]. This is much easier than placing an object, twisting it by some amount, placing the next object, etc.

Strangely there is no way to place a series of objects at the same angle, which would be useful when adding houses to a city street for example.

There is a block asset copy which can be used to create forests (among other things) much faster than would be possible planting one tree at a time. To use it, plant a group of trees, then draw a box



5. A smattering of the simple objects available in Trainz 2019.



6. Five spline objects - road, barrier, weeds, fence, and power poles - are next to each other in three segments - straight, curved, and straight.

around them and copy all those objects into the copy buffer. Then they can be rubber-stamped wherever needed on your map. The tool allows you to copy track, terrain textures, objects, any one of those categories, or any combination of those categories.

Copied objects can either be added with the objects already present or used to replace the objects in the destination area. I've found this is a very helpful tool for building routes. I've even copied entire yard ladders and moved them elsewhere.

Block-copying an empty area is a quick way to erase places where there are lots of objects/assets you'd like to remove.

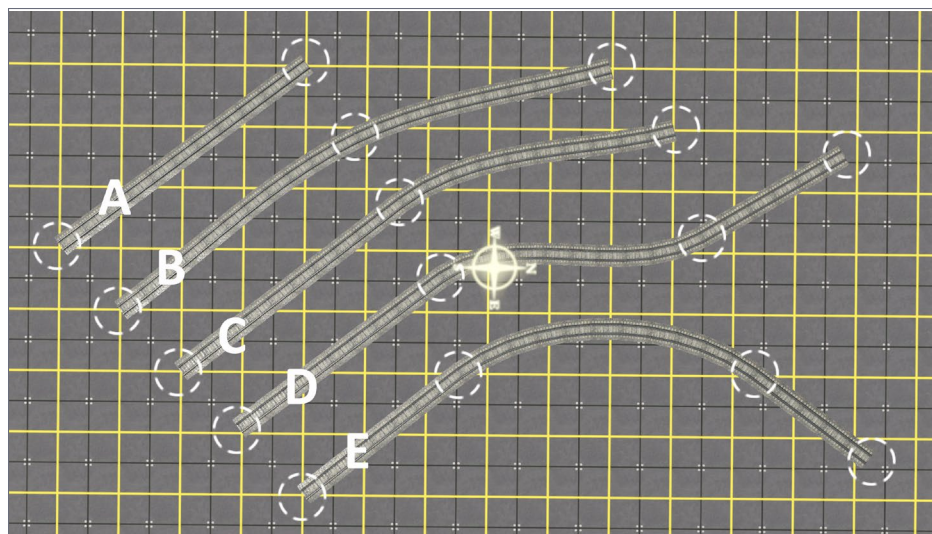


There is a bulk-asset-replace tool that allows all copies of an object type to be replaced with a different object of the same type on the entire route, in the current board square, or in a selected area. This is very useful for changing tree types.

TRACKWORK

Press F4 while in Surveyor to enter the trackwork tool.

Trainz tracks are 3D models of rails, ties, spikes, tie plates, and ballast. Some track variants leave out some of these. I like to use rails-only track in yards where the ties would be buried in the dirt/ballast anyway. In a large yard, omitting the polygons used by ties and ballast makes a noticeable difference in rendering performance.



7. Track-laying stages: A) single track segment, B) two segments, both auto-curved, C) two segments, first segment straightened, D) three segments with S-curve between straight segments, E) three segments with smooth curve between straight end segments.

Tracks are laid by moving the cursor to where track should start, then holding down the left mouse button while dragging the cursor to where the track should end. If the start or end positions correspond with an existing track end, the new and old tracks will snap together. Holding down the shift key disables auto-join for tracks and spline-based scenery objects.

Track curves using mathematical splines. Given a set of end- and mid-points, the program computes curves that result in track that smoothly connects the points [7]. This makes freehand trackwork easy as pie. Just point to the end of the previous piece of track, lay a new piece, and the tracks will be auto curved to smooth the joint. Click to add new track, and smoothly curved track simply appears. Curiously given this is a railroad simulation program, the curves do not use prototypical easements. Often the smaller radii are at the ends of a curve. I work around this by breaking curves into multiple sub-sections.

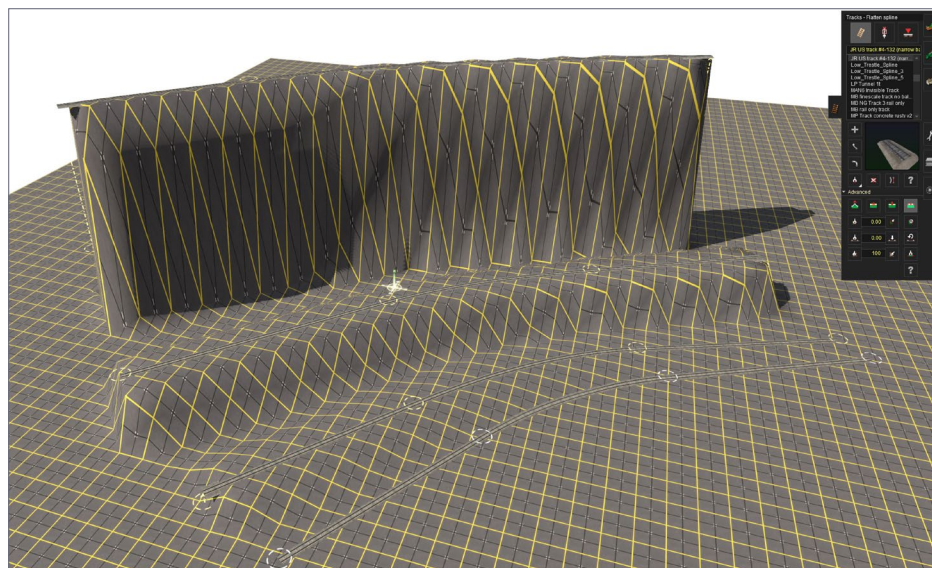
Once you have multiple pieces of track joined with each other, hit the “B” key to enter the straighten mode, then click on the pieces of track to be straightened. Always leave a piece of track between straight sections. Attempting to straighten two adjacent pieces of track will cause them to “fight” with each other over who will be straightest.

There is no way to directly specify the radius of a piece of curved track. Railroads generally build track as a series of tangent (straight) track sections connected (through easements) by constant-radius curves. The program’s curve creation function doesn’t know about your desired curve radius, which may result in a minimum-radius violation.

Trainz does provide a radius readout tool. Select that mode (L in the trackwork tool) and click on a track location where you’d like

to know the radius. I use this to test newly laid track to ensure the minimum radius is OK. It is nearly impossible to freehand-draw constant-radius track in Trainz. That is a big issue for me, especially after learning 3rd Planit layout design software. But then 3rd Planit doesn't do freehand track.

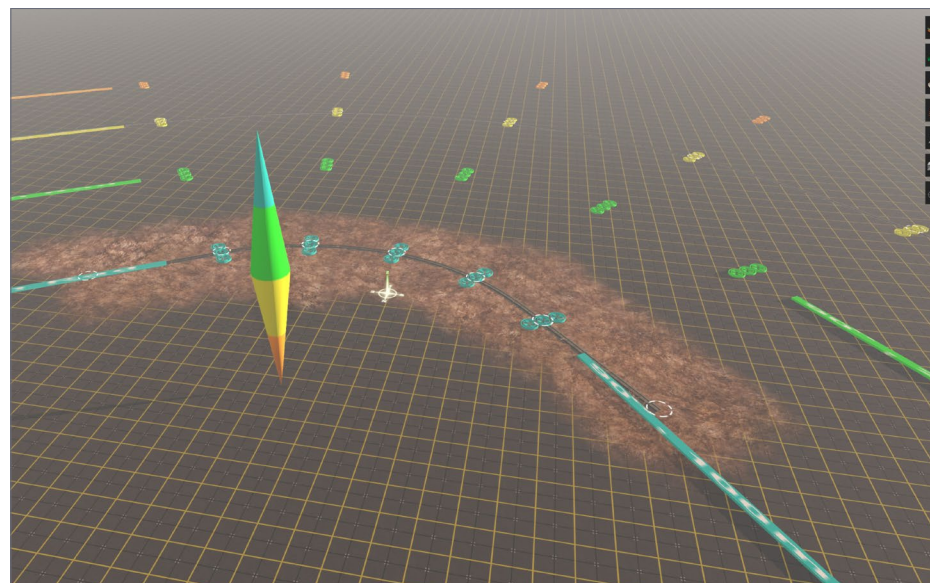
Track as originally laid follows the terrain contour [8]. Once track is laid, use the smooth mode (hit S while in the trackwork advanced tool mode) to smooth out track undulations. A side effect of this mode is the terrain below the track is brought up to the bottom of the track. This is very helpful when trying to visualize the elevation of tracks in a scene.



8. Building railroad tracks in Trainz. From nearest to farthest: track directly on the terrain base, track laid with a 2% grade and terrain adjusted to the track base, track laid above the terrain then filled in, higher track filled in.

To approximate a constant radius, it is necessary to use a curve template [9]. I divide the track into multiple segments and align each of the end points to the point on the curve template. It's a time-consuming process and prone to inaccuracy if I'm not exceedingly careful!

What difference does it make if the radius isn't constant? While you are unlikely to see radius imperfections just by looking at the



9. Using a curve template to approximate a 100-meter-radius curve. The green, yellow, and orange template marks are for 200-, 300-, and 400-meter curves respectively. Several similar templates are available on the Download Station. Template use is easiest on flat ground with level track. With non-level track, you should set the view direction to looking vertically down, maneuver the cursor directly over a template point, then drag the track vertex into alignment with the template, a somewhat tedious process. Otherwise parallax errors are likely to occur.

track, you will notice when driving a train and looking back at it from in front. As the radius jumps, the terrain behind the train will appear to surge left or right – an unsettling effect.

Roughing-in a scene, I usually lay track first, adjust its elevation and gradient (slope), use smooth mode to bring the terrain up (or down) to match the trackwork, then use the terrain editor to create terrain to match the track's height. I find this easier than building mountains first, then trying to add the track, especially if I'll be using curve templates.

TURNOUTS

Turnouts had problems with earlier versions of Trainz. They worked fine to change the route of trains from one track to another, but there were issues:

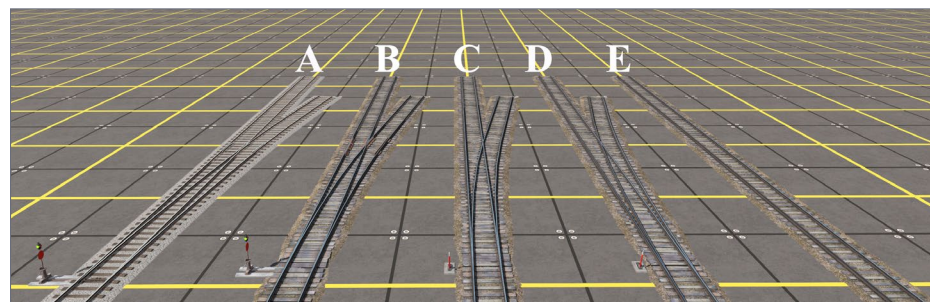
- As created, they didn't include wing or guard rails (these are available as separate pieces that can be added with surveyor).
- The ties under the frog and closure rails aren't correct. There are two sets of ties, one for each route of a turnout.
- The points aren't drawn, making it difficult to determine which route a turnout is lined for by looking at it (however this is not a problem if a switch stand with a target is added, or when driving, for reasons that will be apparent in the next section of this article).

I was amazed when I first saw this. Over time, I realized that when driving a train, I hardly noticed whether wing and guard rails were present. It was also hard to see the ties and points. Close up photography is the place where this issue shows.

The introduction of Procedural Track in Trainz 2019 solved the tie placement and the missing wing/guard rail problems [10]. These are now automatically generated, as are moving points. You can throw the turnout and watch the points move. Additionally, the new track's ballast can use a PBR (3D) texture for added realism.

When I started using Trainz 2019, there weren't any US prototype procedural track types available. The existing track types used clips instead of spikes! Thankfully this has been remedied by third-party content creators. There are a LOT of these in the Trainz community.

There is another problem though. Turnouts are created by putting the cursor on an existing piece of track, then pressing and holding the left mouse button while dragging the cursor to where the diverging track should go. The auto-join feature connects the first end of the diverging track to the straight track automatically, but the track-smoothing software kicks in and decides that it needs to smooth the old track. The original path of the turnout is changed. I've gotten used to this, and use the straighten-track tool to bring the straight leg back into position.



10. Turnout-building steps: A) procedural turnout, B) old style with updated switch stand, guard, and wing rails, C) Turnout with rails straightened, D) Turnout before rails straightened, check lead rails, E) track before turnout.

But this isn't easy when making curved turnouts, as there is no tool to return a curve to its original shape. Remember there's no fixed-radius feature. Restoring the curve of a "smoothed" curved turnout can be tricky. Luckily, most turnouts are not curved.

The switch stands provided when a turnout is created look rather toy-like to me. A selection of more prototypical switch stands is available that are easily retrofitted. I like a switch stand with a target on them so an engine crew can see turnout position from some distance away.

And one more issue: it's up to the route builder to guesstimate the frog angle of a turnout. I move out six grid-boxes and over one to make a #6 frog. When building a yard, create a turnout angle template to keep the diverging angles constant. In most places, eyeballing frog angles is good enough once you've trained your eyes to avoid #3 turnout frogs. As an alternative, there are some turnout assets available with different frog angles. Place these where the turnout should go and connect tracks to it.

US prototype track assets used in [10]:

- (A) SAP Protrack U.S. 132LB SG, FB, TP with Spikes, Shiny
- (B-E) JR US track #4-132 (narrow ballast)

More alternatives exist for railway track styles of other nations.

This probably sounds like I hate laying track in Trainz. I got used to precise track-laying tools using 3rd Planit and was hoping for the same here. However, now that I've laid a couple bajillion miles of track, I've gotten used to the tools and it's much easier for me. That said, N3V Games is continuing to work on the program and I'm hoping they'll be upgrading the trackwork tools.

SURVEYOR TIPS

If you are building a route in Surveyor, I recommend:

- Saving your work frequently.
- Saving your work using different names – I add a numeric version to the route name to distinguish between versions.
- Every couple of days, export your work to a .cdp file. These files are external to the program's database. If your database becomes corrupted by a crash or power-fail and can't be recovered, you'll only lose a day or two of work.
- **Don't accumulate weeks of work under a single route name.** A crash could wipe out everything you've done.

Overall, Trainz 2019 has been mostly reliable, but it isn't perfect. Protect yourself and your work. Of course, if your thing is running trains on someone else's routes, then the most you can lose are your saved games. ■

TRAINZ SPECIAL EFFECTS/FEATURES

PBR (3D) textures

Textures have long been used to apply an image to a rendered surface in computer graphics. Trainz 2019 features 3D textured surfaces. That is, instead of a texture appearing flat when viewed from a shallow angle, an elevation map is included with the texture, allowing the computer's rendering software to synthesize height information for the textured surface. These are great for cliff faces, farm field furrows, or ballast [11].

PBR textures are new with Trainz Railroad Simulator 2019. In addition to red, green, and blue data, each pixel in the texture map has a height value. The program uses the height values to synthesize 3D output from a 2D texture map. The effect is very realistic.

Special features in Trainz 2019

The Trainz 2019 TurfFX feature automatically generates realistic grassy areas comprised of hundreds or thousands of blades of grass, and they wave in the wind. The height, style, and color of the grass is user-configurable. I've been combining multiple grass types to enhance the realism of scenes [12].

TurfFX looks great but isn't the easiest to use. Grass is "sprayed" in place within one of the circles that shows where the tool is active. Expect some overspray outside of the circle. Remember



11. An example of a 3D texture. These are called PBR textures in Trainz. The crops growing on the left of this photo are a PBR texture!



12. The foreground in this shot has been covered with two types of TurfFX grass – a layer of basic green combined with a layer of yellowed grass that is going to seed. The grass waves back and forth when wind is present.

those 10m grids visible on a newly created square? All scenery textures including TurfFX are aligned with those squares. This means that if track or highways are not aligned with the grid, it's easy to end up with grass growing in a highway. Supposedly well-maintained track may have patches of grass on it. I learned to keep the TurfFX grass well away from places where it isn't desired. When working in close quarters, I use a small-radius circle and thoroughly check for stray grass after application.

Trainz 2019 also includes a Clutter feature that randomly generates some of the "clutter" that is frequently found beside railroad tracks. I've seen photos of this feature's results, but I've not used it yet.





13. Summer season.



14. The same shot as [13], but in fall. Certain deciduous trees and shrubs have become more colorful while the conifers keep their color year-around. In spring, fruit trees have blossoms on them!



15. A cold winter's day at Roberts Creek siding.

Changing seasons

Another cool feature is seasonality. Pick a calendar month to set the current season, and all assets with the “seasonal” attribute will change depending on winter, spring, summer, or fall. Summer [13] and fall [14] shots of the same area show how the season effects some trees.

Other items may be created with the seasonal attribute. A building or rail car may accumulate snow on its roof in the winter and seasonal texture maps can become flooded in a rainstorm.

It snowed up in the mountains

Trainz has a snow feature [15]. To use it, you must select the seasonal assets for the route. Trees, phone poles, and rolling stock are not seasonal assets, but it still looks good.

Day and night

In addition to a calendar, Trainz has a time-of-day clock that controls many aspects of scene lighting. In early morning, expect

the light to come from low in the east [16, 17] The lighting coloration also changes with bluer light in the morning and redder light in the evening. As the sun sets, buildings equipped with



16. Junction City in the morning.



17. Junction City after the sun has set. Compare with [16].

lighting will turn them on. At night, stars are visible in the sky. The clock speed can be set to 1x (normal time rate) or to fast time for folks used to operating with a fast-clock.



18. A rainy, foggy April morning in Jefferson. Note that the orchard trees are blooming in April, an aspect of the seasonality feature.



19. This shot of the "roller coaster" area demonstrates haze and lighting effects. Building a scene of this size in HO scale would be impractical.

Fog, haze, and inclement weather

Weather conditions are also programmable, which is difficult to do on a model railroad! You can always have clear, cloud-free skies, or if you so desire, you can run trains in the rain or snow or fog [18].

While the fog effect is nice, it does have a problem. The foggy blurriness is inconsistent, and distant objects are sometimes rendered with a very light color. I expect this will get fixed in a future release. It's also tricky to customize the environment to conjure up a fog at times other than morning and evening [19].

Customization

The Trainz programs allow a user to customize objects used in their routes. For those with a private-name railroad, such as my Bear Creek & South Jackson, this is an invaluable feature. It's not



20. Re-skinned (custom-painted) BC&SJ boxcars based on the included Custom 40' Boxcar #1 object. Different car numbers are automatically generated when the cars are created.

reasonable to expect N3V Games to release private-name equipment for personal railroads, although I've seen equipment for the V&O, G&D, and The Delta Lines.

The simplest customization is re-skinning, which applies a new texture map to an existing object's polygon mesh. N3V Games recently uploaded a tutorial to YouTube video demonstrating how to re-skin a boxcar (youtu.be/pUOd4qh1lDA).

I followed the steps in the video, and now have a fleet of home-road BC&SJ boxcars [20]. I expect to be doing a lot more of this in the future!

When producing the BC&SJ re-skin of the boxcars, Trainz allowed me to specify a range of running numbers for them. The program automatically generates unique car numbers within the specified range when a car is added to the route. Auto-renumbering also works with locomotives.

You can also use a 3D object-editor program such as Blender to create custom objects from scratch. I've yet to attempt this, as the learning curve is reputed to be more than steep. I'll probably give this a try sometime after finishing the terrain.

RUNNING TRAINS IN TRAINZ

Each route that comes with Trainz has one or more sessions built into it. A session is a series of instructions for a train crew: go to a place, throw a turnout, pick up two cars from the spur, set out three cars on another spur, run to the next location, etc. You can choose to follow a session or to free-drive, where you hop in the locomotive cab and run wherever you'd like to go.

Some routes available free off the DLS (Download Station) do not include sessions. For these you either free-drive or make up

your own sessions. There are many YouTube videos discussing session creation on Trainz.

Trainz 2019 features a series of built-in tutorials that make learning to run trains a snap [21]. Each tutorial teaches a new skill needed to become a proficient engine driver [22-24].

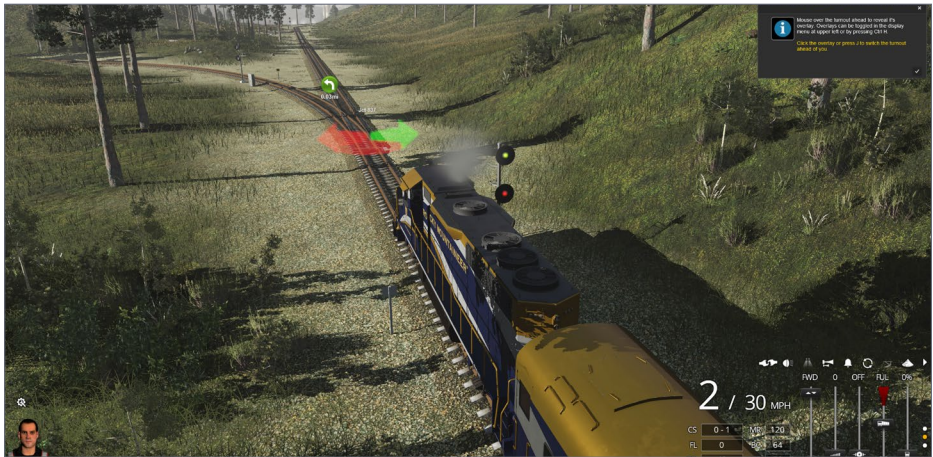
There are several different cab driver interfaces ranging from super-easy to full manual control of a steam locomotive. When using the steam loco controls, you'll need to keep an eye on water level, fuel for the fire, and boiler pressure while you use the throttle and reversing lever (Johnson bar), train brakes, and engine brakes to control direction and speed. If traction gets to be a problem, sand the rails. A grade crossing ahead? Blow the appropriate whistle signal. Don't forget to keep within the track's



21. This shot was taken as I ran my first tutorial. The red circle with the hand in front of the locomotive shows the current session objective - stop at the red circle. The easy mode driver interface is shown at lower right.



22. This shot was taken from inside the lead locomotive of the Rocky Mountaineer during the second tutorial. The selected train control mode lets the engineer operate the reverser, throttle, dynamic brakes, train brakes, and independent brake.



23. Placing the mouse over a turnout ahead brings up direction arrows. The green arrow indicates how it's currently set. Clicking on it will line it to the other, diverging, route.

speed limit – exceed that and the game will deduct points from your session's score.

Derailments are possible. If you run a turnout the wrong direction, don't slow down enough when coupling to a car, or run into another train at a turnout or crossing, stuff comes off the tracks.

AUTOMATA

Trainz has a programming interface that allows objects to communicate with each other. For example, an in-track train detector communicates with grade crossing signals (causing crossing gate motion, flashing lights, and sound effects) and traffic stoppers (placed in a road to prevent cars from crossing the tracks at an active grade crossing). As a train approaches the grade crossing the bells ring, lights flash, the crossing gates come down, and



24. The blue circle on the car at the freight station tells us we need to couple to that car. The text in the info box tells us to move that car to the passenger station.



25. Departing Oakhill eastward in the late afternoon.

the vehicle traffic stops. The interface also allows factories to keep track of when they need cars and/or commodities delivered to them.

Being an ex-software engineer, I find this fascinating, and plan to explore these possibilities. Right now, I'm having too much fun building my route. You won't have to learn to do the under-the-table programming. It's already built into objects that need it. But for any who would like to develop content for Trainz, it's there.

MY REACTIONS

Trainz Railroad Simulator 2019 is not your father's train simulator. It can render stunning scenery where I can run trains to my heart's content. Despite a few issues when using Surveyor, I've built over 70 miles of track and scenery for the virtual Bear Creek & South Jackson railroad, just five months after I installed the program.

The Good

- Creating flatland track and terrain is easy.
- Being able to create terrain from real maps is a great feature (albeit one I've not yet tried). Especially for prototype modelers looking to faithfully duplicate a stretch of real railroad.
- PBR (3D) textures are amazing!
- TurfFX makes some very realistic grass and yet all the additional polygons don't kill rendering performance.
- There's a wide variety of rolling stock for multiple eras, railroads, and continents available to help get you started.
- A moderate-power gaming computer can run the program, although routes with pervasive superdetailing will likely require turning down the rendering quality settings.
- Running a train is either simple or complicated depending on which locomotive interface the engineer desires.
- Running a session is relatively simple because of the provided directions. Even someone new to Trainz will quickly become proficient.
- N3V Games is actively working on software updates!
- The forums are a great source of help.
- So far, the software has proven reliable on my PC (Windows 10, AMD CPU, NVidia GPU) (aside from a few crashes when cut-and-pasting HUGE areas with tons of stuff).
- Did I mention the graphics are pretty darned impressive?

The Bad

- There isn't a terrain-smoothing function when creating topology.
- When working with spline objects, it's necessary to use the mouse to select "advanced" mode to change elevation or smooth the object. Not a biggie but annoying.

- Ditto when working with track.
- Every time a new piece of track is connected to an existing one, the existing track sort of "wiggles." Straight tracks become un-straight; curves change radius. This can make trackwork non-intuitive
- While a piece of track can be marked as tangent (straight) track, there is no way to assign a constant radius to a piece of curved track.
- I would like the ability to multi-select many pieces of track and then copy them to a parallel location – extremely useful when making double track or parallel sidings.
- It would be nice if TurfFX always stayed within its circle.

The Ugly

- Recent versions of Trainz use a database to hold everything from routes and assets you create, purchase, or otherwise download. Should power fail (or the program crash) while this



26. I lost the detailed scenery shown in this shot near Tunnel Five when a program crash resulted in an unstable database. A week-and-a-half of work went down the drain. Luckily it wasn't more. Ouch...

database is being modified, database corruption can and does occur [26]. There is a database repair tool, but results are not guaranteed. I protect myself by frequently exporting my route to a not-in-the-database .cdp file. I number versions of my BC&SJ route and keep a back-trail of older versions should I need to revert something (e.g., BCSJ-315, BCSJ-316, BCSJ-317 etc.). Overall, Trainz has been reliable, but sometimes it does crash. Don't let a crash-corrupted database destroy your work.

- Procedural track (finally) auto-creates guard rails and wing rails for turnouts and handles tie length/placement correctly but no US prototype procedural track was included with the program. Trainz relies on third parties to create proper US track, and it only adjusts ties and creates guard rails for turnouts, not crossings.
- Being forced to work with a 10-meter grid for terrain polygons puts a route-builder in a straitjacket when attempting to build a railroad with lots of vertical topology in close quarters. You can go to a five-meter grid square, which helps a bit, but at a performance penalty.
- Simple (non-spline) objects should have the ability to be frozen in place. As it is, moving the ground below them causes them to move vertically. Sometimes this is desirable, but when trying to precisely line up several objects, this unwanted movement makes building trackside structures a painful proposition.

CONCLUSION

At times I've felt frustrated while building the V scale BC&SJ. Over time, I've learned how to cope with Trainz idiosyncrasies. Do expect to spend time learning to use Trainz Surveyor before tackling that rail empire of your dreams.

Over the past nine months I've spent many happy hours building a virtual version of my model railroad and running trains on it. I think the screen shot evidence speaks for itself [27]. It's pretty cool!

Is it indistinguishable from a prototype railroad? No. However, it gets close, and in many cases it's better than would be possible with a traditional model railroad, especially when a high scenery-to-railroad ratio is desired. How many layouts do you know with over 50 scale miles of mainline and realistic scenery that dwarfs the trains?

I think Trainz has what's needed to run prototype op sessions like those I've been hosting on my HO scale BC&SJ.

My verdict? I'm giving Trainz Railroad Simulator 2019 a thumbs-up. It's a big step in the right, but that remains to direction, but that remains to be put to the test to address reported issues and bring out periodic updates.

Now I need to figure out how to implement those multiplayer Timetable & Train Order op sessions.



27. Heading west over Dobson Hill, near Lincoln.

UPDATE

Somehow the BC&SJ route keeps expanding [28]. As I type this in Feb 2020, the mainline is about 105 miles long, and it doesn't yet include Mill Bend or the South Jackson yard. I recently started work on a three-foot narrow gauge logging line to feed a lumber mill in the Browning area. I'm also improving at generating simulated scenery which sometimes leads to me to go over an existing area again.

I'm working to get the BC&SJ released so Trainz users can download and run on it. However, I've been thinking it's "real soon now" for four or five months, so I'm reluctant to name a date when the route will be available for free download. There are payware assets for which I need to find substitutes.

The BC&SJ is a graphically intensive route. My RTX 2080ti graphics card is working hard when I'm at play on the BC&SJ! I'm continuing to look for optimizations to speed things up, but that's a slow process. ✓

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28. You can get a zoomable version of the full Bear Creek & South Jackson route in this month's [Bonus Downloads](#).

THE AH-HAH MOMENT

column



MRH Running Extra | April 2020

V.S. ROSEMAN SHARES TIPS FOR STORING MODELS ...

★★★★★
RATE THIS ARTICLE

I HAVE SEEN FRIENDS PULL A NEW MODEL LOCOMOTIVE or car out of a foam-lined box and toss the clear plastic sheet wrapping the model.

In the 1970s, I bought a plastic loco that came in a foam-lined box. Instructions showed their method of wrapping the model [1].

1. Lay a clear plastic sheet on a flat surface.
2. Place the model in the center of the plastic.
3. Hold the upper and lower edges of the plastic and lift, like a sling.
4. Lower into the foam-lined box.
5. Fold over excess plastic.
6. To remove the model, take hold of the two sheet edges and lift.

The plastic sheet makes it easy to pull the model out of the box with no rubbing of the model finish.

I've started noticing the oldest foam in model boxes has been deteriorating. In some cases, the foam stained or even etched the model. Wrapping models in plastic prevents crumbling foam from damaging models.

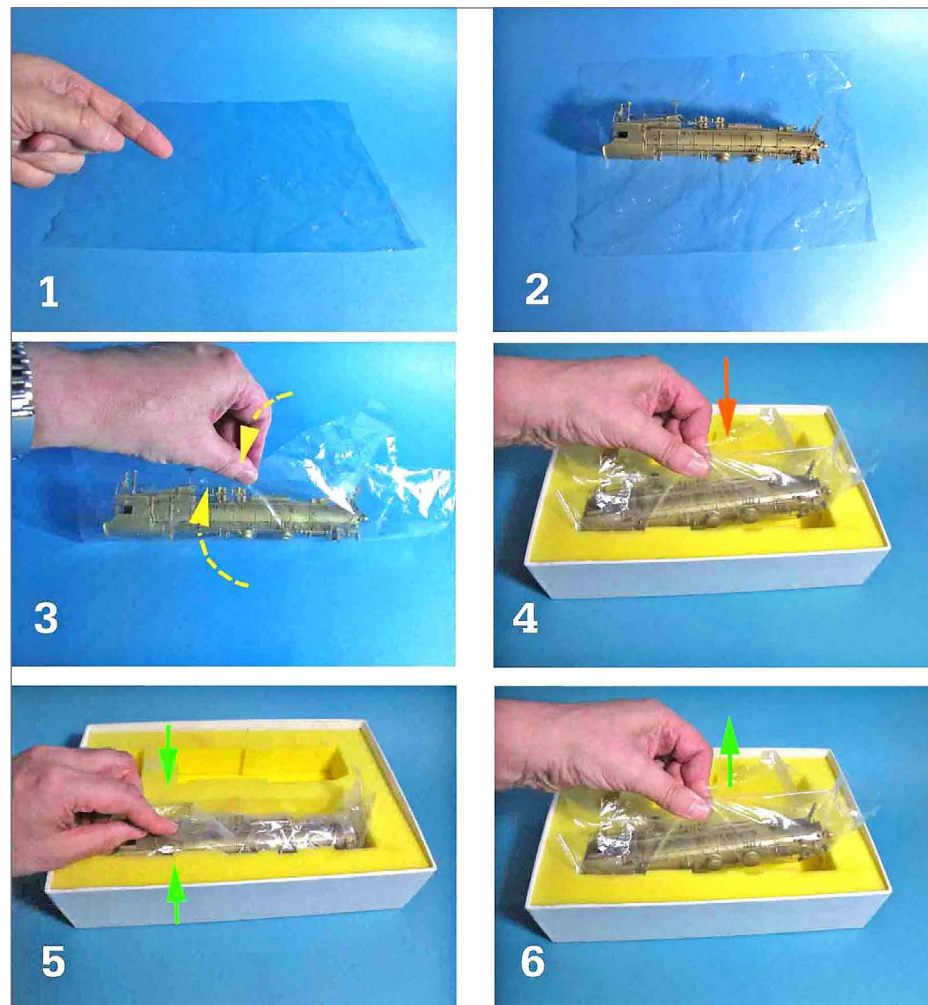
Recently, I bought an engine on eBay. When I received and opened the box, a cloud arose. Almost all the foam had crumbled into brown dust and hard rubber particles and *no* plastic sheet around the engine.

Foam dust was everywhere. The model would require disassembly to clean. I decided it wasn't worth the effort and sent it back. I advised the seller to wrap his models and not to ship them in bad foam.

THE AH-HAH MOMENT | 2

Carefully wrap models in plastic sheeting before inserting them into a foam-lined box. Cut a gallon-size plastic bag along its edges and use the resulting sheets to wrap models. Cut foam blocks to fit into well-made replacement boxes.

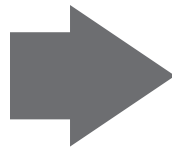
Brasstrains.com offers replacement boxes with foam and plastic sheets. Store your models safely! ☒



1. Simple steps can improve long-term model storage.

Bonus section!

Here are all the pages
from the April issue of
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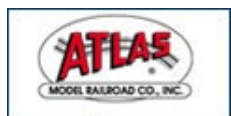
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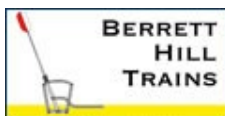
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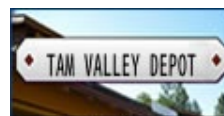
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Model Railroad Hobbyist | April 2020

**JOE FUGATE: A COMPLETELY
DIFFERENT WORLD**★★★★★
RATE THIS ARTICLE

SINCE LAST MONTH'S ISSUE, THE WORLD HAS completely changed as a result of the Covid-19 crisis. We all wish it was some kind of bizarre April Fools, but unfortunately it's quite real. We're all in this together, so we might as well make the best of it.

Making lemonade out of lemons

If you're growing weary of all the bad news in the media while battenning down the hatches and being stuck at home, it's time to take these lemons and make lemonade!

Our great hobby of model railroading can provide a healthy and satisfying pastime until the media returns to its regularly-scheduled obnoxiousness (and make no mistake...they will).

Many of us have enough in our hobby stash we could almost start our own hobby shop. With a lot more time on our hands, it's time to pull out some of that stash and get to building some models!

We can also be thankful we have the internet. It's possible here in 2020 to stay well-connected without ever leaving our homes. We can share photos of the things we're working on and help inspire each other into expanding our hobby skills. Plus if you're bored, MRH has over 20,000 free pages in our magazine back issues: [\[mrhmag.com/magazine/back-issues\]](http://mrhmag.com/magazine/back-issues).

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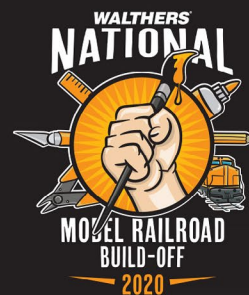
And if you've ever thought of becoming a TrainMasters TV member, we're making all **memberships 30% off right now.**

Finally, we've decided to do something very special with our new no-ads monthly eBook, *Running Extra*. We've taken seven of the highest rated articles from the 2019 eBooks and we've collected them into our **Best of 2019 Sampler** – and have decided to make this 100-page eBook free. That's right, it's *free!*



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We've also decided to take no profits during this time. Instead we are dedicating any surplus to funding modeler scholarships.

If you are a modeler who is now out of work or dealing with a difficult hardship during this time, then consider putting your name in the hat with us for a scholarship. Here's the link:

[\[mrhmag.com/hardship-scholarship-entry\]](http://mrhmag.com/hardship-scholarship-entry)

We're offering free months of TrainMaster TV memberships, or if that doesn't work for the scholarship recipient, we're offering them some free product downloads from the MRH Store.

So far, we've funded 36 free months and we're just getting started. If you purchase anything from us during this time, a portion of your purchase will be used to fund these modelers dealing with hardships at this time.

Next month we will be giving you some names of the modelers you have helped, and with their permission, even share some of their stories with you.

Things hit home

Unfortunately, this pandemic has become all too real for us. One of the MRH Staff members, Richard Bale, lost his oldest son to Covid-19 recently. They're stunned since their son was only 59 years old and in good health prior to this.

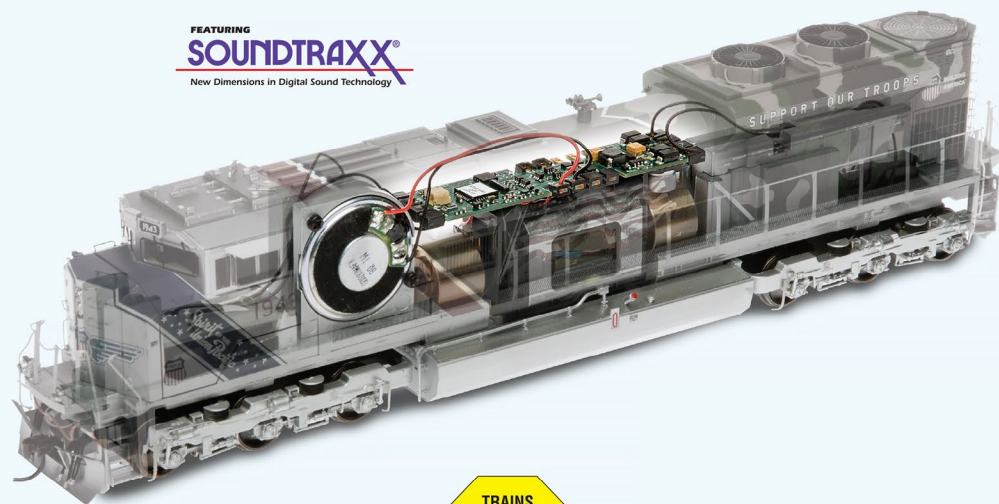
One of our local modelers, Greg Martin, is in the ICU on a ventilator with the Coronavirus. Greg has come and operated on my Siskiyou Line several times, so this is very troubling news.

MRH itself is seeing some steep revenue downturns, so I've had to lay off several staff members. That puts more load back on me, which means among other things, the Locomotive book project

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EDITOR-AT-LARGE | 5

is on hold until this thing passes and we can bring the staff members back on board to give me more time for extra-curricular projects.

Less staff and less ad revenue also means look for some magazine downsizing. We can only produce as many pages as we can pay for.

I'd love it if making good quality, well-vetted modeling info took zero time and just grew on trees. For better or for worse, this info all takes time to produce, edit, package, and distribute.

Just because it's digital doesn't make it take any less time than what it takes to make paper pages or make DVD videos.

Also look for layout tours to dry up for a while. For some reason, nobody wants us to come visit them and shoot their layout.

Some real heroes

Because MRH is seeing some revenue downturn, I have contacted our contributors and explained to them that article payments are

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MRH Media and the pandemic

1. Our first priority:

Taking no profits during this time ...
any surplus goes to help those out of work

- Contributors out of work go to the top of the payment list
- For modelers facing hardship -- surplus will fund MRH paid content scholarships at no charge. Put your name in the hat to receive a hardship scholarship:

[Submit MRH hardship scholarship entry](#) ▶

2. Our second priority:

To help encourage modelers stuck at home, we're giving extra discounts on how-to hobby content:

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EDITOR-AT-LARGE | 6

likely to be delayed more than normal until this thing is all over. Our goal is to pay for articles within 30-60 days after publication. Depending on how good ad revenue is, that can vary, especially in the summer and fall when the hobby seasonally bottoms out.

Here is what I've told our contributors:

1. If you are out of work and things are uncertain financially, let us know and we will move you to the top of the list for payment.
2. If you are doing okay financially and can afford taking a reduced payment at this time, that will really help.
3. If you have been looking at a product we offer in the store or thinking about trying TrainMasters TV and you're doing okay financially, going ahead with a purchase would be helpful right now.

Some MRH Heroes

The following contributors are making financial sacrifices to help MRH. We are very humbled by their amazing generosity, and want to recognize them for their contribution.

Tony Thompson	David Bott	Terry Chamberlin
Brian Krupica	Jack Burgess	Bob Morningstar
David Forbes	Ben Kaur	Richard Deuso
Charlie Comstock	Jack Heninger	Jeremy Dummmler
Carl Blum	Evan Neubee	Nick Muff

Thanks so much (I hope I haven't forgotten anyone).

We *will* get through this, please stay safe. You're some of the greatest people on the planet! ☑



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LAST ISSUE'S RATINGS

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

4.4 John Peluso's Frisco Eastern Division

4.4 March 2020 news

4.1 Quad servo DCC decoder: 2

Issue overall: 4.2

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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mrhmag.com **THIS MONTH**

Model Railroad Hobbyist | April 2020

compiled by **JOE FUGATE**

★★★★★
RATE THIS ARTICLE

Backdrop painting time-lapse

MRH forum member **johncaff22** (*John Caffarelli*) shares this fascinating backdrop painting time-lapse video on his MRH blog:

“With unexpected time for working on the railroad I was able to complete the base painting of the backdrops on the upper level.”

View the video on the MRH website by clicking below.



View the full thread on the MRH website

► MRH'S MONTHLY GREAT MODELER POSTS



1. Mark Paul wants to model a concrete and steel freeway bridge on his layout, so he's documenting the build on the MRH forum.

Building a concrete and steel highway bridge

MRH forum member **Nsmapaul** (*Mark Paul*) decided to grab the bull by the horns and model a curved and banked freeway overpass on his layout. He says:

"So, last week I had gotten the itch to build a unique highway overpass ... a modern steel girder and concrete bridge type ... and did I mention, it will be on an slight gradient and a mild curve? Well, as most of you know, I love to torture myself. I'll try and document my process [for] those of you [who] wish to undertake a similar modeling experience."

Follow the progress on the MRH website thread link below.

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

ANIMATE YOUR BUILDINGS

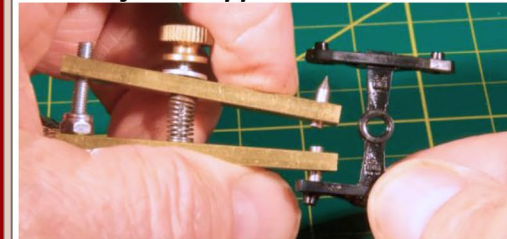


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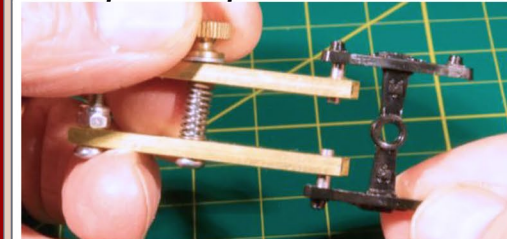
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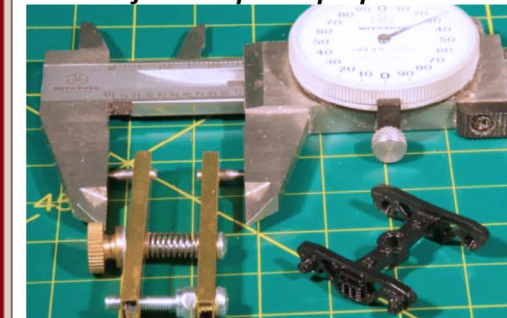
Adjust to approximate width.



Squeeze to put in truck frame.



Adjust Caliper to proper fit.



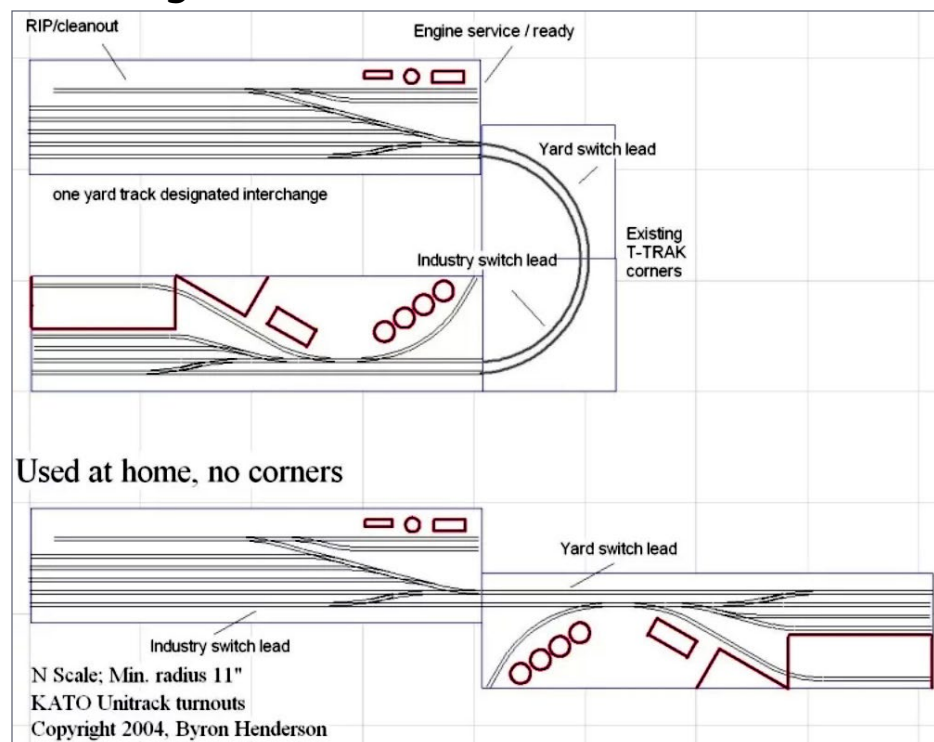
Measure for proper axle length.

Proper axle length is critical for reliable operation. Sloppy short axles allow wheels to lift off rail and derail cars.

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Planning an extension



3. Some layout expansion planning ideas offered on the MRH forum by MRH member Cuyama (Byron Henderson).

Forum member **Bremner** (*John Bremner*) posted recently:

“[When] operating [my] Playa Desnuda branch ... there is no way to have the train roll in, switch the industries, then leave town. I am looking at adding the fictitious Washington Blvd. Yard.”

Follow the developments of this layout expansion and the advice other forum members are offering, use the button below.

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

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Chessie System MOW cars



4. Mike Kingsbury built a wheel car and then added a lifting mechanism with chains to his crane car for getting the wheels on/off the car.

MRH forum member **grenadier1943** (*Mike Kingsbury*) has a running blog about maintenance-of-way cars he's building for his Chessie layout.

“[Here is a] Chessie System C&O MOW wreck train wheel car.

“My inspiration for the project came from the ‘Chessie System Color Guide to Freight Equipment.’ I decided to use only parts that I had available in the modeling room.”

We're really enjoying the many projects Mike posts about and how the forum members pitch in to provide advice and build assistance. Visit the MRH website and read the full thread!

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

Monthly “What’s on your workbench” thread

Each month, MRH readers post their workbench projects on this monthly workbench thread. Very inspiring and often quite fascinating!

For more great projects, visit the MRH website and view the full thread.

[Read March’s thread on the MRH website](#)



5. MRH forum member **splitrock323** (*Thomas Gasior*) posted this photo of his prototype project (among others). Note the prototype reference photo above and compare that to the model below.





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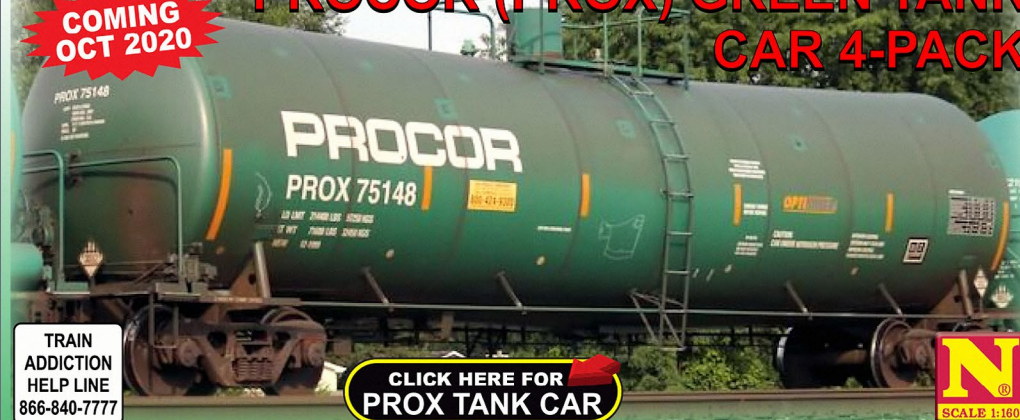
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WHAT'S NEAT

column



Model Railroad Hobbyist | April 2020

KEN PATTERSON SHOWS OFF A FRISCO MAIN LINE LAYOUT,
DESCRIBES HIS CATALOG COVER SHOT OF BACHMANN'S ALL-
NEW AMTRAK CHARGER, AND HEARS HOW TONY PELLEGRINO
DESIGNS OPERATIONAL PLANS ...

IN THIS MONTH'S VIDEO, JOHN PELUSO'S DISPLAYS
his fantastic HO scale Frisco layout representing mainline loca-
tions from St. Louis to Springfield, Missouri.



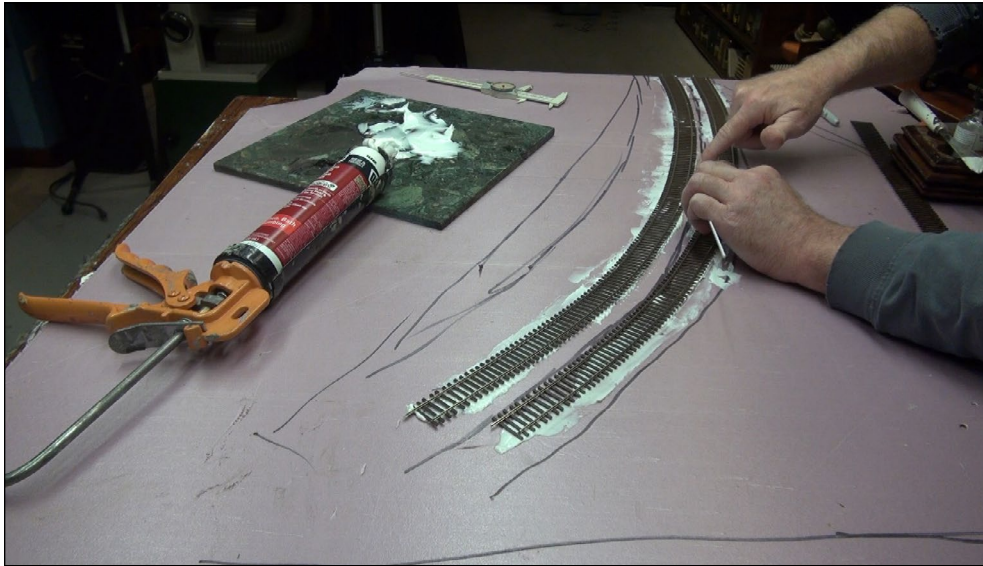
WHAT'S NEAT! MODEL RAILROADING Bachmann Diorama build



April 2020 show

► PHOTOS AND VIDEO OF SUPERB MODELING

Model photograph design ideas for your models



1. This year Bachmann Trains from Philadelphia, Pennsylvania asked me to design a colorful and exciting cover shot for their upcoming catalog. The subject was to be their new Charger locomotive in HO scale. I wanted to create something where the train rounding a super-elevated curve would add movement and speed to the shot, with the locomotive coming right at you through the cover. I set up the camera in front of a piece of pink 2" thick insulating foam. I drew the dimensions of the shot on to the foam, knowing exactly what would be seen through the lens. The curve was super-elevated using two strips of 0.040" Evergreen styrene glued together, making the outside rail of the curve 0.080" higher than the inside rails on both main lines represented in the scene.



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2. I used Dap Kwik Seal Plus bathroom adhesive to glue both the Micro Engineering code 83 track and the styrene on to the foam. This glue dries clear and is paintable so ballast will stick to it. Once this was cured, I spray painted the scene with Rustoleum Earth Brown, coloring the rails and track on a newly carved and cut scene that measured the length of the locomotive and two passenger cars.



Also see the "What's neat this week" weekly video podcast!



WHAT'S NEAT | 4



3. I ballasted the track with fine black cinders from Woodland Scenics. I added backyard dirt for the scenery immediately adjacent to the track and light green and dark green ground foam.



4. I spread the ballast smooth with my finger and followed this up with an artist's fan brush for the length of both super-elevated tracks.

WHAT'S NEAT | 5



5. Once the track and its surroundings looked prototypically correct, I wet the entire scene with Woodland Scenics Scenic Cement to hold everything permanently in place.



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6. To use the new track diorama in a photo shoot, I stacked or layered many scenes together using a small four-foot-long hill covered with green fake fur right behind the foreground track scene. Pine trees stuck to a taller piece of shaped foam made up the third layer of scenery. Each tree was placed into position while looking through the camera outdoors. I then used two 8' long panels of carved foam to represent distant background mountains.



7. Here you see the final photograph. Two passenger cars rounding the curve with a powerful locomotive and plenty of layered scenery to make it interesting.

Operation design in model railroading



8. Tony Pellegrino has designed operation scenarios on many layouts. Operational design starts with emulating the prototype because trains don't run in circles as they run to make a profit. Trains make money by delivering and receiving goods. Once you think that way about your layout it simply lays itself out. Tony says it all started with him and his wooden trains as a child when he would draw operation on paper and mimic that with his wooden push trains. "I have always loved that part of the hobby, the problem-solving and the prototypical operation of the trains," he says. "If the railroad had tracks in an area, they were there for a reason and it was my job to figure out the 'why' part of the equation as it related to profitability."

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WHAT'S NEAT | 8



9. Brett Tate handles his train's paperwork as Greg Lane, in the background, takes care of their radio chores while operating on Joe and Tony Pellegrino's two-level operating layout. Even if you have a simple circle layout, once you add a siding with a track to place a box car or a tank car, you now have a reason for the railroad to exist rather than simply running in circles.

One thing that helped Tony to accomplish this was to imagine he was the engineer, rather than being separated from the train. This makes him in the crew of the train. For example pull up to the sand siding at Owens-Illinois with three hoppers full of sand. Set out the three loaded cars on to the track. Pull the three empties and take them to wherever they are filled again with sand. That's how simple it is to get started.

You can evolve ops to be as complicated as you want as you learn. You can track car numbers, create train orders or track warrants, use paperwork that tells where each car should go (car cards or switchlist), or add a dispatcher to control train movements.

WHAT'S NEAT | 9

Tony says he takes his inspiration from real train orders for various prototype locations. He studies where real cars come from and where they go and tries to emulate those patterns on the layout using similar patterns that fit their model railroad.

A lot of the operating research comes from historical societies. This information can be obtained for free from many historical societies online. It can be as much fun to scratchbuild a prototype structure where part of the fun is doing research and planning before you start. Ops research can work the same way!

John Peluso's Frisco Layout in HO Scale



10. In this month's video we get to see this wonderful layout where the trains really move. John Peluso has been a model railroader for 50+ years. His passion for the hobby comes from all aspects of model railroading that include scenery, carpentry, electrical, painting, and railroad operations.



11. During an operating session, John's railroad keeps seven operators busy with a three-hour session split into two segments of 90 minutes each. A dispatcher and two to four yard crews keep things moving fluidly. They use a dispatcher's board with a track plan painted on a metal surface. Small painted magnets represent all the trains on the main line and yards to prevent cornfield meets on the main. They use two-way radios to keep the road crews, yard crews, and dispatcher in contact on the double-deck layout.

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12. When was a kid, he and his friends would ride their bikes down to the MoPac and Frisco mainlines and watch trains all day long. It's that part of this childhood that he models on the layout.

The areas around St. Louis are modeled to represent the prototype locations accurately, for example Webster Groves train station, Valley Park, and the Meramec River crossing bridges. "I want people to know where they are at, they've been there, they can recognize that. It's a personal fulfillment I like personally."

The layout occupies 16x30'. The lower level is 43 inches and the upper level is 62". There is 400' of code 83 track on the two levels, connected by a helix that takes 2 minutes and 20 seconds to climb from one level to another. The layout has a minimum radius of 30".

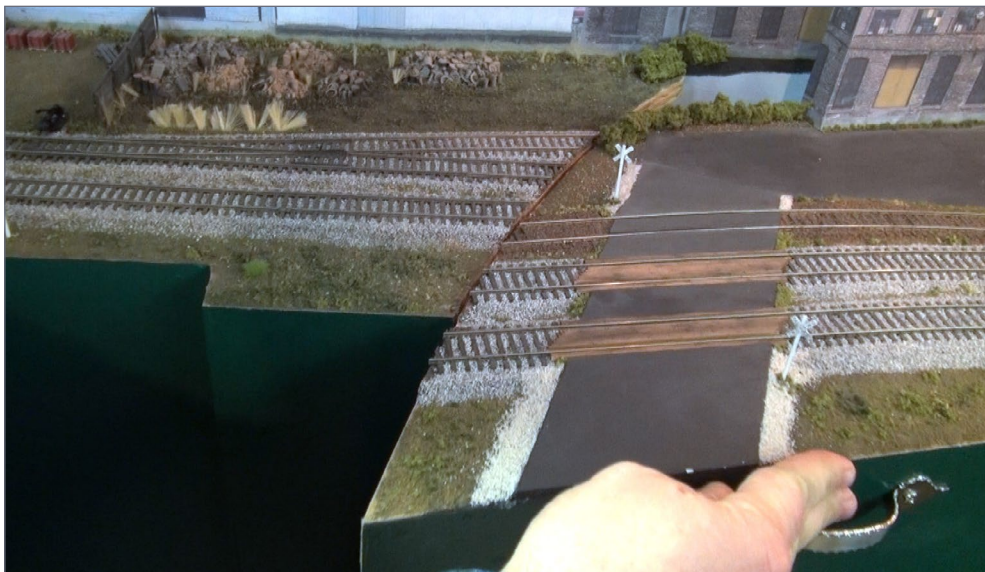
Many of the trees are Scenic Express "Super Trees" with that fantastic fine branch structure, the ballast is from Woodland Scenics ballast and there are many scratchbuilt buildings and bridges.



Also see the "What's neat this week" weekly video podcast!

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WHAT'S NEAT | 12



13. One of the amazing parts of the layout is the folding gate in a corner of the layout that allows access in and out of the layout room. It has two tracks on the upper level and three tracks on the lower level with full electrical power to the rails and curved backdrops. The video runs 10 minutes with the full interview and is amazing to watch in action.



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WHAT'S NEAT | 13



14. Both levels swing at the same time to open the accessway to John Peluso's well-crafted Frisco.

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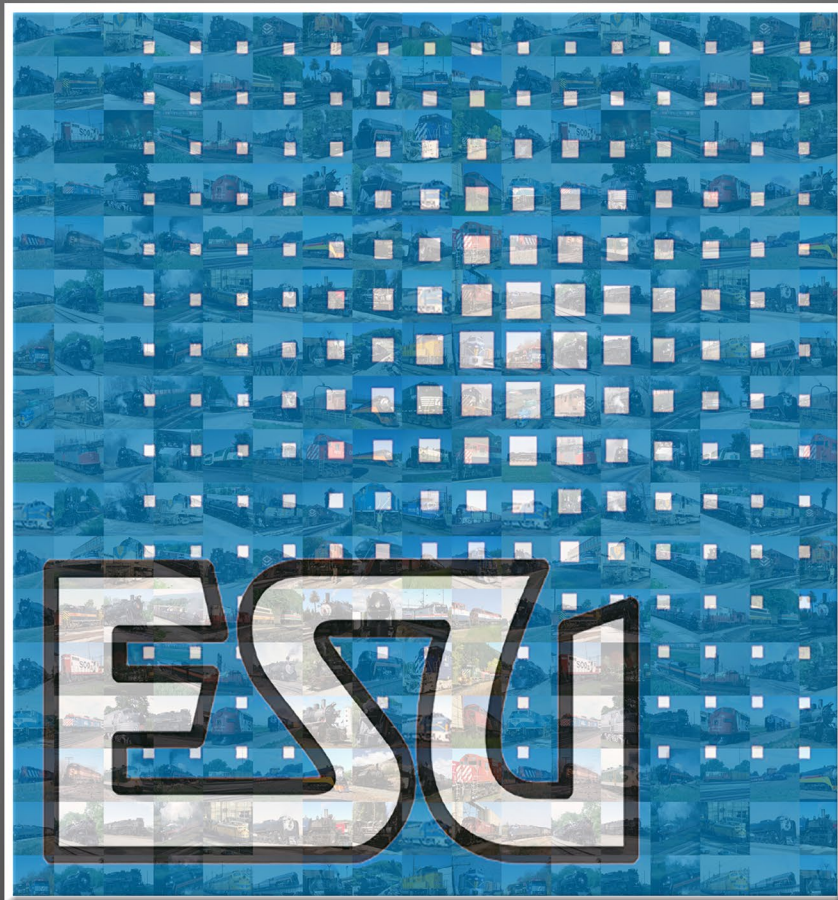


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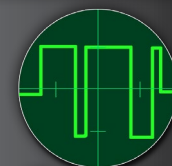
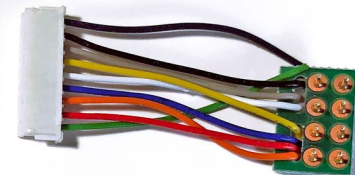
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DCC plugs and sockets



Electrical
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Model Railroad Hobbyist | April 2020

1. This Train Control Systems combination T1 decoder with KA2 Keep Alive® includes one of the most common DCC plug-n-play plug combinations – the NMRA 9-pin JST decoder socket and the 8-pin NMRA medium/ NEM 652 plug.

JOE FUGATE reviews the different DCC decoder plug standards and how to work with them ...

AFTER BEING INTRODUCED IN THE EARLY '90S, various DCC decoder plug-in standards have emerged as we moved away from hard-wired to plug-and-play. Which plug works for what situation can be confusing, so let's sort it all out for you.

But before we do that, a word about the plug standards, which do vary slightly between North America and Europe.



RATE THIS ARTICLE

The NMRA and the NEM

MRH Media focuses on North American modeling, so the modeling standards we pay most attention to come from the NMRA (National Model Railroad Association). Our friends across the pond in Europe have their own standards established as the NEM (Loosely translated as “Normal European Modelling” standards).

While the two standards have significant overlap, differences do exist as well. Since some decoder makers such as ESU Loksound have their headquarters in Germany, they lean toward favoring the NEM standard a bit more. That said, ESU has taken great pains in recent years to be a lot more cognizant of the NMRA DCC standards, so we applaud those efforts.

We explain the differences between the two standards as we go along.

Overview of the different plug types

Before diving into the details of each plug type, let's first conduct an overview. Table 1 lists the most common plugs in use. For a visual catalog of these plugs, see [2] and [3].

NMRA large, medium, small – and JST decoder plug

The NMRA has four core decoder plug standards, the large, medium, small, and JST decoder plug standards. Information is scant on the large 4-pin standard and we can't find any implementation examples of it. Recently, the NEM 654 standard was deleted by the European MROP guidance organization. So the NMRA large

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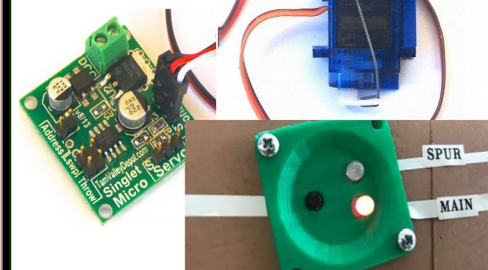
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THE EVOLUTION OF PLUG-N-PLAY

When DCC first entered the hobby in the early 1990s, plug-n-play did not exist. All decoder installs had to be hard-wire installs.

The first major plug-n-play option came with the NMRA medium / NEM 652 8-pin plug, which has become widely adopted in HO and larger scale locomotives. A few N scale locos use this 8-pin socket as well, mounting it sideways on the loco motherboard. While that's better than nothing in N, it's awkward.

The 6-pin NMRA small / NEM 651 plug fits better in N scale locomotives, but has mostly seen adoption in European N scale models – very few North American N scale loco makers have adopted this design. One North American manufacturer, Fox Valley, has adopted the 6-pin standard for their N scale locomotives.

To date, most N scale locomotives require DCC decoders using a loco motherboard replacement form factor or they come from the factory with custom DCC decoder motherboards.

With the introduction of sound decoders and many extra lighting functions, eight pins just were not enough, so a new 21-pin standard came on the scene. But this new 21-pin standard doesn't fit in N or Z scale locomotives at all.

More recently, the Next18 standard has started to become popular. This plug standard is physically much smaller and easily will fit into N and Z locomotives, yet has plenty of pins for the more advanced decoders.

On top of all these pin standards, a new PluX standard has appeared, which allows using one socket to accommodate 8, 16, or 22 pins. These varying plug sizes allow adapting the plug for more limited space situations in the smaller scales or for more basic decoders which do not need all the extra pins. ■



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DCC PLUGS AND SOCKETS | 5

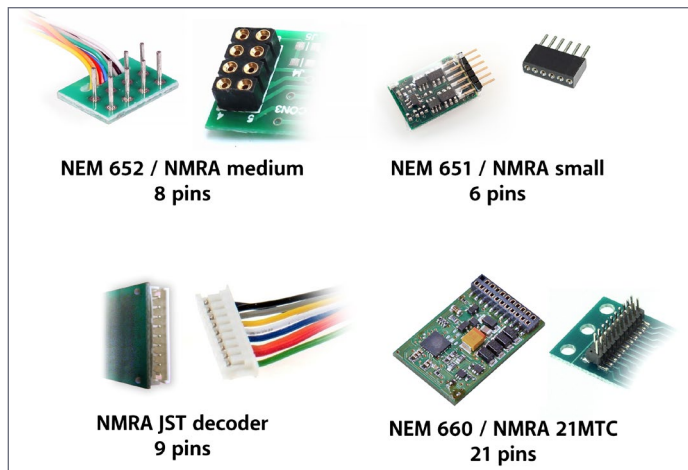
4-pin standard now looks outdated, so we won't discuss it any further here.

The other three standards, the medium, small, and JST decoder plug standard do have implementation examples, so let's look at them.

DCC Interface Plug Conventions

Name	NMRA	NEM
4 Pin	NMRA Large	NEM 654
6 Pin	NMRA Small	NEM 651
8 Pin	NMRA Medium	NEM 652
9 Pin	NMRA JST decoder	-
21MTC	21MTC	NEM 660
Next18	-	NEM 662
PluX	PluX8/16/22	NEM 658

Table 1: List of the DCC interface plugs in common use.



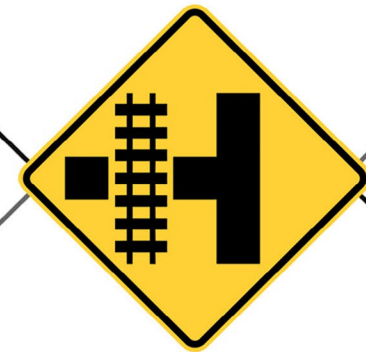
2. The four most commonly used DCC interface plugs.

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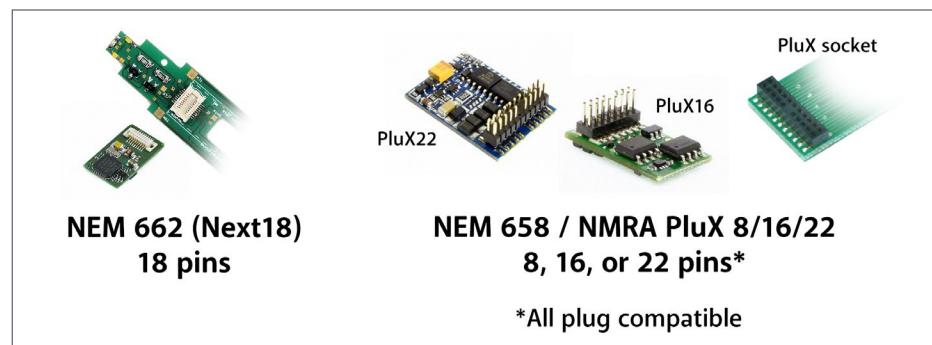
NMRA large, medium, small – and JST decoder plug

As [4] shows, these plug standards cover all the main rail and motor wire routing, along with the front and rear headlights. The NMRA 9-pin JST decoder plug standard includes wires for F1 and F2 as well. Those two extra function feeds (green and purple) come as loose wires out of the decoder and need to be hard wired to whatever they control in the locomotive (most often additional lighting).

However, most modern decoders allow remapping functions to various outputs, so if you prefer the green and purple wires to be used for a different function key, you can likely remap it. Remapping functions is outside the scope of this article – we will cover that in a future article.

Note that if you plug the 8-pin plug in backwards, the motor will run backwards and your light functions will not work. If you notice this behavior in your decoder install, just turn the plug around.

All decoder manufacturers provide decoders with the 8-pin standard plug as a common wiring harness option. Many locomotives



3. Two of the newer additions to the DCC interface plug options.

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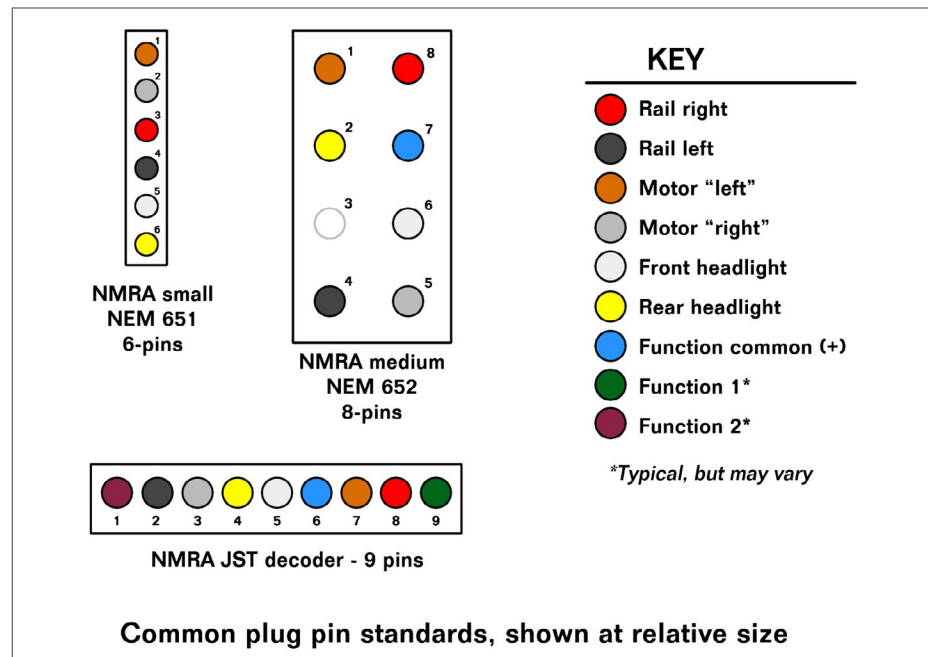
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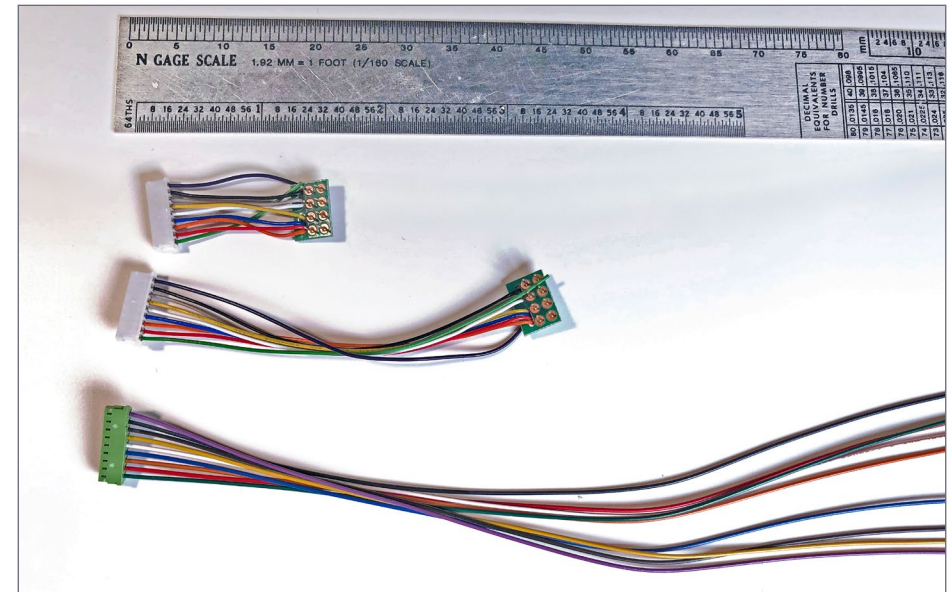
come with the 8-pin socket as standard, although that's starting to change to other standards with more pins as sound decoders gain in popularity.

Many non-sound decoders also use the 9-pin JST standard plug on the decoder. This enables swapping out the decoder harness as needed to get the most convenient wire length for your locomotive [5].

The NMRA small / NEM 651 standard seems to be mostly used in Europe for N scale locomotives. The only North American firm we could find that uses this standard in an N scale locomotive is Fox Valley Models.



4. Here are the three common NMRA plug standards and their pin-outs identified.



5. The NMRA 9-pin JST decoder plug allows swapping out wiring harnesses to get the length needed for your particular loco install. Shown from top to bottom are harnesses of 1.5", 3.5" and 9" in length.

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The 21-pin “standard”

As more advanced lighting and sound features have appeared in decoders, the ubiquitous 8-pins just aren't enough to cover it all. Enter the 21-pin “standard.”

I put “standard” in quotes because it's close but not quite 100 percent, with the NMRA and the NEM standards having a few minor (but potentially annoying) differences.

Even though the connector has 22 pins, pin 11 is “blanked” to act as an index and make it impossible to install the plug backwards. That leaves 21 pins for active use. For a description of what the more esoteric pin outs such as **TB clock** or **Vcc** mean, you can read the full official standard here:

NMRA 21MTC				NEM 660			
Input 1	1	22	Rail right	Input 1	1	22	Rail right
Input 2	2	21	Rail left	Input 2	2	21	Rail left
Function 6	3	20	GND (Ground)	Function 6	3	20	GND (Ground)
Function 4	4	19	Motor “left”	Logic 4	4	19	Motor “left”
TB clock	5	18	Motor “right”	TB clock	5	18	Motor “right”
TB data	6	17	Function 5	TB data	6	17	Function 5
Front headlight	7	16	Function common (+)	Front headlight	7	16	Function common (+)
Rear headlight	8	15	Function 1*	Rear headlight	8	15	Function 1*
Speaker A	9	14	Function 2*	Speaker A	9	14	Function 2*
Speaker B	10	13	Function 3	Speaker B	10	13	Logic 3
Index	11	12	Vcc	Index	11	12	Vcc

Slightly different 21 pin plug standards

6. Comparing the NMRA 21MTC standard to the NEM 660 standard. They're close, but not exactly the same.

NMRA S-9.1.1 standard (scroll down to section E):

nmra.org/sites/default/files/standards/sandrp/pdf/s-9.1.1_connectors_2015.05.22.pdf

NEM 660 standard (in German):

morop.org/downloads/nem/de/nem660_d.pdf

The big difference between the NMRA 21MTC standard and the NEM 660 standard [6] comes down to functions 3-6. The NEM standard specifies those functions as “logic” instead of “functions” – which means the output is just a ~5V digital signal when it's a logic pin out. For a function pin out, you get a full constant 12-14 VDC output that can drive other electronics like LEDs properly.

ESU makes an adapter board (59168) so that the logic signals on an NEM standard decoder may drive LEDs or other such electronics. But there are no adapter boards to go the other way and take a function output and make it act like a logic output.

See [Table 2] for a list of which manufacturers support which standard. For more on the whole 21-pin standard and the differences, see Mark Gurries' webpage on the topic: mrhmag.com/magazine/url/gurries-21pin-issues

Note that Digitrax actually includes the ability to set a decoder CV and swap the F3-F6 outputs between digital logic outs and full power function outs.

NixTrainz offers a 21-pin adapter board called the Decoder Buddy that greatly simplifies the installation of 21 pin decoders into a locomotive when adding stay alive or special lighting using F1-F6. We covered the Decoder Buddy in the April 2019 issue of MRH: mrhmag.com/magazine/mrh2019-04/electrical-impulses.

Strictly speaking, the 21-pin standard has been declared obsolete by the NMRA, to be superseded by the PluX standard (more on that

below), but manufacturers persist in making decoders that use the 21MTC standard. We hope at some point, the manufacturers will finally move to the PluX standard.

The Next18 plug

The 21-pin standard is great for HO and larger, but the socket is too large for N and Z scale locomotives.

Enter the Next18 plug standard – with a much smaller form factor that fits into N and Z scale locos. And it has many more pins, which provides more advanced decoder plug-n-play connections than do 6 or 8 pins.

The NMRA has not embraced the Next18 standard, but the NEM has adopted it as the NEM 662 standard.

Manufacturer	Standard	Notes
ESU	NEM	
TCS Steam	NMRA	
TCS Diesel	NEM	
ZIMO C ver	NEM	
ZIMO D ver	NMRA	
NCE	NMRA	
Bachmann	NMRA	
Lenz	NMRA	
CT Electronics	NMRA	
Digitrax	Both/PROG	CV64 sets logic or function
SoundTraxx	NMRA	

Table 2: List of which 21-pin standard the various manufacturers support. *Updated version of a Mark Gurries table*

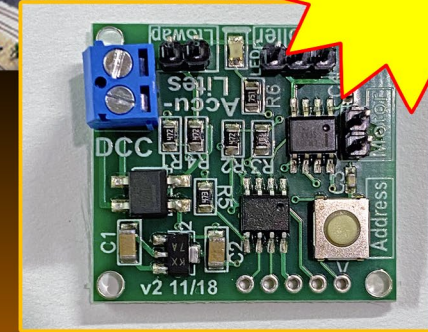
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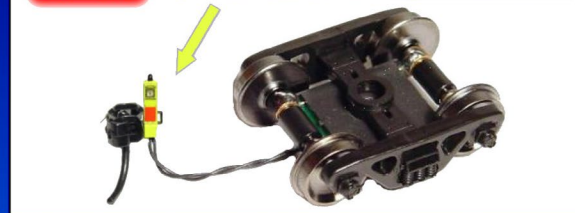


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The entire Next18 connector is only 8mm long and 5mm wide, making it extremely compact. However, the tiny connector's pins only rate at 500 milliamps, so track power (red/black) and the function common (blue), and the ground get allotted to two pins each [7]. This makes the Next18 effectively a 14 pin standard in reality.

The Next18 standard actually has two variations, the straight **Next18** in which pins 7 and 16 get used for functions, and the **Next18s** in which these two pins get used to drive speakers for sound decoders.

The Next18 the pins have been assigned following a symmetric-like design, so if you install the decoder backwards, no harm gets done

Rail right	1	Red	18	Rail right
Motor "right"	2	Orange	17	Rear headlight
Function 1	3	Green	16	Speaker A / Function 5
Function 3	4	White	15	Function common (+)
GND (Ground)	5	White	14	GND (Ground)
Function common (+)	6	Blue	13	Function 4
Speaker B / Function 6	7	Brown	12	Function 2
Front headlight	8	White	11	Motor "left"
Rail left	9	Black	10	Rail left

Next18 standard

7. The pinouts on the Next18 standard are limited to 500mA each, so four key connections double up to allow for 1A. This means the standard actually only has 14 workable pins.



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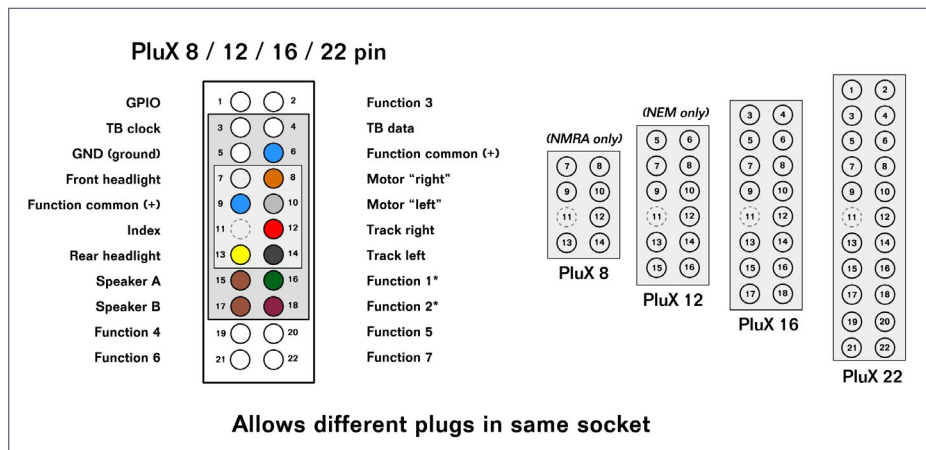
to either the locomotive or the decoder. It will not function correctly, but nothing gets “smoked.”

The newest standard: PluX

Although the 21-pin MTC / NEM standard has become something of a defacto standard, there's a new plug standard on the block that being promoted to replace the older 21-pin standard: PluX.

In fact, the NMRA has declared the 21-pin standard to be obsolete and they're now promoting the PluX standard instead.

What's interesting about this standard is it allows the plugs to have 8, 16, or 22 pins, but thanks to an index pin, they all will plug into the same 22 pin socket. Or for smaller scales, you can have a smaller plug socket to save space. That makes this standard very adaptable across the scales, a strongly appealing concept. The NMRA standard calls for three plug configurations: 8, 16, and 22 pins. The NEM standard replaces the PluX8 option with the PluX12 option instead.



8. The new PluX standard as defined by the NMRA and NEM 658.

The smaller pin configurations allow for using a subset of the larger interface. In practical terms, the PluX8 standard offers no real advantages over the NMRA small / NEM 651 interface, so it's not included in the NEM 658 standard, being replaced by the PluX12 standard instead.

The standard also defines limits on decoder size, both footprint and thickness, allowing for plug-n-play decoders in all scales from Z-G.

You can read the full standard here:

NMRA S-9.1.1 standard (scroll down to section F):

nmra.org/sites/default/files/standards/sandrp/pdf/s-9.1.1_connectors_2015.05.22.pdf

NEM 658 standard (in German):

morop.eu/downloads/nem/de/nem658_d.pdf

European manufacturers such as Roco, Fleischmann, Piko, Tillig, and Dapol have begun producing models with the PluX interface. ESU LokSound also has begun offering some PluX interface decoders and adapter boards.

The North American market, however, has yet to really embrace this new PluX standard.

Converting between standards

What do you do if your locomotive is DCC plug-n-play, but it has the wrong plug socket on the motherboard? You use a plug adapter.

Table 3 provides some of the many options available for converting between plug standards. ✓

Most common North American decoder plug conversion options

Decoder-to-loco	Product	Vendor	Link
From NMRA small/NEM 651 To NMRA medium/NEM 652	6 to 8-pin harness	DCC Concepts CM3 Models	https://mrhmag.com/magazine/url/6-8-dcc-concepts https://mrhmag.com/magazine/url/6-8-cm3models
From NMRA medium/NEM 652 To NMRA 21MTC/NEM 660	8 to 21-pin adapter	DCC Concepts	https://mrhmag.com/magazine/url/21-8-dcc-concepts
From NMRA JST decoder To NMRA 21MTC/NEM 660	9 to 21-pin adapter	Soundtraxx TCS	https://mrhmag.com/magazine/url/9-21-soundtraxx https://mrhmag.com/magazine/url/9-21-tcs
From NMRA 21MTC/NEM 660 To NMRA medium/NEM 652	21 to 8 pin adapter	ESU LokSound	https://mrhmag.com/magazine/url/8-21-esu

Table 3. Common North-American decoder plug to loco socket conversion options.



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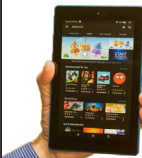
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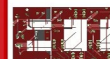


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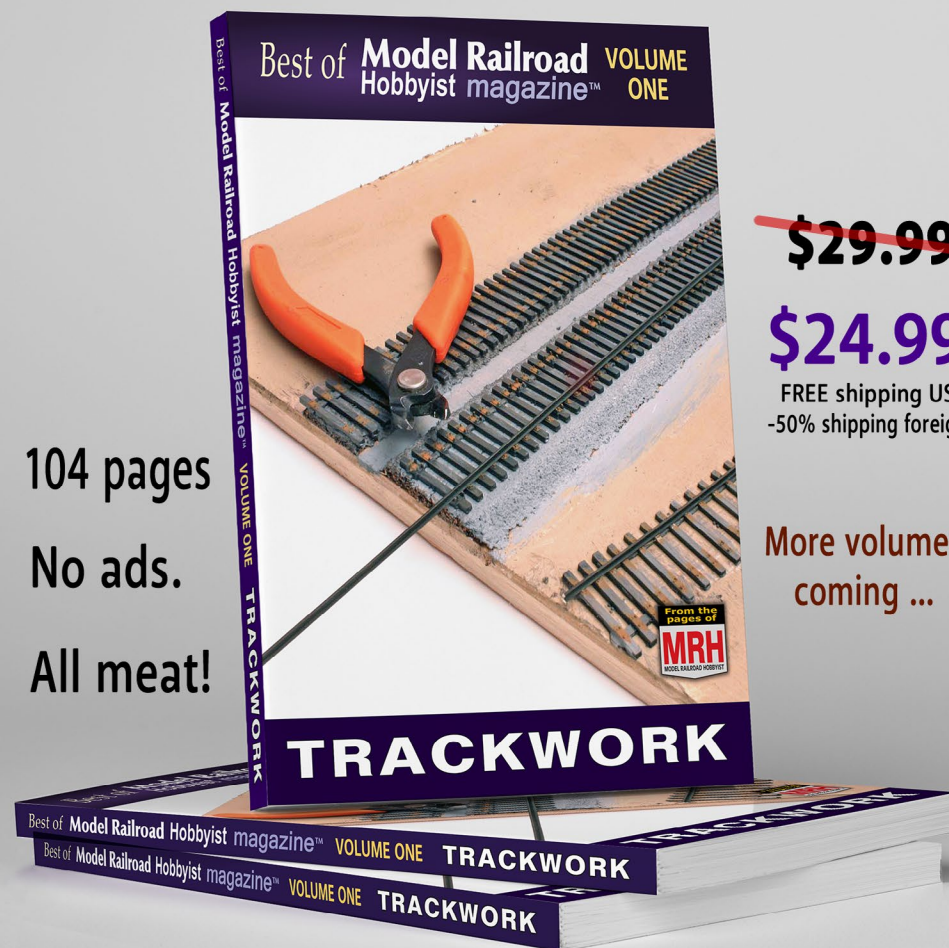
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Joe Visintine's **East Bluff Terminal**



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1. Trains come from both the north and the south and terminate on Joe Visintine's East Bluff Terminal railroad, located in Illinois along the Mississippi River across from St. Louis. Here, a train from the south brings its freight to the area's industries.

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[INDEX](#)

[TABLE OF CONTENTS](#)



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MRH: WE'RE VISITING WITH JOE VISINTINE ABOUT his East Bluff Terminal layout in St. Louis. Joe, take us back to your beginning in the hobby.

JOE VISINTINE: I first got started in the hobby with an American Flyer train set back when I was probably six or seven years old, running it around a Christmas tree. My dad bought more track for me and it just got bigger and bigger. Then it got put away as I got older.

Later I got into HO when my sister's husband bought me my first HO scale set, which was a Santa Fe. I did a 4x8 sheet of plywood with just an oval and started out with that. Then I progressed to another locomotive: I bought an Athearn Hustler. Those things are fast and great to play with!

I did another oval on the same 4x8, but I added a cross-over between the two tracks – I had some great wrecks with those! Then it all got put away during high school and during my time in the military, getting married, and working for a living.

Then back in 1985 while still in California, I ran across a modular club, the Monterey & Salinas Valley railroad. They were in Salinas and they had set up their modules in a mall. My wife and I were walking by and we saw their modular setup. I said, "Wow, this is neat!"

I started talking to these guys and the next thing I know, I'm a member of the club. So that got me back into the hobby and it just progressed from there.



2. A GM&O coal drag heads South after exchanging cars at the Peabody coal loader. We like the high-tension power line, something that's not often modeled this effectively.

MRH: That's so typical – you discover the hobby as a kid, drop out as you enter your adult life, then rediscover the hobby accidentally as an adult. Bring us up to date – how did you get from there to this layout here?

Joe: From the Monterey & Salinas Valley club, I also joined the Bay area S Scalpers because I was an American Flyer fan – but they were scale S, not high rail. That got me into scale S modeling. We set up our modules at shows in Monterey.

We also went to Dunsmuir, California for Railroad Days and set those up for about six years. Plus, I became friends with a couple of other S scalpers up in the Mount Shasta and Weed area.

From that group, and from the Monterey & Salinas Valley club, I met several members that used to be part of the Gorre &

Daphetid layout operating crew – you know, John Allen's famous layout. Unfortunately, I never got to meet John Allen or see his layout.

We had a round robin group on Tuesday nights that included three of the remaining G&D operators, which was interesting. The round robin group had HO scale layouts and we operated on them.

I finally talked my wife into moving back to the St. Louis area, so I joined the St. Charles model railroad club once we moved back here and built this house. I told my wife, you can have anything you want on the upper level, but the basement's mine!

So, I drew up plans for the basement, including an operators lounge, a storage room, a hobby work room, and the layout room. The layout room came to 44x15'!

MRH: What is it you're modeling here in your basement?



3. Trains from the north and the south terminate in East Bluff Terminal yards like the one shown here, where cars are sorted into locals to go out and serve the industries.



4. A St. Louis Terminal Railroad (TRRA) transfer run heads back across the river to St. Louis. You can clearly see the Mississippi River bluff strata in the background.

Joe: I call my layout the East Bluff Terminal (EBT) Railroad. It's a freelanced line running between the Illinois Bluffs and the Mississippi river. The EBT runs south of East St. Louis near the Gulf, Mobile & Ohio main line.

It's a "terminal" railroad rather than a through route. Trains come in from the north and trains come in from the south, they drop cars off, they pick cars up, and then they go back the same way they came in. That's what a "terminal" railroad does.

This is 1972 before the Illinois Central took over the GM&O. From the North the GM&O, L&N/Monon merger and the CB&Q come into East Bluff to transfer cars to local and Southern destinations. From the South the GM&O, SSW - that is, the Cotton Belt and the

THE MANUFACTURERS RAILWAY

The Manufacturers Railway (MRS) in St. Louis, Missouri was wholly owned by the brewing giant Anheuser Busch (AB). The railroad switched the extensive AB brewery in south St. Louis, along with a few smaller customers.

The MRS had a half-dozen EMD switchers and was known for keeping its power in pristine condition.

Most of the beer was shipped on a Terminal Railroad Association of St. Louis (TRRA) transfer to Madison, Illinois where it went to the BNSF.

Foster Townsend Rail Logistics (FTRL) announced its intentions to take over operations once Manufacturers Railway ceased operations. On October 2, 2011, FTRL Railway began providing rail switching services at the St. Louis brewery. ■



Manufacturers Railway Alco S2 model designed for use with Trainz software. Photo courtesy of JointedRail.com

Southern/Central of Georgia merger drop off cars for local or Northern destinations. The SSW brings 57' reefers of produce from California.

Also, from staging an ADM train will come up from the South to switch grain cars at the grain complex and return to staging.

Lastly, we have trains come over from St. Louis across the river.

The St. Louis Terminal Railroad (TRRA) comes over and switches cars – and the Manufacturers Railway (MRS, also a St. Louis line) comes over with their beer cars and hoppers to switch. They send beer to the south or north, wherever they need some Budweiser!

That's what my layout includes.

MRH: Why did you pick this to model?

Joe: Because it has a lot of operating potential. It's really nice because when trains come in from the north and you're switching the north industries, they're off the main line enough that you don't foul the main line while switching.

You can have operators on each end of town *and* you can have operators running the classification yard. We have the switcher that classifies cars that come in and we have the other switcher that feeds cars from another yard. When the next train comes, we'll have a switcher pull out the cars to be dropped.

This is basically the third time I have built the same layout concept. The last time it was in a 10x14' bedroom back in California. That previous layout used a double deck with a helix, which took up a lot of real estate.

I've made my latest layout all single deck and it's easy to operate because it sits along the Bluffs of the Mississippi River in Illinois

following a nice north-south orientation. We've got trains that come in from the north and south to drop off cars – and then pick up cars destined for their road and head back the same way they came.

The only regular through train we have is a passenger train.

This layout has a high scenery-to-track ratio, which I love. There's not that much track but I do have two opposing single-ended yards. It can be interesting to get both switchers, one on each yard, working together to feed cars back and forth.

The terminal concept worked well on my last two layouts – and it's working great on this layout, too. So why change something that works?

MRH: Why this particular era and not some other?



5. The one through train on the East Bluff Terminal is this GM&O passenger train, still running aging E units in 1971. The train is rolling to a stop at the East Bluff station.

Joe: I picked 1971 because I like the GM&O. I was sad when the Illinois Central took over the GM&O, so I stopped in 1971.

I try to maintain 1971, but there's probably a few pieces of rolling stock later than 1971. You need to know what you're looking at if you're going to be nitpicky about it. There might be a few automobiles newer than 71, but I tried to keep things the right date for the most part.

I don't do steam locomotives. I do model a steam locomotive at the depot that the East Bluff supposedly had back in the days when they were switching the yards. I put this steamer on display at the depot, but that's about it for steamers on my layout.

MRH: How difficult was developing the track plan for this layout?

Joe: I did my first track plan on the modular layouts with the Monterey & Salinas Valley. When I built my layout in a 10x14' bedroom, I just expanded it – and it worked great.

When I moved here to this big space that I have now, I didn't draw a track plan. I liked what I did for the last layout and it worked out fine, so I figured I didn't need a track plan because I know what I want. And that's basically how I came up with it.

What industries do I need? I can put an industry over here. I can put a power station here to take coal. So, I need a coal mine as a source for coal.

I initially put in a hidden track between the power plant and coal loader as an empties -in loads out operation during construction, but hiding the track would make the scenery unrealistic, so I removed the track. Avoiding that created more restaging effort but resulted in better-looking scenery.

MRH: So how many feet of main line do you have here?

Joe: As I've said, the layout is 44x15'. I only have a single track main line, which is probably around 95' long. It goes around in a circle through the Y at the room entrance forming a continuous run.

But usually, we just run a train from staging into the yard and back. We never do continuous running during an operating session.

MRH: Okay, great. What's the minimum radius on this layout?

Joe: When I was laying the track on this layout, I used metal gauges. I used a 32" radius and a 36" radius to help me with my curves. I also used a straight metal guide.

I may have situations where it's less than 32" but nothing that's under a 28" radius.



6. This GM&O freight waits in the siding for the passenger train to arrive. Meanwhile, passengers wait outside on the platform since their train should be arriving any moment now.



7. The passenger train finally arrives and draws slowly to a stop at East Bluff. Number 100, the one remaining East Bluff steam loco saved from the scrapper's torch, quietly reminds us of a bygone era on this line.

MRH: As to turnouts: you use #4s and #6s. Any #8s?

Joe: When I was doing trackwork for the staging yard, I used track salvaged from my layout in California – Peco code 100 and Peco #4 turnouts. On the layout I went with code 83 from Micro Engineering. I use their turnouts as well everywhere, and they're all #6.

MRH: So, what's the ruling grade on this layout?

Joe: The grade does not exceed 2%. The benchwork varies anywhere from 50" to 56". We double-head every train we operate, so you have two locomotives. When they end their run in a yard, they have to go back the exact opposite direction.

So, an engineer just gets out of one locomotive, goes into the one on the other end and he's heading out the other direction.

The 2% grades don't present any problem with two locomotives on each train.

MRH: What kind of track are you using?

Joe: I'm using Micro Engineering code 83 with their #6 turnouts.

Micro Engineering later came out with their more compact yard ladder track system too late for me to use. I said, "Man, I should have waited a little longer!"

The #6 switches work okay but I sure would have used the more compact switches if they would have been available.

MRH: How did you set the layout height?

Joe: I determined the layout height based on the duck-under. So, I asked, how low can the duck-under be?



8. Joe's layout height is from 50" to 56", or just above waist height for many people. As you can see, the attractive, carpeted, nicely lit layout space is very inviting.



9. When you enter the layout room you bend under this 4'-6" permanent duck-under bridge. Joe has added thick foam padding so any accidental bumps remain relatively painless.

I'm 6'-4" and my bones are getting cranky about bending over and bending down. So, I set the duck-under as high as I could without visually impacting the layout for people with a shorter height.

I want it so an average-height person can come in, look at the layout, and see everything on it.

I chose a duck-under because I didn't want a removable bridge, a swing bridge, or a tilt-up bridge. Those things to me are tedious.

Some guys have great luck with something removable, but you need good strong hinges. My friend Bill Young up in Mount Shasta scratchbuilt a three-track bascule bridge in S scale and he motorized it. When entering the layout, he just pushes the

button and that bridge goes up. Then it comes back down and it sits right square on the tracks with no derailments.

People like that are very admirable. How can you top that? But it was something that I really didn't want to do – I didn't want to fool with it.

And so, I just built the duck-under. It's built strong and fastened solidly to the wall. It's padded underneath, so you're not going to hurt yourself going through it.

MRH: That makes sense. When, then, did you start construction?

Joe: I started this layout in January of 2014.

I finished the basement out first. The only thing the builder put in was a spare bedroom and a full bath. I wanted an operators



10. A Southern freight train passes the Peabody coal loader South of the EBT yards. The Peabody loco number 703 is busy moving Commonwealth Edison cars to be loaded.

lounge, a storage room for all our stuff, plus a “dirty” room, and a modeling room. I did get some help finishing the basement.

I did probably 85% of the construction in the basement and probably 95% of the construction of the layout.

I did the benchwork, the electrical, the trackwork, the scenery, pretty much everything. I did have a couple people help me with ballasting. A friend of mine built one of the bridges.

But basically, if you want it done your way, you pretty much have to do it yourself.

MRH: Did construction go as expected?

Joe: Building the layout went fairly smoothly. There were things that I wanted like a dip in the scenery, so that benchwork went a little bit lower for the bridges to cross.

I did have to change some things as I went along. My caboose storage track didn't work out and I had to remove the caboose track turnout and move it to another track.

When I put the main line in, I realized I needed a siding by the main line so another train can get through while the passenger train is at the depot.

Adding that extra track meant I had to add some framework to bring the front of the benchwork out, and then frame that up so I could attach the fascia to it.

I built the turnout control panels myself. I copied the trackwork onto the panel, drilled the holes where needed, then put bipolar LEDs in to indicate the direction the switches were thrown.

I used Tortoise switch machines on the Micro Engineering turnouts. They're all #6 using Micro Engineering 83 code track.

My staging yard is all Peco code 100 with Peco number four turnouts. Twin-coil machines run that through a 52-diode matrix. A homemade capacitor discharge circuit powers the machines.

MRH: What are your thoughts on doing scenery? Do you have any favorite methods?

Joe: Doing layout scenery wasn't always easy, but it was interesting.

I use SuperTrees, a nice product but you do need to pay attention to the preparation process. First I had to get all the seeds out of the sprigs. Then I had to soak the sprigs in matte medium and hang them upside down with a weight to get them to straighten out.

And then I painted trunks and used hairspray to hold the sprinkled ground foam on them. Some time they still have a curve to them. I found out with SuperTrees you can take a hot soldering iron to the curve of that trunk and straighten them right out and get a tree to stand up straight.



11. The Union Electric power plant has an ample water supply from the Mississippi river. The kit is a left over from the layout in California.



12. The East Bluff Terminal includes a lot of on-line industries that serve as destinations for all the traffic that comes from the north and the south.

My brother helped me put the drop ceiling in the basement down here, so I had a lot of tiles left over. I was looking at modeling the river bluffs and I started thinking the tiles could make great bluffs, along with some rock castings.

I took the ceiling tiles, cut them into strips, and shaped them into various jagged angles. I hot-glue them together, then take a real stiff wire brush and scrape it along the sides. Those wires gouging into the side of that ceiling tile makes some beautiful strata.

I paint them with black and dark colors, then dry brush them in light colors. I use five different acrylic colors to paint them with.

I do the same to paint the rock castings after they're put in. You put a rock casting here and place another one next to it but you get a gap. I've gone through a lot of Sculptamold and a lot of

dental tools just trying to fill those gaps and keep the look of the rocks consistent.

It's fun, actually. You can reuse the same casting – you just turn it upside down or whatever. I have the same three castings within inches of each other and it's hard to spot them.

MRH: What do you do for backdrops?

Joe: I'm using very simple backdrops on this layout. When we got the house, the basement walls were studded, so we just put drywall up and taped it. Then I went like to Home Depot, found a nice blue, and painted the layout room walls blue. And that was it, that's the backdrop!

I thought of painting some clouds on it, but that's never happened yet. I've got a book on how to paint clouds that I've looked



13. The EBT purchased an Alco S2 from the GM&O and only replaced the lettering. It was never repainted to the green and yellow.



14. Here's a closeup of RS1 #401, also seen in [13], sporting the new green and yellow EBT paint scheme.

through, then just put back on the shelf. I said, I'll do that later. Maybe it's time to finally do some clouds.

MRH: What kind of locos do you use? Do you have a particular brand that you prefer?

Joe: My locomotives are a mix of manufacturers. There's Athearn, there's Atlas, and that's pretty much it. There might be a Walther loco in there, too.

MRH: What about the rolling stock? What sort of rolling stock does your layout have, and do you have a preference there?

Joe: My rolling stock is a mixture of just about every manufacturer you can think of. Most of them are 50', I have very few 40' cars.

There's a mixture of coal cars from Commonwealth Edison that the GM&O Historical Society produced one year. In fact, I have a lot of

GM&O cars that the society has produced such as covered hoppers for the grain peninsula.

But I have just about any make of car that's out there. They do all have Kadee couplers and metal wheels though.

MRH: What kind of structures do you have on this layout? Do you kitbash? Do you scratchbuild? Do you use a lot of wood structures or brick structures? Do you have certain kits you like, such as Cornerstone kits? Tell us about your structures.

Joe: I'm using a mix of structures. I'm using Walthers kits, and a lot of Pikestuff. I also have a few things from my first 4x8 HO layout, from Revell.

Many of my structures, I use them as manufactured or as they were supposed to be built.



15. Joe has several bridge scenes on his layout. This is one of the more dramatic and represents a Mississippi river estuary along the EBT's east riverbank route through the state of Illinois.

But I did make some modifications, like the grain elevator has more silos than the kit does. Several of my structures have been kitbashed using DPM brick modular walls. I just put them together in any fashion needed to make some huge industry buildings.

The Union Electric power plant is a Korber kit. The Peabody coal mine coal loader comes from Walthers. For my engine house, I can't remember the manufacturer but I added the car repair shop to it as a kitbash.

Most of the buildings behind the two yards I pretty much kitbashed or scratchbuilt from different parts. I used the office building on the grain elevator as is, but I scratchbuilt the corn syrup plant and the lumber yard. For the propane dealership and the storage warehouse, I pretty much built them right out of the box.

MRH: How about the bridges on the layout? How have you done those?

Joe: I only have two significant bridges. One bridge, I believe, is a Micro Engineering kit and the other bridge is a Pikestuff concrete bridge. The overpass in the yard is a Pikestuff concrete bridge.

Oh, I do have an Atlas bridge, where I used the deck girder bridge sides. I put those together and ballasted the track on top of that. So, there's basically four bridges on the layout, I guess.

Wait, there's also a bridge over by the town area near the duck-under.

MRH: What control or DCC system do you use and why?

Joe: When I joined the St. Charles model railroad club, they used Digitrax and they operated all the turnouts with the throttle. But the Digitrax just seemed a little too much for me. I like the NCE system, it was a little simpler. I can just hold it with one hand and operate it. It just seemed like a nice product, so I went with NCE.

I've got a ProCab and a PowerCab. I have three cab 06s and a cab 04. NCE works very well for me.

MRH: Do you use tethered or wireless throttles?

Joe: My NCE system is all wireless. I bought it without it being wireless – and then I thought, I don't want these plug-ins all over the fascia. It distracts from running the trains.

So, I just went wireless.

MRH: What kind of decoders do you use and why?

Joe: Most of my locomotives are equipped with NCE decoders and they're not sound decoders. I have very few sound decoders on the layout.

A few sound decoders I have on the layout are QSI. There may be another brand of sound decoder too, but mostly I'm using silent running NCE decoders and they work fine.



16. In this scene, the EBT line uses a through girder bridge to pass over a roadway along its southern route.



17. Joe loves running trains with his wireless NCE DCC system. Here he's switching the large grain elevator scene that dominates the only peninsula on his layout.

MRH: Do you program your decoders on a programming track, do you program on the main, or do you use JMRI?

Joe: When I program a fresh decoder installed in a locomotive, I'll take it into my office. I have a program track there hooked up to the computer and I use JMRI to do the programming. Using JMRI is pretty simple and it goes pretty quick.

The hardest part I have is getting locomotives speed matched because I'm running double-headed on all the trains. I still haven't conquered the speed matching – I still have trouble with it.

MRH: What do you like most about your layout?

Joe: The thing I like most about the layout is its appearance. When you walk in there, you see something that's – I'll use the term loosely – museum quality, at least that's my definition of it.

With the skirting, the carpeting – it all looks very finished. But actually, a layout's not really finished. I started this thing six years ago at the door duck-under – and went in a clockwise direction around the room, putting in buildings and scenery and details.

I finally got back around to the door, but I still have about two square feet of scenery to do that's not finished.

Once I get that done, I'll start at the door again and just keep going around doing more detailed work. I've got lighting to do, I have cars to weather. I have more roof detail to add, and just more small details to add. But I really like doing that.

I'm down here almost every day and working on it.



18. This view from the end of the layout peninsula shows the extensive grain elevator facility served by the EBT along its northern line. The considerable switching needed in this facility can take a good part of an operating session.

MRH: What do you like least about this layout?

Joe: Man, that's a tough one. If I had to choose something that I like least, I would say the skirting. I installed the skirting in eight-foot sections. If you want to reach for something under the layout and it's in the middle of an eight-foot piece of skirting, it can be easier to just take the skirting down because it's going to be in the way.

But other than that, there's nothing I don't like about the layout, except maybe it could be bigger. But then when I think about it, it's actually big enough for me.

MRH: What would you say has been your greatest challenge in doing this layout?

Joe: I think the greatest challenge was programming all the turnouts for the yards on the layout.

I purchased Digitrax DS64s to program all the turnouts in the yards into a matrix. However, I use North Coast Engineering for my control and North Coast Engineering will not talk to the Digitrax DS64s, so I had to go out and buy a little Zephyr to program the DS64s.

The DS64s are a completely different source from the NCE and they're all on a different power supply that powers the turnouts.

MRH: Any other nasty surprises with this layout? Any totally unforeseen headaches?

Joe: I have been fortunate with building this layout. I have never experienced anything that was disastrous or that wasn't easily repaired or changed.

When you build the same thing for the third time, you kind of know where you're going. As I said, I did encounter a couple surprises, but they were minor things that caused maybe a two- or

three-week delay. Once I figured out the solution, they were not that hard to fix.

Oh yes, one other surprise was how many cars I could get in a classification yard or in the departure yard. I could get more cars in the on-layout yards than I could get into staging.

So, I thought, well, I do need to keep these operators busy, so I need more cars on the trains. I just lengthened the staging yard tracks to give me more cars on a train and give these guys more work to do!

MRH: What's your least favorite part of doing a layout?

Joe: Well let's see. Doing the layout has been very satisfying to me since it's the third time I've used this same configuration. When it's the third time you build a similar layout, you're pretty experienced in doing benchwork construction, doing electrical, doing scenery, and things like that.

Maybe 5% of the things on my layout now came from the previous layout in California. I am very comfortable in doing everything myself, especially the wiring. I did wiring for Western Electric in Chicago when I worked up there. They want their wiring to be neat, clean, and traceable. So that's how I do my wiring. I use a lot of zip ties to cable the wires together.

In building this layout, I have enjoyed everything in it. I can't think of anything that I disliked doing in building this layout. The benchwork, the trackwork, the wiring, installing switch machines. I enjoyed all of it. There's hardly anything that I disliked doing.

I did hand off a few things that I could have done myself. But my friends wanted to help so I gave them things to do and appreciated their help. It's great to have friends who want to help.



19. Joe has a significant staging area outside of his layout room, feeding trains to his East Bluff Terminal's industries from lines both north and south of St. Louis.

But I don't want to lose control over how things look – I'm picky about stuff like that.

MRH: So, what are your thoughts on layout size and this layout – can a layout be too big?

Joe: Layout size must be determined by who's building it. If they want just a small layout that's fine. If that's all they're comfortable with, then enjoy it. Other people have huge layouts that fill their basement and go on forever.

Huge layouts are great for a group of guys who want to come in and run trains and switch cars. I could use more of this basement and have a bigger layout, but 44x15 is big enough for me to handle, to keep clean, and to keep operating.

MRH: Speaking about keeping things clean, what's your track cleaning method? Or your wheel cleaning methods?

Joe: Trying to keep the layout clean can be a challenge with the dust and everything. To clean the track, I use a locomotive and two cars with metal rollers using Handy-Wipes around them.

I soak the first one with mineral spirits and then I push them both around the track. The first one gets the track wet with the mineral spirits and the second dry one picks up the dirt.

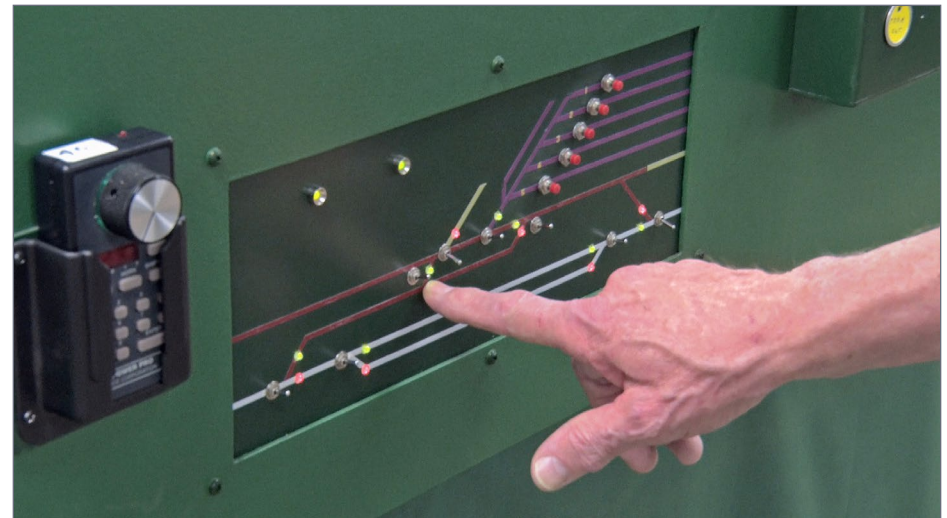
I run the track cleaning consist around the main line in the yards and in the staging yard.

To deal with the dust problem, I've heard that someone took a box fan and they taped a furnace filter onto the fan. They just run the fan in the room to circulate the air. The air comes through the fan and catches the dirt on the filter, which is a good idea. I built one, but I probably don't use it often enough.



For cleaning the equipment, I have a one of those brushes the guys use to put the shaving cream on with. It has

20. Joe uses this 1:1 clock during his operating sessions. This prominent wall clock can easily be seen from anywhere in the room.



21. Joe has built a number of turnout control panels at strategic points along the fascia. In the yards, he uses a DCC matrix routing system so you just select the track you want and the system throws all the turnouts needed to reach that track.

very soft bristles. I use that brush on the top of the cars and on structure roofs to dust things off.

MRH: Do you host regular operating sessions? How are they working?

Joe: We have operating sessions at least once a month, and we hold them on a Tuesday night. We start around six o'clock and we're done by nine o'clock.

I'd like to have more op sessions, but I'm still working on the layout and trying to get things done too.

The guys love coming over here. I have five positions that need to be filled. They decide among themselves what they

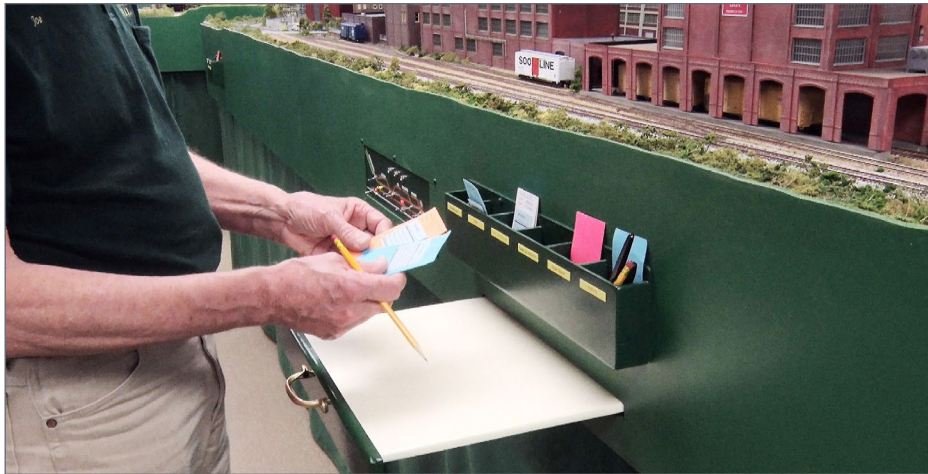
want to do. Then they grab a throttle, dial in the loco number, and start running.

It's fun when somebody does something wrong or it derails – we get on each other a little bit, but it's all in fun! It's about having fun with your friends.

MRH: When you host operating sessions do you get to run trains?

Joe: During an operating session I may run a train. I have a situation where we'll bring the ADM grain train through and park it on a siding in front of the depot. Then I let it sit there until the passenger train comes in from the other direction.

Once that happens, the grain train can go on to the north end and switch out the cars there. I will do the passenger train and let the guys switch the grain train.



22. Joe has built these clever slide-out drawers at key switching locations to aid managing and sorting cards as you work the industries.

I also have one optional run-through freight that can go either north or south. Once it runs around the layout it goes back into staging – that works to just to have something else moving on the layout.

MRH: Are you committed to HO or would you ever consider doing a layout in a different scale or gauge?

Joe: As far as gauge of trains and scales, I like HO because you can get more into the space. N scale is just too small for my old eyes. Like I said previously, I was in S scale for a while.

In our house in California, I don't know how I got by with it, but I had a soffit running all the way around the living room and I had two tracks of S scale trains running up there. One was a passenger train and one was a GM&O / Baltimore & Ohio freight train.

It was neat to have trains running up there, but there was no switching. It had no switching or anything. They just ran in circles around the room.

I still have a lot of S scale trains and hopefully one of these days I will build a soffit in the office with two tracks. Then I can run my S scale trains because I don't want to give them up – I still like them.

MRH: What sage advice might you give to someone just starting out in the hobby?

Joe: To someone just starting out in the hobby, try to find a model railroad club in your area. Join and learn from these guys.

Start out simple if you build anything for yourself. If it's a four by eight sheet of plywood it doesn't need to be fancy, just little more than an oval. Lay down some track, run some cars, learn how to put in a decoder if you want to go with DCC – or just stay with DC. Put in a turnout to see how that works.

Figure out how to do electrical work, how to run wires, and what size wires to use. How to do this can all be obtained on the Internet – or it can be learned through comradery in a club.

If you're on your own, just start doing the hobby and learn on your own. Figure out what works for you, what doesn't work for you.

If you've got questions, you can find answers on the internet. If you have friends that are doing a model railroad in a different scale – go help, it doesn't matter, it all works the same.

MRH: What do you hope convention-goers get out of coming to visit this layout?



Joe: I will have my layout open for the NMRA National convention in July. And when people come in, I want them to think, yeah, I could do this.

I like to show that they can do the same thing or even better. I really like this *Trains of Thought* from Tony Koester, it's what I go by, my philosophy of the hobby. Can I share a little of it?

MRH: Sure, go ahead and tell us what Tony said.

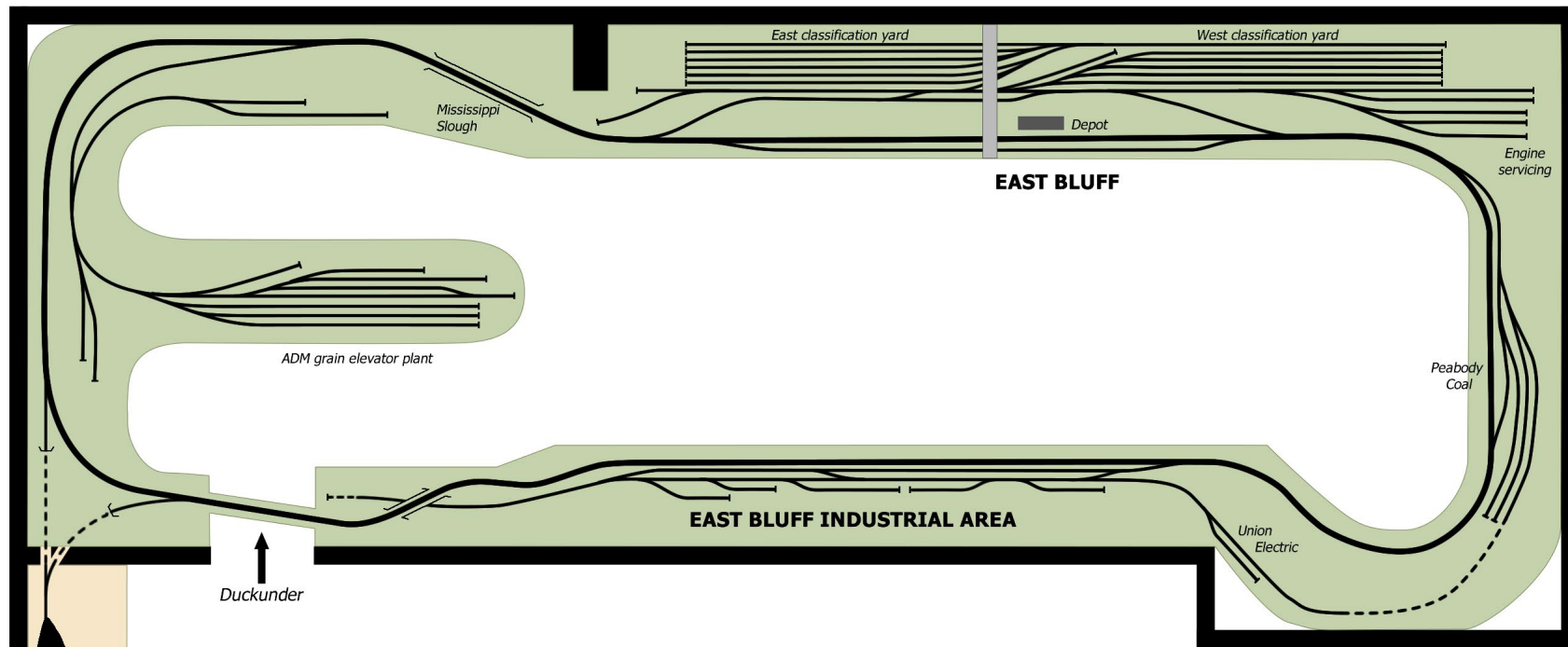
Joe: When people come to see my layout, I want them to see what's possible and be inspired to try the hobby themselves. I learned this from Tony Koester a long time ago.

I printed this up from an article in *Model Railroader* that he wrote.



Also on TMTV!

23. Joe Visintine's East Bluff Terminal is a great example of what can be accomplished as a plausible freelanced route. Even though the EBT itself is freelanced, Joe cleverly connected to various favorite prototype lines such as the GM&O, a particular favorite of Joe's.



Staging yard (12 tracks)

JOE VISINTINE'S EAST BLUFF TERMINAL

HO layout room size: 15' x 44'



Also on TMTV!

Tony says, "This hobby isn't about playing with toys. It's about enjoying the magic of railroading by building and operating scale models in a manner that captures the essence of the prototype. To what extent you do that is your choice. But understand that those hobbyists who do it extremely well are simply showing the rest of us the opportunity that lies ahead."

And to top it off, he autographed my printout at the 2000 convention in San Jose! ☒



Get a zoomable track plan

For a zoomable track plan of the East Bluff Terminal, visit this month's [Bonus Extras](#).

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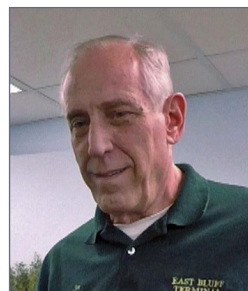


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JOE VISINTINE



Joe was born in East St. Louis, Illinois and watched the Arch being built while riding the bus across the Eads Bridge on trips to St. Louis. He was drafted into the army after high school and served a year in Vietnam and a year in Germany as a radio and relay tech. His parents moved to Elwood, Indiana during his

term in the service. From Elwood he went to Chicago working for Motorola and Western Electric. He was transferred to California in 1971. After WE closed its plant in Dublin California, he joined General Electric repairing and calibrating radiation detection equipment.

Joe decided he didn't like being around plutonium and cobalt 60 and quit his job. He hired on with a construction crew doing concrete and remodeling homes. When the interest rates went up in the '80s with the housing market slump, Joe hired on as an installer for Culligan installing water treatment equipment for homes and industries in the Monterey Bay area. After a few years of night school and getting certified for water and wastewater operations, he was hired by the City of Watsonville in water operations for 19 years and retired as senior operator. He organized the City's water sampling program to comply with state and federal regulations.

Joe and his wife Denise left California in 2012 to return to the St. Louis area to be with his remaining brother and sister and their family. They have a son Roman and a granddaughter Audrey who live in San Jose, California. ■

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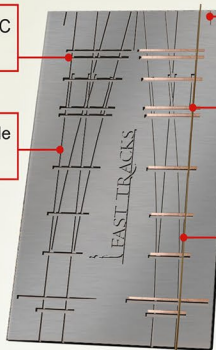


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Walthers Trainline track cleaning car upgrade



Model Railroad Hobbyist | April 2020

1. The Walthers track cleaning car straight out of the box. Unfortunately, the rather squat car body makes it stand out rather than blend in!

STEPHEN KAY improves the Walthers track cleaning car ...

PROBABLY THE MOST IMPORTANT ITEM ON OUR turnout layout maintenance list needs to be keeping the track clean. For many years I used a homemade hardboard slider car to keep my track clean and dust-free.

Recently, I discovered a Walthers track cleaning car at my local hobby shop, painted for my favorite road, the Union Pacific. I picked one up to give it a try. My plan was to run the car on regular freights as an added way to keep track clean.



When I got the car home and put it on the layout, I noticed a problem immediately. The car itself runs well, and the heavy diecast frame does a nice job, but I found the car body to be very low and squat [1].

The car stands out among my standard height cars – calling far more attention to itself than I want. To add insult to injury, the car has the wrong color – the UP used a much more reddish box-car color.

I decided to replace the car body so it blends into my trains better. This upgrade turned out to be a relatively simple project.

Fixing the squat car body

As the first step, I chose a body from a donor kit. I wanted something relatively nondescript, so I went with a typical car my hobby dealer had on the shelf – in this case an Accurail #3104 Soo Line plug-door boxcar.

I was somewhat familiar with this model, and could use the left-over underbody on other projects, as it fits perfectly in the Trix/Marklin series of boxcars that came out a few years back.

Note: The Trix/Marklin boxcars are nice cars, but they have the funky European-style swivel couplers and deep pizza-cutter flanges. But the Accurail underframe fits perfectly onto these bodies and converts them to NMRA standards in minutes.

Adjusting the underframe

I only needed to make a few adjustments here.



2. I glued a 0.060" styrene strip with CA to each end of the Walthers car underframe so it just fits into the Accurail shell.

First, I found the Walthers underframe to be slightly shorter than the Accurail frame. I measured a difference of 0.120".

I lengthened the underframe by attaching a strip of 0.060" square styrene to each end of the underframe with CA [2]. This turned out to be a bit oversize – but a few swipes with a file took care of this.

If you choose a different replacement body, you may need to use a different size strip. After I got everything to fit properly, I painted the styrene black.

With the underframe length taken care of, I looked into dealing with the higher car body. I used 0.125" x 0.250" styrene as blocks inside the car body to hold it at the correct height [3].

I used what I had on hand, the exact size styrene strip size doesn't matter that much. Figuring out where exactly to attach the blocks was more of a problem!

I wanted the carbody to ride at the same height as other Accurail cars, but I had trouble figuring how far up the inside of the shell to attach the styrene strips to get this.

I had to experiment to figure this out. I put two Accurail boxcars on the track with the Walthers track cleaning car underbody between them.

I put a spot of Testors plastic tube cement on each styrene block and gently stuck them to the inside of the car body ends as far down as possible. Then I placed the body on the Walthers underframe and, using both hands, carefully pushed the car body down until it rode at the same height as the cars on either side.

I removed the body, and evened up the blocks by making them both level and at the same distance from the bottom of the car body.



3. Fitting these styrene blocks inside the ends of the shell turned out to be trickier than expected. These blocks establish the height of the shell above the rails – see the text for details.

I let things set up for a few minutes and then put the body back on the frame. If all is well, use liquid cement to firmly attach the blocks to the body.

If not, I popped the blocks off the car body and tried again. It took me a couple of tries to get this right.



After the cement sets up, the car should ride at the correct height.

I found the body needed one more modification: the Walthers shell is held to the underframe with two styrene tabs molded to the inside. These fit into small recesses in the underframe.

I replicated these tabs using a couple of short pieces of 0.030" x 0.100" styrene [4]. I put the Accurail body onto the Walthers underframe and then simply cemented the tab strips in place with liquid styrene cement.

4. Fitting these styrene blocks inside the ends of the shell turned out to be trickier than expected. These blocks establish the height of the shell above the rails – see the text for details.

Walthers uses cast metal for the body, so it won't stick to the styrene tabs, and you will be able to remove the body if needed. I filed a taper on the edge of the tabs to make it easier to remove the car body. I painted these strips to match the car body.

Final steps

Because the replacement body ended up longer than the original car, the couplers needed to be extended.

I replaced the Walthers factory couplers with #1013 Accumate couplers. I had a little trouble making this change, but not for the usual reasons.

The heavy, diecast underframe of the Walthers car has its trucks mounted in rubber grommets inserted into the casting. I was unable to get the trucks off! Mounting the couplers with the trucks in place was a little fiddly, but it was doable.

Once the couplers were installed, I reassembled the car and tested the coupler height, which was properly to spec. I also found the



5. The car with an Accurail body in place – now it blends into the train much better.

wheels in the Walthers trucks to be in gauge and free rolling – although the car, with the track cleaning pad on the rails is not!

I painted the trucks and gave the car a light weathering with powders. With it all complete, I put my modified track cleaning car back on the layout.

My upgraded Walthers track cleaning car helps keep my track clean without drawing attention to itself. It blends right in and rarely gets noticed – which is exactly what I wanted. ☒



STEPHEN KAY

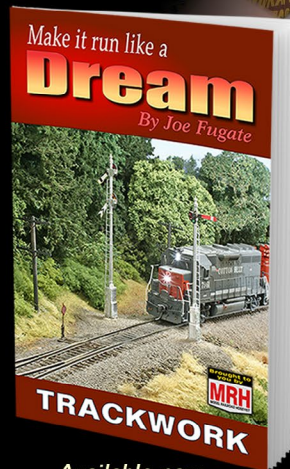


Steve Kay got interested in model rail-roading in 4th grade, when he took out a copy of *Making and Operating Model Railroads* by Raymond Yates, from the library at Oakville Elementary in Mayfield Heights, Ohio.

Starting with several small, 4x8 layouts, Steve has since built a number of larger railroads, and has a “pretty-much finished” 21’ x 11’ HO Union Pacific in his basement. He likes to build structures and freight cars, and now in the planning stages for his next layout.

When not building models, Steve works as a docent at the Cleveland Museum of Natural History. He also has acted in over 40 plays at local theaters and directed a few as well. ■

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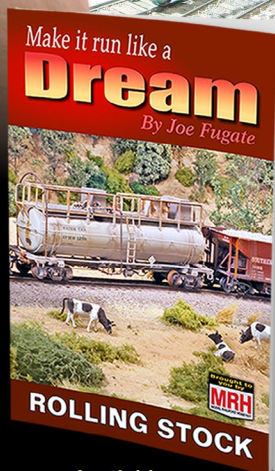


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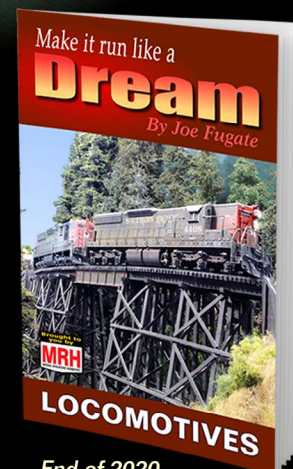
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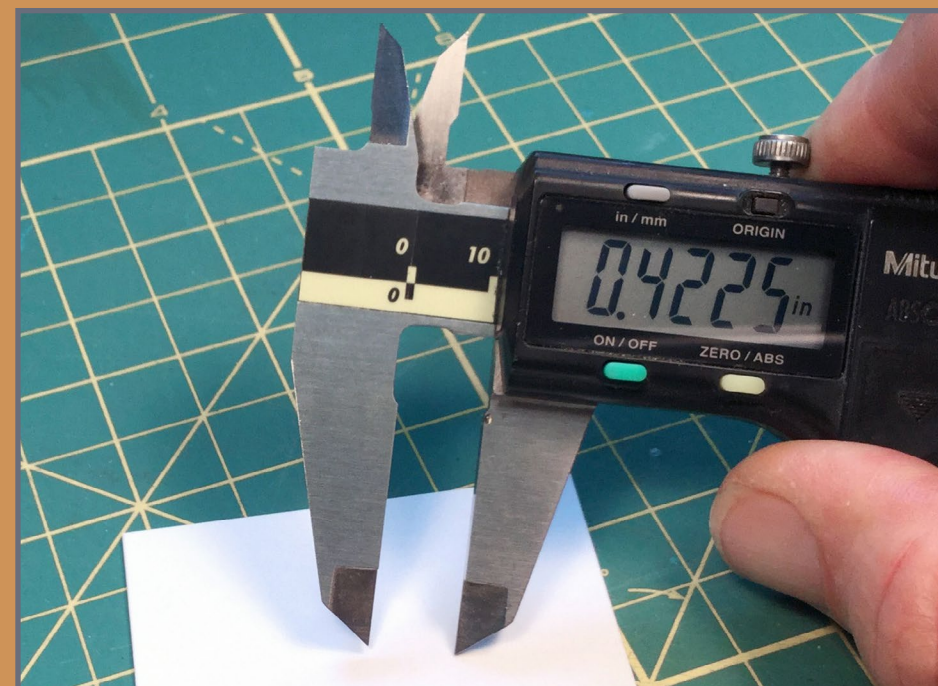
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Model Railroad Hobbyist | April 2020

JACK BURGESS looks at using digital calipers for modeling ...

WHEN I BEGAN WRITING ARTICLES FOR MODEL railroading magazines in 1975, I spent all of the payments I received on tools. That should not be surprising to faithful "Tool Shed" readers.

[INDEX](#)

[TABLE OF CONTENTS](#)

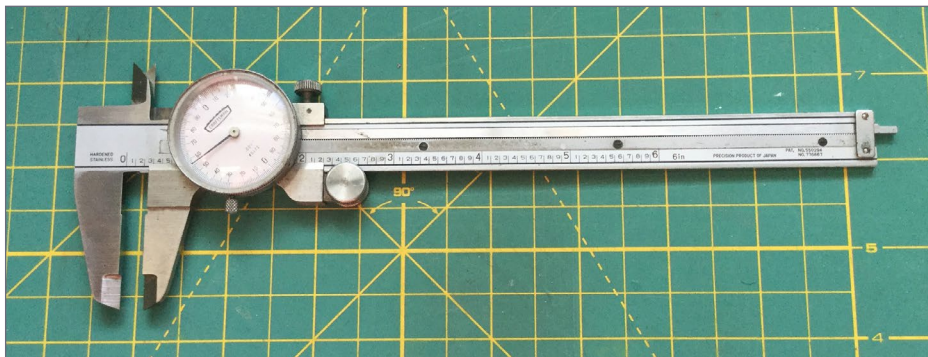


The first “expensive” tool I purchased was a Sears Craftsman dial vernier caliper. Unlike today’s digital calipers, they didn’t need batteries. I still occasionally use mine when I need to measure something longer/wider than my 4” digital caliper. Dial vernier calipers have been displaced by digital calipers, and are no longer widely available [1].

However, being a traditionalist, I resisted for years and continued to be happy with my original dial vernier caliper. However, the cost of digital calipers eventually became significantly cheaper (most likely when models made in China arrived).

When Harbor Freight began selling digital calipers [2] for \$20, I gave up on my old ways and purchased a 4” model and later a 6” model. I eventually purchased a second 6” model when the first one failed.

As I recall, they were accurate, compared to my old dial vernier caliper and initially worked fine. But one of the 6” models



1. My original 6” Sears Craftsman dial Vernier caliper.



2. Two of the three Harbor Freight digital calipers I originally purchased as my move to digital calipers. These inexpensive calipers have served their purpose, but after upgrading to my Mitutoyo caliper, these “cheapies” are now obsolete for me and I am discarding them.

seemed to “eat” batteries if I forgot to turn it off after taking a measurement. The other one eventually wouldn’t turn off.

Getting frustrated with these continuous problems, I emailed a friend, who is the owner of a company that produces injected plastic freight cars, and asked for his recommendation for a *good* digital caliper. He suggested a Mitutoyo Absolute Digimatic 4” Model 500-170-30 digital caliper.

At around \$150 on Amazon, it is not an inexpensive alternative to Harbor Freight offerings. But it measures to 0.0005” accuracy (higher than Harbor Freight) and you don’t need to be concerned about battery life. This caliper [3] uses very little battery power, so the battery lasts a very long time.

If you enjoy the feel and accuracy of precision tools, consider such a quality tool. For some reason the same caliper with a 6" range is \$5 cheaper, although I don't think that was the case when I purchased mine many years ago.

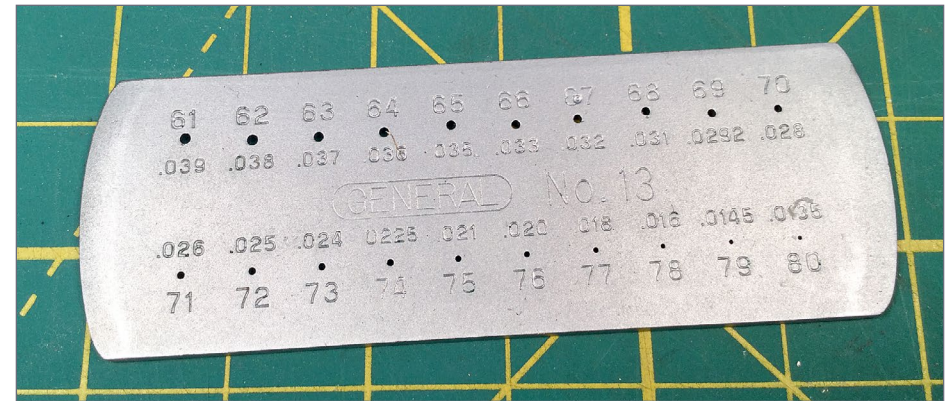
Uses of a digital caliper

When I purchased that early Craftsman dial vernier caliper, the first thing I did was to measure the drill bits in my circular 60-80 drill bit holder. Not unexpectedly, many of those drill bits were in the wrong place in the holder, the result of years of breaking drill bits and not putting others back in the proper spot.

In hindsight, a 61-80 drill gauge would have been a much better way of addressing that problem, and I encourage modelers to purchase one of these metal drill gauges [4] for about \$15.00. Using a



3. My Mitutoyo digital caliper. You can see that the caliper reads to the nearest 0.0005 inch. The lower jaws are used to measure outside dimensions while the jaws at the top are used to make inside measurements. The gray button above the LCD display changes the display from metric to inches.



4. This drill gauge made by General is what I use to check 61 to 80 drill bits.

digital caliper to measure the shaft of a drill bit is not an accurate way to determine the drill bit size.

I find myself using my digital calipers all of the time. Resin freight car kits typically include grab irons and the instructions suggest drilling the holes based on a drill bit size such as a No. 78. A No. 78 drill bit results in a hole which is 0.016" in diameter. But what is the thickness of those supplied grab irons?

Those from Westerfield are made from 0.012" wire. If you drill the holes for those grab irons with a No. 78 drill, the holes will be over-size for the grab irons which can easily result in grab irons which are not parallel to each other.

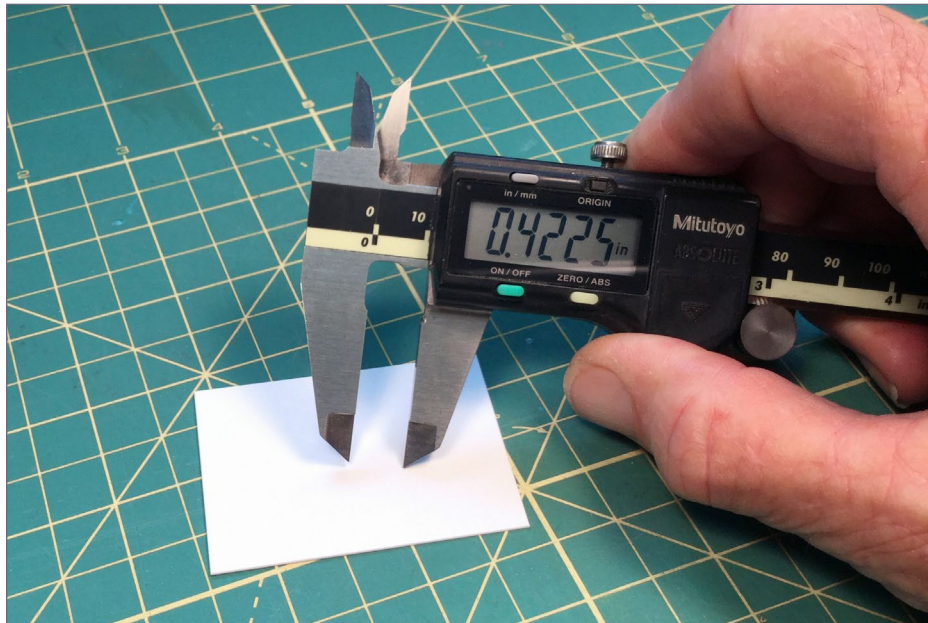
I therefore always ignore suggested drill bit sizes listed in the resin kit instructions and measure the wire specified for a particular application and pick the appropriate drill bit. But you would not know about this discrepancy without a good digital caliper.

Assume that you are scratchbuilding a small structure using Grandt Line or Tichy windows and doors. You can hold one of

these castings against what will be the side of your building and try to trace around it so that you can carve out the opening, or you can use a better way.

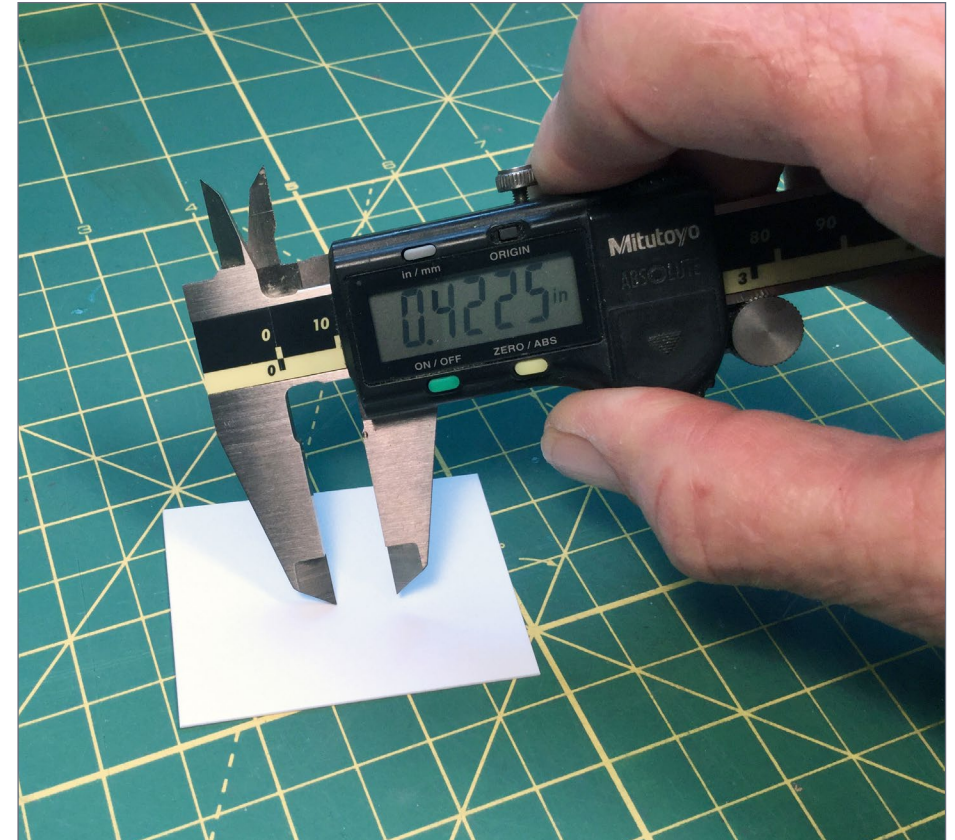
Both Grandt Line and Tichy list the size of openings needed for their windows and doors on their websites. Look up the “Fits in” size (Grant Line), or under “More Information” (Tichy), and set your caliper to that dimension.

Next, lock the caliper by lightly tightening the lock screw on top of the caliper and use the jaws on the caliper to transfer that width and height to each window and door onto the structure walls [5 and 6]. Cut the opening to match your marks, and the castings will fit perfectly.



5. With the lock screw on the caliper set, push one jaw into the styrene to make a small mark.

You can also use the caliper to scribe styrene for cutting. Say you need a piece of styrene 45 inches wide which is 0.5172” in HO scale. Dial 0.5170” into your calipers (which is as close to 0.5172 as you can set the caliper) and lock them. You can then easily scribe a cut line on the styrene [7 and 8].



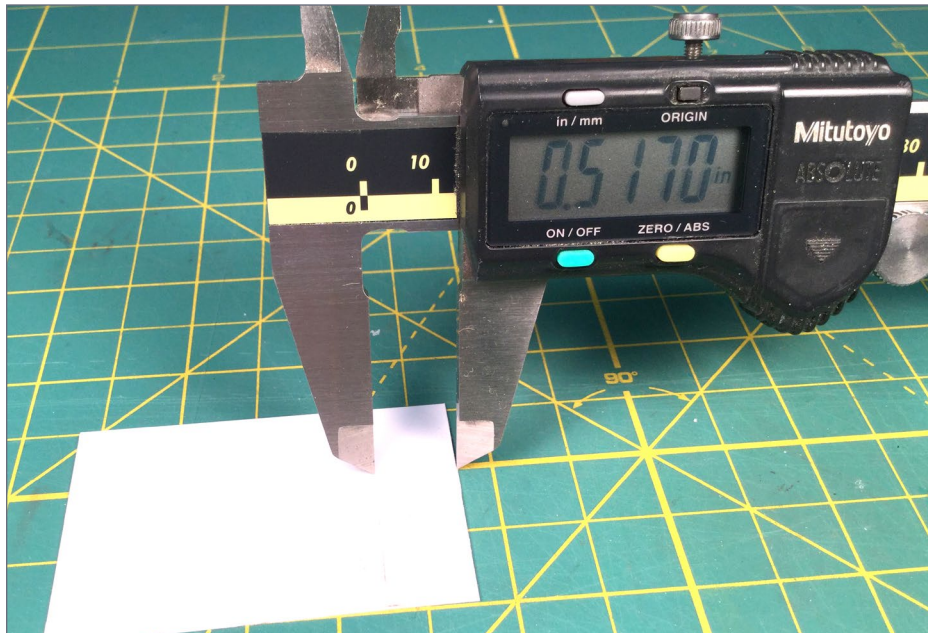
6. Rotate the other jaw onto the styrene to make a second mark. Then draw a circle around each mark with a pencil so that they don't get lost. If you use a square or straightedge to scribe a line through the marks, you will feel the knife “drop” into the mark when the straightedge is aligned with the mark.

Measurement calculations

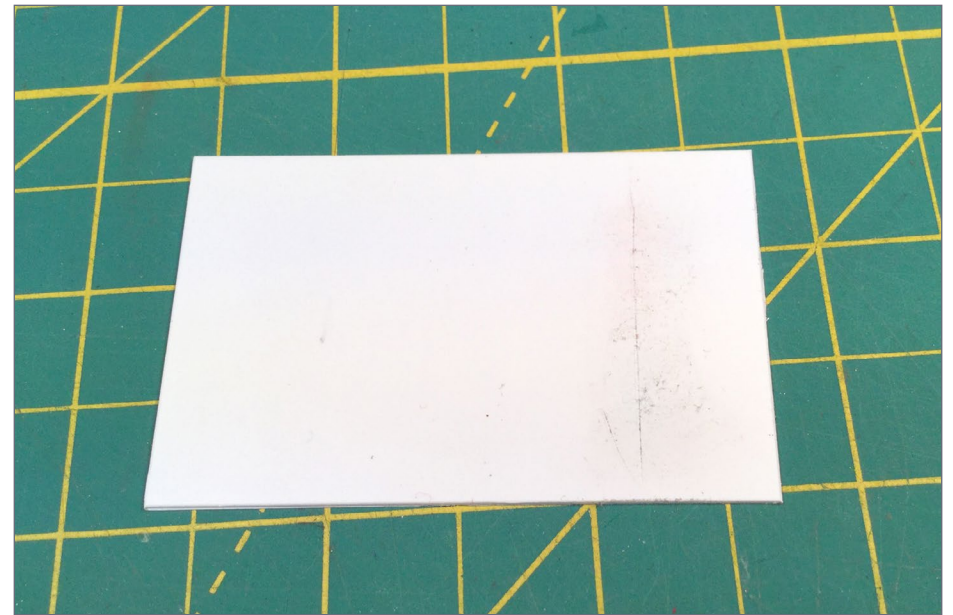
Using calipers in your modeling can result in more accurate modeling in two ways. First, the materials that you use to duplicate prototype parts, whether the diameter of the main brake pipes on a freight car or the trim material on a building, will be more accurate. Using calipers to lay out a building or scratchbuilt a freight car can be more accurate than using a scale ruler.

But in many cases we need to convert real, prototype dimensions to scale dimensions, and the other way around. I know that this might sound a lot like high school math but it is easy.

For example, I want to add some uncoupling levers to a freight car I'm building. I have an actual uncoupling lever from a Yosemite



7. Scribing a piece of styrene using the caliper.



8. You can easily see the scribe line if you rub your finger in some dust and draw it across the scribe line.

Valley Railroad stock car, and it was fabricated from 1" round bar stock. What size brass wire do I use to model 1" in HO scale?

There are two basic rules when converting dimensions from real measurements to scale dimensions. First, everything needs to be converted to inches since we will be selecting materials in inches. That 1" round bar stock is already in inches. If a measurement is in feet and inches, multiply the feet by 12 and add that to the number of inches.

Now back to the first question, what size wire do we need to replicate the uncoupling lever in HO or another scale? Simply divide the prototype dimension in inches by your scale factor. You probably already know your scale factor but if not they are: O scale is 48, S scale is 64, HO scale is 87.1 (I just use 87), and N scale is 160.

THE TOOL SHED | 10

The uncoupling lever is 1" in diameter. Assuming that you are modeling in HO scale, divide 1 by 87 and you get 0.0115". You therefore need to use 0.012" brass wire to create scale uncoupling levers.

There are some other things you can also do with digital calipers. If you are building a flat car and need to find the center of the car so that you can accurately position the bolsters. To do that, measure the width of the flat car in inches and divide the result by two. That would be the center line of the car.

Dial that result into your caliper and lock the caliper so that it won't move. Then scribe a line onto the bottom of the frame of the car from one side. Check your effort by tracing the same line from the opposite side of the car. That will be the center line for the bolsters and the trucks.

When you slide the caliper open, a depth rod slides out of the other end. Need to know the depth of a hole? Position the caliper above the hole and open the caliper so that the depth rod bottoms out in the hole. That will give you the depth of the hole.

I use my calipers on just about everything that I build. I have found them indispensable. ☒

Disclaimer - I love good tools and don't hesitate to invest in them.

You can find a shopping list for this article here:

mrhmag.com/magazine/mrh2020-04/digital-calipers

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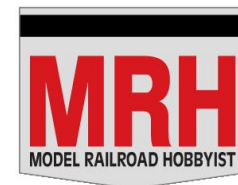


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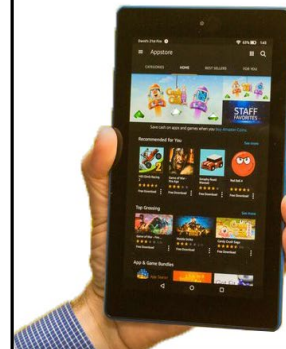
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Model Railroad Hobbyist | April 2020



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Coloring model rocks to look more like real rocks

Last month, YouTube modeler **BNSFUPRailroader** showed how to carve realistic rock formations in plaster. Here in part 2, he shows how he paints his carved rocks to look like real rocks. He goes through the process, step-by-step, showing the paint colors and the techniques he uses. You can replicate his methods and also get some great looking rocks on your layout! ■



► GREAT MODELER VIDEOS ON THE WORLD WIDE WEB

[INDEX](#)

[TABLE OF CONTENTS](#)

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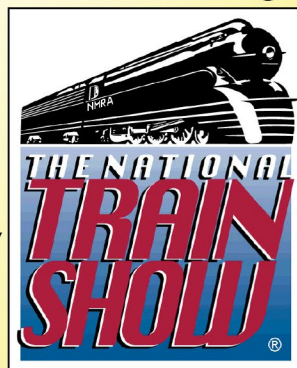
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APRIL NEWS

column



Model Railroad Hobbyist | April 2020

RICHARD BALE and
JEFF SHULTZ report the
latest hobby industry news

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NEW CLUB CARS



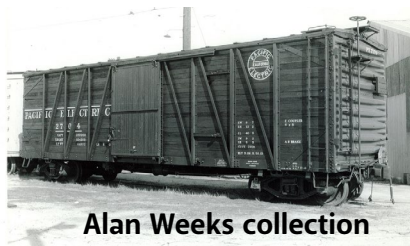
Model by Bob Chaparro

The **NMRA-Pacific Southwest Region** has made its 2020 convention car available online. Produced for PSR by Accurail, the HO scale kit is based on class B-50-13

boxcars built by Standard Steel Car Co. in 1924 for Southern Pacific and its subsidiaries. The single-sheathed prototypes were built with wood ends, however, many were rebuilt with corrugated steel ends in the early 1930s. PE still owned 177 of these cars in 1950. A year later they became part of the SP fleet.

The PSR convention car is based on Pacific Electric No. 2720. The kit comes with appropriate trucks, Accumate knuckle couplers, decals

► **THE LATEST MODEL RAILROAD PRODUCTS, NEWS & EVENTS**



Alan Weeks collection

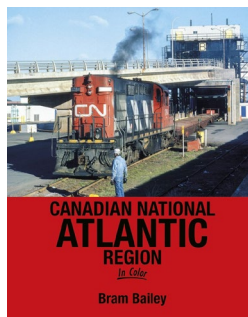
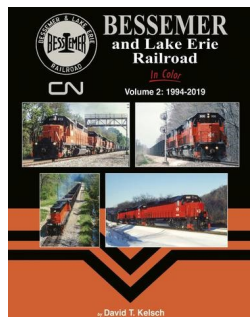
for renumbering, and a separate add-on convention logo. To order visit www.psrconvention.org/VanNuysLocal2020 and go to the Company Store.

Worcester Model

Railroaders Inc. is offering an Evans 52-foot steel gondola

decorated for Warwick Railway, a subsidiary of the Providence and Worcester. The ready-to-run HO scale model was produced for the Massachusetts-based club by Atlas. For additional information visit wmrr.org/club-cars.

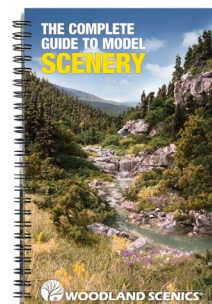
NEW PRODUCTS FOR ALL SCALES



New publications coming next month from **Morning Sun Books** include Volume 2 of *Bessemer & Lake Erie Railroad*, in which author David Kelsch presents a color portfolio of operations and equipment from 1994 to 2019. Bram Bailey's study

of the *Canadian National Atlantic Region* is scheduled for release in June. Photo highlights include CN's RSC-14 program where 38 RS-18 locomotives were modified with six-wheel trucks for operation on the light rail branch lines typical of those in the Canadian Maritimes. CN operations are documented in the provinces of New

Brunswick, Prince Edward Island, and Nova Scotia. For additional information contact a dealer or visit morningsunbooks.com.



Woodland Scenics has released a full-color book titled *The Complete Guide to Model Scenery*. The new publication combines Woodland Scenics original *Scenery Manual* and *SubTerrain Manual* into one expanded book. The book offers tips, techniques, and step-by-step information on creating model scenery. The wire-bound 200-page publication will lie flat on a work bench. For additional information contact

a dealer or visit woodlandscenics.com.

HO SCALE PRODUCT NEWS



New HO scale rolling stock kits from **Accurail** include this Baltimore & Ohio 40' PS-1 steel boxcar. The model represents a prototype Pullman-Standard delivered to the B&O in September 1963.



Accurail's HO scale version of this Denver & Rio Grande Western 36-foot Fowler wood boxcar is based on a car built in 1916 and rebuilt in 1929. The unique herald promotes the D&RGW's scenic Royal Gorge Route.



The prototype of this Canadian National 70-ton triple-bay open hopper with offset sides is based on a car built in

March 1959. All Accurail kits come with appropriate trucks and Accumate knuckle couplers. For additional information contact a dealer or visit accurail.com.



R. Bale

EMD SD60M DIESEL UNITS

EMD unveiled the first SD60 locomotive in 1984. The four demonstrators were equipped with 3,800hp 16-cylinder 710 series turbocharged prime movers. Five years later, EMD upgraded the SD60 with a Safety cab. The wide nose cab featured a distinctive 3-piece windshield that earned the locomotives the nickname Tri-Clops. Union Pacific was the first road to order the new SD60M locomotives followed by Burlington Northern and SOO Line. BN's SD60M locomotives went on to the merged BNSF while the SOO units went to Canadian Pacific. Later, some of the BNSF units were leased to Norfolk Southern and CEFX.



Athearn plans to release an HO scale version of EMD's

SD60M next February. Heading the list of road names for the Genesis 2.0 model is a Union Pacific unit that features the original, as-delivered details including rounded front number board housings, operating front ditch lights, and a large electrical cabinet behind the cab.



Burlington Northern versions of Athearn's SD60M will have a deck mounted strobe light, a small window in the nose door, a

small access door on the left of the cab, and a long panel with a door for access to the dynamic brakes.



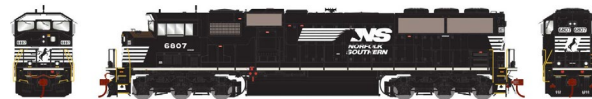
In addition to pre-merger details, BNSF units will have working ditch lights, a blower housing kick plate on the handrail, and a replacement horn.



Norfolk Southern modified its ex-BN SD60M tri-clops with the addition of a large electrical cabinet behind the cab.



Features unique to the Canadian Pacific (ex-SOO) SD60M tri-clops diesels will include a small access door on the left side of the cab, a large window in the nose door, working ditch lights, and a winterization hatch.



Norfolk Southern modified its ex-BN SD60M tri-clops with front ditch lights and a large electrical cabinet behind the cab. Features on all versions of the Athearn Genesis 2.0 SD60M include etched see-through walkway steps, illuminated number boards and ground lights, uncoupling levers, rubber MU and trainline hoses, cab interior details, walkway tread, wire grab irons, Celcon handrails, windshield wipers, lift rings, a detailed fuel tank, sander lines, and LED lighting.

The Genesis all-wheel drivetrain includes a 5-pole skew wound motor, machined flywheels, and all-wheel electrical pickup. DCC models with sound will have dual sugar cube speakers. DC models

are DCC-ready with a 21-pin connector for installation of an after-market decoder.



Also scheduled for release from Athearn next February is a Genesis 33,900 gallon LPG tank

car. Phase variations include early, flat panel, and late body designs. Features include wire railings, uncoupling bars, brake and trainline hoses, printed placards, separately applied walkway and manway platforms, and full brake rigging detail.



The Genesis HO scale model comes with 100-ton trucks with machined wheelsets and rotating bearing caps. Road names will be TILX, UTLX, SRIX, UPEX, and PROX.



R. Bale

AUTO-MAX VEHICLE CARRIER

Gunderson began production of the 140-foot long articulated Auto-Max car in 1999. This unique car carrier can handle 22 SUVs on three levels. Given its excessive length and 20-foot height, the Auto-Max pushes the operational and clearance limits of the railroad industry, particularly in the northeast region of the nation.



Athearn has included Auto-Max auto-carriers in its February 2021 production schedule. The HO scale models will have a flexible diaphragm and full articulation. A minimum track radius of 22" is recommended for reliable operation.



Separately applied details will include ladders, brake rig-

ging, stirrup steps, and brake equipment. The articulated car rides on three 70-ton roller-bearing trucks with 33" machined metal wheelsets.



Three numbers each will be available for cars decorated for

AOK, BNSF, CSXT, FXE, KCS, and CMO.



Athearn reports it will include Freightliner COE (cab-over-engine) trucks and matching 28-foot trailers in its February 2021 production schedule. The

trucks and trailers will be available decorated for United Parcel Service, XPO Logistics, Motor Cargo, Transcon, YRC, Estes, and Old Dominion.



The trailers will also be available separately in two-packs with landing gear and different fleet numbers. Athearn's Freightliner COE trucks, which represent

equipment introduced in the mid-1970s, will also be available individually. Features include clear window glazing, interior details with a separately applied steering wheel, and rubber tires. The Freightliner trucks will be decorated in the carrier names listed above as well as in purple, teal, and green without any lettering.



Roundhouse brand models coming from Athearn in February 2021 include a group of 40' steel refrigerator cars.



Decorating schemes include SRIX/Swift, WFEX/Northern Pacific, American Refrigerator Transit, Pure Carbonic Co., Illinois Central, St. Louis

Refrigerator Car Co., and three PFE schemes including an aluminum car. For additional information on Athearn and Roundhouse products contact a dealer or visit athearn.com.



Bachmann is selling HO scale models of steel bay-window cabooses. The Silver Series ready-to-run models come with knuckle couplers and appropriate trucks with metal wheelsets. Two styles of bay window are available.



Road names include Baltimore & Ohio, Erie, Nickel Plate Road, New York Central, Santa Fe, and Union Pacific.



For additional information contact your favorite dealer.



Berkshire Valley Models has expanded its selection of kits for horse-drawn vehicles with the addition of a farm wagon,



an ore wagon, and a Heinz delivery wagon. Harnessed horses are available singly and as a team. The wagons are composed of laser-cut wood and white metal castings. The horses are of white metal. The assembly instructions include photos and suggestions for painting. For additional information visit www.berkshirevalleymodels.com.



Bowser has announced undecorated HO scale ballast car kits from their English's Model Railroad division. The kits include a modified 70-ton

2-bay hopper car body. The hopper body has been milled to accept the 3D-printed chutes, and additional parts include roofs, brake details, free-rolling trucks with metal wheels, and knuckle-spring couplers. Two versions of the kit, with an "open V" hopper body or a "closed side" hopper body, are available. Data only and decorated cars are expected to follow soon. For more information visit www.bowser-trains.com.



Broadway Limited expects to

deliver the long-awaited streamlined Pennsylvania 4-6-2 class K4 steam locomotives this spring. In 1936, PRR locomotive No. 3768 was clad in a streamlined shroud designed by famed industrial designer Raymond Loewy.



A matching tender rode on unique six-wheel trucks. The PRR's advertising department made the most of the slick looking engine, however the streamline panels hid most of the locomotive's working parts and impeded maintenance. Eventually most of the shrouding that covered the wheels, rods, and cylinders was removed.



Broadway Limited will offer a 1936 version of the streamlined K4 in several paint schemes including bronze and DGLE (dark green locomotive enamel), and with both low and high mounted Keystones. Unlettered models in both bronze and DGLE will also be available. The HO scale model will come with Paragon3 Sound & Operation System. For additional details contact a dealer or visit broadway-limited.com.



InterMountain Railway has scheduled another production run of ACF twin-bay covered hoppers. Advance reservations for the HO scale model are due by April 30, 2020.



Eight road names will be available including Norfolk & Western, Winchester Western, Chicago & North Western, Burlington Northern, CSX, Union Pacific, BNSF, CEMX.



The ready-to-run model comes with knuckle couplers and appropriate trucks with machined metal wheelsets. For additional information

contact a dealer or visit intermountain-railway.com.



R. Bale

PS-1 BOXCARS

One of the most successful designs of plain boxcars was the PS-1, with Pullman Standard producing more than 100,000 PS-1 boxcars between 1947 and 1963. By 1957 more than 78 railroads had purchased PS-1s. Although commonly referred to as 40' or 50' cars, the interior lengths were 40'-6", and 50'-6" respectively. The sides of most PS-1s were assembled of butt-welded steel panels riveted to the door frames and corner posts. Between 1948 and 1954 Pullman Standard produced a number of 40' PS-1s with 10-panel riveted sides. Customers could specify side door openings of 6, 7, 8, and 9 feet on the 40' cars, and 8, 9 or 15 feet on the 50' cars. Double doors could also be specified. Customers had a choice of Pullman Standard, Youngstown, or Superior sliding side doors.

The corrugated steel ends were of Pullman Standard design stamped in two sections riveted together. The assembled end was riveted to the sides and at the roof. PS-1s built after 1949 had a signature of six small rectangles at the top of the ends. Polling pockets and the type of end sills were optional. The copper bearing galvanized roof was composed of riveted panels of Pullman-Standard design. The cars came with Apex or U.S. Gypsum steel brake platforms and running boards. The brand of geared hand brakes varied with Miner, Ajax model IP80, and Equipco type 4000 being among the most common.



Coming soon from **Kadee** is a 40' PS-1 boxcar decorated for Chesapeake & Ohio. The HO scale ready-to-run model replicates a prototype built in 1952 with 8' Youngstown sliding doors. Kadee models come with Kadee metal couplers and self-centering trucks. For more information contact a dealer or visit kadee.com.



wide whitewall tires.

Oxford Diecast has released two new 1:87 scale vehicle models including this 1957 Dodge Sweptside D100 pickup truck. The model is tricked out with a two-tone paint job and



Also new from Oxford Diecast is a 1946 DeSoto Suburban with a wood roof rack. For additional information contact a dealer or visit walthers.com.



Ring Engineering has introduced a new Power Backup Module (PBM-2) that will temporarily supply power to a locomotive module whenever the normal flow of power is interrupted by dirty track or other causes. The PBM-2 measures 1.27 x 0.66 x 0.32" and can be added to any HO scale locomotive.

Unlike most backup systems that are essentially large capacitors that discharge voltage

rapidly, Ring's PBM-2 is an active device with an onboard microcontroller and other electronics that releases a fixed voltage output enabling locomotives to perform better and lights to stay a constant brightness. For additional information including a FAQ guide visit ringengineering.com.



R. Bale

FAIRBANKS MORSE H-16-44

Fairbanks Morse introduced the 1600hp 8-cylinder H-16-44 road switcher in 1950. More than 350 of the locomotives were completed when production ended in 1963. Midway through the production period, the H-16-44 was updated with raised walkways and changes in the hood to simplify production. The general appearance was similar to F-M's larger Trainmaster, but with four axles rather than six. Internal upgrades centered on replacing the Westinghouse electrical system with a more robust control system supplied by General Electric. H-16-44 units ordered by Canadian Pacific and Canadian National were built by F-M subsidiary Canadian Locomotive Company. The final H-16-44 was built for the Ferrocarril de Chihuahua al Pacifico Railroad in 1963. This was the last locomotive produced by Fairbanks Morse.

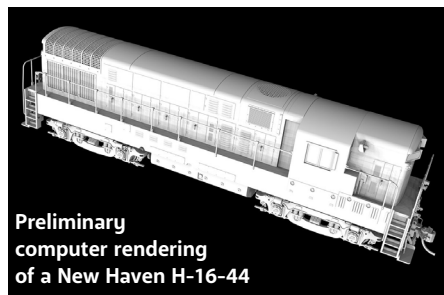


NHRHTA photo

Rapido Trains has announced plans to produce an accurate and fully detailed HO scale version of a Fairbanks Morse H-16-44 road switcher. The HO scale model is based on a Phase III prototype the Rapido team

located and measured in Alberta, Canada.

Features will include accurate hood doors, separate grab irons and handrails, full underbody piping and conduits, illuminated number boards, headlights and green and white class lights. Variables depending on the prototype road being modeled include different fuel tanks, steam generators, dynamic or non-dynamic bodies, and Dofasco or AAR trucks. The drive system will be the same as employed on Rapido's FA-2 locomotive.



Preliminary
computer rendering
of a New Haven H-16-44

Rapido reports that while it is not abandoning LokSound, it is currently working with TCS to develop a new Rapido-TCS decoder that is fully compatible with its ESU LokSound decoders. The Rapido-TCS decoder will not be a Wow Sound decoder,

thought it will have many of the popular Wow Sound features as options. Models equipped with Rapido-TCS decoders will incorporate a Keep Alive function.

Although specifics on the H-16-44 decoder are pending, Rapido will announce full details before the order deadline.



this year. Two-packs with new fleet numbers will be available for CN (We Deliver), CN (Intermodal), CP (gray), CP (red), JB Hunt, and Schneider.



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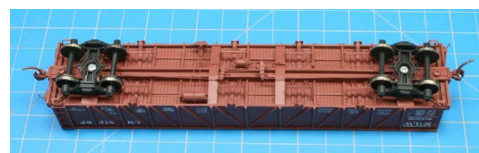


New carrier names in this production run include Armour Transportation, Clarke (Transforce), Western Canada Express, Maritime-Ontario, and undecorated. For additional information contact a dealer or visit rapidotrains.com.



Resin Car Works has a new kit for a Milwaukee Road 48'-6" composite gondola. The HO scale craftsman kit replicates the more than 1000 cars

built in 1937 in Milwaukee Road shops. The cars featured welded construction, stamped steel ends, and drop bottom doors. Following the period represented by this model, the cars were rebuilt with steel sides and solid steel floors.



The kit features a one-piece cast resin body, Tichy ladders and brake hardware, Precision Design decals, and Tahoe ACF 70-ton A-3 truck

side frames. Couplers and wheelsets are not included. For additional information, including ordering instructions, visit resincar-works.com.



ScaleTrains.Com is working on a new run of the HO scale version of the GE Dash diesel locomotive. Both Operator

Series and Rivet Counter versions of the ready-to-run model will be offered. Road names for the Rivet Counter Dash-9s will include Norfolk Southern's Thoroughbred scheme with D9-40CW stenciling.



A Southern Pacific Dash-9 will be available along with two of BNSF's unique Heritage I/Heritage II Frankenlocos that feature two different paint schemes on one locomotive.



Some of the BNSF locomotives from this production run will have exhaust housing covers.

Rivet Counter features include wire grab irons and lift rings, wind-shield wipers, snowplows, horns, uncoupling levers, trainline hoses with silver glad hands, sand hatch covers, directional LED headlights, LED lighted number boards, treadplate detail, separate plumbing and traction motor cables, see-through dynamic brake intakes with resistor grid detail, sliding cab windows, detailed cab interior with standard AAR control stand, and metal semi-scale E Type knuckle couplers.

Rivet Counter DCC and sound equipped models will have ESU LokSound 5 DCC & sound decoder, dual cube-type speakers, and an ESU PowerPack with two supercapacitors. DC locomotives are DCC and sound-ready with a 21-pin connector for an aftermarket decoder.



Road names for the economy priced Operator series Dash 9-44CW will be BC Rail, BNSF, and a GE Demo. Operator series features include LED lighted and printed number boards, operating LED ditch lights and headlights, see-through steps, nub walkway tread, finely-molded grilles, cab interior, and numerous factory applied details including snow-plow, windowed nose door, sunshades, air tanks, exhaust stack, horn, and brake wheels.



Operator series DC/DCC-ready models will be available as well as DCC units with factory installed sound. A detail kit

with grab irons, uncoupling levers, MU cables, and trainline hoses the modeler can install in predrilled holes will be available as a separate purchase.

Both Rivet Counter and Operator series locomotives utilize the same power chassis that features all-wheel drive and electrical pickup, a 5-pole skew wound motor, and dual flywheels. For additional information visit scaletrains.com.



Tangent Scale Models has released another group of HO scale General American 4180 cu.ft. Airslide covered hoppers. Variable

details that represent GA production changes from 1965 thru 1980 include different roofs, running boards, body side post profiles, high or low brake arrangements on the B end, different ladder and grab iron arrangements, and options in the application of crossover platforms and handrails. Additional details include see-through etched-metal running boards, wire uncoupling bars and grab irons, separate air hoses, and Kadее couplers. This production run has been upgraded with Tangent's new 100-ton Barber S-2 roller-bearing trucks that feature rotating ends caps, separate brake beam detail, and machined 36" wheelsets.

Decorating schemes include a Boston & Maine car decorated with the Prince Spaghetti Day slogan. The unique car features 1977-era details.

This Chicago Burlington & Quincy model represents a group of 50 4180 Airslides with 1966-era details including high-mounted brake



appliances and Apex metal running boards. Four road numbers are available.

Two numbers are available for this Chicago & North Western 4180 that represents a 1967-built car repainted in CNW shops in 1983.

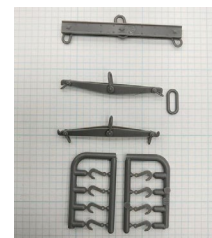
GA delivered the prototype of this car to Great Northern in March, 1968. The car features low brake details on the B-end, and an Apex running board.

This HO scale ROCK 4180 from Tangent is based on a group of 25 prototypes GA built in 1975. Correct phase details on the model include low mounted

hand brake, a later body with wide side posts, and an Apex running board.

Additional decorating schemes available on this run include a Louisville & Nashville car from 1971, and an ex-ROCK car patched for NAHX-Great Western Sugar. Undecorated options for the 4180 include three different phases in primer gray and undecorated kits. For additional information visit [tan-gentscalemodels.com](http://tangentscalemodels.com).

Tichy Train Group has released several new items including (left to right) chain rollers and sheaves, wrecking spreaders and hooks, and hopper door operators. Also new are a variety of signs, stove pipes, and double-sheathed wood reefer ends.



For a look at all the new items visit www.tichytraingroup.com/WhatsNew.aspx.

.....

This report on the **Walthers** Milwaukee Road Twin Cities Hiawatha name-train will demonstrate to readers why we discuss products a year or more in advance of their scheduled availability. Individual cars from this project are just beginning to arrive, but most are already sold out. All is not lost, however, since some hobby dealers who placed advance orders may have some models still available.

Walthers production run of the Twin Cities Hiawatha includes cars decorated in orange and maroon as well as in the later UP yellow and gray paint scheme. Details on all of the eight HO scale cars include tinted windows and factory installed grab irons. In addition to printed names and/or numbers, Walthers will include decals with a full set of names and numbers with each model.



The first car released was this 85' 52-seat coach which arrived in March.



A 63' Railway Post Office car (above) and an 85' 26-seat tap lounge car (below) are scheduled to arrive next month.



A June date is planned for the release of a 75' express car (left). Milwaukee Road's Pullman-built 85' skirted Super Dome (below) will arrive in July or August.



Milwaukee Road's distinctive 85' Skytop lounge-observation car.



The orange and maroon cars with black roofs are typical of 1952-1956 equipment in service until repaints began in 1955. Notable details include black trucks, folded steps, straight side sills, and original ends without lift rings. The yellow and gray cars match Union Pacific equipment after the Milwaukee Road assumed operation of Chicago-Omaha trains in late 1955. The scheme became the standard on Milwaukee passenger equipment into the 1970s. The yellow and gray cars have silver trucks with disc brakes, notched side sills (except the Super Dome, which was not modified), fixed car steps, end lift rings, and updated diaphragms. A minimum 24" radius is recommended. For modelers operating on tighter curves, optional extended drawbars will be included with each car.

August or early September will see the arrival of this 85' 48-seat diner (left). It will be followed about 30 days later by an 85' 30-seat parlor car (below).

The eight-car train set will be completed in October with the release of

The orange and maroon cars with black roofs are typical of 1952-1956



To lead the Twin Cities Hiawatha, Walthers will release EMD FP7A and F7B units appropriately decorated in both the orange and maroon (1950-1953) and the post-1955 yellow and gray livery. The diesel models will be available

for DC operation and with ESU LokSound 5 Sound and DCC.



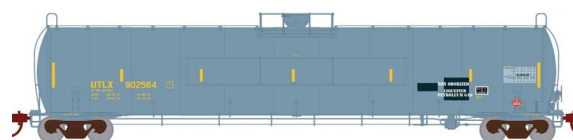
For additional information contact a dealer or visit walthers.com.

N SCALE PRODUCT NEWS



Athearn has scheduled a February 2021 release for an N scale 33,900 gallon LPG tank

car. Variations in body phases include early, flat panel, and late designs. Road names will be TILX, UTLX, SRIX, UPEX, and PROX.



Details include printed placards, wire safety rails and end hand-rails, photo-etched

metal walkways and end platforms, 100-ton roller bearing trucks, and extensive underframe detail.



R. Bale

AUTO-MAX VEHICLE CARRIER

Gunderson began production of the 140-foot long articulated Auto-Max car in 1999. This unique car carrier can handle 22 SUVs on three levels. Given its excessive length and 20-foot height, the Auto-Max pushes the operational and clearance limits of the railroad industry, particularly in the northeast region of the nation.



Athearn has included Auto-Max auto carriers in its February 2021 production schedule. A flexible diaphragm will provide full articulation for the N scale model. Separately applied details include ladders, brake rigging, and brake equipment. The articulated car rides on three 70-ton roller-bearing trucks with 33" machined metal wheelsets.



Three numbers each will be available for cars decorated for AOK, BNSF, CSXT, FXE, KCS, and CMO.



Athearn will include N scale 28-foot trailers with landing gear in its February 2021 production schedule.

Carrier names will be United Parcel Service, XPO Logistics, Motor Cargo, Transcon, YRC, Estes, and Old Dominion. In some cases the



trailers will come with different decorating schemes for the same owner.



The trailers have rubber wheels and movable landing gear.



Completing Athearn's February 2021 production schedule of N scale models is an ACF 2970 cu. ft. twin-bay covered hopper car. The model will have round or

trough hatches depending on the prototype being modeled. Additional features include a photo-etched metal roof walk, separately applied wire grab irons, detailed outlets, separately applied brake wheel and brake equipment, body-mounted McHenry knuckle couplers, and appropriate trucks with machined metal wheelsets.



Road names will be Union Pacific, Burlington Northern,

Northern Santa Fe, CSX, Missouri-Kansas-Texas, Rock Island, and two Great Northern schemes. The N scale models will be available in a three-pack with unique road numbers. For additional information contact a dealer or visit athearn.com.



Broadway Limited has released a group of Alco PA/PB locomotives. The

N scale models feature Paragon3 sound. The models are composed of an ABS cast plastic body with a heavy diecast chassis. Details include separately applied grab irons, rear diaphragms, and Micro-Trains compatible couplers. In addition to the Southern Pacific Daylight scheme seen here, A and A/B sets are available for Santa Fe and Denver & Rio Grande.



Additional road names for the N scale PAs include New Haven, New York Central, Pennsylvania Railroad, Union Pacific, and Cuyahoga Valley.



For additional information contact a dealer or visit broadway-limited.com.



KatoUSA is quoting an August delivery date for a group of N scale GE ES44DC GEVO locomotives. Units decorated for Canadian National and CSX boxcar scheme have been added to the original list of road names that included Canadian Pacific, Union Pacific, and BNSF.



Features on the N scale model include directional headlights, preprinted illuminated number boards, functioning ditch lights, and Kato magnetic knuckle couplers.



Both DC and DCC versions of the N scale locomotive will be available. The models are also available on special order, through a dealer, with ESU LokSound. For additional information contact a dealer or visit katousa.com.



Micro-Trains is selling N scale versions of a 78' single-window coach decorated for Great Northern and Canadian Pacific. The models represent standard heavyweight equipment built in the 1920s that continued to see service until replaced by lightweight cars in the 1950s and early 60s.



Enclosed tri-level auto racks, like this 89' Santa Fe car, began to appear in the late 1960s. The enclosed design effectively decreased vandalism and damage to new automobiles being transported from assembly plants to car dealers.



roller-bearing trucks.

Micro-Trains has released this 50' Airslide twin-bay covered hopper car decorated for Archer Daniels Midland. The N scale model rides on 100-ton



This 50' boxcar is fitted with two 8' sliding doors. One is a Youngstown corrugated door, the other is a six-panel Superior door.

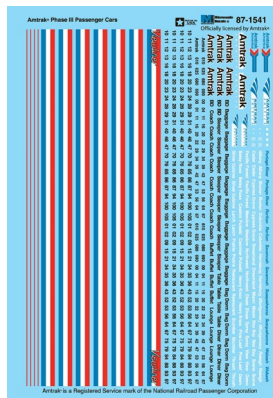
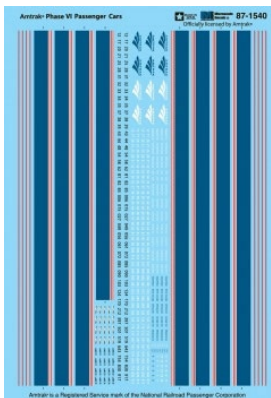
The N scale model is based on a prototype built in 1957 for New York Central for auto parts service. In a later rebuild the running board was removed, the ladders shortened, and the car repainted for Conrail.



Micro-Trains has released this 39' single-dome tank car decorated for Deep Rock. Founded in 1913 by H.M. Byllesby, a Chicago investment banker, Deep

Rock grew in the 1920s and 30s with the purchase of several rivals. Contact a dealer for additional information.

NEW DECALS, SIGNS AND FINISHING PRODUCTS



Microscale has released new HO and N scale water slide decals for Amtrak Phase III (introduced in 1976) and Phase VI (introduced in 2002) passenger cars. For additional information contact a dealer or visit microscale.com.

Switch Line Decals is selling HO scale water slide decals for Rocky Mountain Railway locomotives and passenger cars, and for Great Canadian Rail Tours passenger equipment. For details visit switchlinedecals.com.



Prime Mover has water-slide decals for Delaware, Lackawanna & Western maintenance of way equipment. The HO scale white lettering sheet covers all categories of DL&W MOW equipment including flangers, plows, side dump cars, bunk cars, troop sleepers, and tool cars. For additional information visit primemover-decals.com.

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BRIEFLY NOTED AT PRESS TIME ...

Among the new models coming soon from **Accurail** is an HO kit for a 50' Southern Railway steel boxcar with welded sides and a single sliding door...

Atlas's 3rd quarter schedule includes a new N scale GP60 and new paint schemes for a 40' wood reefer and steel flat car. Both N and HO scale versions of a 64' Trinity reefer, 5077 cu. ft. boxcar, and two versions of steel cabooses, plus HO SD24 and SD26 diesels are all coming later this year. O scale modelers can look forward to new paint schemes on a 40' Airslide hopper and a Ford F-100 pickup...

Morning Sun Books has released *Trackside around Pueblo 1955-1970* in which author Jim Boyd presents the steam-to-diesel transition period on Colorado's famous "Joint Line" between Denver and Pueblo and the Fort Worth & Denver in Texas. Operations include the Santa Fe, Denver & Rio Grande Western, Colorado & Southern, FW&D, Rock Island, Missouri Pacific, and the Colorado & Wyoming railroads...

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SELECTED EVENTS



Model Railroad Hobbyist | April 2020

APRIL 2020

(Many events charge a fee. Check individual info website for details.)

**Due to concerns about the spread of the coronavirus, many events have been, or will be, canceled. Readers should refer to organizers' websites to determine the status of specific events.*

***CANCELLED CANADA, ONTARIO, FENWICK**, April 19 and 26, Open House sponsored by Greater Niagara Model Railroad Engineers, at 1141 Maple Street. Info at www.gnmre.ca.

***POSTPONED NEW ZEALAND, CHRISTCHURCH**, April 10-13, National Model Railroad Convention. Info at www.model-railcon.co.nz.

***CANCELLED CALIFORNIA, CONCORD**, April 30-May 2, Clear to the Coast convention co-hosted by NMRA Pacific Coast Region and Western Railway Museum, at Crowne Plaza Concord/Walnut Creek, 45 John Glenn Drive. Info at pcrnmra.org/conv2020.

CALIFORNIA, GLENDALE, April 6, Glendale Model Railroad Society Open House, 619 Hahn Ave. Info at www.gmrrs.org.

***CANCELLED CALIFORNIA, OCEANSIDE**, April 11, Train Show & Swap Meet sponsored by North County Model Railroad Society at Heritage Park. Info at swapinfo@ncmrs.org.

SELECTED EVENTS | 2

***CANCELLED COLORADO, COLORADO SPRINGS**, April 17-18, TECO-Train Expo Colorado, at Chapel Hills Mall. Info at www.tecoshow.org/tecswap.htm.

***CANCELLED COLORADO, COLORADO SPRINGS**, April 17, Track to Success Train Show, held in conjunction with the TECO Train Expo. Request info from Al Hovey at alhovey@com-cast.net.

***CANCELLED FLORIDA, DELAND**, April 4, Model Train Show at Volusia County Fairgrounds.

***CANCELLED INDIANA, FRANKLIN, (Metro Indianapolis)**, April 4, Franklin Spring Train Show, sponsored by NMRA Central Indiana Division at Johnson County Fairgrounds, 250 Fairground Street. Info at www.cidnmra.org.

IOWA, DAVENPORT, April 18, Model Railroad Show at Mississippi Valley Fairgrounds, 2815 W. Locust Street. Request info from Roger Kujawa at AGWRailway@gmail.com.

***CANCELLED MICHIGAN, BLISSFIELD**, April 18-19, Model Railroad Open House, at Blissfield Model Railroad Club, 109 E. Adrian St (US223). Info at bmrr.org.

***CANCELLED MONTANA, HELENA**, April 26, 40th Annual Helena Railroad Fair, at Helena Civic Center, 340 Neill Avenue. Info at www.facebook.com/pages/category/Event/Helena-Railroad-Fair-225320020901434.

***CANCELLED NEW MEXICO, ALBUQUERQUE**, April 2-4, Sn3 Symposium. Info at sn32020abq.org.

***CANCELLED OREGON, ELSIE**, April 4, 16th Annual Pacific Model Loggers' Congress, hosted by Lon Wall and Jeff Johnston at Camp 18 Restaurant and Logging Museum, 42362 Highway 26. Info at www.pacificmodelloggerscongress.com.

SELECTED EVENTS | 3

***CANCELLED OREGON, EUGENE**, April 21-24, Make Tracks to Eugene 2020 Convention, hosted by NMRA Pacific Northwest Region, at Valley River Inn, 1000 Valley River Drive. Info at www.MakeTracksToEugene.com.

May by location

***CANCELLED CANADA, BRITISH COLUMBIA, BURNABY**, May 22-24, 2020, 5th Annual Railway Modellers Meet of BC, sponsored by Burnaby Railway Modellers at Simon Fraser University's Burnaby campus. Info at www.railwaymodellersmeetofbc.ca.

NEW ZEALAND, DUNEDIN, MOSGIEL, May 9-10, Model Train Show at Taieri Bowling Club, 12 Wickliffe Street. Request info from Trevor Buchanan at dunedinmodeltrain-show@gmail.com.

CALIFORNIA, SANTA CLARA, May 21-23, Combined O Scale West and S Scale Meet, at Hyatt Regency Hotel, 5101 Great America Parkway. Info at oscalewest.com.

***POSTPONED ILLINOIS, EAST PEORIA**, May 14-17, NMRA Midwest Region Convention, at Holiday Inn, 101 Holiday Street. Info at www.peoriarocket2020.org.

KANSAS, HERINGTON, May 2-3, Herington Railroad Days and NMRA Meet, sponsored by NMRA Central Division, at Herington Community Building, 800 South Broadway.

***CANCELLED OHIO, HILLIARD**, May 15-17, Central Ohio 12th Annual NTrak Weekend, at Franklin County Fairgrounds, 4100 Columbia Street. Info at www.centralohiontrak.org.

PENNSYLVANIA, PITTSBURGH, May 28-31, NMRA Mid Central Region Steel City Express Convention, at Doubletree by Hilton Greentree, 500 Mansfield Avenue. Info at www.keystonedivision.org.

SELECTED EVENTS | 4

***CANCELLED SOUTH DAKOTA, SIOUX FALLS**, May 14-17, NMRA Thousand Lakes Region 2020 Convention, at Best Western-Ramkota Hotel Conference Center, 3200 West Maple Street. Info at dakotasoutheastern.org.

TENNESSEE, NASHVILLE, May 31-June 6, National Garden Railway Convention, at Gaylord Opryland Resort. Info at ngrc2020.com.

***CANCELLED VIRGINIA, FISHERSVILLE**, May 17, 34th Annual Shenandoah Valley Model Train & Railroading Show, sponsored by Augusta County Model Railroad Club at Augusta Expo, 277 Expo Road. Info at www.acmrrc.org.

Future 2020, by location

AUSTRALIA, SYDNEY, ROSEHILL NSW, June 5-9, 34th National Model Rail Convention.

ARKANSAS, JACKSONVILLE, August 22-23, 10th Annual Jacksonville Train Show, sponsored by Tuscarora Lumber Company at Jacksonville Community Center, 5 Municipal Drive. Request info from Daryl Conner at 501-982-6835.

FLORIDA, TALLAHASSEE, June 27, 26th Annual Model Railroad Show & Sale at Forth Florida Fairgrounds, Info at www.facebook.com/events/564525630749478.

KANSAS, HUTCHINSON, June 6-7, Center of the Nation Model Railroad Expo, at Kansas State Fairgrounds, Pride of Kansas Building, 2000 N Poplar. Info from kansascentralmodelrailroaders.org.

MASSACHUSETTS, GARDNER, October 3, O Scale Model Train Show, sponsored by Southern New England Model Railroad Club, at United Methodist Church, 161 Chestnut Street. Info at www.snemrr.org.

SELECTED EVENTS | 5

MICHIGAN, EAST LANSING, November 22, Train Show & Sale hosted by Lansing Model Railroad Club at Michigan State University Pavilion, 4301 Farm Lane. Info at lmrc.org.

MISSOURI, ST. CHARLES (METRO ST. LOUIS), September 2-5, 40th National Narrow Gauge Convention, St. Charles Convention Center/Embassy Suites Hotel. Info at www.40nngc.com.

MISSOURI, ST. LOUIS, July 17-19, National T-TRAK Layout Exhibit and N Scale Banquet at 2020 National Train Show. Info at nationalt-traklayout.com.

MISSOURI, ST. LOUIS, July 12-18, 2020, NMRA National Convention and National Train Show. HQ at Hilton St. Louis at the Ballpark. Info at gateway2020.org.

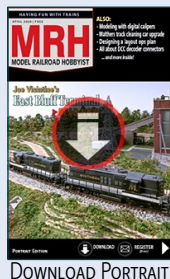
Beyond 2020, by date

CALIFORNIA, SANTA CLARA, 2021, NMRA National Convention and National Train Show.

ENGLAND, BIRMINGHAM, 2022, NMRA National Convention and National Train Show. www.nmra2022uk.org. ■



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Bachmann	Pre-Size Model Specialities
Berrett Hill Trains	Precision Design Co.
Bethel Terminal Models	Rapido (1)
Black Cat Publishing	Rapido (2)
Blair Line	Ring Engineering (1)
Canyon Creek Scenics	Ring Engineering (2)
Coffman Graphics	Roomettes
Crew Call with Mike Rose	ScaleTrains.com
Crow River Products	Southern Digital
Digitrax (2 page spread)	Streamlined Backshop Services
East Coast Circuits	The TrainMaster, Inc.
El Dorado	The National Train Show (St. Louis)
ESU LokSound	TrainMasters TV (1)
Fast Tracks	TrainMasters TV (2)
Great Decals	Tam Valley Depot
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Iowa Scaled Engineering	Walthers
Litchfield Station	Westerfield Models
Logic Rail Technologies	
Micro-Trains Line	
Model Railroad Control Systems	
Model Rectifier Corporation	
Mountain Subdivision Hobbies	
Model Train Man	
Monashee Laser Engineering	
Monroe Models	
MRH Store (1)	
MRH Store (2)	
MRH Store (3)	
MRH Store (4)	

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[Other - Contents](#)

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[Other - MRH Marketplace](#)

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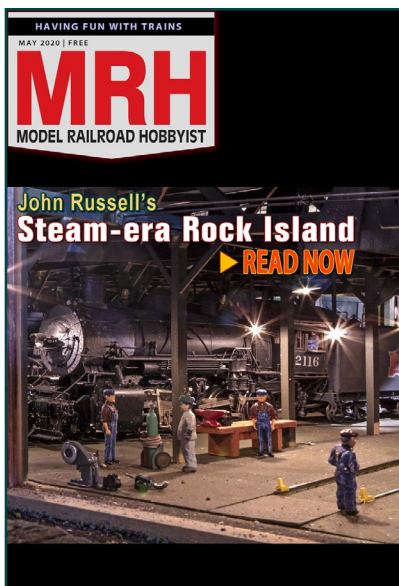
COMING NEXT MONTH IN MRH ...



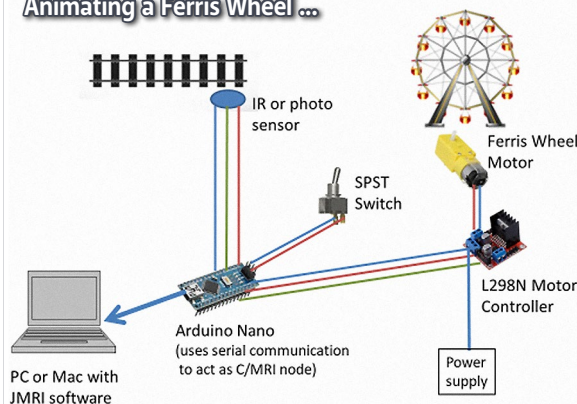
John Russell's late '40s Rock Island ... in O scale!



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