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Model Railroad Hobbyist | March 2018 | #97
(Updated 02/25/18)

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ISSN 2152-7423

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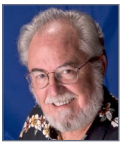
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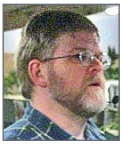
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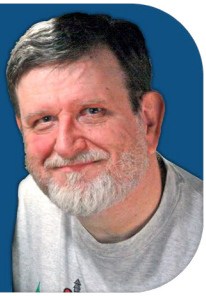

Model Railroad Hobbyist | March 2018 | #97

Joe Fugate talks about the "realism continuum"

RATE THIS ARTICLE

How do you define realism as a model railroader?

In the simplest terms, I define realism as how good the illusion is – if you crop out all the 1:1 edges (room ceiling, fascia, etc.), does the scene look like the prototype scaled down?

How well have you fooled the senses into thinking you used a shrinking machine to get what's before you?

I don't see realism illusion as a single target, but rather as a varying continuum that depends greatly on vantage point.

How critical of an eye you need varies depending on your vantage point.

If the trains are moving, it's a lot harder to discern detail. In hobby publications' still photos, the trains are always stopped, but that's not how you experience a real layout where the trains run.

When the trains are running, the most easily discernible "extra detail" is weathering. It's pretty hard to count ribs, louvers or rivets on a moving train.

Typical viewing distance matters as well. If you're an operator like me, then the "three foot rule" applies. How realistic do things look from the aisle three feet away?

The next most common view is what I would call the one foot rooftop view, as if you're a person standing on a structure roof looking at things. Most magazine layout shots feature this view.

The three foot rule

Most of the time we view our trains from the aisle rather than down at track level. This aisle side view is about three feet distant, giving rise to the so-called "three foot rule."

Closer still is the trackside railfan view. Magazines like to feature this view too, if the modeling will hold up to it.

Finally, there's what I call the "contest view" where you can pick up the model and study it from all sides.

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Publisher's Musings | 3

Magazines limit this view to just the truly special models.

The realism continuum, from least stringent to most stringent is:

1. Three feet away, trains moving.
2. Three feet away, trains not moving.
3. One foot rooftop view, trains moving.
4. One foot rooftop view, trains not moving.
5. Trackside railfan view, trains moving.
6. Trackside railfan view, trains not moving.
7. Contest view, model in your hand and viewable from any angle.

When I started out in the hobby, I was going to do the contest view for everything! However, I quickly found out I wouldn't live long enough, even on my small switching layout, to model everything to the contest level.

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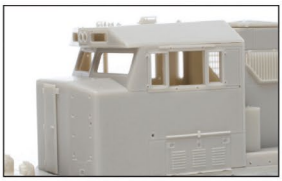
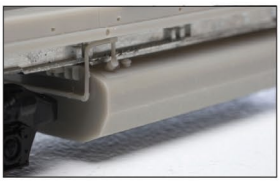


NS-designed Crescent Cab

Rebuilt inertial/clean room



NS specific crash-worthy fuel tank per prototype

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Publisher's Musings | 4

After building a large home layout and realizing I had a monster by the tail, I finally settled on level 3: One foot rooftop view, trains moving.

This is just a bit more stringent than the 3 foot view, trains not moving (level 2).

The magazines, I think, have done something of a disservice with our focus on super-detailed realism down to the last nut and bolt.

The reality is, if you're building a larger layout and you're into operations, you need to pick something achievable.

By picking level 3 on the realism continuum, I'm good with Kadee #5 couplers that don't use a scale head. Sure, they're a bit oversize, but at three feet away, you just don't notice that. In fact, at the one-foot rooftop view, when the train is moving, you still can't tell the couplers are slightly oversized.

This goes further – I use picks to uncouple. I don't use magnets. Even so, I leave the

coupler trip pins in place. My reasoning is at three feet away (or at the one-foot rooftop view), those trip pins look like connected brake hoses.

They look a whole lot better than brake hose castings hanging lose. In fact, I remove any scale brake hoses castings from the model because "double brake hoses" just look silly when you get within a few feet.

I can hear the gasp now – the editor of a big time model railroading magazine is advocating crudely-detailed modeling! That's very true if you're talking level 7 modeling: contest level super-detailing that holds up no matter what your viewing position.

But those of you who have been in the hobby for a while may remember Allen McClelland of V&O fame and his "good enough" philosophy. As the builder of a large layout, Allen learned (as many of us have) that you can't get too crazy with realism across the entire continuum and finish a larger layout in one lifetime.

So I'm just codifying the "good enough" philosophy a bit more by putting some practical parameters on it, that's all.

TOMA with a twist contest results

Our TOMA with a twist contest concluded January 31st, and the staff judges have selected the winners!

Grand Prize: Benoît Evellin - *Industries along the rail*

First Place: Peter Vassallo - *Chesapeake & Ohio*

Second Place: Fernando Bellini - *Albany & Eastern*

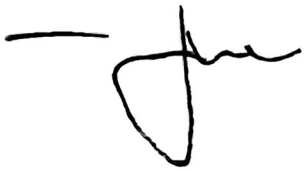
Third Place: Michael Wolf - *Drummond Island*

Honorable mention: David Erickson - *African Mushroom*

Honorable mention: Daniel Risdon - *Modesto Interchange*

The prizes will be awarded as the submissions are published, beginning with the Grand Prize winner next month. The honorable mention submissions will not be published, but they will be awarded their prize payment next month and their submissions will be available to subscribers in the bonus downloads next month as well.

Next year's contest will be something completely new and not specifically TOMA-based, so stay tuned! ☑



VIEW READER COMMENTS
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Last issue's ratings

The five top-rated articles in the February 2018 issue of *Model Railroad Hobbyist* are:

4.9 Getting Real: Modeling El Portal
4.8 Easy inexpensive window glass
4.8 DCC Impulses: Adjusting your decoder's personality
4.8 What's Neat: Weathering roofs, On30 layout, ...
4.7 Accurail 36-foot boxcar assembly

Issue overall: **4.5**

Please rate the articles! Click the reader comments button on each article and select the star rating you think each article deserves. Thanks! ■

MODEL RAILROAD HOBBYIST MAGAZINE (MRH Media, LLC)

STATEMENT OF OWNERSHIP, MANAGEMENT, AND AUDIENCE[1]

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Total monthly unique device views: 119,306 (based on unique IPs)
Total monthly unique users: 90,815 (determined per IAB guidelines)

Total monthly website visits: 249,278

Percentage of OS/devices used to visit:
Windows: 52.5%
iOS: 22.0%
Android: 13.9%
Macintosh: 8.4%
Linux: 2.6%
All others: 0.6%

Percentage of browsers used to visit:
Chrome: 36.2%
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Total mailing list subscribers: 33,276

We certify that the statements made above are correct and complete.
Joe D. Fugate Sr., CEO and Publisher; Patricia C. Fugate, Co-owner
Model Railroad Hobbyist Magazine (MRH Media, LLC)

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1 Per the Alliance for Audited Media and the Interactive Advertising Bureau (IAB), a totally digital publication such as Model Railroad Hobbyist must measure "circulation" by tracking *Audience* per publishing cycle (monthly in the case of MRH) since there is no direct physical publication to count. The Audience statistics reported here follow the strict guidelines set forth in this document published by the IAB and endorsed by the AAMi: http://www.iab.com/guidelines/iab-measurement-guidelines/#audiencereach

2 Computed by Google Analytics and AWStats and can be independently verified as third-party provided values.

MRH ... Questions, Answers, Tips

Model Railroad Hobbyist | March 2018 | #97

compiled by Joe Brugger

RATE THIS ARTICLE

Radius measurement

Q. Is there a mathematical formula to determine a radius, or a chart that describes how to determine a radius for a layout by sizes? My goal is to develop an On30 dog-bone type layout on the smallest surface space possible

—Goober

A. HVT Dave: From my experience radius is generally measured to the center line of ties. I add 2" (depending on the scale) to that radius measurement for overhang, etc. so that a 24" x 36" oval of sectional track will require 28" x 40" benchwork.

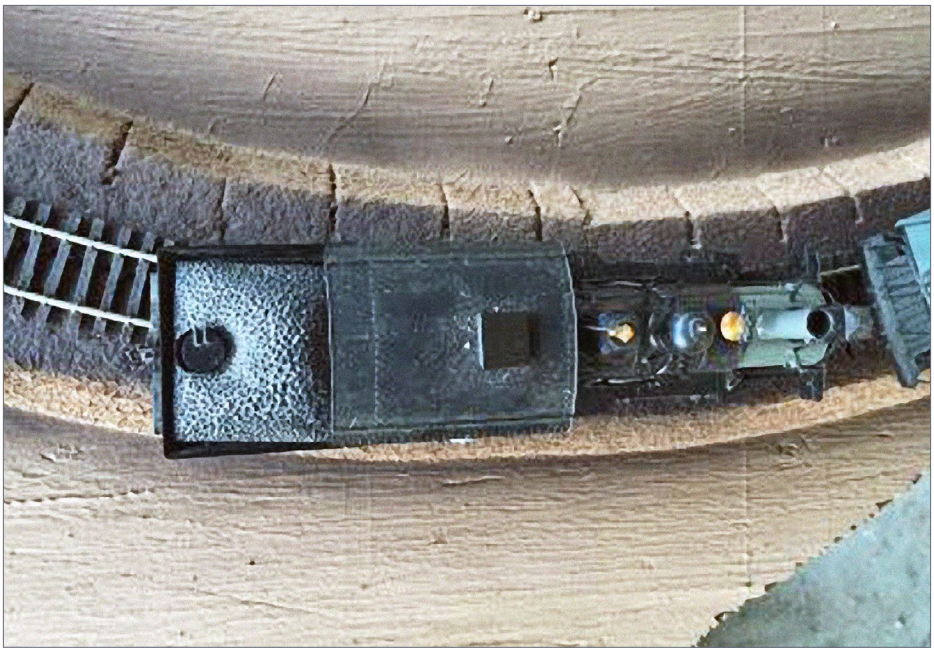
Prof. Klyzlr: If you're specifically looking at On30, I'd recommend Googling "On30 Minimum Radii.PDF"

Selector: The radius is a straight line between a circle's center and the rim. When you want to know how wide you can go in a circle/curve, it depends on your intent. Will you have a loop, or will it be an out-and-back? If you want something interesting and involved, but still with a loop so you can enjoy watching your trains run

around, you will need curves that allow you to close that loop and still have the geometry that allows for connections (turnouts) to the non-curved parts of your track plan.

When you know what your locomotives and cars can handle for minimum curvature, you should add 10% to that if you can. The extra reduces the probability of increased wear and derailments.

The late John Armstrong, who was a pioneer in designing track systems for model trains, wrote *Track Planning for Realistic Operation.* You can obtain it from model railroad hobby shops or from kalmbachhobbystore.com/product/book/12148. He describes planning by dividing your layout space into "squares" to limit your curve radii and keep your track system workable and interesting.



1. An On30 Forney on a tight radius leaves the rear coupler hanging on the outside of the rails. *Neil Erickson photo*

Neil Erickson: Yes, measure radius to the center of the track. In addition, an On30 track spacing might be three inches so consider that a minimum safe distance to a table edge.

The stated minimum radius of engines and cars for On30 varies by car or engine type and what is acceptable to you visually. A 0-4-0 Porter may be able to negotiate 12-inch curves but 18 inches is going to look and operate better. A 2-6-0 may need 18-inch minimum but will work more consistently with 22 inches or greater. Forneys need a lot more than 22 inches as the overhang starts to look excessive and staying coupled becomes difficult. Get some track and try it out. My 26-inch curves seemed generous at the time but long passenger cars look like toys on this radius.

There's much more discussion and advice at mrhmag.com/node/32367.

Read Joe Fugate's "Curve Radius Insights" from the very first edition of Model Railroad Hobbyist, at mrhmag.com/mrh2009-01/curve_insights.

Mud and earth between the rails

Q. I intend to start with ballasting my layout. But I'm not sure how to make spots where ballast has changed to dirt and mud and covered ties.

—Jure Sporn

2. Ties are almost invisible on former Soo Line tracks in Chicago. *J.D. Larson video*

RATE THIS ARTICLE

A. James S.: This is what I call Industrial Hardpack Earth. Choose powder colors depending on the region and industrial earth that varies from location to location. A good place to start is the small sizes of crushed rock from Arizona Rock and Mineral: rrscenery.com/Cart/index.php. Lay out the material dry and spread it out exactly how you want it to look. Spray with soapy water, and while still wet, spray or drip on a diluted white glue mixture. Don't touch it while wet or you'll have a mess.

Steven: What about using sanded grout? I'm modeling the Rio Grande Southern. "Ballast" there was nearly all dirt & mud, with the occasional small rocks for variety! I'm experimenting with various mixtures of paving sand and sanded grout. So far the results are encouraging.

M.C. Fujiwara: I'm assuming you're modeling in HO. Sanded grout looks good. So does real dirt, baked and fine-sifted. If it's still

3. Sunken, muddy track is often found in well-established industrial areas, with ties almost completely buried.

too grainy after the glue dries, you can sand it to produce finer (but usually lighter) textures. For muddy, mix dirt with some matte Mod Podge or pour a little Magic Water or thinned Mod Podge over already-installed dirt. I strongly suggest trying out various materials and techniques on a practice diorama before sacrificing your layout.

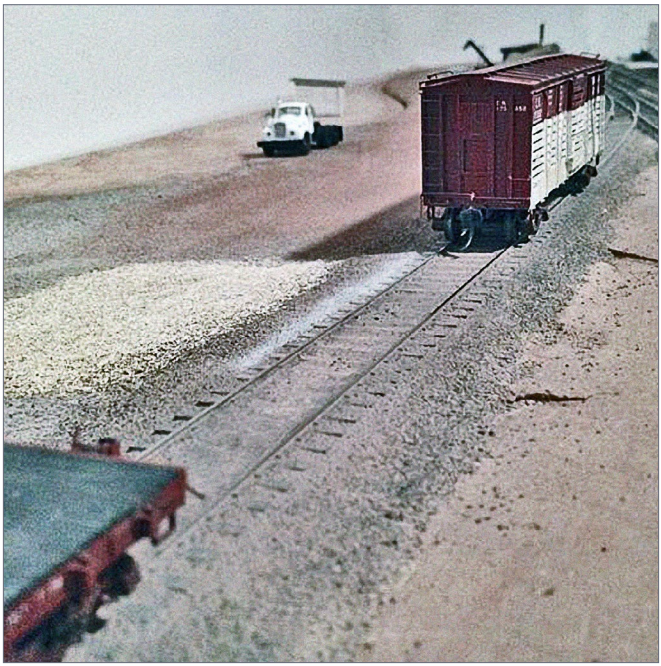
Joe Atkinson: I used real dirt from the prototype engine facility I modeled. I found that sifting through window screen material and then through a Tide laundry bag resulted in a powdery material that was ideal for hard-packed surfaces like you see around engine terminal tracks.

The tracks leading into my engine house were covered with dirt up to the railheads. As the diluted white glue used to bond the dirt was setting up, I repeatedly scraped out the flangeways with an NMRA gauge and then ran a spare truck through both tracks to ensure that the flangeways stayed open.

Deemiorgos: I've been working to create the look of an area of track that gets flooded occasionally and leaves mud behind. Here's my step-by-step: mrhmag.com/node/30693 and a summary:

Make a wash with half water and half acrylic paint, mixing a color consistent with the look of the area. Cover the entire siding with the wash and let it dry before applying a very light wash of grimy black over it.

To create the look of mud – especially where it is the same height of the ties – I put a layer of tissue paper (toilet seat covers work well) between the rails. I put a thin coat of white glue between the rails and place the tissue paper on top of it. I cut it as one long 16mm wide (HO scale) strip and laid it between the rails, but not for the entire length of the siding. Pull or tear the ends off to leave an indistinct edge showing. This siding is Micro Engineering code 55 track, so I had to be careful not apply the glue too thick, so



4. Deemiorgos' final product, with dirty ballast between the rails shows the effects of flooding.

the tissue paper would not get high enough for the wheel flanges to touch it. This happened in only a few spots after it dried, and I resolved this by running my NMRA gauge's flangeways points along the inside of the rails.

My siding is slightly elevated, so I did not put tissue paper on the ties outside of the rail. Where it seems to have mud build-up [4] is just weathering powder between the rails that has a wash applied to it. With a very soft makeup brush, I applied the clay wash over the tissue. After that dried, I applied a very thin wash of grimy black, and then sprinkled a just a pinch of brown weathering powder in some spots, thend lightly misted the entire siding with water to blend the colors.

To get the look of some ties holding more mud than ballast, I painted ties individually with the wash. When it was almost dry,

I lightly dragged a soft brush primarily over the areas with tissue paper to depict mud accumulated between the ties to the height of the ties.

I saved a little of my colored mix in a bottle in order to create a new batch. Next time I'll write down the recipe. This way I'll be able to do other areas if needed, or make touch-ups in the future.

Read it all at mrhmag.com/node/8961.

See more dirt-track switching action at youtube.com/watch?v=H2JJQpScMKg.

DC or DCC

Q. I have DC now and I'm thinking about switching to DCC. Is it as simple as buying new DCC-equipped engines and transformer, or is there more to it?

—biketolive 2003

A. Neil Erickson: The only issues may be what kind of switches you have.

DCC, and sound-equipped engines in particular, need all-wheel pick-up, clean track, and switches preferably with live frogs. If you have power-routed frogs then everything may be fine.

Engines equipped with "keep-alive" capacitors will help with both of the above. You may want someone to do the DCC install for you if you don't feel comfortable with that.

I believe the easiest introduction to DCC is an NCE PowerCab. It comes with everything you would need to hook up and get started running engines. DCC-equipped engines can be purchased "off the shelf" or online. In my opinion, sound is worth the extra $$ and brings running trains up to a whole new level.

Manufacturers MRC, Digitrax, Lenz, RailPro, CVP, ESU, and others maintain websites that will keep you doing research until

you dive in. Other options, such as Bachmann E-Z App BlueRail, shop.bachmanntrains.com/index.php?main_page=product_info&products_id=5844 would be a very economical way to run multiple engines with your existing transformer and a smartphone. No other equipment would be required. It is not DCC, the sound comes from the smartphone, and it is not compatible with other systems but another choice for the cost of an engine. There may be a club or modelers nearby that use one of these DCC systems, and can explain how and why it was chosen. Ring Engineering Railpro at ringengineering.com is another option.

Kriegwulfe: DCC is a fairly easy upgrade to good track. The evils are things like reversing loops and such. I started with an NCE PowerCab and I was up and running in 10 minutes. I did have a DCC-equipped locomotive to let that happen.

Usually locomotives come in three types..Non-DCC-ready, DCC-ready and DCC-equipped. HO has a pretty easy installation process, as most manufacturers agreed to an 8- or 9-pin universal connector. N scale is a bit more involved. Non-DCC-ready locomotives are usually a bit older, rare builds, or scratchbuilts. They can be made DCC but it can cost time and money.

There are a ton of threads that have shed blood and destroyed friendships over the "best" DCC system. I would avoid that particular animal and search the forums for advice and or hit up a local club or model RR close by.

Montanan: I am a lone operator and my layout was built mainly for switching. On the rare occasions that I run more than one locomotive at a time, is is run in MU as a helper on the grades. I belong to a number of model railroad forums and I have lost count of how many posts are about DCC problems.

I have a few DCC locomotives that I run at my model railroad club, and have seen members having problems with their locomotives.

If I were to convert to DCC, I would have no local support in case I have a problem, as there are no hobby shops at all near me.

I plan on keeping it simple and will stick with DC.

Joe Fugate: I was a dead-frog fan until I found locomotives that would stall in a yard ladder with each end sitting on a dead frog. I finally decided "belt and suspenders" (I call it the "Chester principle" after the Gunsmoke character who wore both) was my philosophy when it comes to track conductivity. With live frogs you guarantee the track under both ends of every locomotive is always powered.

More resources

Here is a fairly good site to dig around in, but it can lead to information overload: dccwiki.com/Main_Page.

Read the discussion at mrhmag.com/node/31973.

Digitrax starter sets: digitrax.com/products/starter-sets.

NCE system hook-up videos: ncedcc.zendesk.com/hc/en-us/articles/201306515-Setup-a-Power-Cab.

CVP builds a nice system: cvpusa.com/easydcc_starter_sys.php.

Starter sets for beginners and small layouts: modeltrainstuff.com/DCC-Starter-Systems-s/3252.htm.

VIEW READER COMMENTS
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Tips

A tip for cleaning track

Track cleaning often requires using a finger and a piece of cotton cloth dipped in your favorite cleaning solution, especially on switch points, frogs, and grade crossings. If you have a lot of track or a large layout, this can quickly become the source of some discomfort.

Strong rubber or latex finger protectors from the office supply store can save you from stabbing your fingertip and keep from grinding off too much of the finger when scrubbing the rails clean.

Dave came up with this idea right after joining our club. He volunteered to clean track, as he didn't start with a lot of hobby experience and wanted to contribute.

—Rob Dove and Dave Gorman

5. Office-supply finger protectors make track cleaning painless.

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March 2018

DCC IMPULSES column

Model Railroad Hobbyist | March 2018 | #97

Bruce Petrarca MMR answers a dozen DCC questions ...

RATE THIS ARTICLE

My friend Geoff Bunza forwarded me a bunch of DCC questions that folks have asked him over time, thinking that I could use them to spread some light on DCC. Well, I thank him for that. Here I'll try to respond to what I perceive some of these questions to be asking.

I think they are frequently a result of misunderstandings of technology and terminology. There are some that I don't believe have answers as posed. I'll try to answer what I believe the questioner was asking. Let's see how clairvoyant I really am.

First a bit of background on decoders.

There are two basic variants of DCC decoders: mobile and stationary.

The majority of DCC discussions revolve around mobile decoders [1], as they are the most prevalent, being used in locomotives and in some cars.

MODELING REAL RAILROADS AND WHAT THEY DO

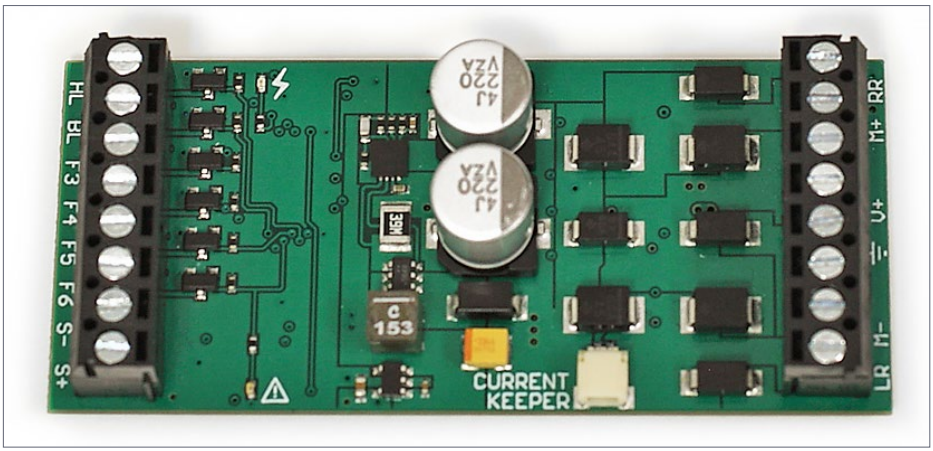
Mobile decoders have their own address space in the world of DCC. In fact, they have three different address spaces, which I'll discuss later.

In most cases, mobile decoders operate a motor to drive the locomotive. They also usually have several "functions" which are designed to activate lights, smoke generators, uncouplers, etc.

Sound decoders are a variant of mobile decoders that are designed to provide sounds in concert with the motion and lights provided by a basic mobile decoder. Yes, there are some sound-only decoders (no motor and few or no functions). But they are going the way of the dinosaurs.

Accessory decoders [2] are usually found as part of the electronics in the layout. Since they don't move, they are frequently called stationary. I gave them their own column, mrhmag.com/magazine/mrh-2015-06-jun/di_dcc-stationary-decoders.

Stationary decoders live in their own address space within the DCC world. Stationary decoder addresses may seem



1. The SoundTraxx Econami ECO-400 mobile decoder is designed for larger locomotives, such as O gauge or garden. It is rated to drive a 4-amp motor. *SoundTraxx photo*

The Future of Model Railroading

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- Completely wireless model railroad operation
- Ergonomic, Android based remote control unit with TFT Display
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- Runs all DCC decoder equipped locomotives
- Automatic train detection using RailCom-Plus®
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ESU Mobile Control II

+ Android operating system
+ 3.2" TFT Display, 800x400 resolution
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+ 4 user-personalized buttons
+ Micro USB port for Software Updates and battery charging
+ 5-8 hours of battery life.
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ESU Integrated Control Unit

+ CabControl creates a wireless network for over 32 wireless controllers
+ Connects through your LAN to provide internet connection
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+ DC 5.5 mm / 2.1 mm socket for external regulated DC power supply

Locomotives

Data for over 16000 locos can be held in the system
Loco Icons show the engine you are running
28 colorized graphical Icons for easy function identification

Accessories

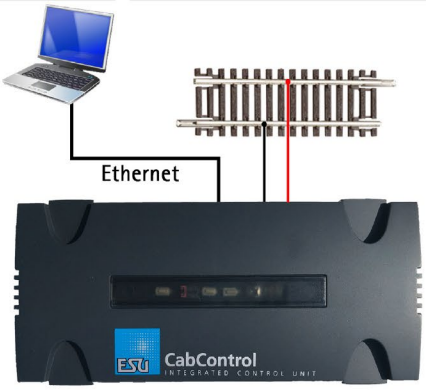
More than 1000 accessories can be controlled and can have status visually displayed

Consisting

Easily created virtual consists so no CV changes are needed
Ability for all functions to be controlled while in consists

Conveniently Updatable

Updated easily for free as new features become available



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numerically identical to mobile decoder addresses, but they are indeed different.

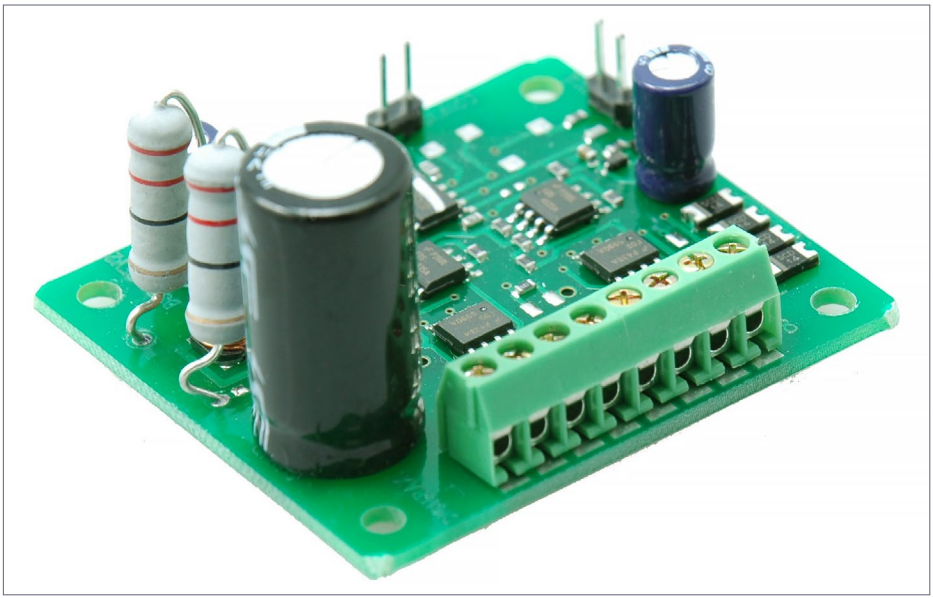
Thus, you can have a locomotive on address 152 and a turnout addressed 152 on the same layout. More on this later, too.

With that introduction, let's get on with the questions Geoff sent me.

1. What are multi-function decoders vs. accessory decoders?

Hopefully a reader can answer this question by themselves at this point.

The questioner seems to be asking about the difference between mobile and stationary decoders.



2. Digitrax DS52 stationary decoder designed to throw snap and stall turnout motors, but not servo motors. There are other stationary decoders designed to actuate servos. *Bruce Petrarca photo*

Mobile decoders usually have multi (two to eight) functions. Stationary decoders, while they may activate one or several items, such as turnout motors, do not have what are called functions in DCC parlance.

2. What are the essential differences between using functions, setting speed vs setting switches open/closed?

Some cabs will control accessory (stationary) decoders, some won't.

Think of the prototype functions. The mobile decoders cover the things that the engineer can control: speed, direction, lights, horn (whistle) and bell. Stationary decoders control things that are prototypically handled by a brakeman or conductor, like turnout direction; or a dispatcher or CTC system, like signals.

A simple cab, like the Digitrax UT4 [3] covers the engineer's needs but won't access stationary decoder addresses, so it won't throw turnouts.

The Digitrax DT500 [4] is a full featured throttle that will, in addition to running two trains on two knobs at the same time, throw turnouts via accessory decoders.

3. The Digitrax UT4D is an example of a simple (engineer's) cab. *Digitrax photo*

Pressing SWCH tells the DT500 that the next things that you are going to tell it relates to a stationary decoder. Note that any time during this process, you can adjust the speed or direction of a locomotive with either knob without losing your place in the turnout process.

Next, press the number keys of the turnout you wish to control, say 152. At this point, the button with the lower-case t next to it (also labeled OPTN) will throw the turnout. Conversely the c (also labeled CLOC) button will close the turnout.

The DT500 will remain in the SWCH mode until commanded out by pressing either the EXIT or the FUNC key. Thus, you can spot a car at an industry with a minimum of button presses. Once you identify the desired turnout, pressing t will throw it. After you back the car in and run the loco out, pressing c will close the turnout.

While the DT500 is in the SWCH mode, the operator cannot control functions on the mobile decoder that is being addressed by the DT500. Pressing the FUNC key will return the DT500 to function mode. Functions can then be controlled normally.

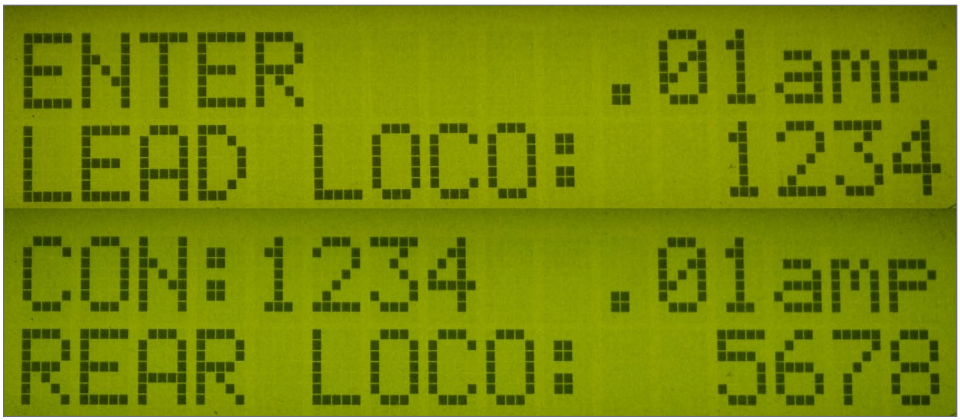
4. The Digitrax DT500 cab allows control of two trains (one on each knob) simultaneously. It will also control turnouts that are connected to stationary decoders with the t and c buttons in the bottom row. *Digitrax photo*

3. Why are CVs used only for mobile decoders?

This is not totally correct.

All mobile decoders use CVs to set the personality of the decoder, by NMRA standard.

Stationary decoders are not as strongly mandated in the NMRA standards, so the designer has some latitude in how the decoder is designed to be set up. Most use some sort of CV to set the address(es) for the turnout(s) and other features of the decoder. These CVs are frequently adjusted by Programming-On-the-Main (POM). Rarely do they use a programming track.



5. Setting up a consist with an NCE ProCab. The NCE system will choose the consist address that it will put into CV19. In the top screen, locomotive 1234 has been selected. In the bottom screen, locomotive 5678 has been selected to be added to the consist started with 1234. To make the consist work, locomotive 5678 will probably have to run in reverse. Thus, the value written into 5678's CV19 will be 128 larger than the value stored in 1234's CV19. *Bruce Petrarca photos*

4. Why are there short and long addresses?

The simple answer is that Bernd Lenz didn't expect DCC to expand to the level that it has when he filed the original patents. The NMRA codified the basic patents into standards when the patent rights were transferred to them. As DCC expanded, the NMRA standards expanded, too.

Originally decoders only had a handful of "registers" to store information. The address was limited to a range of 1 to 127. Later, the "register" that held this address was codified as CV1. Even today, this is the only address mandated by the NMRA standard.

As it became evident that more addresses were needed, the long address, using CV17 and CV18, was introduced. Allowed addresses for this mode are from 0 to 10239. That said, I know of no DCC system that will address this entire range. Many won't address 0. There is frequently an upper limit of 9984 (Digitrax) or 9999 (NCE). This address is optional per the NMRA standard, but virtually all modern decoders include it.

There is a third address, called the consist address which is stored in CV19. This address can be in the range of 1 - 127. Adding 128 to the address, making it in the range of 129 to 255, will cause the locomotive to run in the opposite direction of normal. This address is optional per the NMRA standard, but virtually all modern decoders include it.

This feature is used, for example, to create ABA consists where the first A and the B unit run normally, but the trailing A unit runs reversed. If this were consist number 1, CV19 would be 1 for the first two units and 129 for the third. Frequently this CV manipulation is done by the command station in a "set consists" type of operation and is transparent to the user [5].

The snafu with CV19 comes when a user sets up a consist and forgets that he has done so. Here is locomotive number 1234 and

it won't run on 1234 (long) or 34 (short) address. Reading CV19, the user finds a non-zero value for the consist address. That is the address that the locomotive will respond to. Setting CV19 to zero will return the locomotive to its planned address.

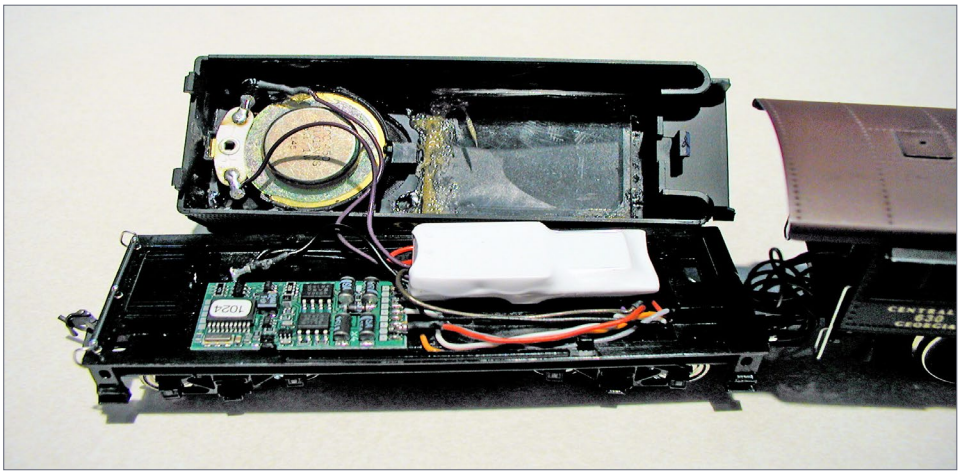
For more information on addresses, see my column: mrhmag.com/magazine/mrh-2014-02-feb/di_unraveling-dcc-addresses.

5. What happens when two decoders have same address on a DCC track?

Since the question mentioned track, I'll talk about mobile decoders first.

They run together.

In fact, that is one way to consist locomotives that is totally DCC system independent. On our club layout, we have through trains that have addresses in the 100 to 107 range. We create these



6. Two decoders in a steam locomotive tender, circa 2003. A Lenz for motor and lights and a SoundTraxx DSX (white) for sound. They run on the same address. *Bruce Petrarca photo*

consists by putting two locomotives (or more) on an address (either consist or short) in that range. When we purge the cabs (Digitrax system) between operating sessions, we don't lose the consists.

This, too, was the traditional way to deal with two decoders in the same locomotive [6], for example a motor and lights decoder and a sound-only decoder.

Expanding this to stationary decoders, the same thing is true – they will operate together. If you can set two decoders to the same address, they can be used to coordinate a crossover, throwing or closing simultaneously.

6. What are the max addresses for different decoder types?

As I mentioned, locomotive decoders can have addresses as high as 10239, but addresses above 9999 are rarely accessible.

Stationary decoder addresses are limited by the manufacturers. Frequent maximum values are 512, 1024 or 2048. The user needs to check to see if his system and decoders have compatible maximum values or limit his usage to the lesser of the two maximums.

For example if the decoders have a maximum of 2048 and the system 1024, it makes no sense to set the stationary decoder addresses above 1024, as you won't be able to talk to them. I'm not even sure you could set them beyond the system capabilities.

Yes, it is okay to mix stationary decoder types. And, yes, they may have different maximum addresses. Just be aware of the limitations of your decoders. If you need 1024 addresses and your system will talk to them, it is okay to have some decoders with a maximum of 512 and others with a maximum of 1024. Just make sure you don't try to name one of the 512 group something above 512.

7. What is indexed CV addressing?

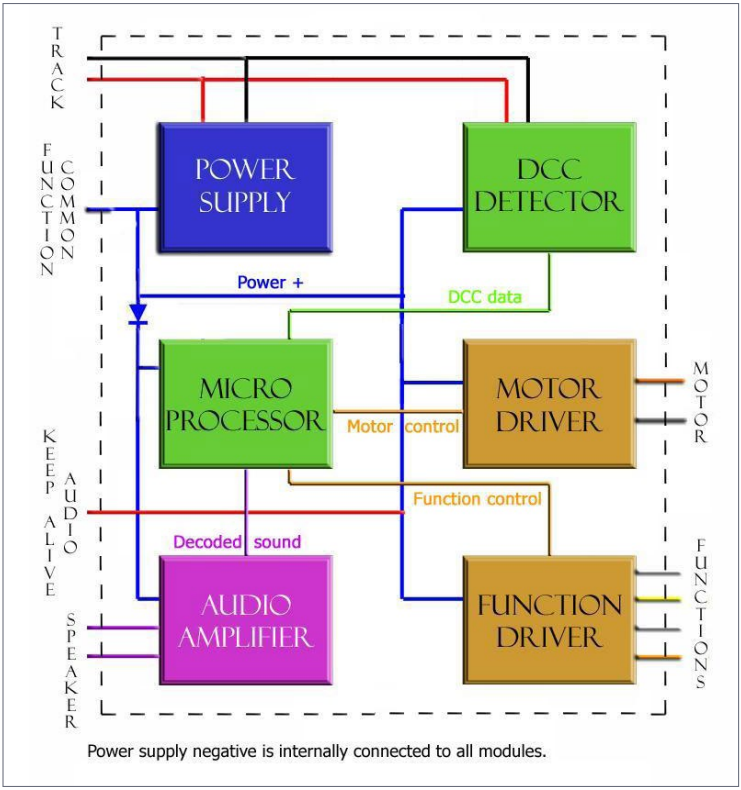
Again, the expansion of DCC comes into play. Many command stations cannot set CV values above CV256. Sound decoder manufacturers were the first to be hampered by this limit. The NMRA defined an "Indexed area" (CV257 to CV512). This uses CV31 and CV32 to create a command to set values in these higher CVs.

Confusing? Yes. Get DecoderPro, as I discussed in a recent column (mrhmag.com/magazine/mrh2018-02/dcc-impulses) and let it do the work for you.

8. What is consisting and how is it used – not the "How" but the "What"?

I'm embarrassed. I did a column on consisting (mrhmag.com/magazine/mrh-2015-12-dec/di_dcc-consisting) and never answered this question.

A bit of history. Steam locos had one engineer and one fireman to each locomotive. To run together, the two engineers needed to synchronize their locomotives to the same speed and direction. Along



9. Anatomy of a DCC decoder showing the power supply (blue) and function driver (lower orange). The power supply provides DC to drive functions and the driver turns them on and off. ***Bruce Petrarca diagram***

came diesels and one of the sales points was that they could be run as Multiple Units (MUed), by connecting a cable from the unit with the engineer to a bunch of unmanned units. One engineer could run the entire front (or rear) end of a train. Later, radio MU capabilities allowed the single engineer to run the entire train, no matter how many units were somewhere in the train.

Consisting is a DCC term for the same idea: One engineer running multiple units, be they steam or diesel. Various manufacturers have used names like MU, double-header, etc. It's all the same concept. Except, sometimes different names have different capabilities. For example, Lenz breaks out double-heading (two units) and MU (more than two units) and treats them differently, just to be confusing.

If you want to have a real hoot, don't consist two steam locomotives and have them on the head end of a train. Give two operators

each a cab for one of the locomotives and tell them to run from here to there together.

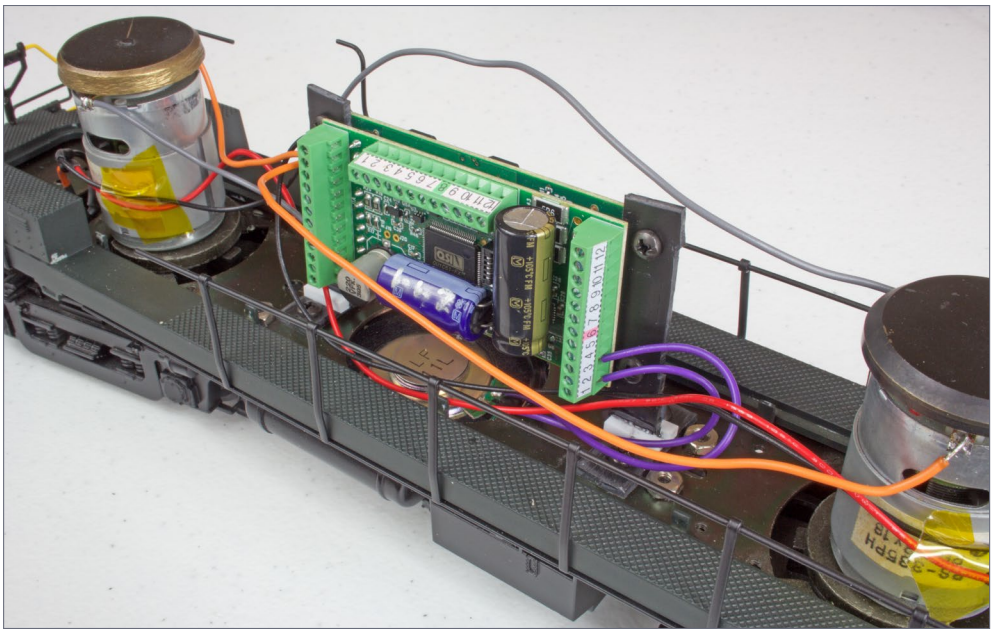
9. Can I power two motors with one decoder?

Yes, but.

Make sure the two motors don't exceed the capabilities of the decoder (draw too much current), especially if they are wired in parallel (drawing twice as much current as one motor alone).

The motors must run together well: the same voltage has each motor turning at the same speed [7].

If the two motors are in two different locomotives, they should to be ones that you will never want to run independently of each



7. One decoder feeding two identical motors in parallel in a Weaver O-gauge RS3. *Bruce Petrarca photo*

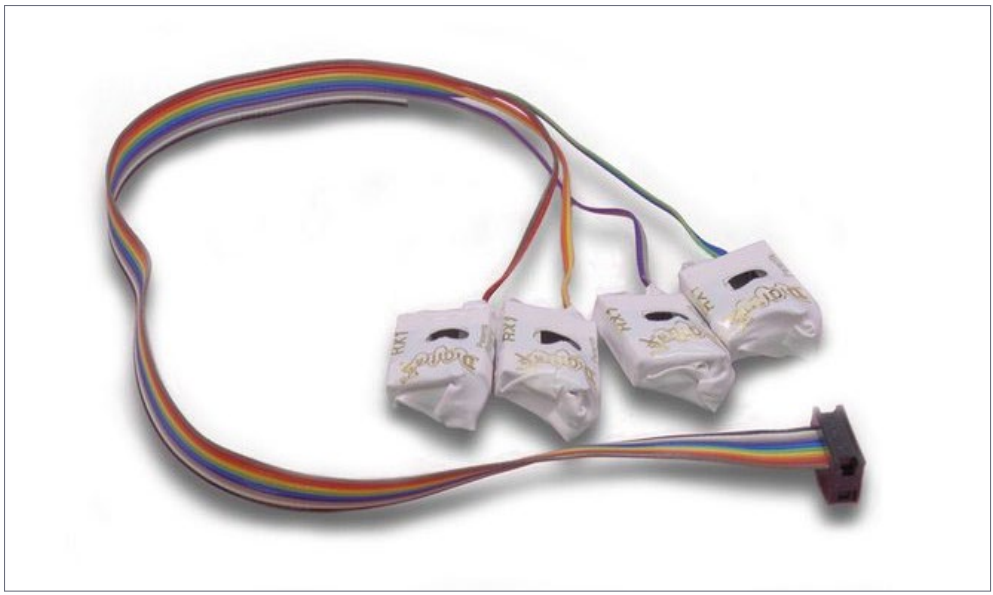
other. For example, drawbar-connected diesels make more sense than coupler connected units.

10. Are communications with base station and a DCC decoder 2-way?

Generally, no, for mobile decoders.

The command station (base) sends data along the DCC bus(es) and then into the track. There, the decoder picks up the data and responds to commands directed to it by name. Usually the response, such as a headlight coming on, is the feedback. There is no mechanism inherent in DCC for a mobile decoder to talk back to the command station.

Yes, but.



8. The detector portion of the Digitrax Transponding system, the RX4 4-zone Transponding Receiver add-on for BDL series detectors. *Digitrax photo*

There are two bi-directional DCC communications protocols available to allow feedback from the decoder to the command station. Each has their place in the sun.

Installing either system is a big deal with lots of technical components and special wiring techniques. They are not for the beginner.

The original was the Digitrax Transponding [8]. Transponding is available from all recent Digitrax decoders to allow them to talk to Digitrax command stations. The SoundTraxx SurroundTraxx system understands Digitrax Transponding to locate its sound field where the locomotive is currently located.

Lenz created their RailCom system and licensed the patents to the NMRA, just as they did with the original DCC patents. There are several decoder manufacturers and a few system manufacturers who support RailCom.

That said, unless folks care a lot about being able to read their decoder CVs on the main, or are using some form of external control, or are doing some exotic operating, they tend to forget bi-directional communication. Very expensive in terms of equipment, time and effort to generate a rather small return. The cost benefit ratio doesn't trip the trigger of most model railroaders.

For stationary decoders, many are designed to report their status to the command station via a DCC network, like Digitrax LocoNet, or the NMRA LCC network. Generally this takes the higher end stationary decoders.

11. What is assumed in decoders at power up as far as function states, turnout states, and CVs?

CVs are stored in non-volatile memory in the decoder. That means that, absent external trauma, the decoder should remember the CV states forever.

This external trauma can be as simple as a short occurring on a marginally wired layout. The voltage spike when the short is removed can do damage that ranges from scrambling the decoder's memory to completely frying the decoder, with or without allowing the magic smoke to escape.

The command station should remember function states. However, most layouts don't query mobile decoders (see question number 10). That means that the command station will expect the functions to be set as they were when it was last operated with the locomotive that has that address. This will drop about a volt, too. Thus, the total voltage to run a light or LED will be about two volts less than the track voltage.

But there are times that it seems to not remember function states. Here are a couple of scenarios to consider.

It could be that someone else had a locomotive on the layout with the same address as one you are just bringing. Even though their locomotive is gone, the command station may still remember what they were doing when they left.

Or, the command station may have been reset intentionally or inadvertently since you last ran your locomotive.

I'm sure that you can you think of others.

Switch states depend on several things.

If the layout has feedback from stationary decoders and the command station queries the decoders on start up, then the system should correctly know the status of turnouts. However, there are many stationary decoders without feedback or not connected to a system with the appropriate communication. These decoders

won't know the status of a turnout until you command it. Then they should keep accurate track for the rest of the session.

12. How do decoders power bulbs and LEDs?

The track power comes into the decoder and is converted to a DCC voltage about 1 volt less than the track voltage in a power supply, the blue box in [9]. This positive voltage comes out on the blue wire.

The function driver (lower orange box in [9]) connects a function lead, such as the yellow for the rear light, to the negative side of the power supply.

Thus, when the function is on, power can flow from the track through the power supply and the external device, bulb, or LED.

Since this voltage is polarized DC and LEDs are polarity sensitive, care must be taken to connect their anode (longest lead on discrete parts) to the blue wire.

Also, the bulb or LED must be able to handle the full voltage (commonly about 12 to 14 volts) provided by the power supply. LEDs must have a series resistor to limit the current flow and control the voltage applied. One thousand ohms (1000 ohms or 1K ohm) is a good starting point for LEDs that don't come with a built-in resistor.

There you go, a dozen questions asked and answered, I hope. Probably conjures up more questions. Send them to me (use

the email link on mrhmag.com) and I'll try to answer them in a future column.

Please share your ideas with us all. I'd love to hear what you think. Just click on the RATE THIS ARTICLE icon at the beginning of the column. While you are there, I encourage you to rate the column. "Awesome" is always appreciated. Thanks.

Until next month, I wish you green boards in all your endeavors. ☑

WHAT'S NEAT column

Model Railroad Hobbyist | March 2018 | #97

★★★★★
RATE THIS ARTICLE

Ken Patterson goes BTS – Back to The Sawmill – and shows how to store people; Jason Quinn makes coal loads; we preview Athearn's Challengers, the Korea Brass cleaning car, Bachmann's On30 0-6-0, and "Modeling Ideas from Above"...

This month I give you an update on my BTS

Sawmill project as we lay the track on the module. Jason Quinn shows us how to make good-looking coal loads for very little money. We test the Korea Brass track cleaning/vacuum car.

Bachmann shares photos of their new On30 0-6-0 locomotive, and we also get a first look at Athearn's new CSA-1 and CSA-2 Challenger locomotives. Steven M. Conroy shares his drone footage of a train running through tunnels in the mountains, just like a model railroad, in "Modeling Ideas from Above." We will look at ways to store our figures/people when they are not at work on the layout, and that's the lineup for March's column and videos. ☑

▶ PHOTOS AND VIDEO OF SUPERB MODELING

Sawmill tracks

I started working on the sawmill again. It seems that I get to work on it five or six days each month. This month we lay the HOn3 track on the scene.

1. (Above) I removed the existing track on the adjoining trestle module to make room for new track at the correct curvature to mate with the log mill diorama. I sanded the transition between the modules with 36 grit sandpaper, smoothing over the ballast and foam for a perfect vertical alignment of the rail across the modules' joint. I then test-fit two Shinohara #6 turnouts to divide the HOn3 track from the trestle to the saw mill trackage.

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

2. This project uses Micro Engineering code 70 weathered track. Before assembling the track with Atlas N scale rail joiners and soldering everything together, it's important to clean the weathering off the rail and the rail ends with a Dremel wire brush. This allows reliable electrical conductivity between sections. Solder won't stick to the weathered rail.

I took my time cutting the rails to length, curving the track (ME flex track keeps its shape when curved), and installing the turnouts. I wire-brushed the rail joiner areas and temporarily lined everything up for smooth operation.

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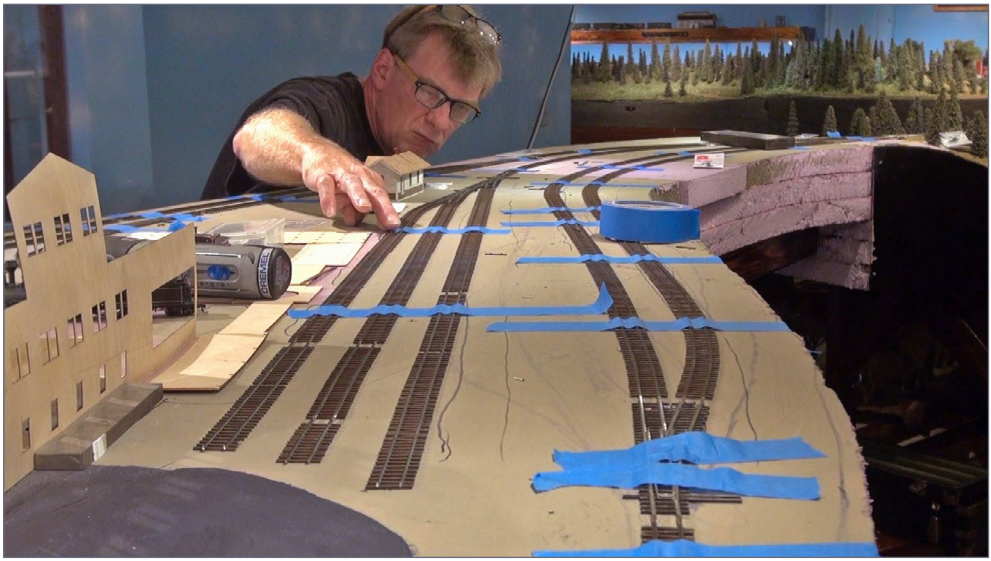
Tip

Pushing a rail car truck through new trackwork lets you feel any bad joints or misalignments.



3. Masking tape and weights keep the track from shifting as I bend the sections of the main line and sidings to serve the saw mill, power plant, the wood drying and loading docks, plus one railroad station stop and the engine service area.

It took about three hours to work out a track pattern that made operational sense for the buildings adjacent to the sidings. I painted the pink foam with latex house paint to seal it, then began spreading a thin coat of Liquid Nails adhesive under the track, using a painters knife.

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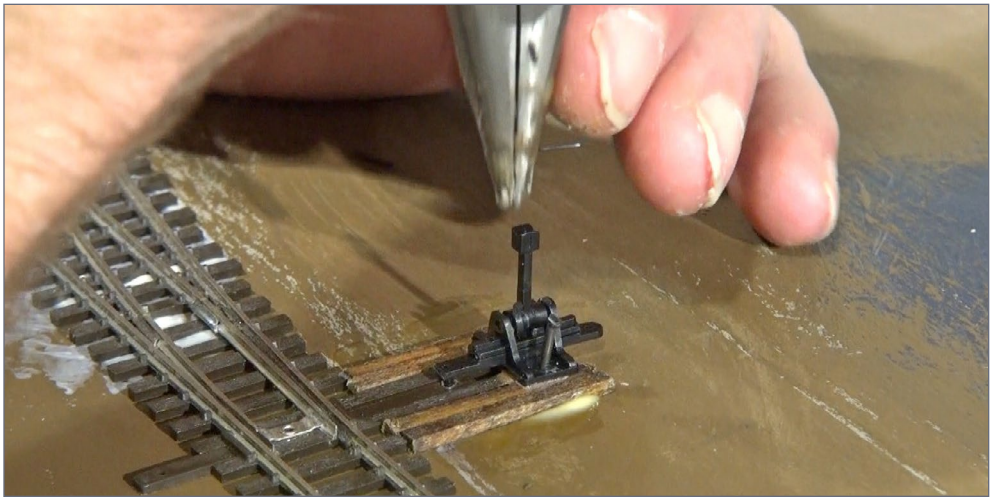


4. I install Caboose Industries N scale 206S ground throws at each turnout to control the switch points. These will be glued into place with Walthers Goo. The switch stand lever and points are set to center as the glue dries and then I secure the ground throw with G scale spikes or small nails.

Playback problems? Click here ...

5. I paint the track and turnouts with Rustoleum Camouflage Brown paint to eliminate the white color of the Liquid Nails adhesive and give a nice color to the rail. It also covers the bright silver solder joints.

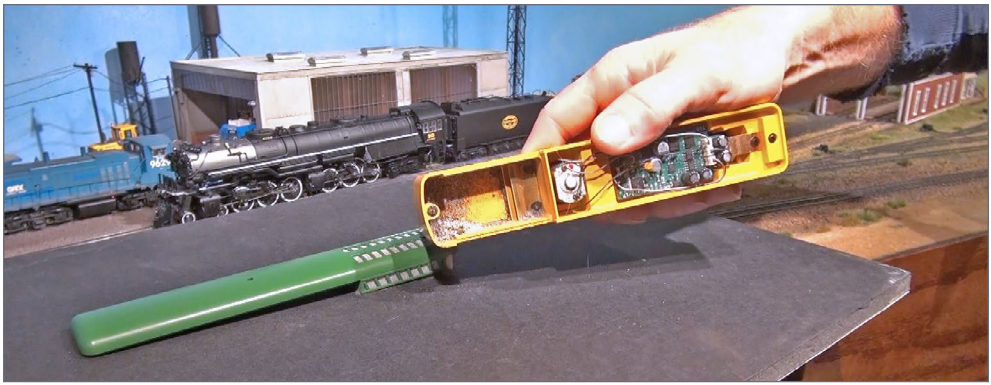
6. Because the module has a return loop, we must wire to prevent a short in the main line. To solve this problem and be able to run a train around on the loop without stopping, I gapped and isolated a section of the loop about two feet long. This isolated section will get its track power from a Digitrax AR1 Power Reverser module. This will automatically switch the polarity in the 2-foot gapped section according to the direction of the train, avoiding a short.

7. I mounted this small module under the layout in a cavity carved out of the foam.

8. With that work finished, I cleaned the track and proceeded to run a test train around the loop. I could hear a quiet "click" sound as the power reverser detected the locomotive and switched polarity without a shudder in the locomotive's performance. In a future episode of "What's Neat," we will finish off the sides of the layout, wrap the scene in ¼-inch oak, carve the log pond, build the buildings, and wire the power supply to the yard trackage.

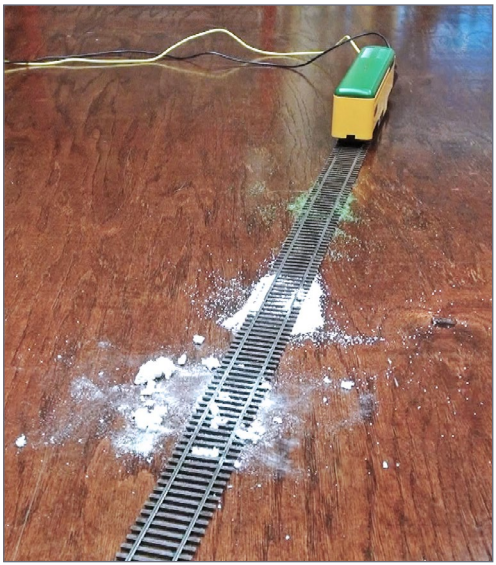
Korea Brass track cleaning car

9. The new Korea Brass track cleaning car/vacuum is hefty at almost two pounds. Our model has DCC installed and came with extra track cleaning pads, vacuum filters, couplers, and extra rubber tires. I ran the unit three times around my 157-foot main line.



10. Inside the model you can see the DCC board and two motors, one to power the vacuum and the other to drive the wheels. There is a compartment to hold the dust and dirt the vacuum picks up. DCC Function 1 turns the vacuum on and off. Function 2 turns on a flashing beacon on the roof. The roof and body are diecast and held together with magnets.

11. The Korea Brass cleaner picked up cat hair, ballast, and ground foam. Fine gray dust accumulated on the filter. It was a real eye opener – I vacuum my layout at least once a month.



12. I tested the unit on a table with a three-foot section of track littered with things like ballast, ground foam, and ceiling tile crumbs. I ran the unit through this very slowly. Watch it real time in this month's video. It picked up the ground foam completely, along with the ceiling tile fuzz. It picked up a lot of the ballast but left a little loose material between the ties. Overall, it is a very good tool to improve the performance of our model railroads.

Drone footage

13. Steven M. Conroy shares his flying skills as we watch an Amtrak with five locomotives plunge through the tunnels cut into the mountains. As the train goes through, we fly over the hills. It looks just like our model layouts, without the aisle spaces.

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

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Bachmann On30 0-6-0

14. Our first look at Bachmann's new On30 0-6-0 locomotive reveals a DCC-equipped model with a speaker installed in the tender. It can be upgraded to sound with a Bachmann sound module available separately. As Bachmann expands its line of On30 models, I am planning to build an On30 layout this summer for a "What's Neat" project to explore the world of On30 modeling. To shoot this photo, I set up a body of water, lots of pine trees, and a flat carved mountain range background. Weeds and an O scale figure finish the scene, which will be Bachmann's 2018 catalog cover photograph.

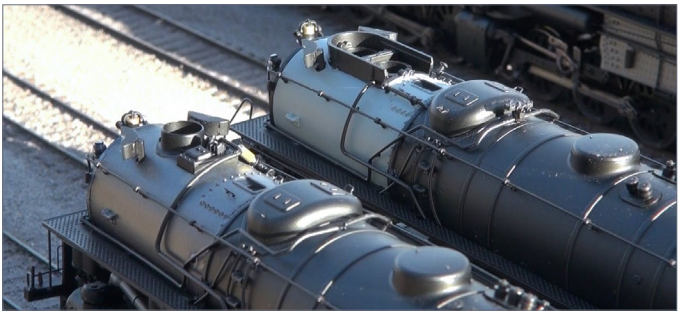
Storing our little people, safe and easy

15. I use hundreds of little people for my photography through any given year. They bring any scene to life.

16. For years, I have used tackle boxes to store my HO, O, and N scale figures/people. Sure, I place them on my layout, but I also use them for various photo shoots, and they are small and easy to lose. Tackle boxes are cumbersome, and you can lose folks in a big box as well.

17. My solution is pill storage boxes available at the drug store. You can group the figures in categories relevant to season and occupation, making it easy to find the ones you need fast, without dumping them all out at once. It works!

Athearn's new Challengers



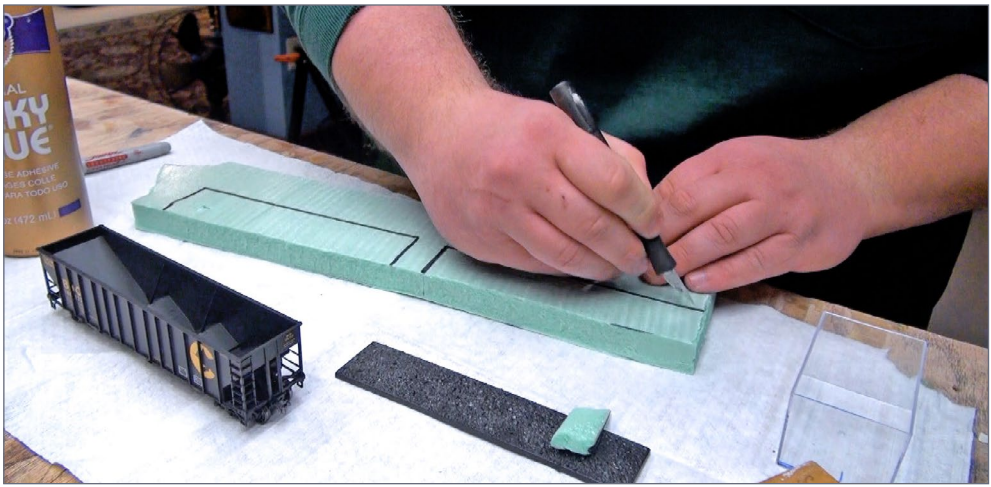
18-20. Athearn sent pre-production models of their CSA-1 and CSA-2 4-6-6-4 Challenger locomotives to my studio for photos and video. There will be eight variations of this model, in three different number series for the 3700, 3800, and 3900 class locomotives, with two styles of Union Pacific lettering. There are three pilot variations, with [20] two stack options – a single stack and a double stack version. These models are brutes.

UP worked closely with Alco in 1936-37 to design an engine that could handle the grades of the Wahsatch Mountains. They wanted to replace the 4-12-2 and double-headed consists with a faster and more economical articulated design. Alco delivered 3900-3914 in 1936 and 3915-3933 in 1937. Engines 3934-3939 we delivered for passenger service, with 69-inch drivers. These ran through the 1950s before being cut up. Out of 105 Challengers in the UP fleet only one, 3985, remains and is now used for special excursion trains. In 1943 UP converted some of the Challengers from coal to oil burners, changing the numbers of the locomotives to the 3700 class. Some later were changed back to coal and renumbered to the 3800 class. It was confusing at the time, according to written texts.

21. Athearn is offering both the oil and coal tenders with this new addition locomotive to their product line-up.

Jason Quinn on coal loads

22-23. (Bottom left, and above) Jason Quinn stopped by the studio and reminded me of the video we made some time ago, when we made coal loads from Great Stuff Pro Foam. We filled a plastic bag in the freight car, forming a load to fit the car. It worked well but was a little unconventional.



24. Jason has come up with a better solution to making coal loads, by tracing the side of the cars' inside dimensions on a piece of ¾-inch foam scrap.

25. After sanding the sides to a perfect fit, Jason draws a line along the side of the foam for a guide line as it sits in the car, to determine where the carving should start along the inside sill and walls of the car. He draws the humps of the coal load onto the side of the foam, on both sides, as a carving reference to form the shape of the load with three humps.

TIP

If you embed / glue a few steel washers into the foam before adding the coal, you can use a magnet to easily remove the load from the car. Keep the washers small to avoid making the car top-heavy however.

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26. He cuts the foam with a serrated steak knife. This reduces the mess and gives a very precise cut line.

27. Jason uses a sanding block and sandpaper to form and smooth the load as if gravity and the movement of the car determined how the coal settles.

28. Paint the top of the load with a brush dipped in a mixture of white glue and black acrylic paint. This black goo covers well and is used to attach black sandblasting medium to the foam. Finely ground coal would work as well but sandblasting medium is easier to get and looks fantastic.

29. See the finished result in Jason's CSX coal train. Follow the entire process in Jason's 8-minute video segment in the March 2018 "What's Neat" (page 5) in my column.

Our friends in Kuwait

30. Model railroad friends in Kuwait sent us video of their trains and said they enjoy watching the "What's Neat" show here in *Model Railroad Hobbyist* and the "What's Neat This Week" weekly video podcast. Here are Gerald Mabry and Abdoulaziz Almodahka standing in front of their train collection. Thank you for the greetings and be safe. Links to the podcasts can be found on the bottom of several page in this column. Don't forget to rate the column! ☑

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Thanks to the internet, MRH reaches hobbyist all over the globe! Some 30% of our readers visit us from outside the USA, yet they like North American prototypes.

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HO SD-40 Locomotives

New Announcements!!

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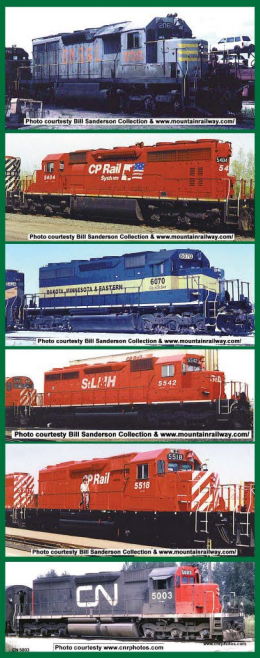
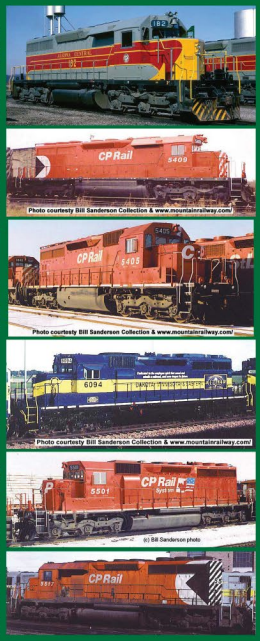
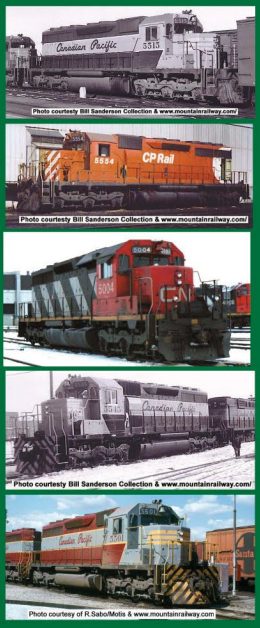
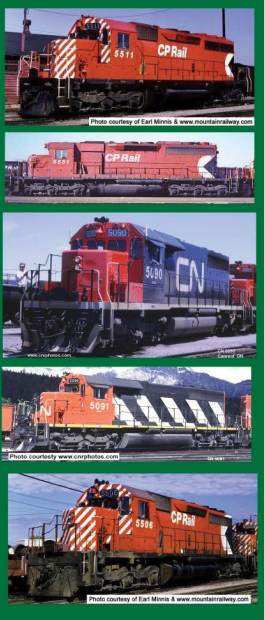
Delivery February 2019









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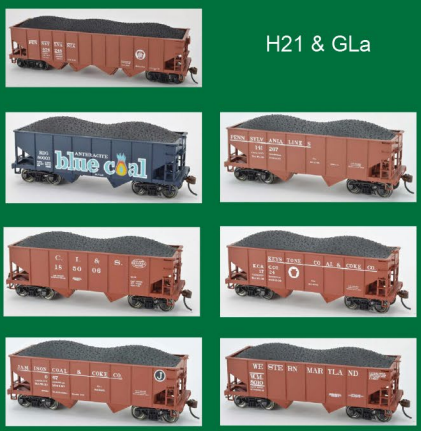

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column

Model Railroad Hobbyist | March 2018 | #97

RATE THIS ARTICLE

Rob Clark delves into his turntable scratchbuilding tips and techniques ...

BUILDING A MANUAL TURNTABLE (Part 1)

Turntables are great. Apart from being visually interesting structures, they (as with the prototype) perform a useful function by ensuring the locomotive faces "forward" on each journey.

However, commercial products are expensive, and many folks are wary of attempting a scratchbuild because of the perceived (and real) pitfalls.

After constructing a manual turntable for Atherton engine terminal from a 1960s vintage Cliff Line kit, I realized that I had done most of the hard work myself. The cast metal center pivot assembly was the only bit I didn't fabricate and I also learned a lot about the geometry issues that can plague track line up. With this in mind I set out to scratchbuild a turntable for the town of Cornhill at the other end of the line, and record my journey to hopefully persuade others to have a go.

EXPLORING THE CREATIVE SIDE OF THE HOBBY

What should it look like

I will show you two deck variations to demonstrate that the construction method is flexible and independent of era.

I didn't start by drawing a plan. The model was imagineered, both at the point of basic conception and throughout the construction.

Inspiration has come from a number of sources including prototypes at Laws, El Portal, Unity Station (Belfast and Moosehead Lake RR) and some commercial products. What you see is a mixture of everything, plus a bit of personal preference. Look at prototype examples of the kind of turntable you want to construct and take the most appealing features, while attempting to maintain engineering integrity.

This article focuses on some core construction techniques that make for an easy build and reliable operation and I am not going

1. This is one of the prototypes used for modeling inspiration

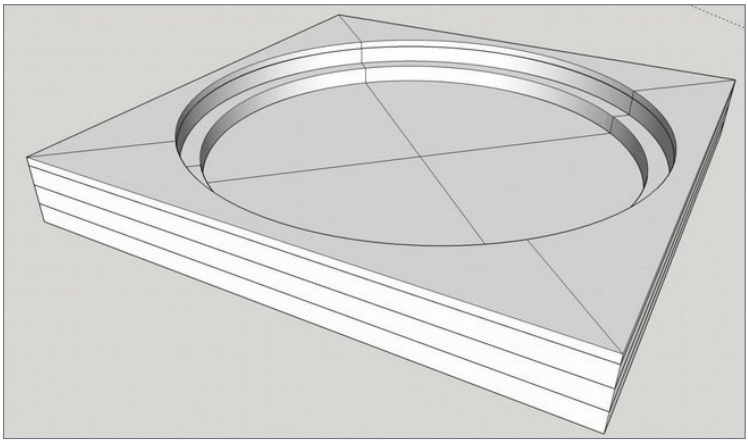
to cover every excruciating detail of construction. This is, after all, an imagineered structure and my hope is that rather than copy what I have done, you be inspired to create your own version.

Construction guide

The model shown is HO scale with an 85-foot (297-mm) deck. Incidentally, my apologies in advance for mixing metric and imperial measurements in this article – it's just the way my head works.

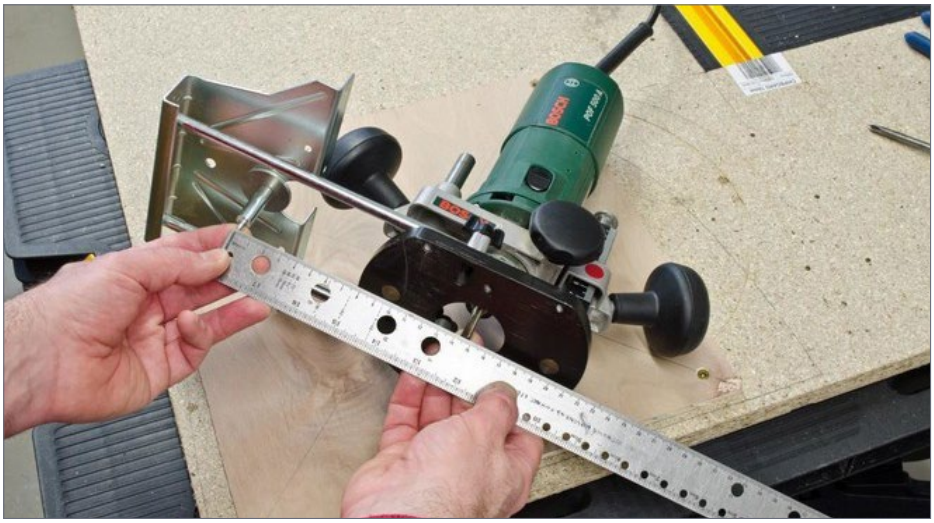
I recommend building your turntable as a separate unit which, when completed, you "drop in" to a cut-out in your baseboard. This is way easier than cutting a round hole in a baseboard and then making sure that the central pivot hole really is in the center.

You will need to start by cutting some squares of plywood [2].



2. Start by cutting some squares of plywood sized at the desired pit diameter, plus 10-15 mm. Mark each from corner to corner to get the center point and provide registration lines for assembly alignment. The bottom layer remains solid, but the top layers need to have circles cut out to the pit diameter. The last but bottom layer requires a smaller circle cut out to provide the support surface for the ring rail ties. Your choice; I went for a 12mm shelf.

The size, thickness and number of plywood squares depend on the pit diameter and depth respectively. For this article I am building a ¾"-deep pit, and used a combination of 12mm and 5mm plywood. This is probably deeper than required for an Armstrong (manually operated) turntable (you can skip the top 5mm layer), but I wanted to use a single pit to demonstrate both "A" frame and girder frame deck options.



3. A router is a very useful tool for the turntable builder. If you already have one, that's great; otherwise please buy, borrow or rent , because it makes the job of cutting accurate circles a breeze. A router also has many other general uses around the home.

It should come with a circle-cutting attachment, and it's a simple matter to set the cutting width to the radius of the turntable pit (measure from pivot center to the outside edge of the cutter bit). If you really can't get a router, careful cutting with a jigsaw will work. As we will see later, the roundness of the pit is not the major issue.

The alignment of the deck rails to the center pivot is critical.

4. The square piece of plywood that is to have a hole cut has been screwed temporarily to a waste piece of MDF. The maximum depth of the router bit should be set so that it just breaks through the plywood by 1/16". Don't try to route the whole depth of the plywood in one go – take a couple of "bites."

When the routing is complete just undo the screws, and you will have perfect circle cut out. You will need one plywood section with a circle 24mm less than the pit diameter. This will form the support for the circular pit rail ties.

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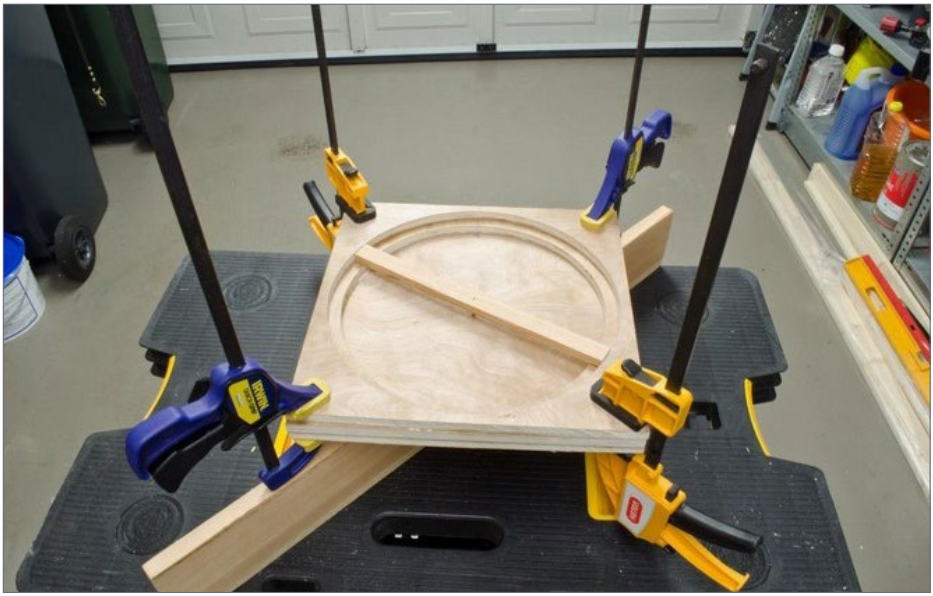
5. Glue the pit sections together with white wood glue and some clamps. Use the previously drawn corner-to-corner lines for basic registration.



6. Finally, glue the base to the pit, again using the pencil lines to ensure the pivot hole is centered. To assist with centering I used a dummy deck (just a piece of ¾" x ½" timber with a brass rod fitted exactly in the middle). Drill a pilot hole in the middle of the base sized to match whatever diameter rod you used on the dummy deck. Spinning the deck and adjusting the position of the base section allows you to check that the pivot hole is aligned in the center of the pit before tightening the clamps. Do the best you can, but don't worry about achieving pinpoint accuracy, as the deck pivoting method shown later provides the ability to correct small errors.

7. By no means an original idea, the "secret weapon" is a guitar jack socket and plug; buy the best quality you can. The picture shows the type of 90-degree plug and socket that is ideal for a pivot. The socket comes with a sizable washer, and you need a second washer and fixing nut. Failing all else, just buy two sockets – they are inexpensive.

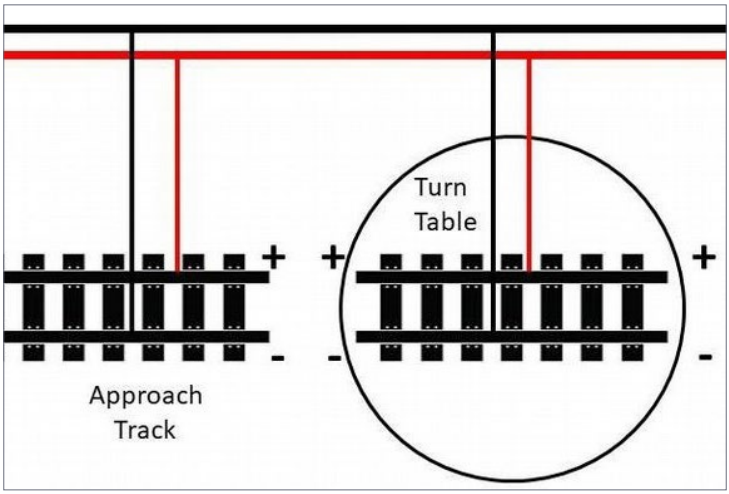
Some may consider the plug/jack approach as a marginal piece of engineering compared to commercial turntable kit pivots, but this is not the case. They are physically tough and electrically reliable – I spent many years relying on this kind of device to connect my bass guitar to some very loud amplifiers.

In this turntable application they are under very little stress, and the main jobs are to keep the deck centered and route power to the track (unless you are using split-rail power – see below). There are no lateral or torsional stresses.

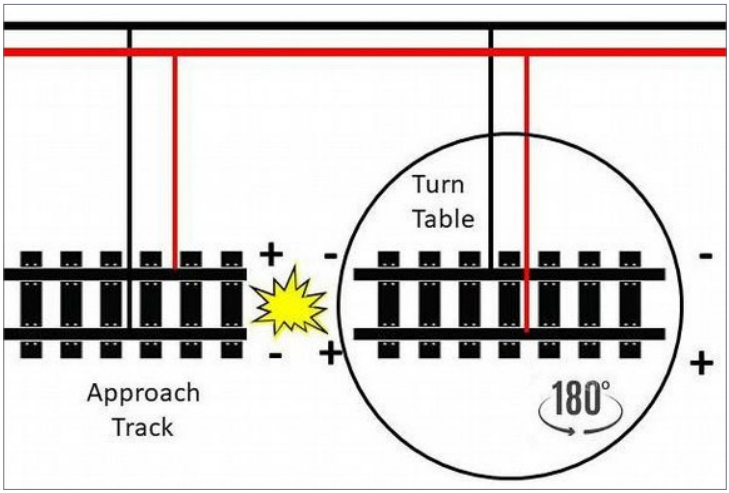
8. This shows how the spring-loaded snap connector works using a cheap open-frame socket to demonstrate. Power connection is simple, and the plug tip connector has a vital role in providing gentle downward pressure at the center of the deck. This is an important reliability feature with this approach to turntable construction.

Avoid using one of these cheap sockets when building a turntable – they are not as durable as the version shown in [7].

THE TURNTABLE POLARITY PROBLEM



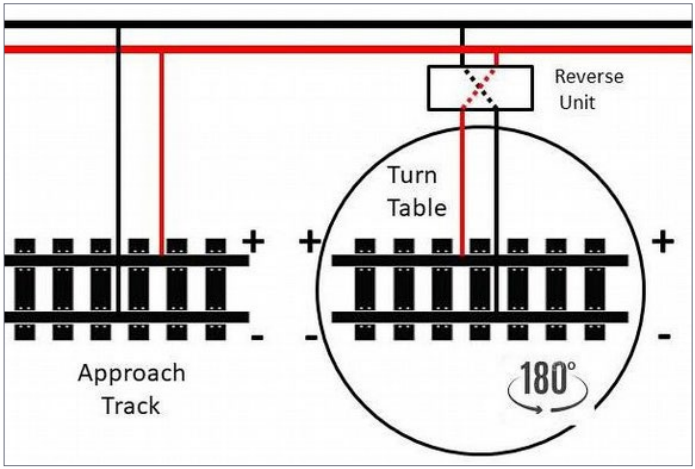
9. Our starting position shows the approach track and turntable deck fed with "in phase" power. Let's assume that we are using the plug and socket as a power feed mechanism to the deck rails.

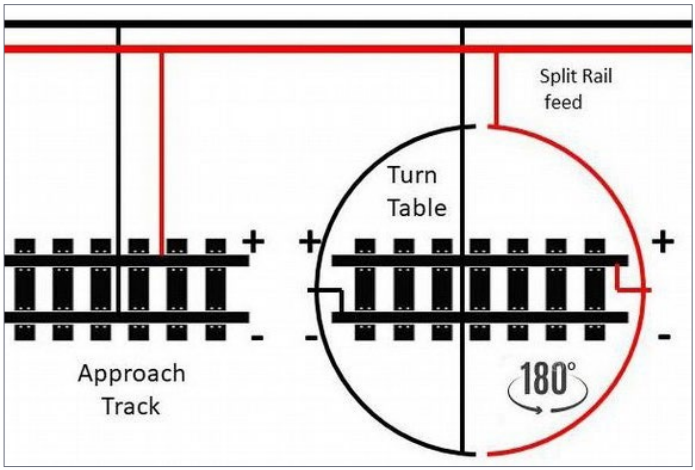


10. If the turntable is rotated 180 degrees, then the deck rails are effectively swapped around and we have a short-circuit condition when a locomotive tries to enter or leave the turntable deck.

Some solutions

11. Reversing the power to the deck rails solves the problem. This can be done very simply with a reverse unit, such as a double pole switch (manual method) or an auto-reverser module (automatic method) – below for more detail.





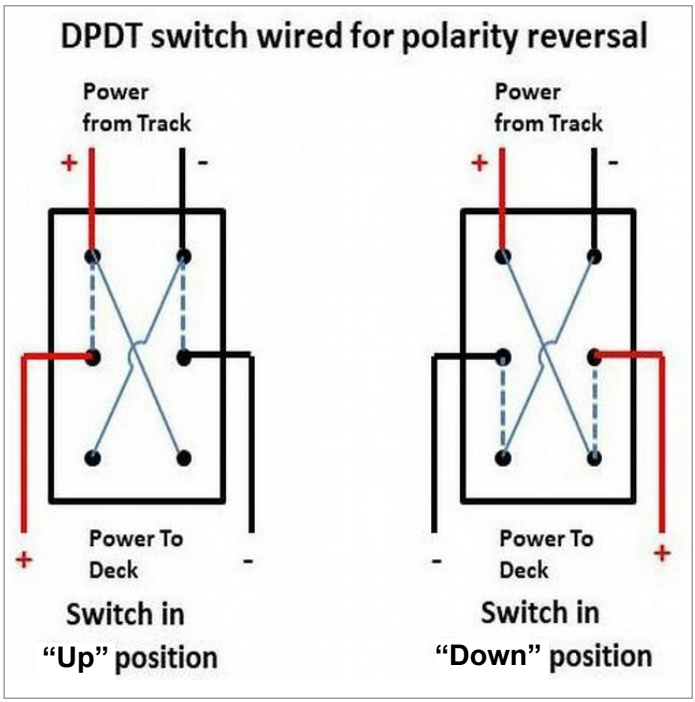
12. Alternatively, a split rail can be laid around the turntable pit. Electrical "wipers" run on the pit rails and pick up correctly polarized power as the deck is rotated. This option is covered in the text.

Polarity Reverse options

The box titled "Reverse Unit" on [11] can be replaced by a couple of options. The simplest and cheapest is a double-pole double-throw (DPDT) toggle switch, cross wired to provide a means of reversing the polarity [13]. When you rotate the turntable deck past the 90-degree point, you flip the switch.

To assist with knowing which way the toggle should be set, it's a good idea to make one end of the deck stand out so you "point" the toggle at the marked end of the deck. Some people attach a model person, but I prefer to use something inanimate.

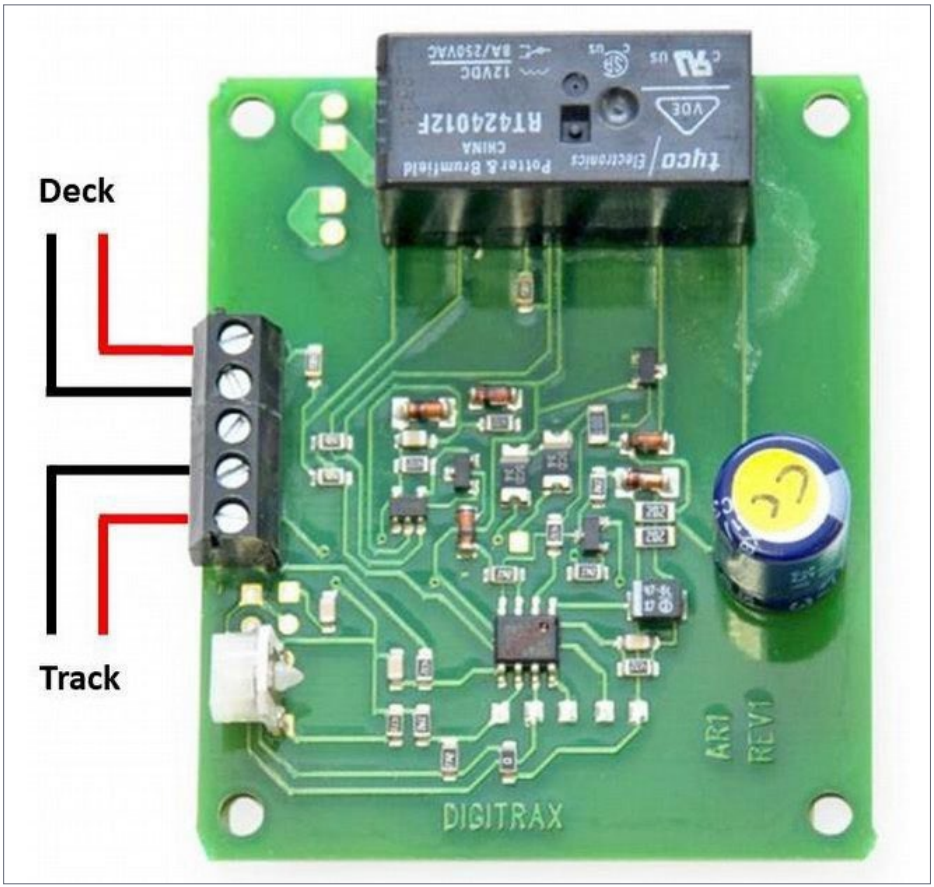
For a deck girder bridge you can use a cabin (housing the controls), or a capstan for a manual table. The disadvantage of this method is that you do have to remember to use the switch.



13. Manual reversing switch.

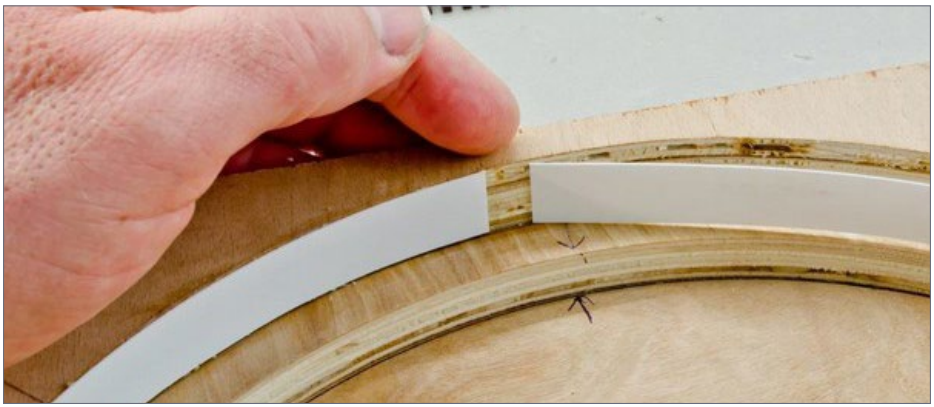
The second option is an "auto-reverse" module [14] typically used to manage polarity changing on a track plan with a reverse loop that causes a same kind of short circuit condition as our deck rotating 180 degrees. The model shown is from Digitrax, but many manufacturers' versions exist.

Two wires go to your track power, and the other two attach to the deck. Some units have a sensitivity control to fine-tune the short circuit detection level. You can fit and forget, but they are somewhat more expensive than the toggle switch.

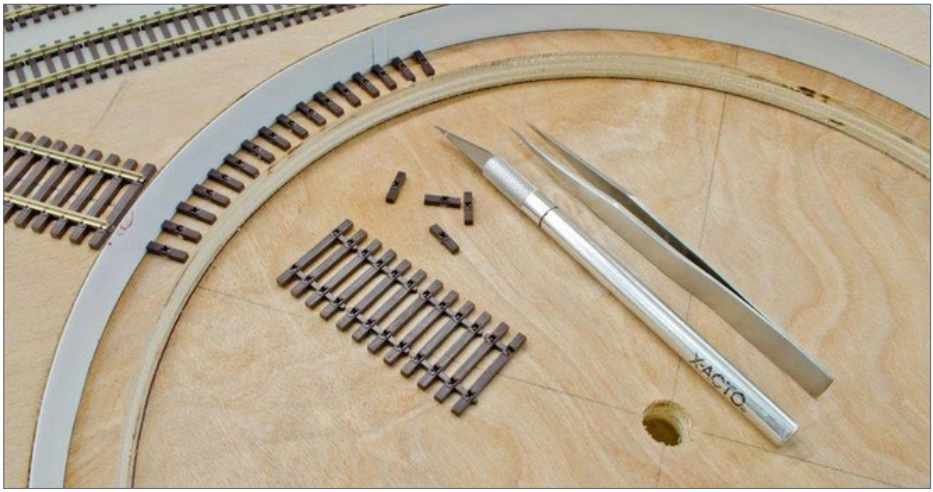


14. Auto-reverse module.

15. Carefully open up your pivot pilot hole using a 13-14mm drill, and then test-fit the jack socket with a washer and nut on the upper and lower surfaces of the base section. The long thread on the socket allows accurate vertical adjustment of the pivot height and also supports different styles of deck.



16. The pit walls need lining to hide the plywood end grain, and you can do this a number of ways. The simplest is a thin layer of spackle, but I prefer to use styrene sheet cemented in place as shown. This can be plain – representing concrete, or you could use a stone embossed type. Alternatively you could use wood planking built up in layers. If you use thick planking, you need to allow for this when cutting the pit holes; otherwise you will shorten your deck length.



17. The plug and socket pivot method requires that the deck be supported at its ends, so a ring rail is needed to provide that support. This can also provide an electrical feed for the deck rails, depending on the polarity-switching method you choose.

Here we see flex track being used to make the ties. Most flex track has a hollow section with solid ends. Cut each tie so that the solid end sits flush with the inner pit ledge. Glue in place (use tweezers to position) and don't worry too much about spacing. Your eye is good enough! The key thing is to ensure that the uncut end of the tie is flush with the edge of the pit rail. This guarantees the spikes will line up for rail insertion.

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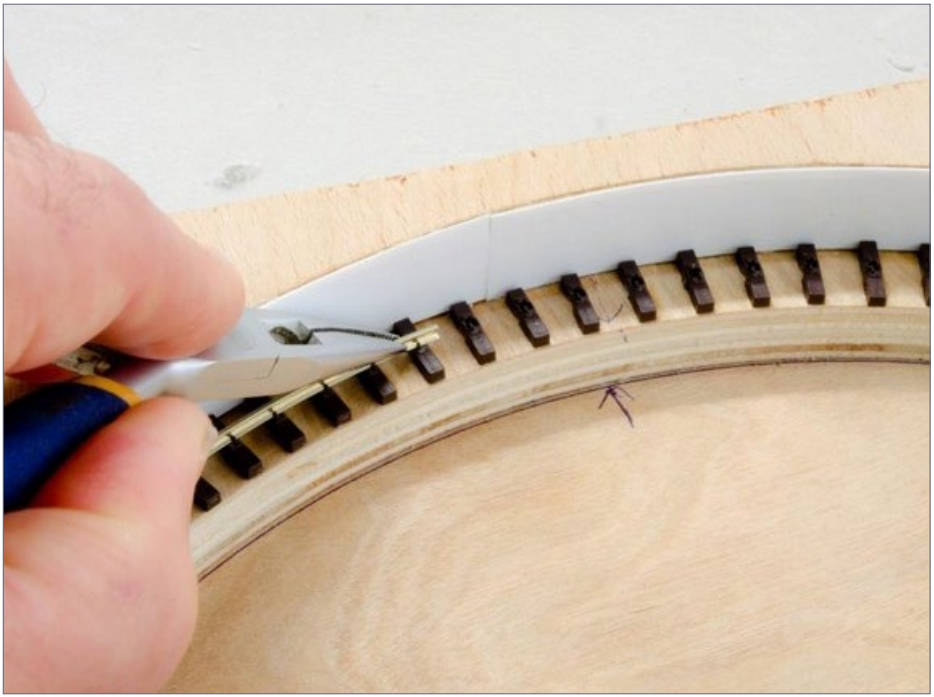
18. The ties have been laid, and you can see that two gaps have been left which make feeding the rail into the plastic spikes easier. If you are going to use "split rail" polarity reversing then you should align the gaps at 90 degrees to the main traffic flow. The two pieces of approach track demonstrate this relationship to the tie gaps. Look at [19] and [22] for methods of joining the rail ends.

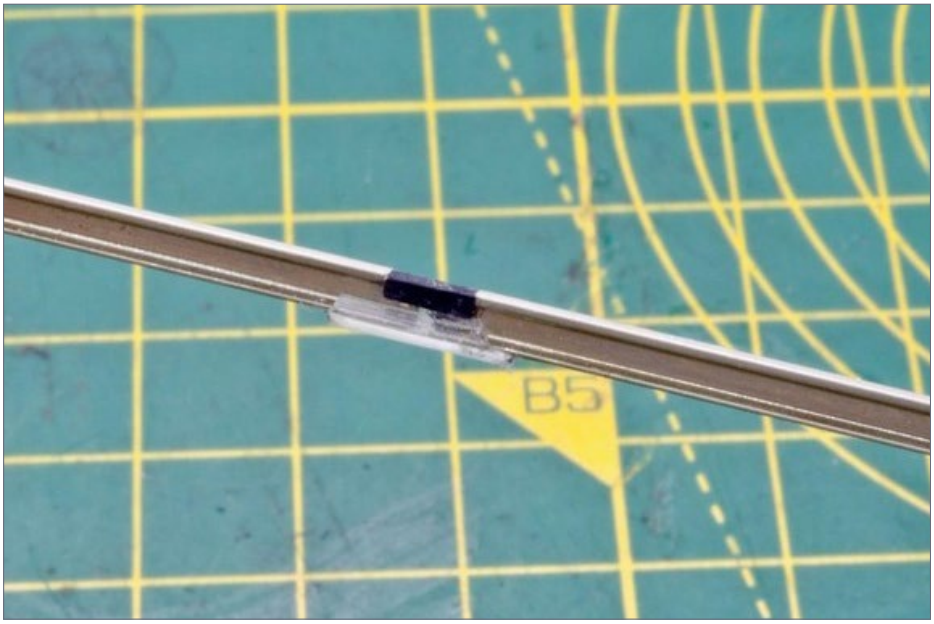
19. Bending the rail is pretty easy. Just run it between your thumb and fingers while applying pressure as shown. After a few applications, the rail will be at the correct radius for your pit. Just keep checking as you create the bend. Don't try to do the whole pit with one piece of rail. Two pieces cut roughly to length (pit diameter x 3.14) will be easier to fit. You may need to apply extra force at the rail ends to get them curved; you can use pliers and your thumb. Alternatively use longer sections of rail than you need and discard the end sections which have not curved fully.



20. Start at one of the gaps and feed the rail into the molded spikes using a pair of pliers to guide the rail end. Make sure you have filed all burrs off the tip of the rail before you start. Repeat this operation for the other half of the pit.

21. You will need to join the ends of the rails, and this is best done using a shortened rail joiner. Cutting a rail joiner with nippers will crush it, so use the method shown here. Feed a rail joiner onto a scrap piece of rail, overlapping by about 5mm. Use a razor saw to cut off the other piece of the joiner.

Slide a few cut ties onto each piece of rail, then slide your shortened joiner fully onto one piece of rail and slide back to join to the other. You can the move the loose ties back into position and flow some glue around them.



22. If you are using the split-rail method of polarity control then you will need to use insulated rail joiners to join the two semicircles. Cut a joiner in half so it fits between the tie gaps, and then install as with the metal rail joiner in [19].

The critical thing is that there is an insulated section that is slightly longer than the electrical pickup wiper you are using. If not, you will get a short circuit as the pickup moves over the rail gap.

File (or use a motor tool to cut) a slot at the end of each rail (best done before [18]) and then insert a piece if styrene fixed with CA to bridge the gap. Use a needle file to match the top of the styrene with the rail heads.

23. Here we see the components of the basic "A" deck - stringers, end plates, center pivot support ties, and deck ties. These should all be cut from stripwood using a razor saw, and cleaned up with fine sandpaper. I use emery boards which have coarse and fine sides. Because of their relative stiffness they are good for maintaining square edges. Everything has been pre-stained with an India ink/alcohol mix prior to assembly. It's a good idea to mark center lines on the end plates in pencil. This aids the rail fit later.

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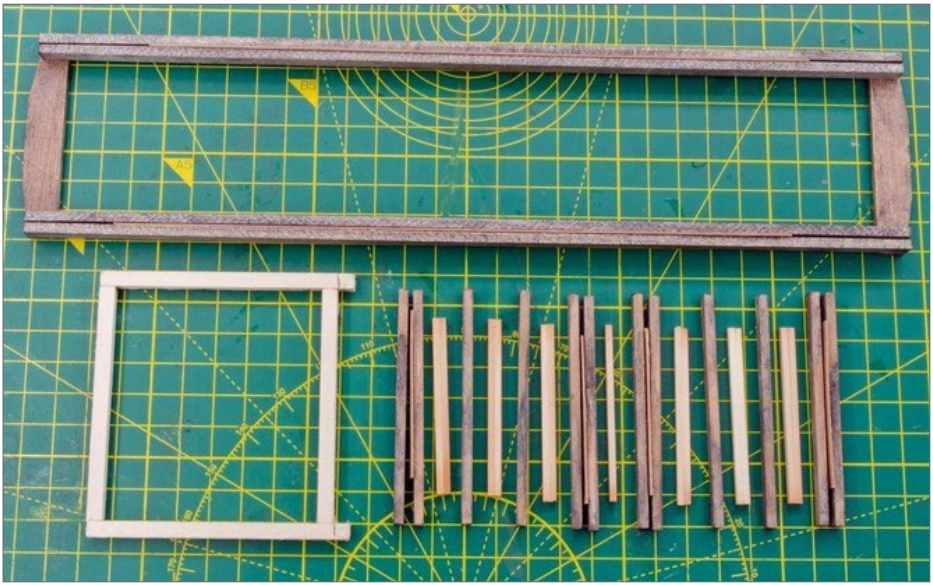


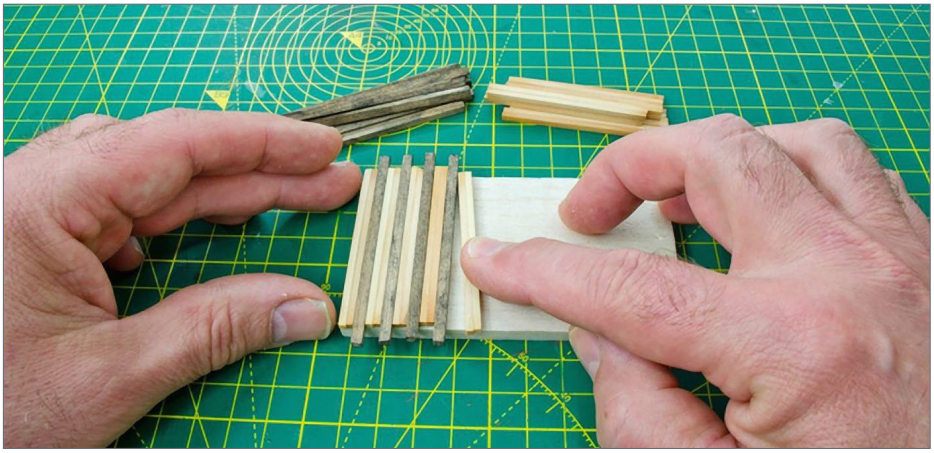
24. The stringers are cemented to the end plates – use your cutting board to square-up everything. Temporary card strips ensure that the stringers are evenly spaced. Below we see the pre-assembly of the center ties.

This consists of four pairs of ties with cardboard spacers and four singles. I use Fast Tracks ties, two glued together as spacers, apart from the center spacer, which is a single tie. Whatever you use should be slightly lower than the center stringer depth so these temporary spacers don't end up glued to the deck!

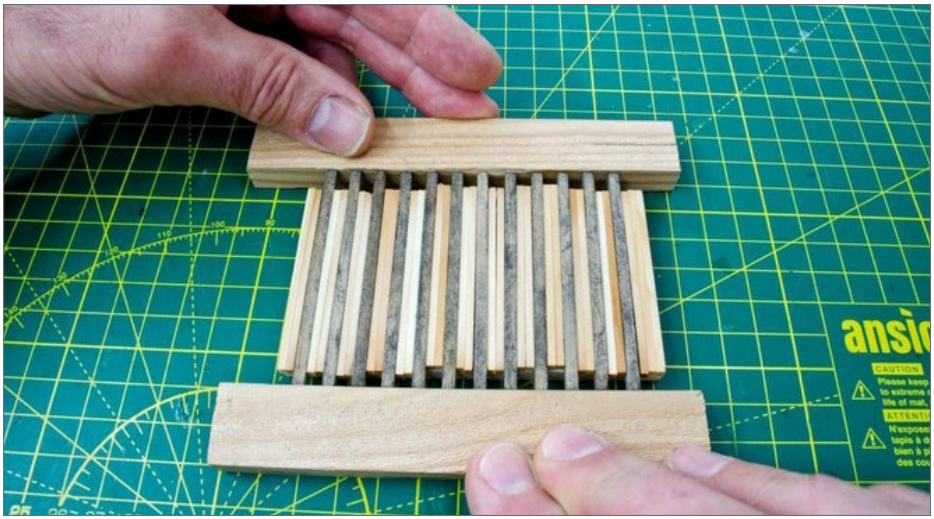
The frame on the lower left is used to hold the tie assembly together prior to attachment to the deck stringers. The frame is made by first cementing one end to the two sides. The end piece should be the same width as a deck tie. All the components are slid into the open-ended frame, then the other end is cemented in place (see next picture).

25. This shows what you are aiming for. This assembly method guarantees that the center ties are evenly spaced and absolutely square.

26. It's a simple matter to cement the center tie assembly to the stringers. Obviously you need to carefully mark the stringer center point as a guide to where the assembly should be cemented. A couple of heavy books should be used to keep everything flat while the cement hardens. A flat and true deck aids reliable operation. When dry, remove the frame.



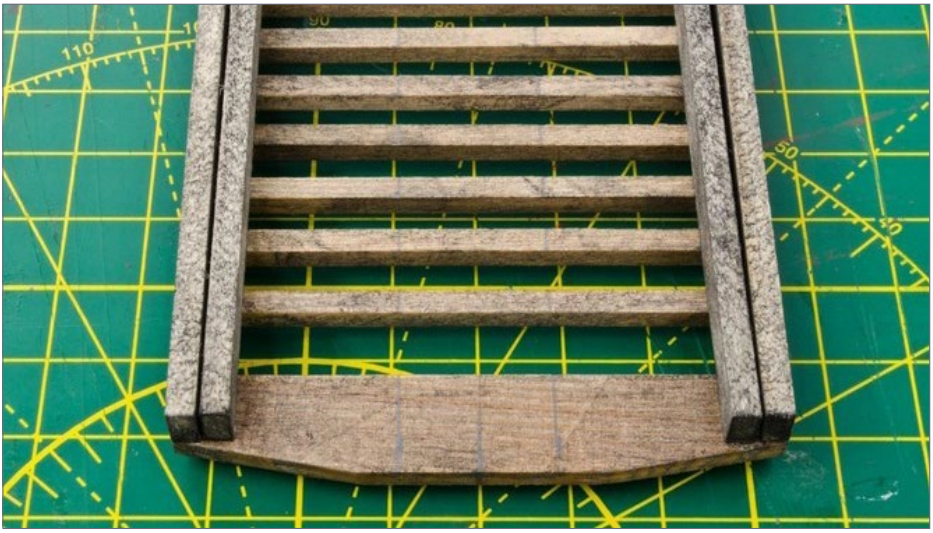
27. The remainder of the ties are fitted using a variation on the box frame. Ties and spacers (single) are assembled as shown. Keep things squared on a piece of scrap 3/16" wood. Continue until you have enough to fill the gap between the deck pivot end tie and the end plate. Absolute accuracy is not necessary here.



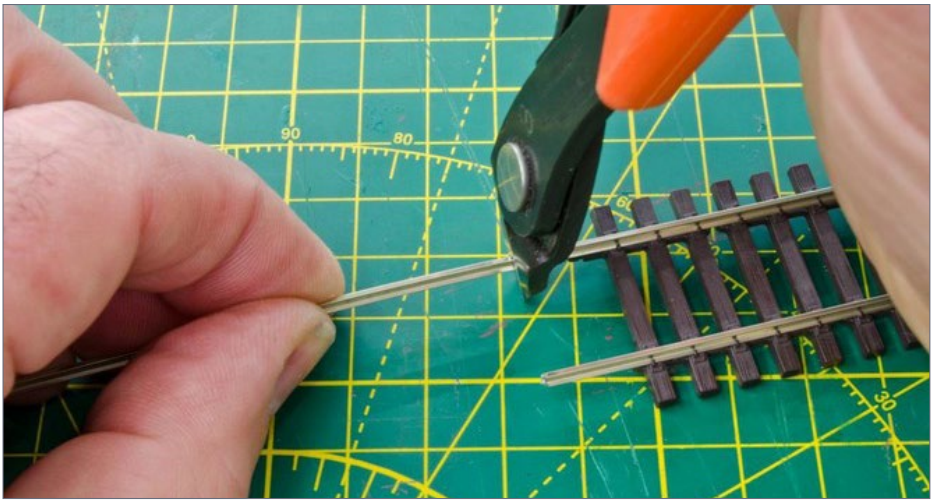
28. Square-up the ends using a couple of pieces of scrap wood. Use your cutting board registration marks as a guide.

29. It's then a simple matter to apply cement to the underside of the stringers and lower the deck assembly carefully onto the ties. After the cement has hardened a little, you can pop out the spacers.

30. Repeat the operation on the other side and you will have a competed deck assembly – level and true.

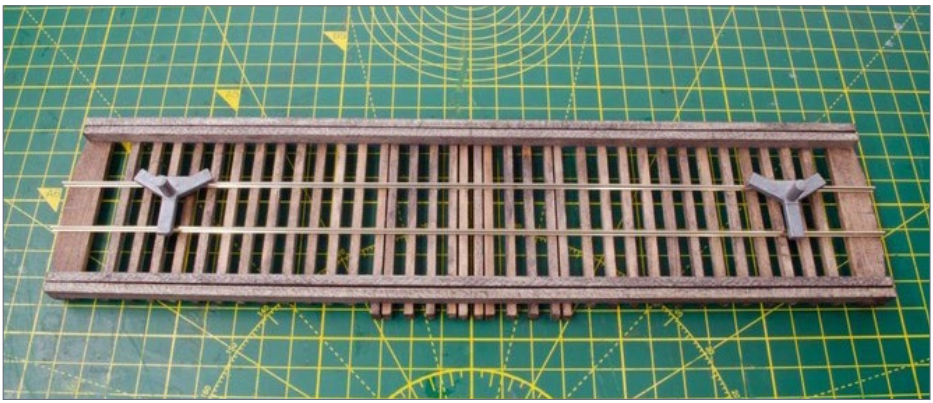


31. Draw two pencil lines across the top of the ties exactly 16.5mm apart (8.25mm left and right of the center line).

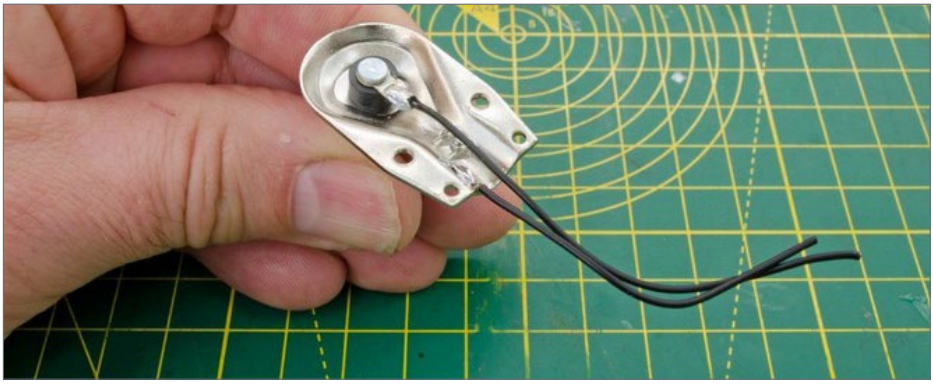


32. Cut two pieces of rail for the deck. Xuron rail cutters followed by a clean-up with a needle file work well. These pieces of rail must be exactly the same length, and overlap the outer edges of the end plates by 1/16" at each end.

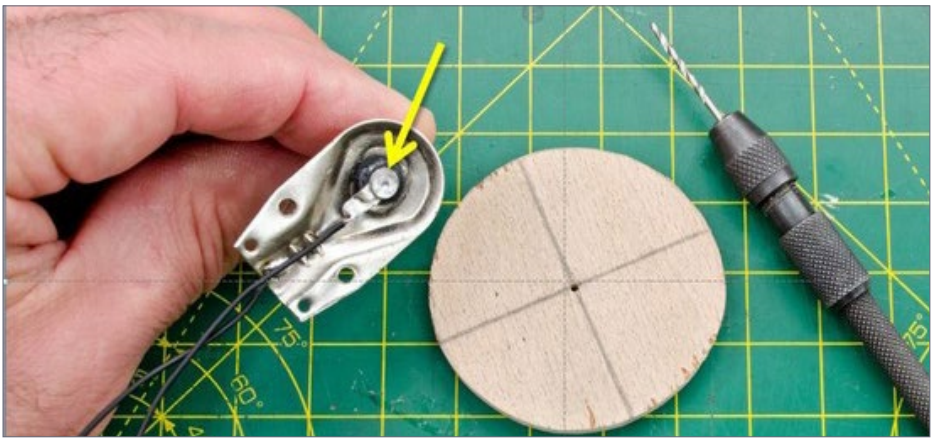
33. Spread a thin bead of contact cement along the pencil lines and undersides of each rail. Cleaning the rail with alcohol first is a good idea to remove any grease.



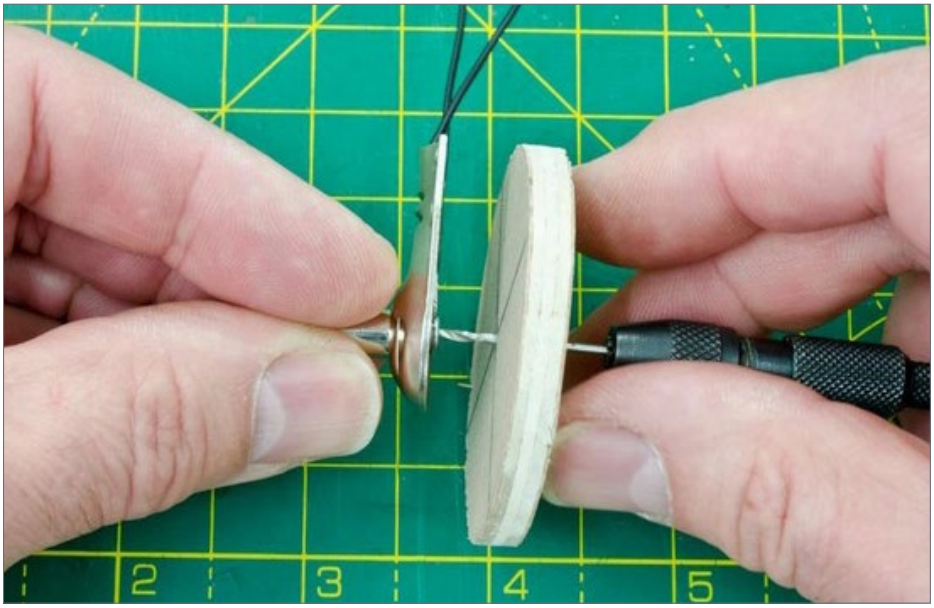
34. Apply the first rail to the deck and then use track gauges to fit the second rail. As previously stated, the rails need to be exactly the same length and absolutely square at their ends.



35. Solder some wire to the center terminal and body of the plug. Although it is quite a mass of metal, the plug body takes solder well – I used a 25-watt iron without issues. Just be patient as the iron heats up the metal, and take care to let it cool before handling.



36. The mounting plate for the plug is a disk cut from 1/4" plywood. Make sure you mark the center point of the disk and then drill it through as square as possible with a pin drill (around 2 mm, but this isn't critical). Note that the pin drill has also been used to "center-pop" the top of the plug shaft. This is important for centering the plug on the disk as we will see in the next picture.



37. First make sure you enlarge the cover plate mounting screw holes (either with a drill or a needle file) to accommodate a couple of #4 x ¼" flat-head wood screws. Apply CA around the base of the plug, and fix it to the disk using the method shown. Thread the disk onto the pin drill, locate the tip of the drill in the previously made center pop, and finally slide the disk up the drill shaft until it contacts the disk. Wait a few seconds for the CA to take, then remove the drill.

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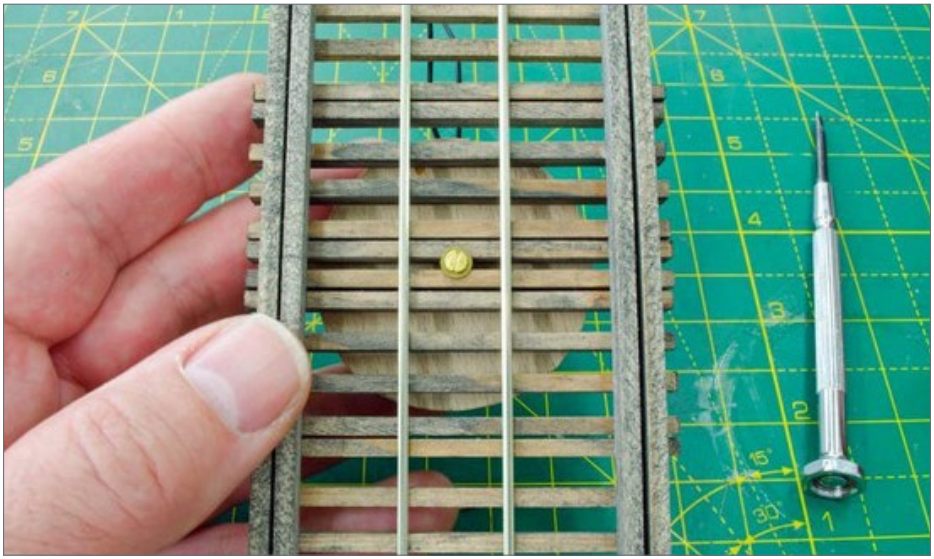
38. After waiting for the CA to set fully, very carefully drill a couple of pilot holes using the plug cover plate screw holes as a guide.

39. Fit a couple of flat-head #4 x ¼" screws. The CA makes sure that the plug doesn't move while tightening the screws. Because the screws are countersunk, no lateral movement of the plug in relation to the disk is possible.

40. (Above) Note the shape of the plug body. The downward angle on the right helps protect the guitar body from scratching, but the shaft center fixing and the ends of the plug body form a three-point suspension. This means the plug is exactly perpendicular to the disk. The hole in the center is also exactly in line with the plug shaft – vitally important for accurate registration, as we shall see next. I have tested three of these plugs and all were good. In the highly unlikely event that your plug does not sit square, you will have to use washers of suitable thickness to correct it.

41. (Top right) A screw and washer are used to clamp the plug mounting disc to the deck. This is a temporary situation, but the screw allows us to adjust the position of the rails relative to the center line of the plug which is very important when it comes to aligning with approach tracks.



NEXT MONTH

In the second installment we will look at the knotty problem of turntable alignment as well as completing the "A" frame deck and looking at an alternative girder deck option. ☑

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MRH Marketplace

THE STOCKTON & COPPEROPOLIS

We visit Don Ball's unique 1895 layout that can be toured at the 2018 NMRA Convention in Kansas City …

1. Train No. 6, the afternoon westbound passenger, waits to depart from Oakdale. Behind the depot are commercial hotels for the traveling public. Don scratchbuilt the depot from plans and photos – the water barrels on the roof are to help protect against fire.

MRH: Tell us about what you're trying to do here.

Don: I've always been interested in 1800s railroading. I'm from California and I spent most of my life there. I wanted to create a slice of history circa 1895 from California – in the San Joaquin Valley.

I was researching a railroad called the Stockton & Copperopolis. I knew nothing about it but the name was interesting so I researched it. I started finding photographs and more information.

I found it was the conduit for most of the goods, services and people going to the southern mines of the California gold rush country. If you visited Yosemite, you went over the Stockton & Copperopolis, for example. It lasted for a number of years and was a prototype nobody else was modeling.

So I worked up a few track plans and went from there.

MRH: Why model railroading in this era?

Don: I've been asked that question a lot of times. I think my first exposure to scale model railroading was when I was about 10 years old and I saw my first copy of *Model Railroader* magazine.

At the time, they seemed to be regularly covering turn-of-the-century railroading. I thought it looked kind of neat. They seemed very receptive to contributions, you know, how to build a 19th century stock car and things like that.

2. The local passes over the "J" Street underpass at the south side of Oakdale. Businesses on this side of town include a "Cash Only" store, a general merchandiser, saloon, and a Chinese laundry.

The more I looked into modeling this era, the more interested I became. I went from being a fellow that hated history in high school to someone who loved researching the past. It evolved and when I got old enough to afford the equipment, first thing I bought was an 1880s locomotive and started working on it.

I knew some guys who would go to Colorado and come back saying, "Oh my gosh, I'm a narrow gauger now." There was no such moment for me. From the beginning, this was where I wanted to be as to era.

I also wanted a railroad designed for operation. I like operation. I wanted to run scheduled trains and do that under timetable and train order operation. And I wanted things to run smoothly.

MRH: Were you fascinated with short cars and short trains?

Don: I had built a couple of smaller railroads before this layout. I tried out little cars and little engines. I was told they can go around an 18" radius curves – well, no they can't. Not and look good!

So, I settled on a 30" minimum radius for the railroad. Number six turnouts and, fortunately the country I was going through was fairly flat so, picking a grade was not too difficult. There's only one part of the railroad that has a grade of 2.5%.

MRH: How long did it take you to come up with this layout plan? Did it go through any revisions?

Don: Yes, the plan I finally went with was version number 32. Around number 30, I discovered the room length was off by a foot – of course, it was a foot shorter than I thought, not a foot longer!

I used CadRail to draw the plan. As I made revisions, I could copy off the parts that seemed to work into the next revision. I kept doing this and I finally got something that seemed to finally fall into place. Like I said, I finally went with revision number 32.

I designed the sidings for a minumum 10-car train. That would be my design standard and I wanted to not see the next station.

3. Wagons pull away from the railroad cars at Oakdale's team track. Behind them is the Stanislaus Warehouse which caters to the storage of sacked grain destined for Stockton's flour mills and warehouses.

And that's with the time table and train order operation. You really have to look at your timetable, look at your orders and decide, do I have enough time to get to the next station or should I wait here and wait for the limited to go by?

And so, the 10-car train siding and a minimum of two train lengths between towns, was pretty much what I had set on.

MRH: How did you select your layout height and why did you pick that height?

Don: I had originally gone with a 56" railroad height for a layout I had in California. I discovered it was a bit much when trying to

4. Engine 25 uses two flat cars as a "handle" to reach the Armour boxcar at Oakdale Lumber. Locomotives are not permitted beyond the lumber yard's gate due to the fire hazard of the woodburners. The lumber storage racks were kitbashed from two Atlas lumber yard kits while the office is scratchbuilt.

reach over and uncouple cars. It was a nice height for viewing but I wanted a layout I could operate, not just a showpiece. With this layout I went with 48". I prefer better visibility when I, for example, want the third track over and uncouple cars with the pick. The first layout was just too high and lowering to 48" worked better.

MRH: When did you actually start construction?

Don: I started in the fall of 2007. The room was ready to go and I started putting benchwork in.

MRH: Did it go the way you expected? Did you find any nasty surprises at all?

Don: It went about as I expected, but progress is never as fast as you like! I was retired by then so every day I came down and

5. The westbound local switches the Burnett's spur serving the Gilmer & Martin grain warehouse. Cars are a mixture of kits, kit-bash, and scratchbuilds. The G&M warehouse was scratchbuilt. The blue wagon at the right belonging to Professor Marvel was copied from the wagon used in 1939's *The Wizard of Oz.*

worked on the railroad. I would build one section at a time. I would start in town A and then build to town B. I'd put in all the wiring, solder all the drops, put in all the switch machines, and then check it out.

Then I would go from town B to town C. I never went crazy just doing benchwork for example – I mixed it up a bit as I built the layout.

MRH: What about modeling structures from this era?

Don: Since I'm trying to match a real situation in time, I try to find structures that look like what I'm trying to model.

Often the kit builders come up with generic buildings. That's fine – I've got DPM kits on the railroad that I've converted to my use but, it turns out that most of the buildings I'm doing are scratchbuilt.

They're not necessarily remarkable buildings, but they're the ones that were there. By scratchbuilding, they end up with not exactly a "family appearance" but something that still looks right. I'm modeling turn-of-the-century California and all the warehouses are going to look somewhat the same, but they won't look like warehouses in Pennsylvania or Indiana.

As much as might I want to use kit structures wherever I can, I find I'm scratchbuilding more and more.

MRH: You must spend more time researching a building than actually building it.

Don: It's about 50-50. I've gone around to various historical societies and museums trying to get pictures of the area I'm serving. I've also gotten copies of railroad plot plans which show auxiliary structures as well as the depots and so on. Some of the Sandborn insurance maps show definite dimensions.

Between all of those, I can come up with what a building looked like enough to build it. Of course, none of the pictures are in color!

But you can make some decent guesses of the details and every once in a while you get lucky. For example, the *Stockton Independent* newspaper ran an article giving all the dimensions of the building. How high it was, how long the eaves were, even detailed plan showing how big the rooms were inside the depot.

To top it off, about a month later, after I had built my model, they told me what color it was! But that is unusual.

Usually you know the building's general dimensions and that it was wood frame, but that's all. You end up needing to freelance something that looks proper for that area. I try to locate photographs from the area to substantiate the structure design before

6. In Oakdale, the Foothill Oil Company operates an independent oil products distribution center. Kerosene is the primary product in the 1890s and is distributed to local customers by oil wagons such as the one at the right of the frame. This wagon was kitbashed from two Jordan wagon kits. The two red Union Tank Line cars to the left actually carry kerosene in internal tanks. The labels on the oil barrels were copied from authentic labels found in photographs of the era.

just I go off and invent a building. But sometimes, that's the best you can do.

MRH: Did you have to do that for the bridges too?

Don: Take the big Stanislaus River bridge – I've got three or four photographs of that back when it was in use. It was built in 1871 and it was removed about 1897 and replaced with a steel bridge.

Fortunately, when they replaced the steel bridge, they made up a drawing showing where it was going to go complete with dimensions showing what was actually there.

So along with the photographs and the drawing of the modern bridge, I was able to get dimensions and enough information to actually put the older bridge together.

MRH: So it was red?

Don: A lot of people remark on that.

Back in the 1800s everything was not automatically creosoted like they do today. But fire was a real concern. There was a lot of dry grass around especially in the summer time, brush fires run rampant in California, so there is a chance of a big wood bridge burning down. It was a long structure about 800 feet long, a good investment of money, so they didn't want to lose it.

7. The eastbound fruit trains passes Orford Junction tower. This train consists entirely of refrigerator cars and serves the produce and fruit packing customers along the railroad. The tower controls the interlocking plant at this location.

As a result, they came up with a fireproof paint. It was a commercial product you could get in red, green, gray and I think a slate color. I chose red because it just appealed to me.

The prototype pictures I have, of course, are in black and white. The bridge was a dark color, so it wasn't just raw wood. Otherwise it would have been a lighter color – that silvery color fresh wood weathers to.

I made an assumption based on the dark color in the photo that it was painted. It may not have been, but I do know other bridges of the same period were painted. So I made an assumption and I painted it red. How often do you see a red wood trestle?

MRH: How do you get steam locomotives to run well?

Don: Well, let me give you a little bit of background. First of all I was educated as an engineer and so things have to work right.

With the car I drive, it must run smoothly, whether it has a nice paint job is secondary. So, if something doesn't work, it doesn't stay on the layout, basically.

Most of my locomotives are older brass imports from the 60s and 70s.

Generally, I have to replace the old open frame motor with a newer can motor and I must replace the gearboxes they came with, or at least rework them so everything runs more steady. Remove any binds and add extra contacts.

The reason diesels run so well is they pick up from all the wheels. Steam engines, historically, have the locomotive picking up from one rail while the tenders have been picking up from the other.

In reality, with small steam, that doesn't work so well. So I just copy what the diesels are doing. I add extra contacts so the locomotive

picks up from all the wheels – it makes a tremendous amount of difference.

DCC with the decoders they have these days and the ability to put in all sorts of behavioral constraints does wonders as well.

MRH: How did you engineer your swing gate?

Don: We have high humidity swings here and I wanted to avoid problems with that, so I used a couple of steel columns anchored into the basement floor.

I used a concrete drill and drilled the holes then embedded the columns into the floor with epoxy.

I used aluminum channel to make the swing gate cross piece. When the gate swings shut, it goes into a pocket that's aligned with the tracks. It's adjustable, because in spite of everything, the gaps still open and close. I align it before each operating session to make sure.

The latch I have on it is spring-loaded, so it's real easy to push it open and to get it to close. It seems to work well.

I do have it wired so there is some dead rail on each end to avoid any disasters. I just used some micro switches to disconnect the track on each end when the gate is open.

8. Leased from the Virginia & Truckee Railroad, engines 2 and 3 pull a train of four-wheeled ore jimmies loaded with copper ore over Keystone Ravine bridge. The train will take the cars to the smelter at Stockton and return with empties. The ore jimmies have cast resin bodies with cast metal underframes.

MRH: What were your greatest challenges with this layout?

Don: My greatest challenge was working up the operating system. It didn't work the way I had first envisioned it, so I had to make changes. I had to adjust the timetable and change what trains would be running where. Everything else up to that point on the layout had been a matter of just plodding along.

9. An overall view of Orford Junction. The Boyd farm occupies the area just beyond the tracks while the traveling wagon of an itinerant photographer rides on a railroad car on the siding. In the far distance to the left is the town of Holden. Telephones such as the one shown here are distributed along the railroad for crews to OS their positions.

MRH: What do you like most about your layout?

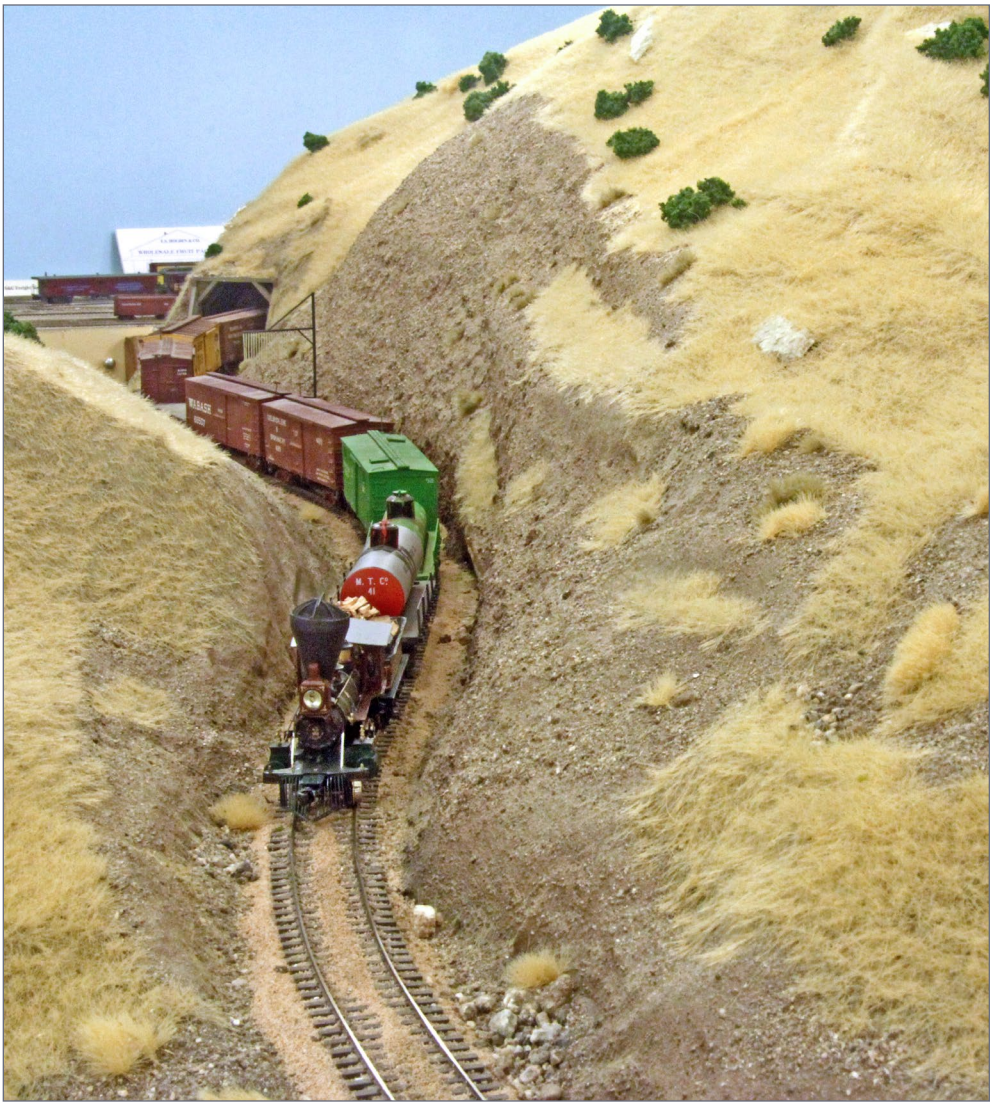
Don: It has come out looking like I wanted it to. It does a good job representing the part of the country I wanted to model and I think that's remarkable, actually! I'm very pleased with that.

MRH: What do you like least?

Don: I could use more yard area, and probably some more staging tracks. I was limited in what I could do and get everything to fit.

MRH: Yes, everything is a trade-off. If you had to do it over again, is there anything you would do differently?

Don: Probably not. If this thing burned up and I had to do it over again, I'd probably choose a different prototype. I have nothing

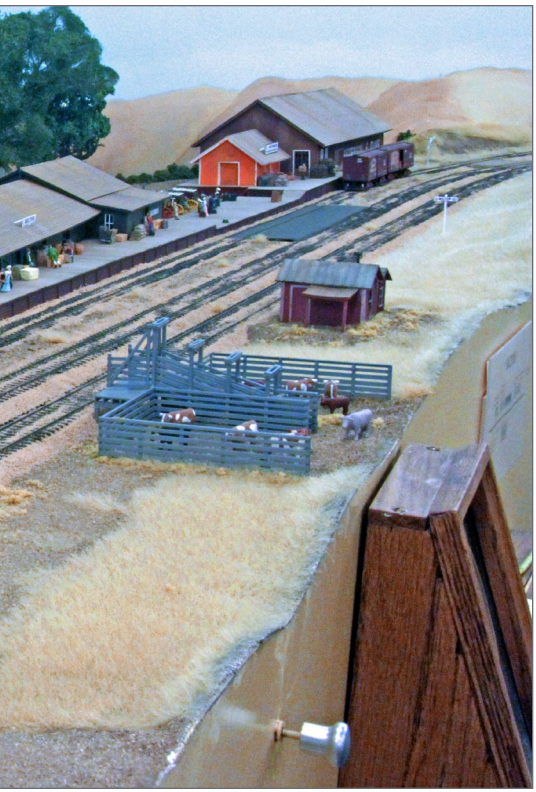


10. The Copperopolis Turn descends the grade on Gopher Ridge on its return to Stockton. The ballast on the ties is not due to sloppiness but is known as crowned ballast. The intent was that water would run down the ballast ridge and beneath the rails to drain the track. Over time, however, the ballast would settle and defeat the purpose.

11. An overall view of Milton, the end of the line for the prototype Stockton & Copperopolis. The entire town was built to scale without compression including the town's business district, the Masonic Hall (large white building) and the freight forwarder's warehouse alongside the tracks.

concrete right now in mind, but there are always three or four other things to pick from that look interesting. I don't really want to go far down that road because I'd rather not tear it down and start over. I still have a lot of things I want to do, and I'm quite happy with it.

It's like when you go into a restaurant and order something – if I start looking too much at what my friends ordered, I might get dissatisfied with what I ordered!



MRH: Is there any part of building a layout that you don't enjoy – and if so, how do you motivate yourself to do it anyway?

Don: I think I'm one of these guys that enjoys all of it. I don't mind woodworking, I don't mind electrical, track laying has become more interesting – I scratchbuilt all my turnouts using the Fast Tracks jigs. I was dreading scenery for a while, but I found out that's not too bad. Structures, I like. I really like doing rolling stock and locos.

The one thing I'm really anxious about is doing backdrop painting. Some of the backdrop painting I'm fine with, but I'm not an artist. So I try to keep it simple.

MRH: Do you host TT&TO operating sessions?

Don: As I mentioned, the layout uses time table and train order.

Passenger trains were very important during this period, so I have several scheduled passenger trains. Generally, one going each way in the morning, one late at night and one midday.

It's incumbent upon the other trains to keep out of their way. I tell the passenger crews: this is the period when you didn't put a passenger train in the hole for freight – quite the opposite. The passenger train had to come in on time.

And it was the era where people sometimes went over the speed limit to stay on time. As long as nobody got killed, everybody was happy - they didn't look too closely at why it only took a few minutes to go 10 miles.

MRH: So passenger trains rule – what about other kinds of trains?

Don: We've got a goodly number of scheduled trains both freight and passenger and then we have several trains which just run extra. The extras are in fear of everybody else, they have to look out for all the scheduled trains and each other!

MRH: Sounds like an interesting challenge!

Don: Yes, you have your extra trains that are out there with orders. They have to look out for the regularly scheduled trains. To help

12. Stages departing for locations in California's gold rush country leave from the passenger platform at Milton. The names of the town's businesses are taken from the 1895 city directory. The stages themselves were scratchbuilt using Jordan parts.

do this, we have telephones scattered throughout the railroad. As each train passes through a station, it reports to the dispatcher that this particular train has gone through at a certain time.

The dispatcher keeps track of that and hopefully can divert any problems before they get too serious.

And that's pretty much what we do. It puts more burden on the crew to figure out when they should go and when they should not. This is opposed to something like a modern CTC system where the dispatcher flips a switch and says: you're staying and this guy is going.

It is a little bit different operation than how trains run in more modern times. But I find it more exciting, let's put it that way!

13. Although the countryside is dry, it is still suitable for raising cattle. Water, however, has to be pumped by windmill.

14. The MSN 104 departs Peters after a brief stop to interchange passengers with the Copperopolis local passenger train on the left. In the foreground is a contingent of the Stockton Wheelmen, the local cycling club.

MRH: Walk us through how things work with an extra train.

Don: When an extra train is to leave, they're given train orders that tell them what they can do, where they're supposed to meet another train and so on. Now quite often, during the session, those orders have to be modified for one reason or another.

Maybe a regular train is late, so this train has to be helped along and then instead of meeting up here, we'll change the meeting point to somewhere else to better accommodate the schedule and keep things fluid.

When this happens, the dispatcher needs to call the appropriate station operator. We have one operator and he's basically wearing the hats for each of the station operators in all the towns throughout the railroad.

The dispatcher will call up and say, "Farmington operator." The operator puts on his Farmington hat and says, "Farmington."

Then the dispatcher will say, "Copy one westbound" and that means the Farmington operator sets the westbound order board (the train order board at the depot) to stop.

He reports back to the dispatcher: "Signal displayed" and then the dispatcher dictates the order. The operator writes it down and then reads it back to the dispatcher to make sure he's written down the right orders.

So when a train comes up to Farmington, he sees the red board. He stops and "goes into the depot" – in other words, walks over to the operator's desk and asks, "Do you have any orders for me? I'm train so and so." If he's the right train, the operator says, "Here's your orders."

15. Due to the track plan, it is necessary for operators to cross the main line several times per session. A swinging gate constructed of steel and aluminum parts is used for this. When the gate is open, trains automatically stop because of a power interlock.

16. The westbound local freight steams slowly across the Stanislaus River bridge en route to Stockton. The bridge was scratchbuilt using basswood.

The train crew looks at the orders. Meanwhile, the operator lowers the train order board and reports "Orders have been delivered." The train crew does whatever the new orders are telling them they need to do.

MRH: You have some fancy-looking interlocking on this layout.

Don: An interlocking is to prevent multiple trains from being assigned conflicting routes at a busy intersection. In other words, you don't want an eastbound and westbound train coming together in the middle of a junction.

An interlocking literally prohibits the tower operator (or in my case, the station operator) from setting up two conflicting routes. In other words, when you get a westbound signal, showing proceed, it physically locks out the eastbound signal showing proceed.

When there's track switches involved, it gets even more complicated because you can't show a signal for a diverging route if the switch is still set for the straight route and so on.

In the old days that I'm modeling, instead of using electronics as they would today, they used an actual mechanical system. You had several bars going down from each lever and when the bars moved they moved horizontal bars.

So, if you flip a switch here, it might move a couple of horizontal bars, which would prevent you from throwing a switch over here. And then when you cleared up that route, say westbound, another bar moved over, it locked the eastbound signal so you couldn't clear up that one.

By this means, you were physically locking up the plant so only one direction and only one movement could be indicated at a time.

So, I tried to replicate that. I thought it was fascinating. Years ago, there was an article in *Model Railroader*, like about 1961. They

17. An overall view of Stockton as the local passenger train runs by a freight on the siding. The A. L. Gilbert Company in the foreground is a dealer in hay, a common commodity found in a horse-drawn society. As on the prototype, the railroad defines the town with buildings on both sides of the tracks. At the far end, the track curves behind the industrial buildings to enter the staging yard at Merced. The knobs on the fascia operate Blue Point switch machines at each turnout.

had a series of articles showing how to build one of these things and make it operational. I read that when I was in junior high school and said, "Someday I want to build one."

Meanwhile, I did research. I read some old interlocking books from the 1800s and early 1900s, saw how they did it. I finally designed my own – and between what I had learned and this old plan, I came up with the working interlocking system I've got at my junction.

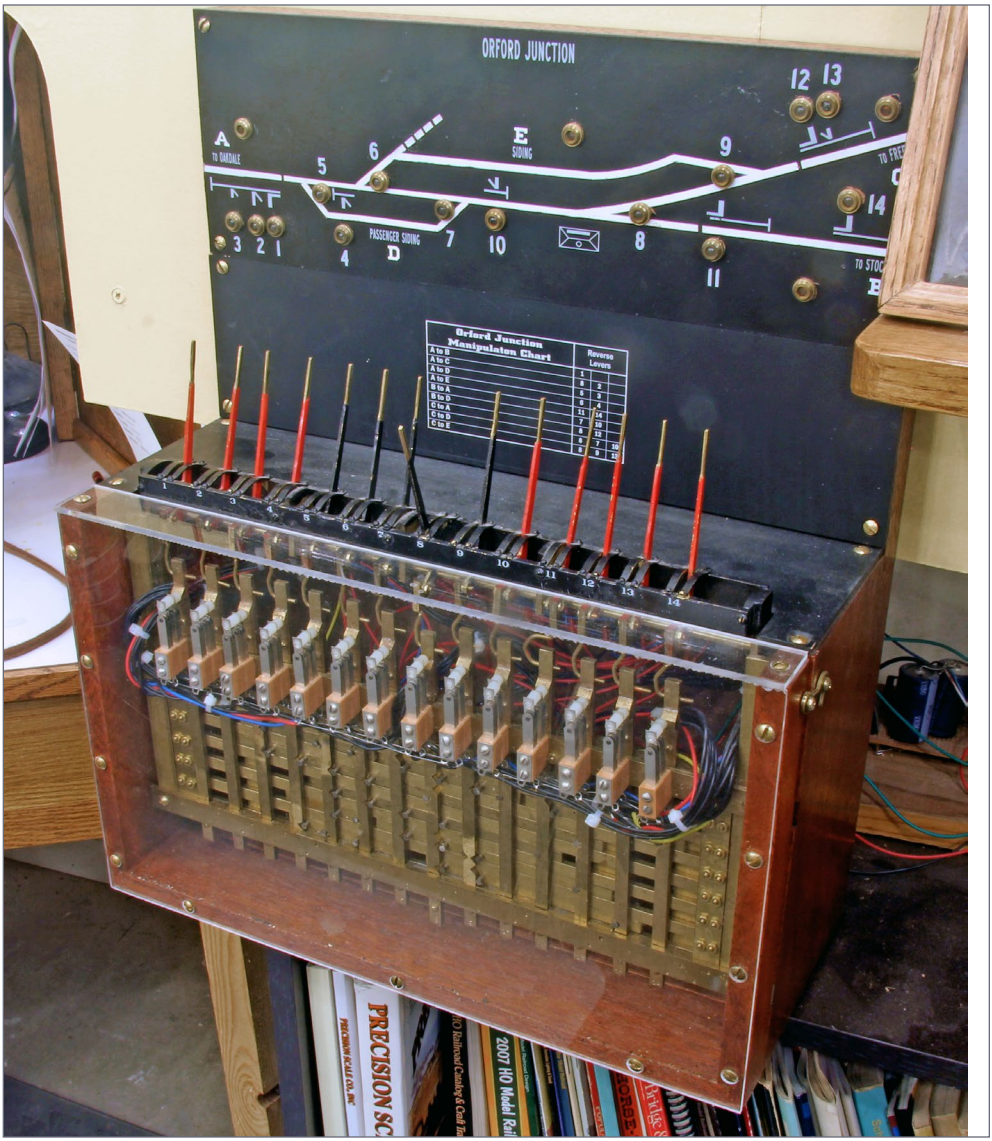
18. The operator's desk at Holden. It is his job to copy train orders from the dispatcher, set train order signals and operate the interlocking plant.

The fun began because I had to start machining the parts. I've got somewhat of a background in machining and I've got the tools to do it. I was able to turn the parts, drill the holes, mill the stuff, and do whatever needed to be done. I milled the parts out of brass, and built the wood case, then assembled everything.

Took about three months to do all that and then it sat on a shelf for about six months because I was tired of drilling aught-80 holes and tapping them and things of that nature.

MRH: How important is it that your operators feel comfortable and free to put on a good show?

Don: It's important because people come to have a good time and I want them to see something a little different than they usually see.



19. The interlocking machine for the Orford Junction plant. The brass bars move as levers are thrown and interact to prevent two opposing routes being aligned at the same time. The turnouts and signals at Orford are all controlled through this machine.

20. The westbound freight, pulled by engine 23 (right), waits for the departure of the Copperopolis local at Peters. The 23 is a reworked brass import while the *Andrew Jackson* (left) is scratchbuilt.

This is the late 1800s, the Victorian era, where everything was a little bit fancier. They polished the engines, they paid a lot of attention to detail. They also did that with their furniture and the design of the rooms they were in and so on.

So, I've tried to make my furniture – the card boxes for example – out of oak and all stained and glossy like they would have been in the 1800s. I made the desks out of oak and finished them nicely.

I want the chair to be comfortable too! If a guy sits at the desk as an operator for three hours and gets a sore back for two days because of it, he's probably won't do that job again. Making things comfortable makes people more likely to come back – and I think it gets people in the mood too.

MRH: Comfortable is good. What else do you hope people take away from an op session experience here?

Don: You come down into this basement and what you see is old time railroading and you say, okay, this is the 1800's. I've got to think a little bit differently than if it was the Amtrak era or the BNSF I'm running.

First of all I want them to have a good time. I want them to go away and say, "Hey, that was pretty neat. I will tell my friends: you're going to have a fun time there."

MRH: "Having fun with trains" can be experienced in a lot of different ways.

Don: Yes, fun can mean a lot of different things. It may be running the trains you like, switching or whatever. But I try to get everything set up so that it's enjoyable.

For example, my wife prepares a very nice tray of refreshments. So if nothing else, they won't go away with an empty belly!

Beyond that, I would like them to see a bit of interesting history. The only thing most people know about history is what they see on movies and television, much or which is wrong.

And there're a lot of things that were very common place in the 1800s that you never see and that's part of what I've tried to reproduce on the railroad.

I've spent a great deal of time, for example, making horses and buggies because they were everywhere. The institution at this time is the livery stable. Just like Hertz and Avis, they had livery stables everywhere to rent things.

But I hope you really go away thinking that I've done something a little different. Ideally it would be nice to have a visitor say, "Gee

I wonder if I can do that in my basement?" I think that would be super neat but I'm not sure anybody has so far.

MRH: Do you get mostly regular operators who prefer earlier eras like you?

Don: I've got a number of people. Most of them model post-World War II up to modern day. Some don't model any steam at all, but they do seem to like coming to operate my railroad. Even though they might not model steam, they enjoy it here and that's neat.

It's something I like. I'd be doing it if nobody else was, but it's even nicer when you have your friends say, this is neat and that it's worth coming over and spending a few hours every month.

MRH: What is your philosophy on doing a layout well?

Don: Figure out what you're doing and then do your research. In my case, I went to a lot of libraries and historical societies to find old photographs and what not. I was actually quite successful at doing that. I did detailed research for two or three years before I started the layout.

By doing your homework, you can get a good idea of what you want to model. Work up a track plan that has what you want, and that includes determining what kind of operation scheme you prefer.

I have a friend who has a nice layout, but it's basically a layout with a yard at each end and one passing siding in the middle. Operationally, it doesn't provide a lot of options.

Better is to try to figure out your trains and what they're going to be doing in advance. Figure this out while making a change is as simple as adding or erasing some lines on a plan.

MRH: What advice would you give to someone who is new to the hobby?

Don: Figure out what you'd like to do and start doing it! Don't over-analyze things, don't wait until you can find the picture of the other side of the building. Make the best of what you have now, you can always make improvements later if someone comes up with that photo of the other side.

It seems like a lot of people aren't building things in the hobby today. I find there is a lot of satisfaction that comes from

21. Here is the dispatcher's desk, in a room separate from the layout. All the conveniences the dispatcher needs are handy: the operator's phone, station call buttons, train schedule, fast clock, and so on.

scratchbuilding a structure, a car, or a locomotive. If you do this, you get a lot of satisfaction and have something nobody else has!

MRH: Why the hobby of trains?

Don: Why do some people like broccoli and some don't? It's one of those things where I started out with a train set when I was two years old. My dad gave me a Lionel set and I used that for 10 years until I discovered scale model railroading and then, that really was what was interesting to me and it's always been trains.

I think my dad was a closet model railroader, but he never ever built anything. But, the older I got the more interesting I found railroads to be and then my interest more or less was honed down to the area I wanted to model and the type of equipment. You know, it just never was anything else.

As you say, I had a lot of different hobbies and those always compete. I'm one of these guys that's, you know, I'm cursed with too many things. Everything I look at seems like something I'd like to try and a lot of things I have.

But I always keep coming back to trains, it's the one that seems the most interesting to me.

It it seems like more people are modeling modern stuff, so we're talking cars that are probably a minimum of 50 or 60 feet long with two or three engines as a standard consist.

Modern trains are much longer while it seems space is getting smaller. So we're trying to get longer and longer things into smaller and smaller areas.

Then I look at my era. I designed my passing sidings for 10 car trains. That works out to seven feet with an average of 28 to 34 foot cars. The locomotives are smaller too.

Basically, you can have as much fun switching 10 car trains in my era as you can be switching 30 car trains from more modern times.

It's an ideal way to solve the space problem and I'm just surprised more people haven't figured that out. But again, it's what you like. If you love modern day railroading, well then steam engines and the small cars aren't going to do it for you. ☑

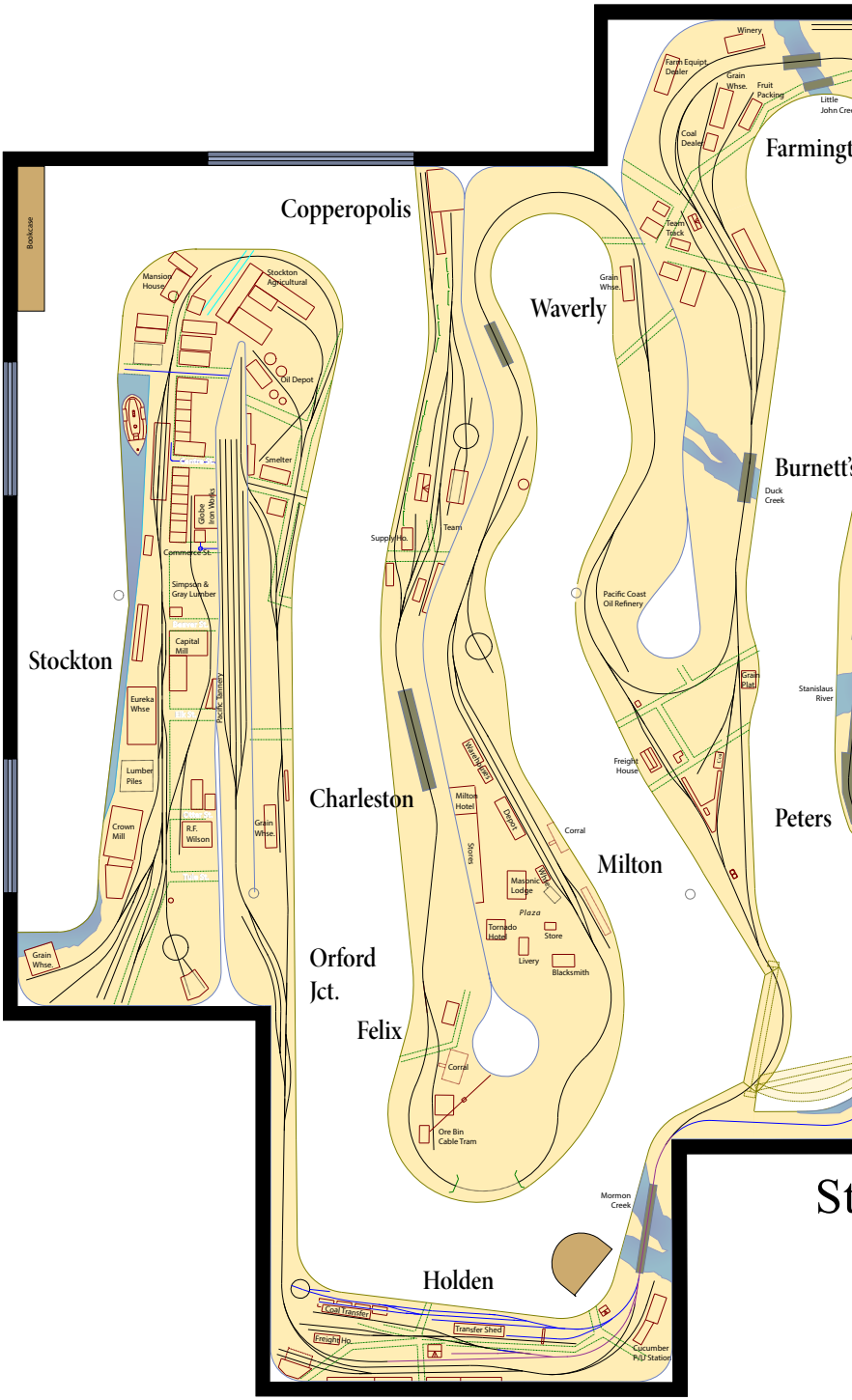
VIEW READER COMMENTS
click here

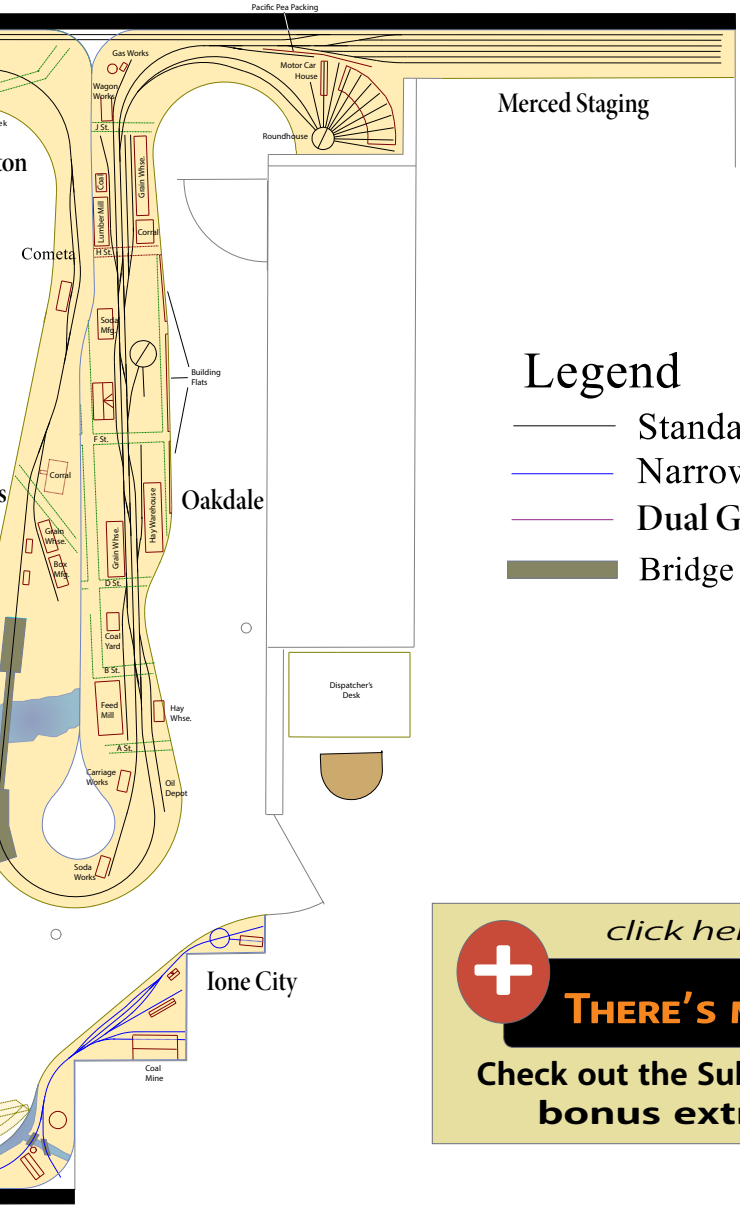
Don Ball

Don was introduced to model trains at the age of two when he got a Lionel train set. At age 10, he discovered scale model railroading and started reading the magazines.

In 2006, Don wed his high school sweetheart, who is very supportive of the hobby. Although educated as a mechanical engineer, Don spent most of his career working as a fire protection engineer and consulting with large firms.

Don also likes photography and has a passion for antique cars. He owns a 1920 Model T Ford and still drives it. ■





Legend

- Standard Gauge
- Narrow Gauge
- Dual Gauge
- Bridge

tockton & Copperopolis Railroad

Builder/Owner - Don Ball

Zoom in to study the details!

YES ... IT'S A MODEL

Model Railroad Hobbyist | March 2018 | #97

compiled by **Joe Fugate**

RATE THIS ARTICLE

1. A drone shot over the Seaboard Central Griffin Yard finds two SC SD40-2s tied down at the west end of South Yard track one. At Griffin, the main line and thoroughfare splits both North Yard, represented by the three tracks on the top with South Yard, represented by four tracks on the bottom. Tim Garland made this shot using an iPhone 7 plus while standing on a stool over his layout. The main line, which is the empty track in the middle, and the thoroughfare to the left of it have medium-grade ballast, and of all the yard tracks use fine-grade ballast. The yard tracks are also less maintained by evidence of some grass and dirt in certain areas.

MRH'S MONTHLY PHOTO ALBUM

2. (Above) The Pennsylvania Railroad's class H8, H9s and H10s steam locomotives were of the 2-8-0 "Consolidation" type, the last three classes of such built by the railroad. These classes differed only in cylinder diameter and thus tractive effort, each subsequent class increasing that measurement by an inch. The first H8 was built in 1907 and the last H10 in 1916. Class H10s was built primarily for PRR Lines West (of Pittsburgh), and featured a typical Lines West tender with a Crawford hood that had sloping side coal boards at the top, to enable a larger load of coal to be carried. The most common locomotive assigned to Grand Rapids & Indiana, Jim Six's steam-era layout, was the H10 class locomotives. Jim Six took the photo on his Sturgis, Michigan-based layout.

3. (Top right) To model this locomotive, Jim Six used a Broadway Limited first released about two years ago and he went with the factory paint and lettering already on the model. Jim weathered it using weathering powders with isopropyl alcohol. The only change he made to the loco was to install Kadee #153 short-shank scale couplers. To deal with marker lights on this model that might be a bit too bright, Jim applied a flat, dark acrylic wash over the lenses, toning them down to a more prototypical appearance.

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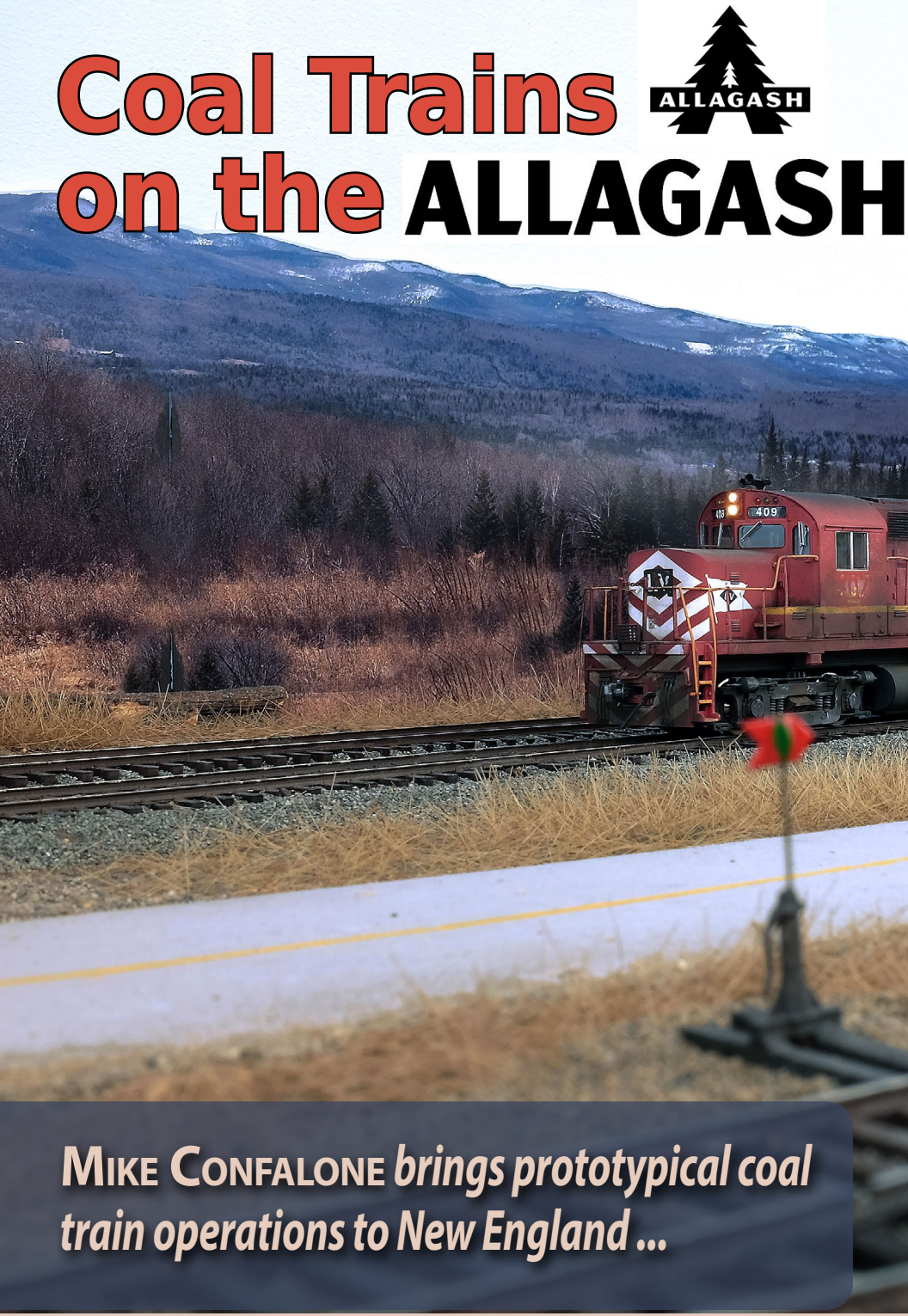
Coal Trains on the ALLAGASH



Mike Confalone *brings prototypical coal train operations to New England ...*

1. Coal Extra 409 North crawls past the yard at New Sharon, ME on a gray April 21, 1984. Leading the train is Delaware & Hudson Alco C420 409, still in Lehigh Valley paint. A pair of Maine Central GE U25Bs and a Boston & Maine GP38-2 round out the consist.

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Many wallpaper photos from this article!

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Thoughts on coal trains

When we think of coal trains, we often have images of fleets of unit trains hauling black diamonds from a few key sources across the nation. In the East and Midwest, we think of the coal fields of West Virginia, Kentucky, western Pennsylvania, or Ohio. In the West is the Powder River Basin in Wyoming and Montana. But where does all that coal go? For the railroad modeler who isn't modeling "coal country," this basic question presents an opportunity to get a feel for the coal industry without actually modeling it.

As we know, most of the coal extracted from the various coal regions of the country is loaded into unit trains and shipped to

2. A close-up photo of an old Reading hopper, one of several Conrail predecessor roads represented in the train. Note the rust patches. These are created by dabbing on full-strength artist oils and applying PanPastels over the oils. Note the streaking of the lettering, achieved with light-colored PanPastels.

coal-fired power plants. Modeling these trains can be pretty cool, and you don't need to build coal tipples and all that infrastructure if you aren't modeling the coal train's origination point. You just need to build a coal train! We'll get to that in a minute, but first a little background.

Coal trains in Maine?

When you think of Maine, the last thing you might think of is coal. Maine is a wood products and paper mill state, and we run plenty of the associated traffic on my proto-freelanced Allagash Railway,

which is set in Maine in the early spring of 1984. Despite this, I've always wanted to model a coal train that came onto the railroad from staging, ran across the entire system and then ended its run in staging, at a fictitious power plant. I've experimented with the concept (see Allagash Railfan Video Series V2), but never had really thought it out.

The route

To do it right for the Allagash, the coal would logically come from load-out points on Conrail, typical of the other major coal-fired plants in New England at Bow, NH, and Mt. Tom, MA. Coal trains to the Allagash would naturally come via Conrail to Rotterdam Jct. in New York, where they would be handed off to the Boston & Maine, then to the Maine Central at Portland, ME and up to Waterville (Kennebec Jct.) for final hand-off to the Allagash. It is

3. A view of the train stretched out on the tangent at New Sharon shows the variation in the colors of the hoppers, as well as the height of the cars. The taller cars are 100-ton, while the shorter cars are of the 70-ton variety.

4. Positioning a Pennsylvania 100-ton car next to an Erie Lackawanna 70-ton car shows the difference in height. Also note the grab irons, especially on the PRR car. Despite the detail being molded on, it is not objectionable. The weathering and the overall look of the car draw attention as the train drifts by.

important to note that in 1984 the Allagash is part of the growing Guilford system, which includes Delaware & Hudson, Boston & Maine, and Maine Central.

Coal trains over the Allagash portion of the route come on to the line at Waterville (represented by staging) and run north up the Kennebec Sub, passing through New Sharon, and into Madrid Yard where the power reverses ends for its run over the Androscoggin Sub. Once on the AN Sub the train passes Sandy River Jct., Weld, Knox, Spruce, and Carthage before it descends the mountain grade

at Holman Summit and ends up at a fictitious Western Maine Power Co. plant at Bethel, represented by staging.

Staging outside the box

This is a good time to point out that staging doesn't have to mean "off railroad." In this case, my lower-level staging yard represents not only an important interchange with the CN at Bethel (an example of traffic going "off railroad" in the traditional sense) but it also represents key industries on the railroad, including a major paper mill at Dixfield, and the coal-fired power plant at Bethel.

5. A Conrail NE-6 caboose brings up the markers at New Portland Jct., passing Sandy River Farm and Building Supply. Note the home road Allagash 100-ton hoppers at the tail of the train. A few of these AGR cars, along with several D&H and B&M hoppers, are in the pool along with the Conrail and family cars.

6. Extra 409 North arrives at Madrid Yard and drifts down Track 3.

7. The coal extra approaches the Madrid locomotive servicing facility. The old coaling tower looms in the distance.

Building the coal train

When I sat down to build a coal train, I had to answer some basic questions. First and foremost, I had to determine which coal hoppers to acquire and how many would be needed. I figured that for a coal train to look like a unit coal train, I would need 20-25 cars. Anything more would just present operational difficulties, considering the undulating and curvy profile of the Allagash. Anything less and it just wouldn't look big enough.

I already had a fleet of Chessie 100-ton hoppers made by Bowser. These are great-looking cars but would not be appropriate for a Conrail-sourced coal train. My friend Mike Rose is a big Conrail modeler and had a large fleet of Bowser Conrail 100-ton hoppers.

He had previously expressed interest in the Chessie cars, so we did a 12-for-12 swap. This gave me a head start on building my train.

Beyond the initial dozen Conrail cars, I wanted a mix of cars for Conrail predecessor roads Erie Lackawanna, Reading, Penn Central, and Pennsylvania, as well as a few D&H, B&M and AGR cars thrown in for good measure. Photos and videos of these coal trains back in the early 1980s show a mix of these roads' cars in both 100-ton and 70-ton varieties.

I began acquiring cars slowly and eventually had enough so that it looked like a unit train. All the cars are Bowser except for one Reading hopper by Bachman. To me, the Bowser cars have just enough detail so that they look great from an average viewing distance, especially when equipped with a solid weathering job and a nice coal load. They do have molded-on details, but to me, Allen McClelland's tried and true "good enough" rule applies.

8. AGR 425 is now on the point and ready to pilot the coal train over the undulating profile of the Androscoggin Subdivision. The train is now designated Extra 425 South.

Weathering is an important part of making things look real, and this is especially true for freight cars. Nothing brings a railroad to life like a fleet of nicely-weathered cars. With a unit coal train, this is equally important but with an important distinction. Because the cars are all viewed together, in a block, it isn't necessary to do a detailed weathering job on every single car. Spending extra time on a few is all you need, while the rest can get basic weathering and look right at home.

For me, PanPastels are the ultimate tool for weathering freight cars (see "Weathering with Mike Confalone V1" available in the MRH Store). They are easy to use and give excellent results time after time. In addition toPanPastels, I use artists oils full strength and with turpentine to create heavier rust and streaking effects.

Photo research

Looking at prototype photos of Conrail 70- and 100-ton hoppers gave me a good idea of how these coal cars weathered over time. I found that highlighting the ribs with a black pastel, and some broad brushing of black or gray pastels on the carbody, did enough to give the impression of a typical Conrail coal hopper that has been in service for a while. On several of the Conrail cars I did some fading of the panels away from the factory bright oxide red. This gave a nice variety among the Conrail cars. Some are almost new and others moderately weathered. For the predecessor roads, I spent more time on each car, especially the Reading and Erie Lackawanna cars. Photos of these prototypes showed more body rust, streaking paint on the lettering, and other effects.

9. From a perch at the south end of Madrid Yard, we see the Conrail caboose pass a variety of freight cars. The coal contrasts sharply with the pulpwood loads and general service boxcars.

10. Extra 425 South crosses the Sandy River on a through truss bridge just a few miles outside Madrid.

Between the pastels and the oils, I was able to achieve a slightly different look on each car. As a whole, the coal train just looks "right," and as it passes by, you might notice a car here and a car there that stands out just a bit from the rest of the fleet without being overdone.

Now, for the coal itself. My friend Dave Barlow has been making coal, wood chip, scrap, and other loads for a long time. Nobody makes a better removable load. I had acquired enough of his coal loads that I didn't even need to consider running with loose coal. Dave's coal loads have a wood base, with the load itself built up with putty, and then painted and covered with crushed coal. The effect is very convincing. Each load is different, some humped up high, while others are flatter. This gives more visual variety to the train.

Despite the realistic load, the Bowser hoppers are as light as a feather. To me, a coal train better have some heft, not only for better tracking but to give real tonnage to the train (see Allagash E-book for discussions of weighting freight cars). The last thing I wanted was a 23-car train that was coming off the rails and having difficulty as it wrapped around the many curves on the railroad.

To combat this, I did what I do to most of the freight cars in my fleet. I add lead. I generally have on hand a supply of sticky-back strip lead used for balancing wheels on automobiles. Typically, these lead strips are stuck inside a boxcar or covered hopper and are permanent. Because the coal train could be run empty if desired, I decided to put a loose strip in the belly of each car, and then add the removable load. This gives the train more weight, which translates to improved operation.

11a. Photographed from a backyard, the coal extra rolls by Milepost 7 as the train leans into a curve. Sandy River Junction and the White Mountain Branch diverge here. The branch is on the other side of the riverbank.

11b. The tail end of the train snakes its way into Weld.

Power – Lots of it!

The actual coal trains to Bow ran with virtually any and every kind of power, including solid sets of Conrail engines, both EMD and GE. Often, the power was mixed, with locomotives from D&H, B&M, and MEC with or without Conrail power. For me, the opportunity to model this rainbow of power was an extension of the day-to-day Allagash operations, where locomotives from the various Guilford railroads mix freely on the daily road freights. I have plenty of D&H, B&M, and MEC power, and a big fleet of Allagash power. Over time I plan to acquire a fleet of Conrail locos to mix with other power or run as a pure set. This is going to be fun!

The coal train makes its debut

Before I knew it, I had a 23-car weathered and loaded coal train and plenty of power. All that was needed was a caboose. I had all

but forgotten that Mike Rose had purchased for me an Atlas NE-6 caboose decorated for Conrail. After a quick search, I found it

11c, 11d. The coal extra passes through downtown Weld.

12. The 425 accelerates as it departs Weld, passing a loaded pulpwood rack on the team track. The remnants of the long winter of 1983-'84 are fast giving way to spring.

and brought it to the weathering bench. Fifteen minutes with the PanPastels and the caboose was ready to bring up the markers!

Preparing for the December 2 operating session, I assigned power to the train and positioned it at Waterville (staging). Plans were for Mike Rose to bring a pair of Conrail GP40-2s to pilot the train ahead of whatever I decided to lash-up from my own pool. As Mike was walking up my driveway toward the house I yelled out to him "how's it going?" His response was a subdued "well, there's good news and bad news." The special box of goodies, which included the Conrail GP40-2s, was still sitting on Mike's workbench two hours away. Bummer!

Not having Conrail power was not a deal breaker as the prototype trains to Bow, NH and Mt. Tom, MA occasionally ran without any

Conrail power. For the first train, I lashed up a D&H Alco C420 still in Lehigh Valley paint, along with a pair of Maine Central U25Bs and a Boston & Maine GP38-2. I must admit it looked impressive!

Mike had called dibs on the train, so he grabbed a throttle and went to work. This is Mike's kind of train! The first run of the coal train, Extra 409 North, was under way. Mike brought the train up to New Sharon and took the siding where he had a rolling meet with a road train piloted by me. Watching a heavy freight pass a unit coal train at a scale 10 mph at New Sharon was simply outstanding!

The coal train proceeded to the north end of the 42-car long passing siding and regained the main line for the trip up to Madrid. At Madrid, yardmaster Joe Posik orchestrated the moves for the power to reverse ends for the trip over the Androscoggin Sub. With the faded Boston & Maine GP38-2 now in the lead, the train prepared to tackle the grades and curves of the Androscoggin Sub. (For this article, I've added an operational twist that we couldn't do during the session, with a fifth unit, AGR 425, added at Madrid. During the session, the 425 was pressed into yard switching duties by the failure of the assigned Geeps, so it was not available!)

Using LokSound's Full Throttle features, Mike had fun navigating the Androscoggin's undulating profile, notching the power while maintaining a slow and steady speed the entire way, suggesting big tonnage. The sound was impressive, with Alco 251-12, GE FDL-16 and EMD 645 non-turbo prime movers singing in unison. The train had to go into emergency while stretched around the curve at Knox due to a piece of lead shifting in one of the 70-ton cars. With the problem quickly addressed, the train continued without further incident, passing through Carthage and down Holman Summit with dynamic brakes roaring. Eventually the train reached lower-level staging and the power plant at Bethel. The first run of the coal train was a success!

13, 14. The train negotiates the sharp horseshoe curve at Knox, passing the farm of the same name. From here, it climbs through Spruce and levels out at the top of the grade at Carthage.

Running empties?

With real railroads, for every loaded unit coal train there is a corresponding empty train. So, it begs the question of whether to run an empty side to the coal trains on the Allagash. There were a few things that I needed to consider. First, without the removable coal loads and lead, the cars will be ultra-light and could present operational issues like derailments. Beyond that, if the cars are to be run empty, the weathering job is more complicated since the inside of every car would have to show the effects of wear and tear. This is not impossible to do, it just adds a lot of time to the job.

I haven't made a decision on this, and will consult the guys and see what they think. If we decide to run an occasional empty, it means

15. Having fought the grade up through Spruce, the train comes out of the woods and coasts down into Carthage, passing the local pulpwood-loading facilities.

16a. Carthage is desolate and quiet save for the occasional passing train or activity at the International Paper wood yard. International Paper loads on the far tracks near the small white and blue office/scale house. The empty racks in the foreground are on the team track used to load wood from local loggers.

16b. Leaving Carthage, the coal train prepares to slowly thread the huge rock cut at Holman Summit.

17. The roar of dynamic brakes shatters the quiet as the coal train descends the 2% grade of Holman Mountain. Trains ascending Holman are faced with a challenge. This is the

ruling grade on the Allagash Railway. Note that there is still quite a bit of snow left on the flank of the mountain.

all 23 cars come back to the weathering desk for more comprehensive work. We'll see.

Black diamonds in Maine – A variety of traffic equals more fun!

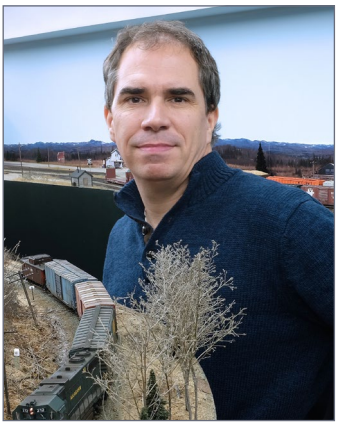
One of the most important things a modeler can do to keep a model railroad interesting is to vary the traffic. One-commodity railroading can bore some modelers. For me, I try hard to squeeze out every opportunity to vary the traffic. This translates into varying the kind of freight cars you might see at a typical Allagash op session. Adding a coal train has brought a new visual dimension to Allagash operations, by juxtaposing gritty, dirty coal hoppers against the pristine Maine landscape. Bottom line, when a coal train traverses the Allagash, the guys are going to take note that something different, something special, is coming down the rails! ☑

Playback problems? Click here ...

18. A nice track-level view shows quite a variety of hoppers. From the left: Allagash 100-ton, Conrail 70-ton, Erie Lackawanna 70-ton, Reading 100-ton and Conrail 100-ton.

19. Conrail caboose 19813 marks the end of the train. In a short while, the train will arrive at Bethel (staging).

Mike Confalone



Mike Confalone grew up in Smithtown, NY, and got into model railroading at age 10 or 11. Like many young teens, he joined the local model railroad club and got his first glimpse of model railroading on a large scale.

College in the mid 1980s took him away from the hobby for a while, but railfaning became a favorite pastime.

Mike publishes a Northeastern prototype railroading magazine called *Railroad Explorer* (railroad-explorer.com), and has published eight books on prototype railroading.

Today, Mike's proto-freelanced, under-construction Allagash Railway occupies a 58' x 24' space – his entire basement and the former two-car garage. Mike loves all aspects of model railroading, from benchwork on up, but his specialty is scenery and weathering. He also enjoys the challenge of prototypical operations.

Besides the trains, he and Susan, his wife of 27 years, love to garden and landscape their wooded two-acre property in southern New Hampshire. He also plays a mean guitar, but his Fender and Marshall-fueled rock-band gigging days are over, at least for now! ■

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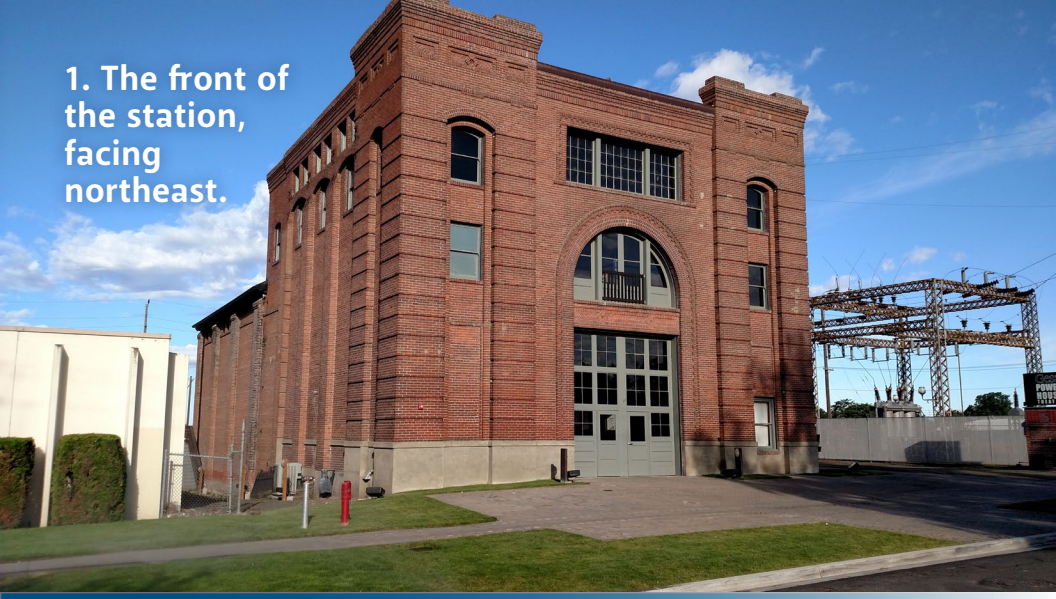

1. The front of the station, facing northeast.

Walla Walla Electric Light Works Building

Model Railroad Hobbyist | March 2018 | #97

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Nicholas S. Muff MD has plans and photos of a dandy little structure for your model railroad ...

Here is a perfect structure, with a small footprint that's just right for a model railroad: the Walla Walla Electric Lighting Plant. Era-wise, this building will work on any layout from the gaslight and trolley era all the way to today.

History

The Walla Walla Electric Light Works building was constructed in 1890. This classic brick structure was designed by the architectural firm of Osterman and Siebert, based in Walla Walla, WA.

Henry Osterman, the senior partner in the firm, was born in Essen, Germany in 1862. Other Osterman works in Walla Walla include the Dixie High School, Liberty Theater, Green Park School, and Walla Walla Public Library.

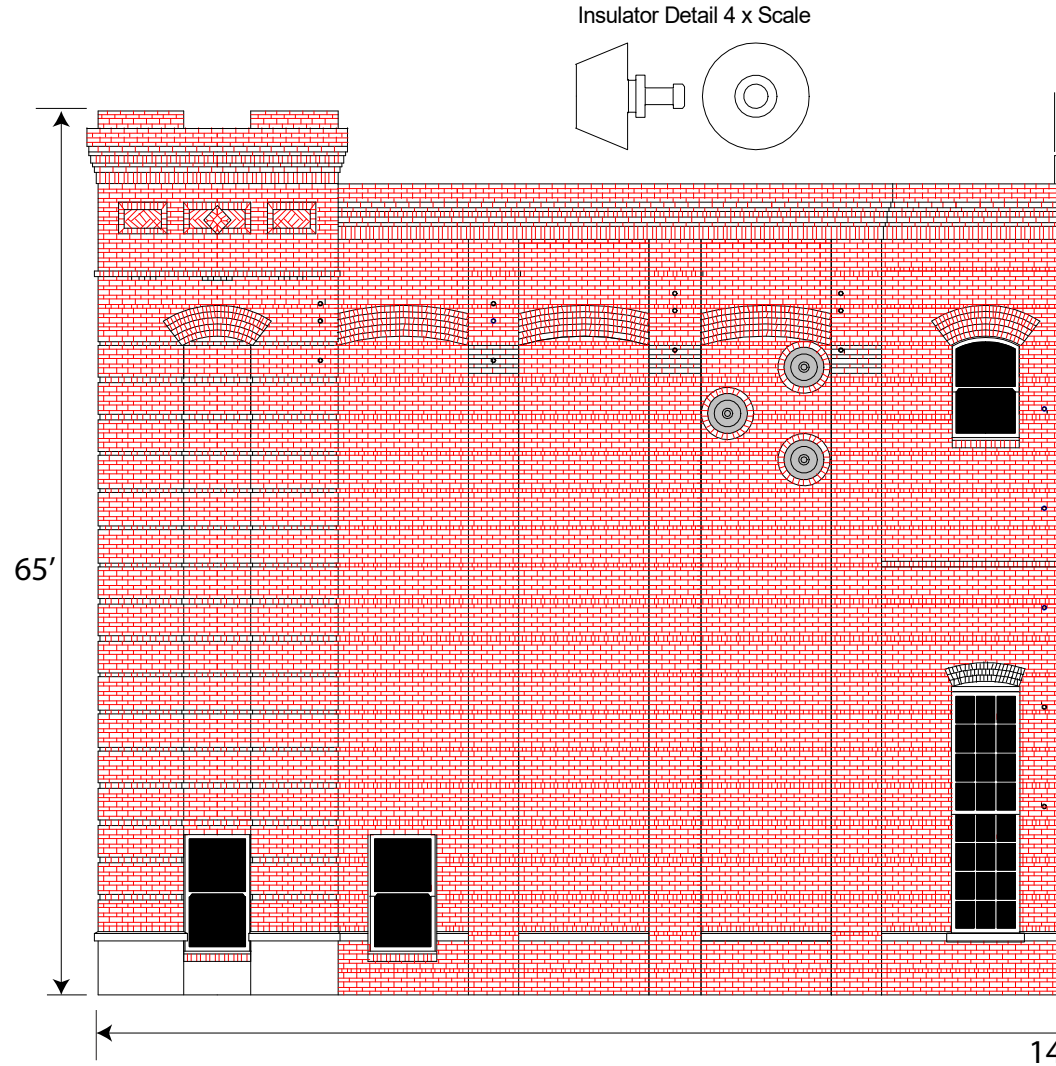
As originally constructed, the electric plant used coal to produce gas which was then piped underground to light homes and businesses in the "gaslight" era.

In 1905 the building was converted to a power station housing coal-fired boilers, steam-driven dynamos, and transformers.

2. A detailed view of the lower front elevation and classic arched entrance.

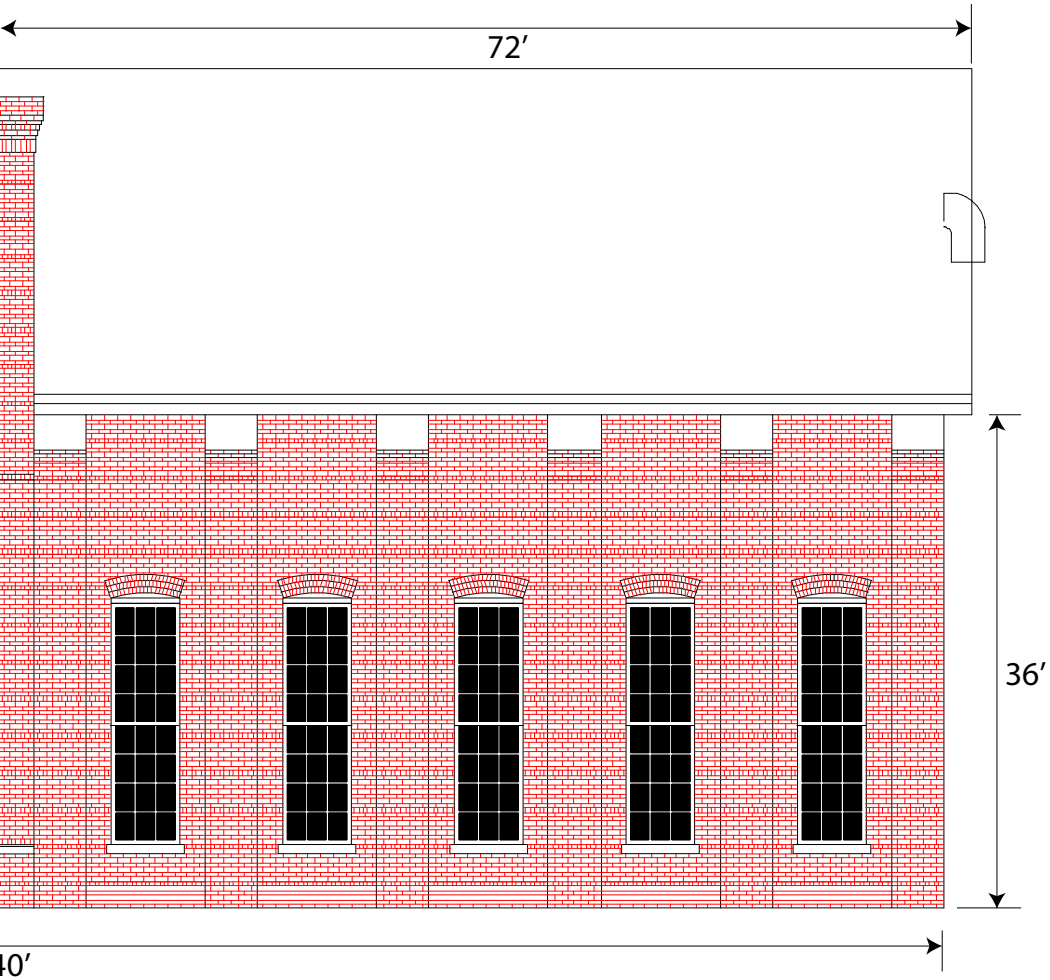
WALLA WALLA ELECTRIC L

Drawn by Nick Muff



IGHT WORKS ELEVATION DRAWING

Full plans available in the subcriber bonuses



The coal was delivered to the plant on a spur from the trolley track which ran in front of the electric plant.

Later, additions were made to the rear of the building to accommodate more equipment.

With the building of hydroelectric dams, and the establishment of a power grid, the boilers and generating equipment were removed from the building. The powerhouse was then down-graded to a simple substation.

As the region grew and more space was needed for equipment, the power equipment was removed from the building and installed outside adjacent to the power plant.

The building remained vacant until it was transformed into a state-of-the-art performing arts theater in 2011. The interior design was inspired by the intimate Blackfriars Theater in London.

3. Details of the upper portion of the front elevation.

The Gesa Power House Theater was named to the list of state historic buildings in January 2012 by the Washington State Building Preservation Commission.

This unique building would be at home on any layout from the gaslight era to the present and would fit especially on a trolley or steam era layout.

Modeling notes

With its classic brick styling, the power house could be constructed using a sheet styrene or laser-cut wood sub-shell covered with N-Scale Architects brick sheet and details. The later additions could be removed from the building to back-date it or selectively decrease its size.

4. The left or southeast side of the building. Note the high square windows which are unique to this elevation.

5. Foundation details of the left side of the building.

6. The southeast corner of the building.

7. An overall view of the southwest corner of the building.

8. This is the northeast corner of the building

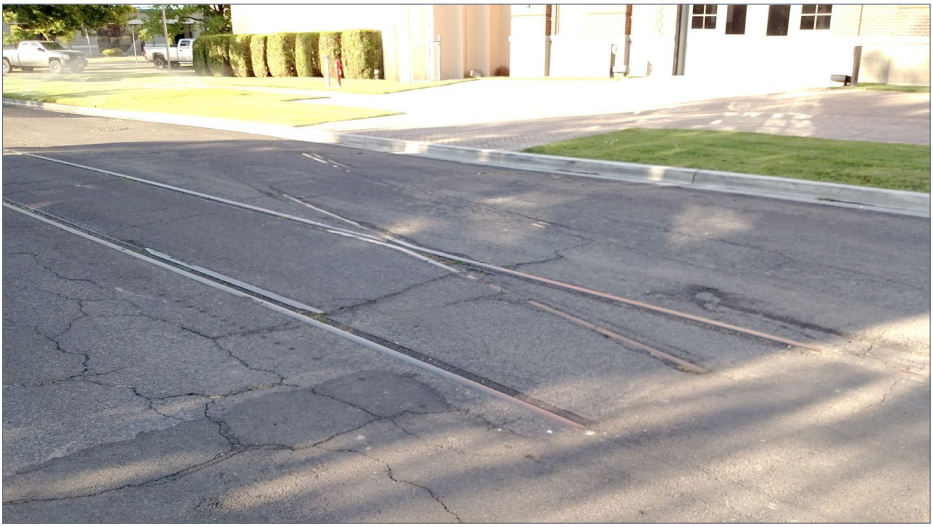
9. A closer look at the right side of the northeast corner of the building.

10. The back portion of the right side of the building. The tall arched windows are unique to this elevation.

11. Looking along the right side of the powerhouse from the northwest corner.

12. The back or southwest side of the building.

13. The current power substation and Gesa Theater sign. If you look closely, you will see that the base of the theater's sign is actually a louvered metal electrical box covered with vinyl graphics to simulate old brick!



14. In many areas adjacent to the building, the original trolley tracks remain embedded in the asphalt. Here is the frog and diverging track that once supplied coal to the powerhouse.

15. There is a wash north of the powerhouse that is crossed by a concrete bridge. The railing on the bridge resembles the product made by Rix. A portion of the wash and bridge would make nice additions to the model scene. ☑

NICOLAS S. MUFF MD

Nick Muff grew up in California's San Fernando Valley with SP Daylight GS-4's and cab-forwards running behind his home and has been modeling in HO scale for over 50 years. In his teen years, he documented the West Side Lumber Co. just before and after its closure, including two weeks on the track into the woods with a home-built speeder.

His interest in the Kansas City Southern and Kansas City Union Station developed from summer train trips to visit his grandparents in northwest Arkansas. The most memorable train for him was the KCS Southern Belle.

Nick enjoys using CAD and has produced over 100 plans and articles for rail magazines. For the past 12 years he's been involved in research, drawing, and production of HO brass models of Midwestern locos and passenger equipment.

Nick and his wife Sue have two grown children. He is a practicing radiation oncologist in Washington state. ■

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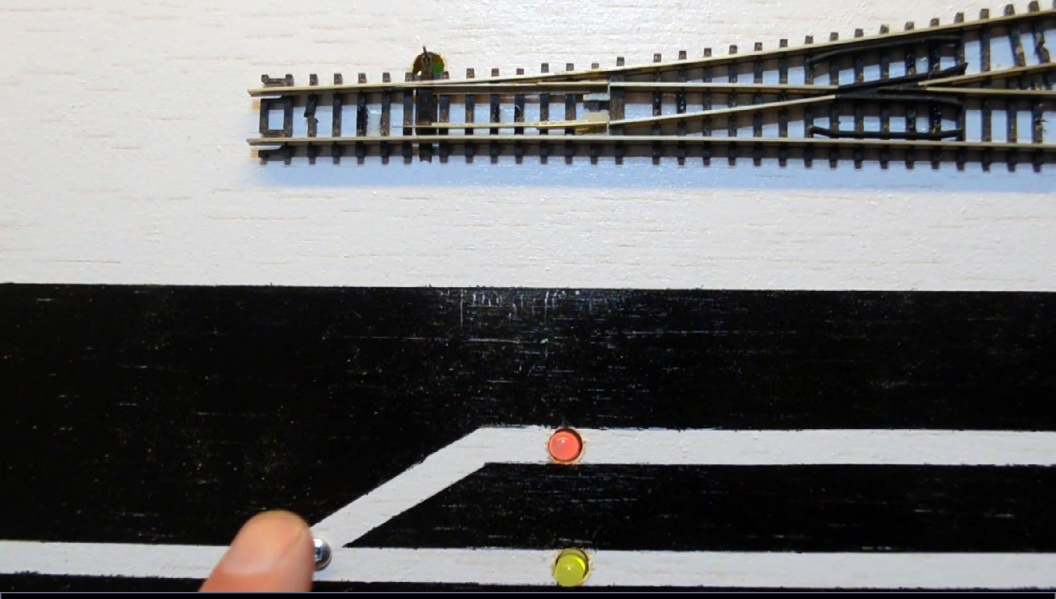


Make your own turnout touch switch

Model Railroad Hobbyist | March 2018 | #97

Stephen Sunshine describes how to control a turnout with a touch switch. ...

The usual method of changing the direction of a turnout is either using a double-pole double throw (DPDT) switch mounted in a control panel or by mechanically pulling or pushing a throw rod. I have always used the DPDT method... until recently.

Since I like to experiment with electronics, I decided to come up with a method for controlling a Tortoise switch machine by just

touching a spot on the control panel where the two legs of the turnout merge. After a few weeks of trial and error, I succeeded, using a capacitance touch switch.

A capacitance touch switch relies on the electrical charge stored in the human body, a small and harmless – but not negligible – charge. When a finger touches a metal object, the electrical charge stored in the body is transferred to a simple circuit that then performs some task.

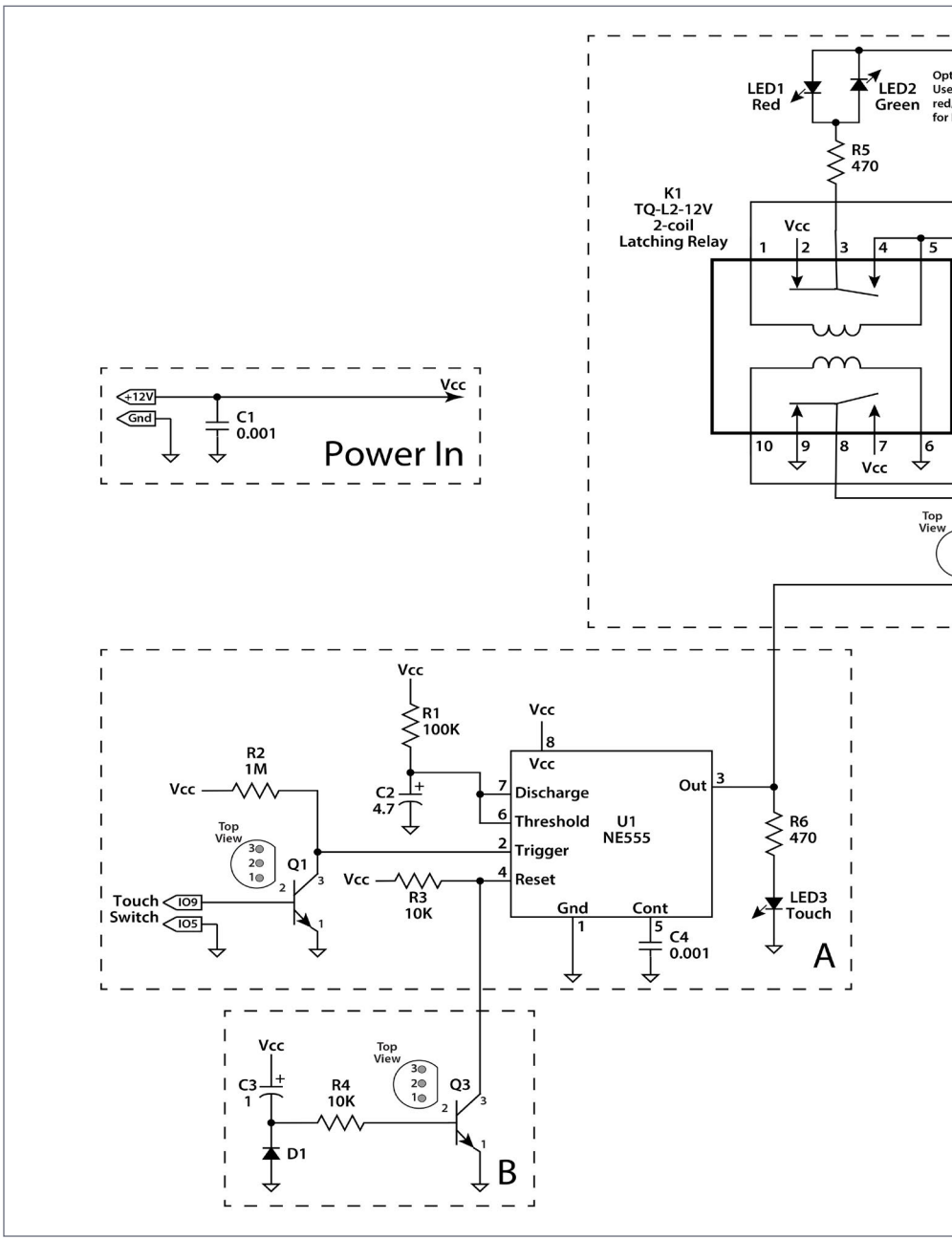
The task my circuits perform is to throw a Tortoise switch machine.

The electronic circuit consists of three sub-sections: (A) the touch-switch circuit, (B) a circuit that prevents false triggering when power is applied, and (C) a relay that controls the actual Tortoise switch machine.

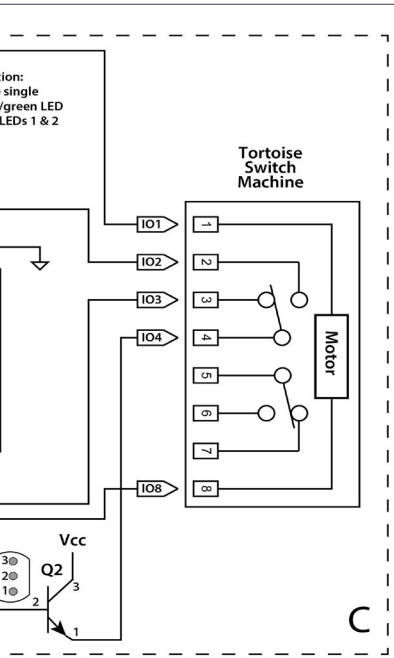
Sub-circuit A is the capacitance touch switch. When a finger touches IO9 through an attached wire, the 555 timer produces a short pulse that reverses the polarity of the relay and the Tortoise switch machine and briefly lights up the Touch LED. The 555 timer then resets itself, ready for the next touch.

Sub-circuit B prevents the 555 from self-triggering when power is first applied to the circuit. Without this, the Tortoise would reverse its position each time the circuit powers-up. This is, obviously, not a good idea!

Sub-circuit C uses a two-coil latching relay to flip the voltage polarity to pins 1 and 8 – the motor – on the Tortoise switch machine to reverse its position. Every time the touch switch is touched, pins 1 and 8 reverse polarity. Since this relay latches and



1. Schematic for the circuit.



Tortoise Touch Switch Schematic Diagram

maintains its position, it "remembers" the position of the Tortoise, so after power is turned off, the Tortoise remains in the same position when power is restored.

The LEDs in sub-circuit C are mounted on the control panel to indicate the direction of the switch points. I used bi-color LEDs for my prototype, but two individual LEDs can also be used, as long as they are wired as shown in the schematic.

After building a prototype of the circuit on a breadboard to verify functionality, I hand wired a working circuit on a small circuit board [2]. As you can see in the video [3], every time I touch the small screw, the Tortoise switch machine reverses position.

Hand-wiring enough circuit boards to accommodate all the switch machines on my layout would be tedious, so I used a free program, Pad2Pad (pad2pad.com), to design

the PCB and have multiples professionally manufactured.

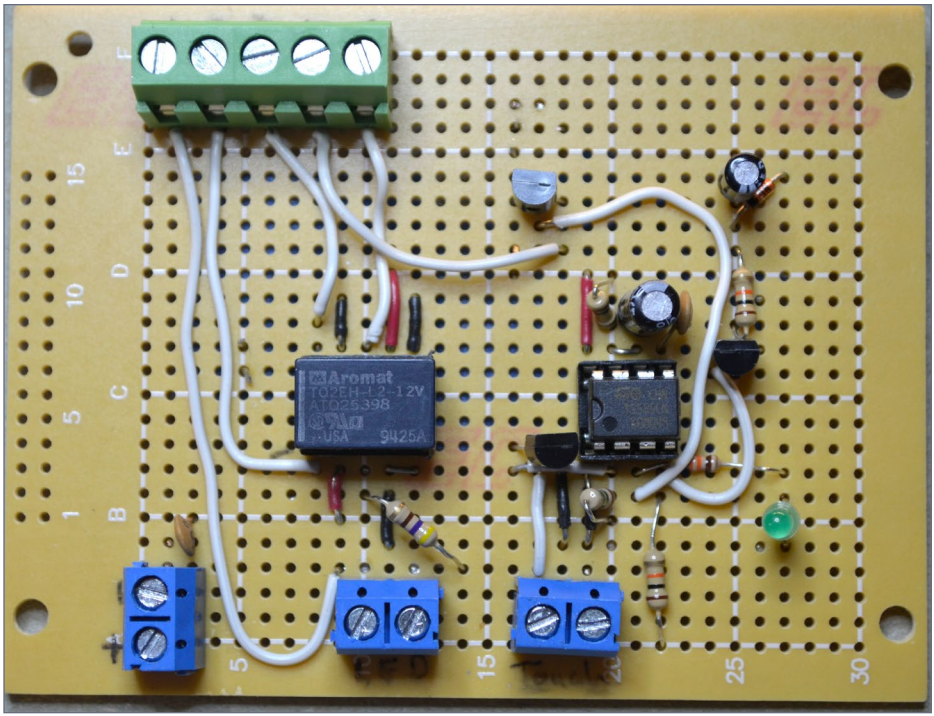
The subscriber bonus downloads has my design file, along with a screen shot of the PCB layout. This file can be opened in the Pad2Pad program and sent to the company for manufacturing.

If you want to hand-wire the circuit, just use the schematic [1].

Notes about the circuit

1. The touch switch can be a small screw or any piece of metal that a wire can be soldered to.

2. The touch switch should be mounted as close as possible to the circuit board to prevent false triggering. I used a shielded cable, and was able to mount the touch switch 18 inches away from the



2. Hand-wired board test the circuit.

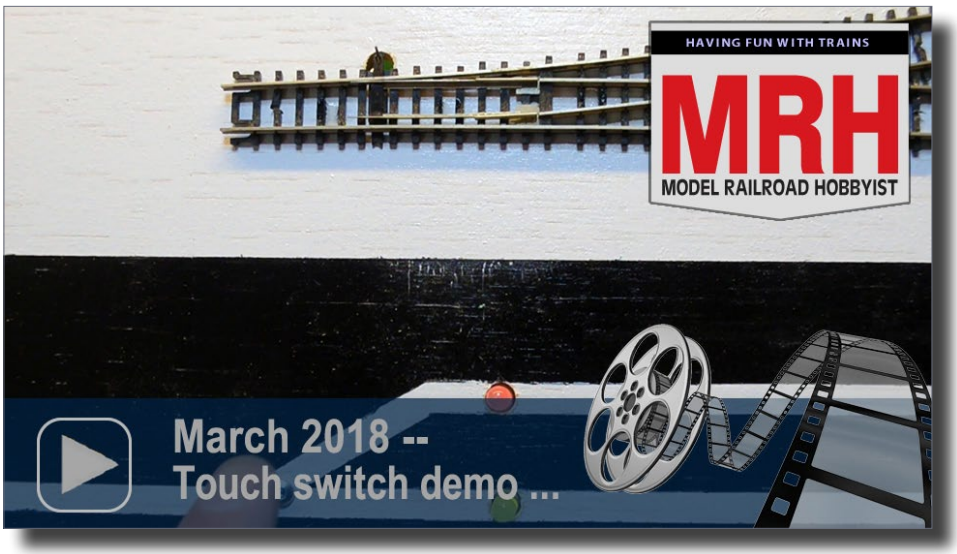
PCB without any false triggering.

3. If you use shielded cable to the touch screw, connect the center conductor to IO9 on the PCB, and the shield to IO5; see the schematic [1]. At the opposite end, connect the center conductor to the screw, but leave the shield unconnected.

4. I selected a 555 timer (Texas Instruments NE555P, Mouser part number 595 NE555P) that can operate with the 12 volts I use to power my switch machines. Be sure to check the specifications if you choose a different one.

A few items that can be adjusted to reduce cost

1. LED3 (Touch) and R5 are needed only if you want to verify the touch switch is working. It flashes each time the touch switch is touched.



Playback problems? Click here ...

3. Video demonstrating the touch switch in action.

2. LED1 and LED2 can be a single bi-color LED instead of two individual LEDs; see the schematic [1] and the parts list.

3. Both screw-terminal blocks can be eliminated, and the wires soldered directly to the PCB. I used screw-terminal blocks for the ease of prototyping. ☑

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Stephen Sunshine

Stephen is a retired high school English teacher who finally can spend time with his life-long hobby of model railroading. He started as a youngster with a Lionel O27 train set circling a Christmas tree and graduated to N scale when he moved into his house, 40 years ago.

He now combines his penchant for electronics and automation with his model railroading skills. He began his current layout in 2011. It includes a downtown area with a moving bus, an elevated train station, and a construction site with a working excavator. The layout also includes an amusement park with an operational parachute jump and roller coaster, along with a few smaller automated attractions.

Stephen lives in Putnam Valley, NY with his wife. ■

PARTS LIST

	Mouser	All-Electronics
.001 uf disk capacitor	80-C3156102J3H-tr	102D50
4.7 uf radial capacitor	647-UVPIE4R7MDO	4.7 R50-C
1 uf radial capacitor	539- SN010M025ST	1R50-C
10K 1/4watt carbon resistor	588-OK1035E-R52	(use their input form to order)
1m 1/4watt carbon resistor	588-OK1055E-R52	(use their input form to order)
330 1/4watt carbon resistor	588-OK3345E-R52	(use their input form to order)
100K 1/4watt carbon resistor	588-OK1045E-R52	(use their input form to order)
470 1/4watt carbon resistor	588-OK4745E-R52	(use their input form to order)
green LED	710-151031VS06000	MLED-2
red/green LED	859-LTL1BEKVJNN	LED-6
2N2222A transistor		PN2222A
1N4148 diode	512-1N4148	1N4148
555 timer	595-NE555P	MC1455
TQ2-L2-12V latching relay	769-TQ2-L2-12V	
5 pin terminal		TER-405
2 pin terminal		TER-202
LED Holder Clips	745-C-174	HLED-5

All-Electronics parts are less expensive than Mouser

Do-it-yourself

3D printing for model railroaders

Model Railroad Hobbyist | March 2018 | #97

Janet Norton gives practical insights on how we can take advantage of 3D printing at home for our modeling ...

One of the biggest appeals of 3D printing is that you can control the creation of repeated parts you want for a project. While there are several other model-building hobbies this applies to, such as RC aircraft, cars, ships, static aircraft, armored vehicles, and automobile models, this article will focus primarily on railroad model railroading.

We likely have all started projects that require duplicate copies of a component, such as a window or door, structural trim, or even wall sections made up of several parts. We have developed jigs to help create these parts, or acquired tools such as the NorthWest Short Line's Chopper or Duplicutter, to help us make the parts we want. With the increasing availability of hobby 3D printers and free or inexpensive software, we can design these parts on our computers, generate the machine instructions (in .stl files or .gcode files), share them with others, then have someone else print them for us or print them ourselves.

Creating detail parts as you need them

If you already have a relatively recent personal computer, you probably can find compatible 3D design software to run on it. If you have a system that can browse the internet, you can find pre-designed parts to download or contact a vendor to print for you. In either case, this opens up the possibility of getting exactly the detail parts you want for a model or a scene. For example, let's say you have a building with a bare loading dock next to a siding and think it's a bit too empty to represent a busy less-than-carload business.

You can place an order with a vendor or search eBay for some detail parts, such as crates, containers, drums, or pallets, or small vehicles, then wait a couple of days or weeks for the parts to arrive. Now, however, you can create those parts in 3D design software, such as SketchUp, run them through a slicer engine, such as Cura, and print as many as you need in the same amount of time or less.

One advantage of printing the parts yourself is that the next time you need more of them, all you have to do is turn on the 3D printer, load the appropriate file, and push the start button.

A Windows 7 machine can run the free 3D design packages and slicer engines found online and produce the .gcode files the 3D printers require.

So while there are some costs, if you already have a reasonable computer, your biggest cost will be the 3D printer and a spool of filament – as little as $200 for an entry level printer and around

Currently Available Hobbyist 3D Printers

Printer Model	Manufacturer's Suggested Retail Price (MSRP)	Maximum size (X-axis)	Maximum size (Y-axis)	Maximum size (Z-axis)
Monoprice Mini Select V1	$200	120mm	120mm	120mm
Monoprice Mini Select V2	$220	120mm	120mm	120mm
Monoprice Maker Ultimate MK11	$700	200mm	200mm	175mm
Dremel Idea Builder 3D40	$1,299	255mm	155mm	170mm
Afinabot Prusa i3 (kit)	$370	200mm	200mm	180mm
Afinia H400	$599	119mm	119mm	119.mm

1000Microns = 1mm. Some of the data for this table was derived from Micro-Mark's website, and it's a good starting point to browse for equipment and supplies. There are many other printers available, and newer models are always being added. These resolutions are the ones that most concern the ability to print parts in your desired scale. If you

$25 - $35 for a one-kilogram spool of filament. Recurring costs will be mostly for more filament as you print item after item. Some specialty filaments are abrasive and can require replacement of the print head more frequently.

Visual limits of 3D printers in scale modeling

Probably the greatest drawback to using your own 3D objects in your modeling is that there are limits to the surface smoothness. Some of these limits are due to the layer-by-layer creation of the objects.

	Horizontal (X and Y axis) Resolution	Vertical (Z axis) position resolution [layer Resolution]
	0.011 x 0.011mm	0.0025mm [0.1mm]
	0.011 x 0.011mm	0.0025mm [0.087-0.2mm]
	0.0125 x 0.0125mm	0.2-0.005mm [0.02mm]
	0.05 x 0.05mm	0.1mm [0.3-0.1mm]
	0.012 x 0.012mm	0.004mm [0.1mm]
	0.05 x 0.05mm	0.015mm [0.150-0.350mm]

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spot a different printer, compare its specifications to those listed here. There are other considerations, such as printing speed, temperature ranges, and extruder diameter; once you've narrowed the range to a couple of printers, examine those in detail as well.

Unlike an injection mold that can have a surface polished to less than 1/10,000 of an inch, most hobby 3D printers have a minimum height between layers of 0.1 millimeter (0.00394") and a minimum horizontal resolution of 0.01 millimeter (0.000394") along the X and Y axes of the part. Think of it as building a macaroni house out of stacked spaghetti, where the injection-molding machine might be using pieces of lasagna on edge to make that same wall.

As you might imagine, some of the surface roughness can be smoothed with sanding or filing, or even chemical means. We will talk about that later.

Horizontal and vertical limits of various 3D printers

Equipped with an idea of the dimensions of a part in our desired scale, we can now turn to each 3D printer's specifications to see how well those dimensions can be met. There are two things to consider: maximum dimensions for a printed part and minimum resolution. Here's how several popular 3D printers compare (see previous table).

Choosing an object to print

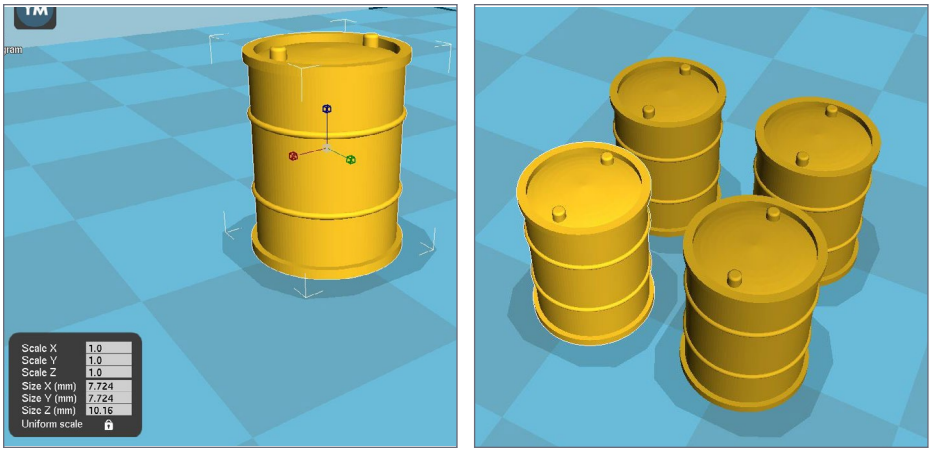
Just because you can print an object out on your 3D printer doesn't mean it's the best way to obtain it. There are times when purchasing an injected molded object or building one out of wood, styrene shapes, or even card stock or plaster makes more sense. The strength of the filament's material should be considered, just as you would consider making a spidery railing out of brass wire rather than styrene rod.

Multiple objects can be grouped together to print at once. Arrange them on the print bed to take advantage of the print

head's movement and minimize printing time. Try a couple of arrangements and check the estimated print time in your slicing software. One last thing to consider when grouping objects: the more objects being printed and the longer the print time, the more likely you will eventually encounter a print that lifts from the printer bed or some other glitch might happen. A power outage 95% through a 10-minute job is annoying; if you were printing nine of those same objects in a 75-minute job, that power outage 95% of the way through will probably be nine times more annoying in terms of time and filament spent. It's a risk we all take; just be aware of it if there's a lightning storm, blizzard, or hurricane scheduled to come through when you're printing.

Finding pre-designed model files

One of the neat things is that there are many sites with loads of files you can use. If you want only one of a particular object,



1. After placing one object on the print bed, you can copy and place multiple copies to print at once.

you may not want to spend the time designing the 3D file yourself. That's fine, but maybe no one else has wanted to spend the time either. Searching the internet may turn up the object as a 3D file, although it may take a while to hit on the right combination of search terms before finding the file you want.

3D PRINTING SERVICES

Site Name	URL	Pros
Shapeways	shapeways.com	Will print files for you. don't need your own 3 printer.
Thingiverse	www.thingiverse.com	Most files are free. Wi with many slicers. Mar can be modified.
3D Warehouse	3dwarehouse.SketchUp.com	Files can be downloade Works within SketchU files can be modified. work with many slicer engines.
Grabcad	grabcad.com/library	Files can be downloade Many different 3D des packages supported. M files can be modified. S work with many slicer engines
Autodesk Online Gallery	gallery.autodesk.com	Files can be downloade Supports Autodesk sof

Using 3D design software to create your own models

3D design software falls into two camps: free versus purchased. Most times, one of the free software packages will get you started creating your own model files. If you already are familiar with a professional CAD or design package, it may be worthwhile to purchase a license for home use. I began using SketchUp a few years back with the idea of just drawing and printing buildings on paper to create models. With today's affordable 3D printing and an .stl plugin for SketchUp, it gave me enough incentive to actually become proficient. Checking on the web, you can find both print and video tutorials on any number of 3D design software packages. Some printer manufacturers recommend one over another, and include a version for you.

	Cons
You 3D	Pay for printing, cost based on material used and model license. Few (if any) files can be downloaded for modification or local printing.)
ll work ny files	Not all files are printable.
ed free. p. Most Will	Not all files are printable.
ed free. ign Many Should	Aimed more at manufacturing and design professionals, models may be more complex than we need for our layouts. Not all files are printable.
ed free. ftware.	Aimed at design professionals, models may be more complex than we need for our layouts. Not all models can be downloaded. Not all files are printable.

Using 3D design software can become a hobby or even a profession unto itself, and is outside the scope of this article. There are any number of books available on becoming an expert on the various packages; an internet search will bring up a list.

Getting the part to print at the right size

There are two schools of thought in building models: use full-size dimensions and a scale rule to translate the dimension of each part to your desired scale, or use a calculator to convert full-size dimensions by the scale factor and use a full-size ruler to mark the measurement on the part.

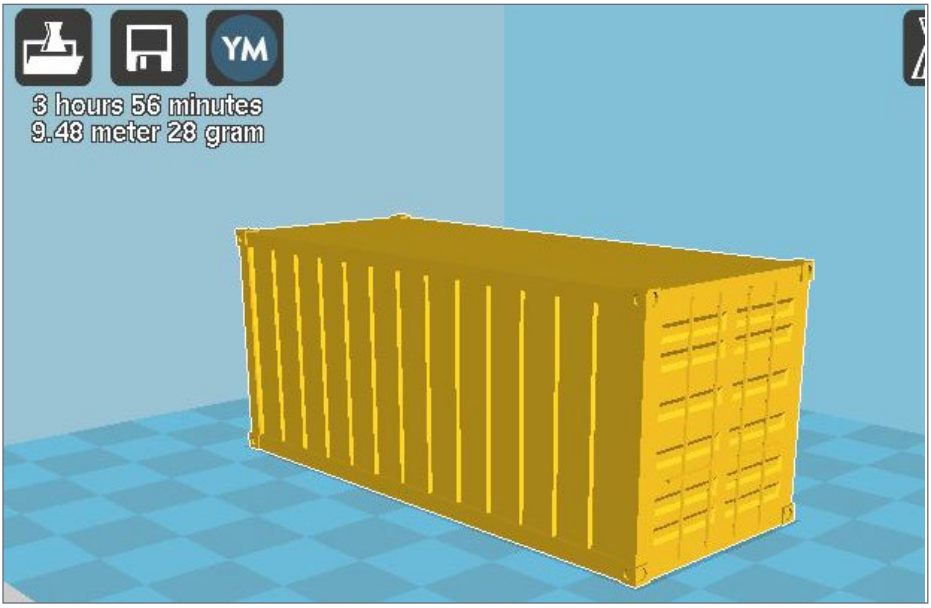
For example, to create an eight-foot-long piece using an HO scale rule, you just put a mark on the material at eight feet. Converting the dimension, we would multiply 8 feet by 12 inches, then divide by 87.1, and wind up making a mark at 1.103 inches. It's a bit more work than using the scale rule, and one of the reasons it's easier to use full-size dimensions in both physical modeling and in 3D design software.

The difference is, instead of a scale rule, you use a scaling factor in the slicer engine to print the part at the desired final dimensions. The key here is always design in 1:1 scale when creating or modifying models.

Scaling Factors

Scale	Scaling Factor		
1:1 (Actual size)	1.0000		1:72 (commo
1:22.5 (LGB)	0.0444		1:76 (
1:20.3 (F Scale)	0.0493		1:87.1
1:35 (military models)	0.0286		1:160
1:48 (Large military aircraft, O scale)	0.0208		1:220

These values have been rounded up at the 4th decimal place.



2. The 20-foot container sliced in Cura and ready for printing.

Fortunately, determining the scaling factor and entering the scaling factor into the slicer engine are pretty trivial. I put common scaling factors into a chart after repeatedly calculating them for object after object. For example, if a part was designed at 1/1 scale, then to print it out at O scale, you enter a scaling factor of 0.0208. If you have a model that is scaled at 0.0208 when opened in the slicer engine, all you have to do to print it at HO scale is to change the scaling factor to 0.0115.

Scale	Scaling Factor
n aircraft models)	0.0139
OO scale)	0.0131
(HO scale)	0.0115
(N scale)	0.0063
(Z scale)	0.0045

FILAMENT TYPES

Filament	Primary Characteristics and Use
ABS	Strong, temperature-resistant. (Emits toxic fumes – requires ver
PLA	Strong, dimensionally stable. Most model parts, excluding high-v
Metals (Magnetic Iron, Stainless Steel, CopperFill, BronzeFill) PLA	Used whenever a metallic finish is desired, or other metal prope desired. Denser than typical PLA.
Woodfill PLA	Contains wood fiber, lightweight. Fit and finish woodwork, hand
APLA	Advanced PLA, improved stiffness and strength over PLA. Most r applications
Flexible (TPE)	ThermoPlastic Elastomer. Strength and flexibility; resistant to ab temperature gaskets, phone cases, toys.
PCPTE	Plasticized copolyimide blend of nylon and TPE plasticiser; flexib enclosures, and shock absorbers.
Carbon Fiber	Lighter and more rigid than standard PLA. Light-duty structural c components.
Conductive PLA	Semi-flexible, has a resistance of 15 ohms per cubic centimeter. conductive runs on other 3D printed components.
Nylon	High flexibility and strength; moisture resistant. Robotic assemb
Tungsten	Used specifically for radiation shielding, dense mass, lab equipm
PETT	High flexibility and strength; won't degrade over time. Large par
Bismuth	Used specifically for radiation shielding, light mass, lab equipme
Bacon (Proto Pasta Bacon HTPLA)	Yes, BACON! Well, bacon-scented, so don't eat it. Use? Maybe a me… Well, this was a one-off special, so it's probably not readily YouTube video at https://youtu.be/78K4G1yW9OI

PLA vs ABS filaments

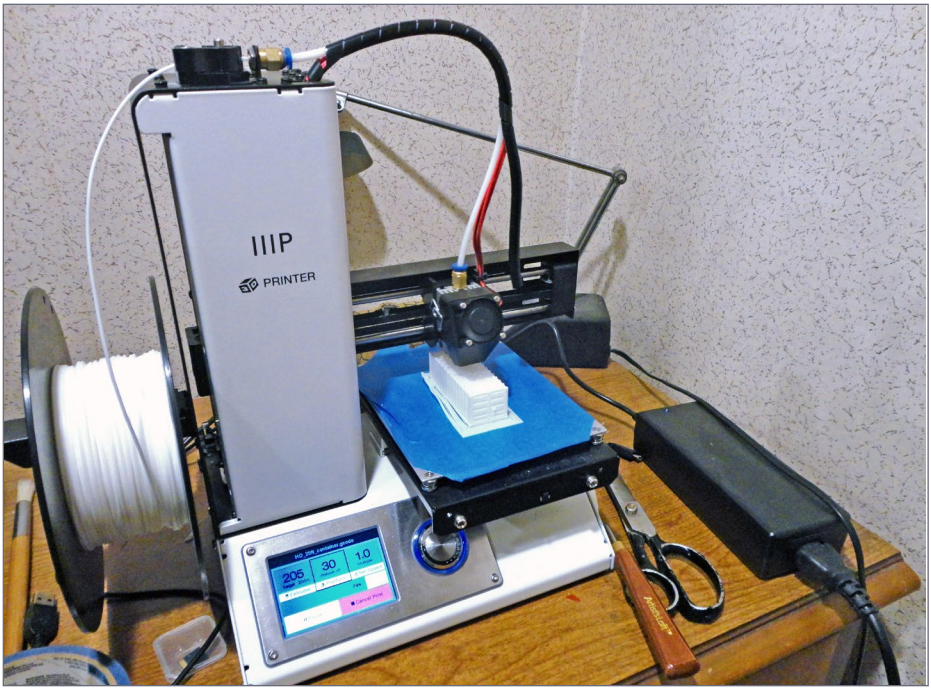
ntilated print area)
wear applications
erties such as magnetism or sheen are
lles, decorative items.
model parts, excluding high-wear
brasion and stretching. Low
ble, strong, can stretch. Bumpers,
components or reduced-weight
Simple electrical components, printed
blies.
nent, weights
rts, optical paths and light pipes
nt
packing plant loading dock? Beats available, but still, BACON! See the

While many different filament types are available for most 3D printers (bacon anyone?), most of the time you can select either PLA or ABS, and get a good, usable object. I'll list some of the more common exotic filaments and typical uses, but you should check for color, availability, price, and reputation before placing an order.

The Micro-Mark catalog itself lists over 20 types of filament, and more are available from other vendors.

PLA plastic is good for general purpose 3D printing. It uses lower temperatures than other filaments, does not give off toxic fumes, and is relatively easier to print with. On the downside, PLA parts don't have much give, are relatively rigid, and can snap if stressed. At temperature extremes, it can become very brittle, and can absorb moisture if kept in a humid environment.

ABS is also good for general-purpose 3D printing. It uses slightly higher temperatures than PLA filaments, but gives off toxic fumes that require ventilation – much like your spray booth when used with solvent-based paints – and is still relatively easier



3. Printing the shipping container on a Monoprice Mini Select 3P printer.

to print with than more exotic filaments listed in the table.

ABS does have a little give, is still relatively rigid, and can withstand higher stresses than PLA before snapping. It also requires a more tightly temperature-controlled printing environment (such as an enclosure around the printing area or even the entire printer, higher print bed and extrusion nozzle temperatures) than PLA, and it requires a longer cooling period or it can warp or delaminate.

ABS tends to lift off the bed a bit more than PLA for longer objects, and can withstand outside exposure to sun and rain better than PLA.

Finding the right brand of filament for your printer

While some manufacturers' printers use proprietary spools (such as Dremel) and other manufacturers also make filament as well as printers, most brands of filament will work in most printers. One key factor besides the material is the diameter of the filament; two common sizes of filament are widely available: 3.00mm and 1.75mm. Your printer is unlikely to be able to use both diameters, so pay attention to the filament's specifications when ordering online.

If there is a local 3D print supply house near you, you could go there and talk to other customers and staff to find out their recommendations and warnings. Not all filament is created equal. For example, some PLA filament becomes brittle after prolonged exposure to air; other filaments swell if exposed to humid conditions.

Some brands of filament are manufactured under less-stringent quality control and can have varying diameter or even contamination from other types of plastic. Otherwise, check a number of online reviews from different sites to eliminate any bias for a particular manufacturer.

In lieu of an exhaustive search, use the brand recommended or supplied by your printer's manufacturer to start with. And follow the filament manufacturer's recommendations for storage conditions regarding temperature and humidity.

Surfacing and finishing parts

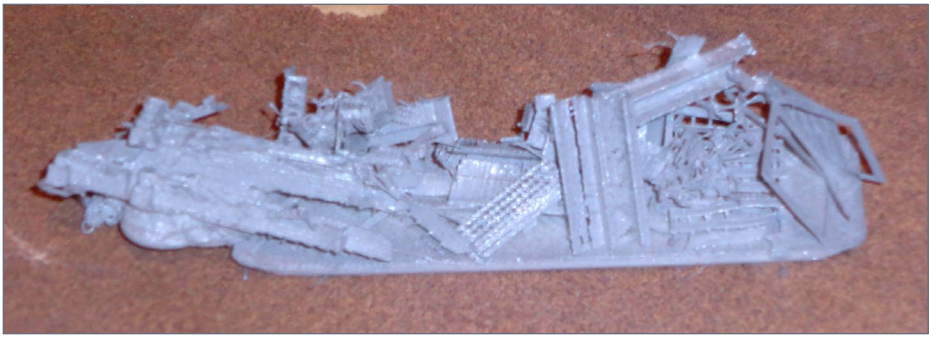
Begin by peeling or cutting away any brims, rafts, or supports with either flush cutters or a hobby knife. Watch for stray bits of filament left when the extrusion nozzle pulled away from the object.

Remembering that PLA parts were formed at relatively low heat, you want to keep the working surfaces cool as you sand them. Wet sanding with 320-grit produces a smoother surface than dry sanding; it also produces less heat while sanding, which can soften the part. Wipe the part with a tack rag to remove any dust.

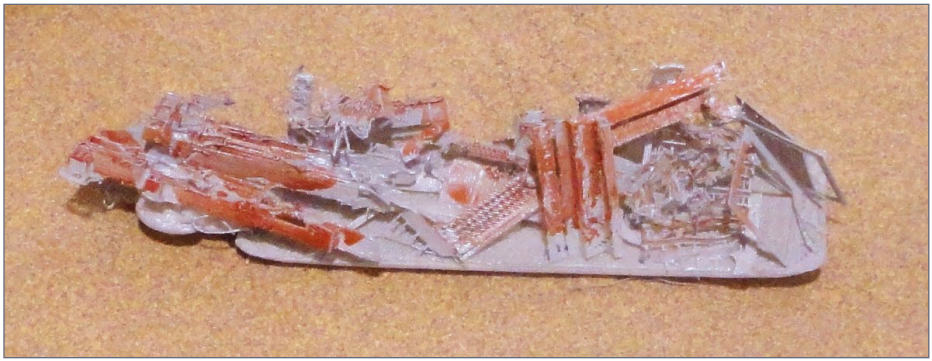
Sandable primer used with 320-grit sandpaper also works well to fill in any small imperfections in the finished surface. Use smaller grits as you continue to smooth the filament layering from any large surfaces. If there are too many small surfaces to sand effectively, Liquitex gesso can be used to help smooth the surface, although it tends to be a bit higher-volume filler than sandable primer.

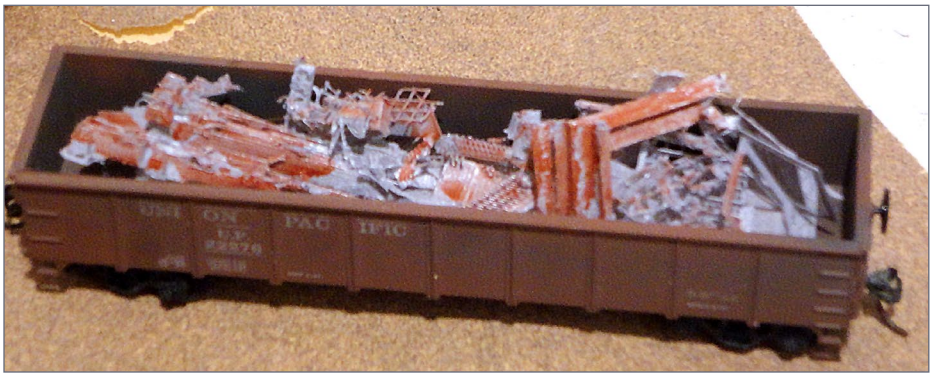
A key point is to allow sufficient time for each coat of primer or gesso to thoroughly harden before sanding and adding the next application.

Ethyl acetate can be used to chemically smooth a piece – you need a well-ventilated work space and you should wear nitrile gloves while handling any solvent-based adhesive. Chemical smoothing is not going to be as effective on large surface imperfections as sanding, although it may be a viable alternative if there is a lot of small detail on the object. Acetone cannot be used to smooth PLA.



4. Priming the scrap load.





5. Painting the scrap and test fitting.

Gluing PLA parts

Loctite 406, gel super glue and activator, Plastruct Bondene, Micro-Mark's Same Stuff, Tenax 7R, and epoxy are the primary choices for PLA to PLA joints. Plastruct Bondene, Micro-Mark's Same Stuff, and Tenax -7R all work well bonding PLA to styrene. Plastruct Bondene and Micro-Mark's Same Stuff work well bonding PLA to wood. Tenax 7R will not bond PLA to wood. Solvent glues won't bond PLA to brass or white metal. Your best bet for gluing PLA to metal is either epoxy or Loctite Super Glue Professional; an accelerator can be useful at times with the super glue.

Painting PLA

Rust-Oleum, Krylon, and other cellulose-based spray paints work well, as do hobby acrylics and Polly-S. Oil paints also can be used. I haven't used lacquers or Floquil, but I would expect that once you prime the PLA, they could be used as on styrene.

Reworking PLA or ABS parts

If a print job is interrupted, theoretically it is possible to figure out which layer had the interruption and you could edit the .gcode file to resume at that point. But the consensus online seems to be that's not really workable.

Your only other option would be to re-orient the object and print it to get the remaining part. Probably the most effective use of your time would be to consider the failed print as fodder for your layout's scrap loads and just reprint completely.

Oh, a quick aside. The broken-off pieces of supports and rafts make good scrap loads as well. A lot of it looks like busted-up rebar, scrap metal, or even chunks of concrete when painted.

3D SERVICE TYPES

Company Name	Site	
Shapeways	www.shapeways.com	Prints parts in-house. Other designers'
You3DIt	www.you3dit.com	Has design service. Connects you with
MakeXYZ	www.makexyz.com	Connects you with a local vendor; no in
Ponoko	www.ponoko.com	Has design service. Prints parts in-hous
UPS store	www.theupsstore.com	About 100 stores nationwide at this po service. Prints parts in-house.

When to use an outside printing service

Knowing your printer's limitations: Comparing your printer's specifications to those of outside printing services may convince you that the solution is to send the model to the service. Reasons can be the physical size of the object exceeds your printer's bed, the desired resolution of the object cannot be achieved on your printer, or you may want the object printed in a material you cannot use in your 3D printer.

The reality is that the top-of-the-line printers are out of the reach of most hobbyists, but these services make those printers available to us – for a price. Most charge a fee based on a flat service charge plus a variable amount based on the type of material and how much is used. As mentioned earlier, some also have pre-designed models available to be printed for a modest fee.

Table of popular 3D printing services: This is not an exhaustive list. Performing a search may yield other sites that perform 3D printing. Note that there are a couple of different types of outside vendors. Some will design and print your objects in-house. Others allow you to resell your designs directly to other people through their website, handling the printing, billing, and shipping for you. And another category act more like matchmakers than printers; they will help put you in contact with outside designers and printers to produce your objects. ☑

designs available for purchase.
a local vendor; no in-house printing.
n-house printing.
e.
int. Has partnership with another design

VIEW READER COMMENTS
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Janet Norton

Janet grew up just outside Boston, Massachusetts, in the '50s and '60s. At four years old, her favorite toy was a wind-up O gauge tinplate Burlington Zephyr. It was followed the next year by an uncle's hand-me-down Marx O gauge tinplate set, and a brand new Lionel steam freight at age 7. A 4 x 8 table in the basement was expanded with switches and a Lionel B&M freight set, and life was grand. Visits to Nelson Blount's Pleasure Island amusement park gave her a chance to sit in a diesel cab, and trips into Boston on the trolley fed her love of the real thing.

Janet learned electronics repair in the Army Security Agency in the '70s, and moved into N scale. While stationed in Germany, she was able to take the Deutsche Bahn trains on a number of off-duty trips. After she left active duty for the reserves in 1979, she switched to HO scale and hasn't looked back. In 1990, she experimented with handlaid track, and has returned to it with her current layout. Since retiring, she is building a sectional proto-freelanced version of the Erie-Lackawanna set in mid-70s New England. Her rationale is that if the initial plans to merge the DL&W, Erie, and D&H had succeeded, maybe they could have reached New England by merging with the B&M or leasing trackage rights. Having the Erie-Lackawanna livery running through the industrial areas of the rocky northern New England coastline is alluring to her.

Janet's career in documenting electronic hardware, software, and mechanical systems has helped her keep up with the hobby's advances in control systems and using technology in modeling. She has been following 3D printing for industrial use for about eight years and experimenting with 3D printing at home since the beginning of this year. Janet is fortunate that for over 40 years, she and her brother-in-law have shared both friendship, an interest in electronics, and a passion for railroading. An as-yet-unrealized goal is to take a long-distance trip on Amtrak to the west coast or Florida. ■

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MARCH NEWS column

Model Railroad Hobbyist | March 2018 | #97

RATE THIS ARTICLE

Richard Bale and
Jeff Shultz report the latest hobby industry news

Jim Vail 1934-2018

Internationally known author and narrow gauge modeler, James Bradford Vail III, lost his battle with cancer in late January. He was 83. Vail's love for model trains began at the age of 11 and continued throughout his life. He developed a worldwide relationship with readers as he shared his modeling experience through his popular column that appeared regularly in the *Narrow Gauge & Short Line Gazette*. Over the years Vail welcomed hundreds of fellow modelers who journeyed to Santa Cruz to see his fabled model railroad. He participated enthusiastically in the Achievement Program sponsored by the National Model Railroad Association. He earned numerous awards including the NMRA's Master Model Railroader.

THE LATEST MODEL RAILROAD PRODUCTS, NEWS & EVENTS

A native of Minnesota, Jim moved with his parents to Santa Cruz in Northern California. After graduating from the local high school in 1952, Vail was accepted at nearby Stanford University. The degree he earned in mechanical engineering led to a career in research at IBM. In addition to trains, Vail had a lifelong love of cars. He liked building street rods, the latest being a 1941 Chevrolet convertible. He was also an eclectic jazz fan and was a supporter of the Kuumbwa Jazz Center in Santa Cruz.

Jim Vail is survived by his daughter, Katherine Welch; and granddaughter Gabriella Welch. Thoughts and prayers may be left at pacificgardenschapel.com/tribute/details/2000/James-Vail-III/obituary.html#tribute-start.

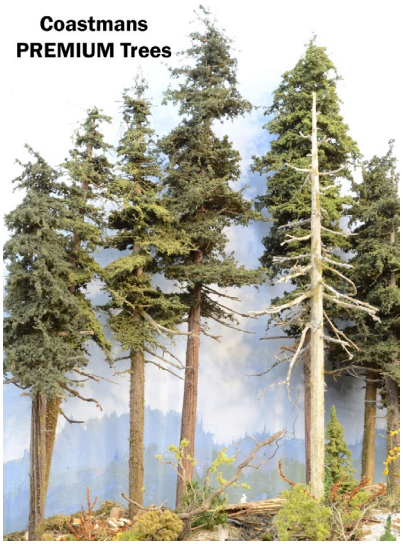
NEW CLUB CARS

The Ohio-based **Orrville Railroad Heritage Society** is selling a custom Accurail kit for a 40-foot AAR boxcar. The HO scale model is decorated to commemorate the sesquicentennial of the Orrville Union Depot. For ordering information visit orrvillerailroad.com.

NEW PRODUCTS FOR ALL SCALES

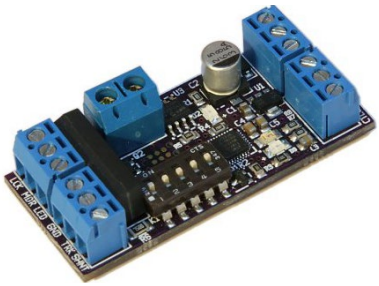
Atlas has announced the Universal Signal Control System, with a planned release in 2018. Designed to integrate directly into a current Atlas signal system, the new system is based around a universal control board sized to work with N, HO and O scales. Existing Atlas signals can plug directly into the new boards as well. The new board supports both common anode and common cathode wiring systems, allowing the modeler to mix both types in the same

signal system. The new board is capable of operating as either a stand-alone or as part of an integrated block system, with options to enable approach-only operation, 2 or 3 block indication, PRR & B&O style position / color lights, and also supports flashing and lunar white aspects as appropriate. Atlas will also be releasing new signal heads, masts and signal bridges, including a variety of systems from the recently acquired BLMA line, modified for use with the plug-and-play signal control boards. For more information see facebook.com/atlastrains/posts/10156540193570110.

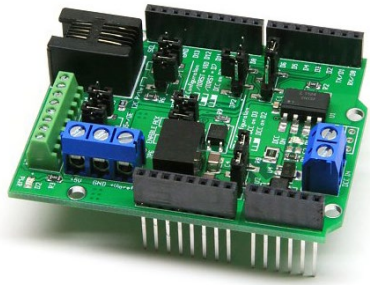


Coastmans Scenic Products has introduced two lines of ready-made trees, the Craftsman and Premium trees. All trees feature "ready to plant" detailed green foliage construction, Port Orford cedar trunks, and a base hole with pin already installed. Premium trees (left) feature maximum detailing, with fine turf highlights on the foliage, dead branches, moss and a light splotching of lichen color. Craftsman trees feature the same basic construction without the additional details installed, but include a packet of dead branches, packets of green branch highlights, and a fine turf earth packet for moss detail. With these additional details, and some watered down acrylic paints for lichen, the Craftsman trees can be brought up to the Premium standard by the modeler. Both tree styles can be purchased in heights of 7, 9, 11, or 13-inches. The trees are packaged in shredded craft paper and a

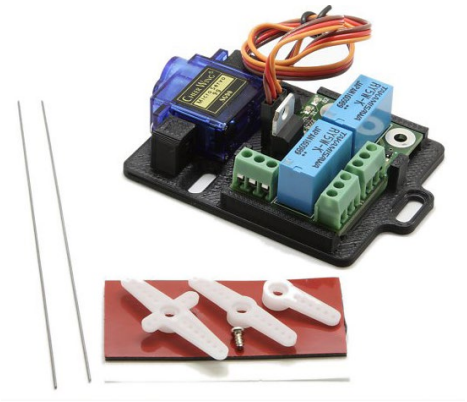
200# corrugated cardboard box to protect them during shipping. For more information visit coastmans.com.



Iowa Scaled Engineering has introduced several new electronic devices to enhance running a model railroad realistically. First is the Time Lock Switch Controller (above), which allows the hobbyist to set up a turnout as if it had a prototype time lock or dual-control power switch. Unlocking the included keylock starts a timer, after which the turnout can be thrown. The prototype uses these to avoid throwing a turnout in front of an oncoming train that has received a clear signal through it. The time delay is adjustable from 5 to 240 seconds and the circuit includes a relay for triggering current-based occupancy detectors. Both MRServo and stall-motor type turnout machines are supported.



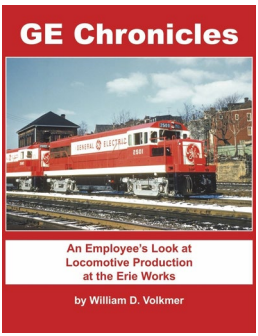
The DCC Decoder Shield for Arduino is an add-on controller that enables the Arduino to be used as a DCC decoder. In addition to I2C port and general purpose I/O lines, the Decoder Shield has provisions for sending a DCC ACK pulse and optionally powering both the Arduino from the DCC power bus as well as providing up to 5V/400ma of power to connected devices. Various DCC decoder libraries and Arduino boards are supported. The Shield does not add DCC command station functionality.

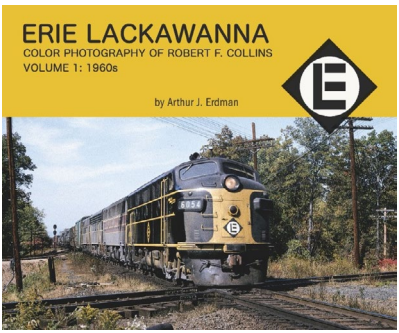


Finally, Iowa Scaled is also introducing the MRServo, a servo-based turnout controller in three versions – one is a slow motion switch machine, a second adds two accessory contacts, and the PowerFrog version has one accessory contact and the ability to power a solid frog without needing to add additional gaps on the point rails. All three versions come with the same low profile mounting bracket, servo, control board, hardware, and throw wires. For more information on these or other Iowa Scaled Engineering products, see your dealer or visit iascaled.com.

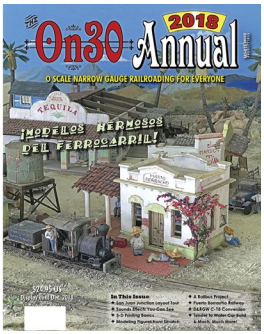
Isle of the Kakapo has released version 6.0 of its RailModeller Pro, a MacOS based model railroad and slot car layout design tool. This new version of the software enables cloud-based sharing and searching of track plans with others in in the RailModeller Pro community. The software can handle layouts of up to 6.2 x 6.2-miles (10x10km) in size, and from T (1:450) to G (1:22.5) scales. For more information visit railmodeller.com.

New hardcovers from **Morning Sun Books** include *GE Chronicles, An Employee's Look at Locomotive Production at the Erie Works,* by W. D. Volkmer; *CSX Power in Color, Volume 2,* by Kurt Reisweber; *Burlington Northern, Oregon, in Color,* by Ed Austin; *Delaware & Hudson in Color, Volume 5,* by Ben Martin and Brian D. Plant; *Auto Rack Color Guide, Volume 1, ACL – KCS,* by James Kinkaid and Jim Eager; and *Green Bay & Western Fox River Valley Railroads in Color,* by Dean Freimund.

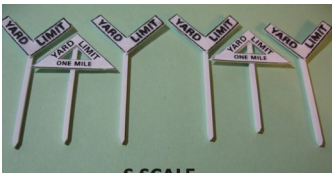




New softcover books available from Morning Sun include *Erie Lackawanna Color Photography of Robert F. Collins, Volume 1 1960s; Lehigh Valley, Best of Bob Wilt, Volume III; Toronto Transit Commission Streetcars,* by Kenneth C. Springirth; and a look at industrial railroads by Stephen M. Timko titled, Railroading Behind the Fences. For additional information contact a dealer or visit morningsunbooks.com.



White River Productions has released its On30 Annual for 2018. This is the 13th year of publication for this popular book that is dedicated exclusively to O scale narrow gauge model railroading. Contact a dealer or visit shop.whiteriverproductions.com/products/on18.



David Willis is selling a variety of railroad and street signs in N, HO, S, and O scale. Street signs include stop, yield, speed limit, handicap, railroad crossing, and a traditional crossbuck. Railroad signs include

whistle posts, mile posts, and yard limit signs. For additional information including ordering instructions visit railroad signs on eBay and look for a seller named radiationbiology.

O SCALE PRODUCT NEWS

Atlas O has scheduled a 2018 third quarter release for three new freight cars. Heading the list of O scale models is a Trainman series 50-foot 6-inch boxcar with a 10-foot Youngstown sliding door, corrugated non-terminating ends, and a diagonal paneled roof. Both 2-rail and 3-rail versions will be available decorated for Burlington Northern, Union Pacific, Berlin Mills, Green Bay & Western, Susquehanna, and Santa Fe (ex-RailBox). A CSX car will be available for 2-rail operation and 3-rail cars will be available decorated for Family Lines, and Clarendon & Pittsburgh.

Also coming during the third quarter is a Master series 40-foot 1937 AAR boxcar with double doors. Two-rail versions of the O scale model will be available for Soo Line and Southern Railway. A car decorated for Santa Fe will be available for 3-rail operation. Both 2-rail and 3-rail versions of the ready-to-run model will be available for Southern Pacific, Baltimore & Ohio, Illinois Central, Erie, Great Northern, and CP Rail.

Completing the third quarter release for Atlas-O is a Trainman series all-steel bay-window caboose. Features include a see-through

running board, separately-applied smoke stack, brake wheel and brake lines; and interior lighting controlled by a switch on the chassis. Both 2-rail and 3-rail cabooses will be available for Conrail, Chessie System, Norfolk Southern, Southern, Union Pacific, and Nickel Plate. All the 2-rail cars mentioned in this report feature 33-inch wheels and body-mounted couplers. For additional information on Atlas-O products contact a dealer or visit atlaso.com.

Frenchman River Model Works has announced the availability of a 50-foot steam freighter kit suitable for O scale. The coastal freighters, known as Clyde Puffers, were constructed between the 1850s and 1920 to transport freight in the coastal Scotland area. Still in use into the 1950s, their nickname came from the puffing noise made by their steam engine. With a look appropriate for freighters around the world, the kit consists of resin castings; laser-cut ratlines railings, and ladders, as well as lead-free metal detail parts. Finished dimensions are 13 by 3.75 x 9-inches. For more information visit your dealer or frenchmanriver.com.

New O scale cast resin details from **Rusty Rail** include a mobile air compressor (above left), and a wooden wheelbarrow. Painting

and some minor assembly are required. At right is a preliminary look at a 3D-printed O scale drill press coming soon from Rusty Rails. For more information visit rustyrail.com.

S SCALE PRODUCT NEWS

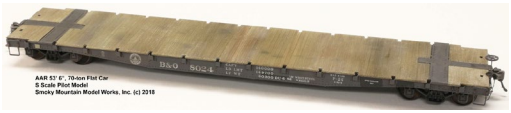
Monster Models Works is selling an S scale kit for Union Brewery. The craftsman-style model is based on an historic structure located in Virginia City, NV. The kit includes walls, corners, roof caps, and cornices of 3D-engraved Aged American Bond Brick; peel & stick windows, shutters and doors; colorful signage, assembly instructions, and finishing suggestions. The assembled model has a footprint of 4.6 x 6.25-inches. For additional information go to monstermodelworks.com.

River Raisin Models is importing a selection of Railway Express Agency steel welded express refrigerator

cars. The S scale brass models are being crafted in Korea by Boo Rim Precision.

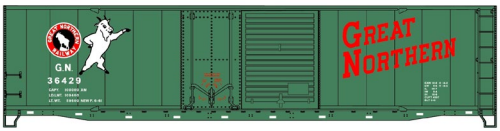
The models faithfully replicate prototypes built by American Car & Foundry in 1947-48 for the Railway Express Agency and Atlantic Coast Line Railway.

Four paint schemes will be offered: original dark green, light green, aluminum body with red and dark green stripe, and the ACL purple scheme. For more details including reservation information visit riverraisinmodels.com.



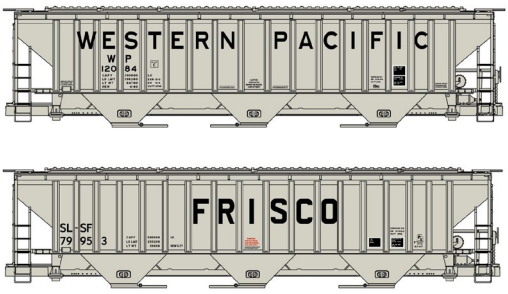
Smoky Mountain Model Works has a new S scale resin kit of an AAR 53-foot 6-inch 70-ton flatcar. The kit includes a single-piece underframe separate stake pockets, resin deck with nail holes, details, wires, and Kadee 802 couplers. Trucks and decals are not included. For more information, visit smokymountainmodelworks.com.

HO SCALE PRODUCT NEWS



Accurail is selling an HO scale kit for a Great Northern 50-foot welded steel boxcar. The model

represents a car built in 1961 with both plug and sliding doors on each side.



Also new from Accurail are two kits for Pullman-Standard 4750 cu. ft. triple-bay covered hoppers. The models are decorated for Western Pacific and SL-SF Frisco. All Accurail kits include appropriate trucks and Accumate knuckle couplers. For additional information on all Accurail products contact a dealer or visit accurail.com.

American Model Builders is selling an HO scale Laserkit for Boron Station, a 14 x 24-foot depot built in the California desert in 1896. The kit includes a separate 12 x 17-foot baggage structure. The prototype depot was relocated several times and is currently preserved in Boron at the Twenty Mule Team Museum. Components in the tab and slot construction kit include peel & stick windows, door, trim, and shake style shingles; metal smoke jacks, a cast resin swamp cooler, and color signs. For additional information visit laserkit.com.

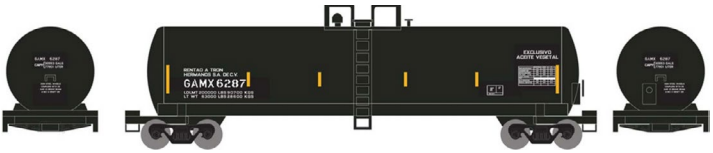
Athearn displayed a pre-production sample of their new HO scale Union Pacific 3900 class 4-6-6-4 Challenger locomotive at the Amherst Train Show. Of special note on the feature-laden Genesis


Photo by Ken Patterson

series model are the fully detailed backhead with printed manual controls, individually applied valves and other appliances, and directional LED headlight and tender backup light. Oil-fired (CSA-1) and coal burning (CSA-2) versions of the giant steam locomotive will be offered. Both DC and DCC with sound versions are included in the release which is planned for late this month.

Athearn's next production run of EMD GP7/9 diesels will be available decorated for Burlington Northern Santa Fe, Chicago & North Western, and Wisconsin & Southern. The BNSF version is a former ATSF GP7u with a Topeka cab and a 1,600-gallon fuel tank. The HO scale Genesis series model will be painted in Athearn's Primed-for-Grime finish. The CNW model replicates a former GP9r fitted for passenger service with roof mounted air tanks and a 2,400 gallon split fuel/water tank. Upgrades since Athearn's last production run include LED lights and rubber MU hoses. Availability is planned for January 2019.

All Genesis sound-equipped locomotives feature a DCC decoder with SoundTraxx Tsunami2 sound. The sound unit will operate in both DC and DCC environments.



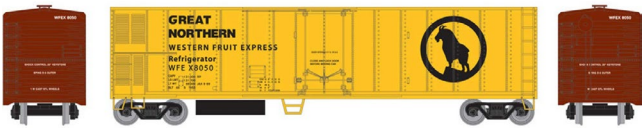
A group of General American Tank Corporation (GATC) 20,000 gallon tank cars are included in Athearn's January 2019 schedule. In addition to the GAMX car shown, the HO scale Genesis series model will be available decorated for PPG Industries, Occidental Chemical, and three slightly different GATX schemes.

Athearn's next production run of HO scale SD40 diesel units will include two Southern Pacific experimental paint jobs.

Additional road names planned for the Ready-to-Roll series model are CSX, Pennsylvania Railroad in Brunswick green, and a high-nose version decorated for Southern Railway. Sound-equipped versions of Athearn Ready-to-Roll locomotives feature Soundtraxx Econami Sound with a DCC decoder. DC-only models come with a 21-pin NEM DCC plug to simplify installation of an aftermarket decoder.

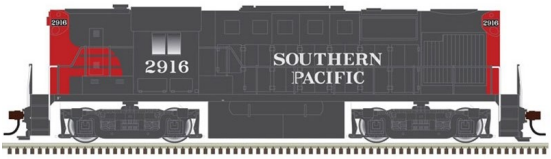
Two versions of a 28-foot drop-sill parcel trailer decorated for United Parcel Service is included in Athearn's January 2018 release. The HO scale model will be available with and without the UPS shield.

Roundhouse branded models scheduled for release next January include this 50-foot mechanical refrigerator car. In addition to the Santa Fe version shown here, the HO scale model will be available in three numbers each for Burlington Refrigerator Express, Fruit Growers Express, American Refrigerator Transit, Chicago & North Western, and Great Northern/Western Fruit Express.

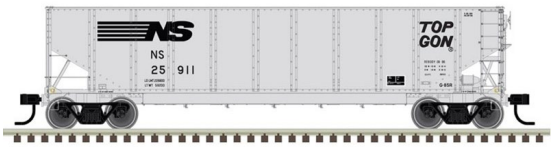


The reefers will have appropriate trucks with 33-inch metal wheels. For additional information on all Athearn and Roundhouse brand products contact a dealer or visit athearn.com.

Atlas Model Railroad Company has developed new road names and numbers for its HO scale Alco RS-11 diesel locomotive. The Classic series model will be available with a LokSound Select Dual-Mode decoder that allows models to be used in DC and DCC environments. Road names will be Apache Railway, Nickel Plate Road, Delaware & Hudson, Norfolk & Western,



Conrail (ex-Penn Central), California Western, Southern Pacific, and Missouri Pacific. An undecorated version will also be available. The RS-11s are expected to be ready during the third quarter of 2018.

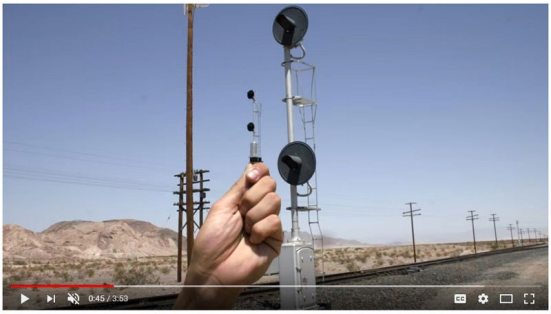


Also scheduled for release during the third quarter is a group of Norfolk Southern class G-86R TopGun coal haulers with new road numbers. The Atlas Master series model will have separately applied wire grab irons and uncoupling levers, etched-metal brake wheel platforms, 100-ton trucks with metal wheels, and knuckle couplers.

Atlas plans to introduce a new Santa Fe class BX-166 boxcar during the third quarter of 2018. A variety of Santa Fe paint schemes will be offered including cars with a 24-inch herald, early and late Q heralds, plain ATSF cars with no herald, and Berwind C and Berwind J repaints. The HO scale ready-to-run model will have 36-inch metal wheels.

Completing Atlas's third quarter release of HO scale models is a Trainman series steel caboose with a center cupola. Special details include separately

applied side railings and clear window inserts. Road names will be Conrail, Amtrak, Chessie System, Chesapeake & Ohio, Lehigh Valley, Reading Railroad, Reading & Northern, Union Pacific, Penn Central, Western Maryland, Lehigh & Hudson River, NJ Transit, Alaska Railroad, Tennessee Central, Delaware & Hudson, Ferrocarril del Pacifico, and Pere Marquette. An undecorated version will also be available.



BLMA In Stock Video

Atlas has released a video that summarizes the availability of BLMA products. The video is hosted by BLMA founder Craig Martin who sold his company to Atlas two years ago. To view the video go to youtu.be/J6P35FT9Nbo. For more information on all atlas products, see a dealer or go to atlasrr.com.

Broadway Limited Imports is preparing to release a run of HO scale USRA 2-8-2 Mikado steam locomotives in May. Both heavy and light versions of the standard USRA design will be included in the release. In addition to the Great Northern locomotive shown here in the road's Glacier Park scheme with a green boiler and mineral red cab roof, road names will be Chicago, Burlington & Quincy; Santa Fe, Central of New Jersey, Chicago & North Western, Erie, Milwaukee Road, and New York Central/ Pittsburgh & Lake Erie.

USRA 2-8-2 Light Mikado steam locomotives will be available decorated for Nickel Plate Road, Baltimore & Ohio, Union Pacific, New York Central/Indiana Harbor Belt, and Southern Railway in the famous candy apple green scheme. Both version of the HO scale ready-to-run model will be equipped with Paragon3 sound and control system for DC and DCC. Synchronized puffing smoke will be available only on the heavy version of the Mikado locomotive. For complete details contact a dealer or visit broadway-limited.com.

Bowser Trains is quoting a December 2018 delivery date for a group of HO scale GMD SD40-2F diesels. The -2F units were basically a SD40-2 in a full-width cowl body. In addition to the Central of Quebec scheme shown above, Bowser will offer the SD40-2F decorated for Bangor & Aroostook, Central Maine & Quebec Railway, and five different CP Rail schemes. Features include individual air hoses, windshield wipers, grab irons, and coupler lift bars; operating headlights, nickel silver wheels, and knuckle couplers. Fuel tank details will be road-name specific. DCC units will feature a LokSound Select decoder. DC versions will have a 21-pin plug for installation of an aftermarket decoder. Reservations close March 30.

In addition to the SD40-2F locomotives, Bowser has another run of GMD SD40-2 locomotives scheduled to arrive in January

2019. Included in this release are Algoma Central, BC Rail (RWB), BC Rail (Two Tone Green), Canadian Pacific (Golden Beaver), CP Rail (no Multi Mark), CP Expressway, CP (small Multi Mark w/Elephant Ears), CP (Block Lettering), Iowa, Chicago & Eastern "City of Buffalo; First Union (Green & Silver), QNSL (grey), HLCX (Maroon & Blue), HESR/ Marquette RR, and W&LE. Additionally, SD40-3's in CP (Block Lettering) and CP (Block Lettering & Golden Beaver) will be available. Preorders are due April 13.

Bowser is working on two new HO scale freight cars for release late this year. The ready-to-run models include a 50-foot steel flat car and a GS gondola. Road names for the flat car will be Lehigh Valley, Penn Central, and three PRR schemes.

The gondola will be available in three different Pennsylvania Railroad schemes.

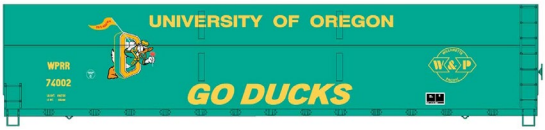
Bowser's long-range plans include an HO scale version of a GMD SD40 diesel locomotive. Road names will include Algoma Central, QNSL, CP Rail (nine schemes), Canadian Pacific (three schemes), Dakota, Minnesota & Eastern (two schemes); St. Lawrence & Hudson,

and Canadian National (four schemes). Pre-orders are due by April 27 with delivery scheduled for February 2019. For more information on all Bowser models contact a dealer or visit bowser-trains.com.

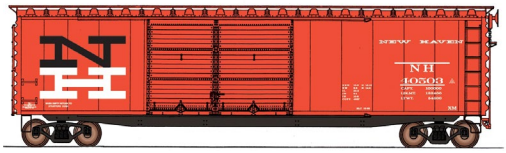
InterMountain Railway reports it will release another production run of its HO scale 4750 cu. ft. triple-bay covered hopper cars in June. The ready-to-run model will have etched-metal roof walks, metal wheelsets, and Kadee couplers.

Six road numbers each will be available for Burlington Northern, Kansas City Southern, CSX, Illinois Central Gulf, Grain Train, BNSF (round herald), Klemme Co-op, General Chemical, Garvey Elevators, Santa Fe Q, FMC, AM Grain Express, Union Pacific (two schemes including Bicentennial), State Line Elevator, Farmrail "I Care", Farmers Elevator, Grain Handling Corp, Goodseed & Grain, Pomeroy Co-op, and Evergreen Fish Hatchery.

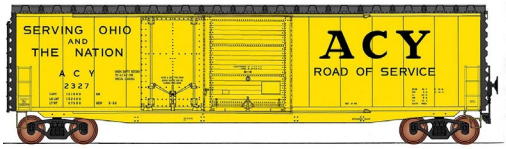
FMC wood chip gondolas with welded sides are due to be released by InterMountain in July. The HO scale Value Line models will be produced from tooling previously used by LBF and E&C Models. Road names will include Southern Pacific, Golden West Service, and Union Pacific/Southern Pacific (post merger).



Wood chip cars of the Willamette & Pacific Railroad will be available in three schemes: D.A.R.E (Drug Abuse Resistance Education), Oregon State University Beavers, and University of Oregon Ducks.



Also due in July are HO scale 50-foot PS-1 boxcars with a cushion underframe and double doors. Road names with two sliding doors will be New Haven, Norfolk & Western, Southern Pacific, Erie, Frisco (SL-SF), Kansas City Southern, Rio Grande, Norfolk & Western, Detroit & Toledo Shore Line, and Southern Railway (two schemes).



Cars with a combination of a plug and sliding door on each side include Akron, Canton & Youngstown (two schemes), Union Pacific (two schemes), Western Maryland, and Rock Island. For additional information on all InterMountain products contact a dealer or visit intermountain-railway.com.

Kadee Quality Products is working on two new HO scale models for release in April. The new cars include this 40-foot PS-1 boxcar decorated for St. Louis Southwestern AKA the Cotton Belt. The ready-to-run model follows a prototype built in 1956 with an 8-foot six-panel Superior sliding door. The model is painted in the original box car red.

The second Kadee model due for release in April is this Detroit, Toledo & Ironton PS-1 boxcar built by Pullman-Standard in 1962. Note the full width side sill and the 8-foot P-S sliding door. The HO scale ready-to-run model is decorated in the original DT&I green scheme.

This 40-foot PS-1 boxcar owned by the Southern Railway will serve as the prototype for an HO model coming from Kadee in May. Spotting features include the narrow bolster tabs, P-S ends, and 8-foot Youngstown sliding door. As shown here, the prototype was repainted in 1972 after having her running board removed and right hand side ladders shortened. All Kadee HO scale models come with Kadee couplers and two-piece self-centering trucks. For additional information contact a dealer or visit kadee.com.

Monster Model Works is selling an HO scale kit for this Brick Pumping Station. The model is based on the historic Rutland Railroad Pumping Station in the small Vermont town of Alburgh. The craftsman-style kit includes 3D laser-engraved American bond brick walls and corner pieces, peel & stick windows, 3D printed piping, metal roofing material, and a laser-cut door. Also included are signage material, assembly instructions and

weathering suggestions. The finished HO scale model has a foot print of 4.25 x 5.75-inches. For more information visit monster-modelworks.com.

New HO scale vehicles from **Oxford Diecast** include this 1957 Chevrolet Nomad wagon in India Ivory over Surf Green.

Also new is a Cardinal Maroon paint job on this HO scale 1936 Buick Special convertible coupe. Details include whitewall tires with maroon wheel rims.

This HO scale 1965 Ford Mustang convertible features the galloping pony mascot on the side of the iconic car. Oxford also produces vehicles suitable for N, S, and O scale scenes. For additional information visit oxforddiecast.co.uk.

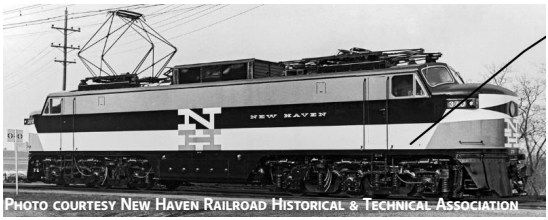
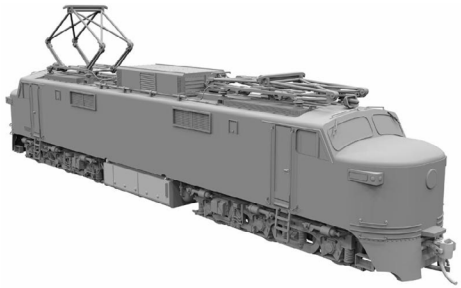
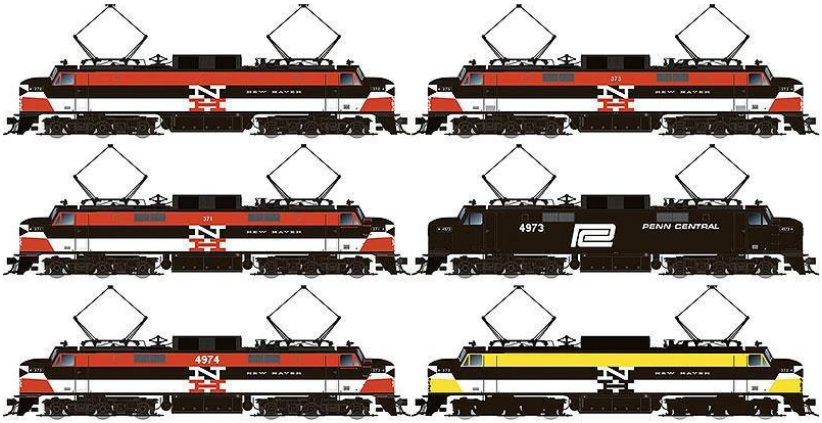


Photo courtesy New Haven Railroad Historical & Technical Association

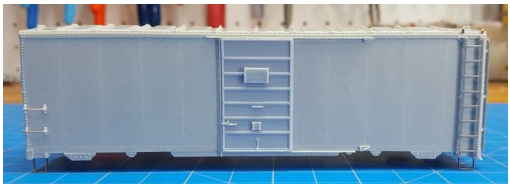
Rapido Trains plans to introduce an HO scale version of the New Haven & Hartford Railroad's EP-5 "Jet" electric locomotive early next year. The NH&H ordered the double-ended locomotives from General Electric in 1954 to head passenger trains between New York's Grand Central Terminal and New Haven, CT. Rapido has completed engineering drawings for the model and the project has entered the tooling stage.



The model will be available as-delivered with plain sides (top photo) as well as with the body side vents that were added to help cool internal electric components. The additional vents are shown in this 3D rendering of Rapido's EP-5.

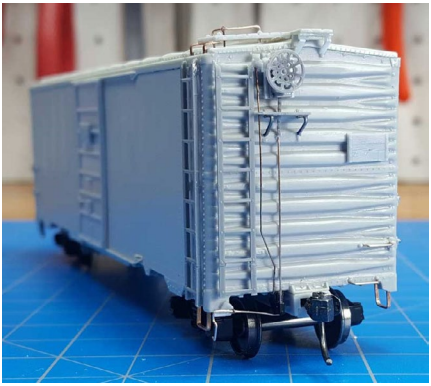


Rapido will offer the EP-5 in several different NH&H paint jobs. They include the as-delivered scheme, as modified later with smaller nose logos, the short-lived experimental yellow scheme, and the black livery of Penn Central. Multiple road numbers will be available. For additional information on all Rapido products contact a dealer or visit rapidotrains.com.

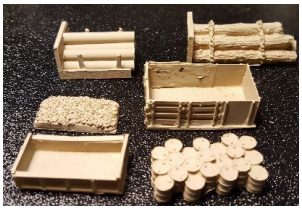


Resin Car Works is selling a craftsman kit that builds into a Chicago Burlington & Quincy 40-foot XM-32 AAR 10-foot

6-inch IH steel boxcar. Between 1940 and 1952 the Burlington Lines, including the Colorado & Southern, and Fort Worth & Denver, acquired more than 16,000 class XM-32 cars. RCW's limited run HO scale model (Kit No. 8.01) replicates the 4,000 early versions built during World War II.



The kit includes a one-piece cast resin body, detail parts, CB&Q decals, and a pair of Tahoe double-truss truck side frames. Wheelsets and couplers are not included. For more information about this RCW kit visit resincarworks.com/extras/extras_kit8-01_CBQ_XM32.htm. For prototype information on modified 1937 AAR boxcars visit steamerafreightcars.com/prototype/frtcars/mod37aarmain.html.



New HO scale resin castings from **Rusty Rail** include a shop cabinet and detailed workbench (left) and several truck bodies. Painting and some minor assembly is required. For additional information visit rustyrail.com.

ScaleTrains.com's next production run of its Rivet Counter series SD40-2 diesels is due this summer. The HO scale ready-to-run model will feature a few additional details over previous runs, the most notable being Flexicoil trucks. Road names will include BNSF/ Heritage I, Conrail, EMD Lease, Norfolk &

Western, Burlington Northern, CSX/YN3, Chessie System, Chicago & North Western, Milwaukee Road, Norfolk Southern, Santa Fe, Union Pacific (mid-1980s repaint), Union Pacific (post 1980 scheme), and Southern Railway (high-nose). The models will have ESU LokSound DCC and sound.

An economy priced Operator series GE Tier 4 GEVO locomotive with factory-installed ESU DCC Essential Sound Unit is planned for release this spring. The Operator model has walkway tread plate, LED lighted number boards, LED lighted ditch lights, and the same drivetrain as the more expensive Rivet Counter model. Road names will be Union Pacific, CSX/YN3, GE Demonstrator, Norfolk Southern, BNSF (Heritage 3), and Canadian National. It will be available without sound (DCC-ready), and with ESU Essential DCC and sound.

Also due from ScaleTrains.com this spring is a kit that assembles into an Evans 5100 cu. ft. RBL boxcar. Features include an 8-foot plug door, machined metal wheels, and semi-scale Type E knuckle couplers. Available road names will be Chicago North Western, Florida East Coast, Evans, Fort Vancouver, Mountain Pine Lumber, Norfolk Southern, Penn Central, and five Wisconsin & Southern cars with special slogans:

US Air Force (above), Support Our Troops, 9-11 Tribute, Breast Cancer Awareness, and God Bless America. A portion of the proceeds from the sales of W&S tribute boxcars will be donated to charities. For additional information visit scaletrains.com.

Showcase Miniatures is selling an HO scale kit based on a rural post office in Fort Davis, AL. Components in the craftsman-style tab-and-slot construction kit include laser-cut walls, peel & stick window material, cast pewter details, and assembly instructions. The completed structure has a footprint of 7 x 2.75-inches. For additional information visit showcaseminiatures.net.

Tangent Scale Models continues to expand its selection of accurately modeled tank cars with the introduction of a GA 10,000-gallon radial course tank car. This all-new HO scale model is based on a General American Tank Car design from 1917.

Road names include HOX-Humble Petroleum Products (1935+), SRDX-Sinclair (1947+), and UTLX- Hercules Powder (1949+).

An undecorated kit is also available.

Also new from Tangent are two versions of a Delaware & Hudson PS-2CD 4750 cu. ft. covered hopper car.

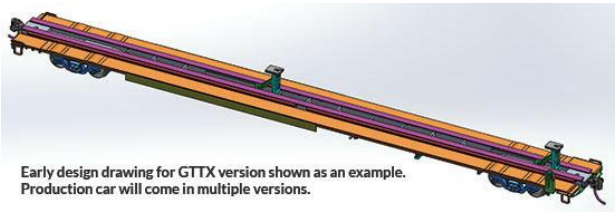
D&H schemes include the original 1974 version (above) and the modern ATGX scheme with conspicuity stripes. The accurately detailed HO scale model includes all of the special appliances originally ordered by D&H including the brake system, triple Miner Selflok outlet gates, and Morton metal running boards. Six road numbers are available. For additional information on all Tangent products visit tangentscalemodels.com.

TrainLife.com has announced two new products. The first is a small Gas & Welding Equipment Repair shop, based on a prototype located about a mile from their store in Provo, Utah. While they don't have any information on the history of the structure, based on the elements of the Streamline Moderne architectural style it is believed to have been built in the late 1930s or early 1940s. A laser-cut craftsman kit, the structure has a footprint of 3.875 x 2.0625-inches.

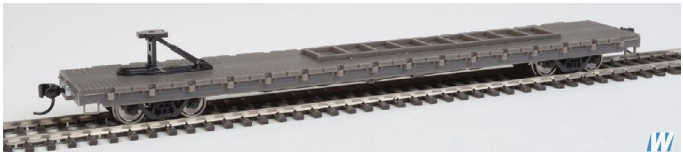
Trainlife has also announced pre-orders of an exclusive-to-them HO scale depressed center flatcar, designed and manufactured by ExactRail. Combining common elements of several depressed center flatcars, this generic model contains General Steel Industries features and is a stand-in for similar depressed center flatcars built for many railroads. Included in the upcoming release are models decorated for TTX, Conrail, Pittsburgh & Lake Erie, New York Central, and Union Pacific MoW. The models feature factory installed Kadee #5 couplers, a narrow-style draft box featuring shank wedges, striker casting, and full nut and

bolt detail; ExactRail ASF 100-ton Ride Control Trucks, wire grab irons, and a GSI-style perforated deck. For more information see trainlife.com.

Walthers has scheduled a June release date for the next production run of its Mainline series ES44AC Evolution GEVO locomotive. The HO scale diesel will come with three truck types as appropriate to the road name being modeled. They include C4 A-1-A with center idler axle, steerable truck, and standard high-adhesion trucks. Road names will be Kansas City Southern, BNSF (Wedge scheme), Canadian Pacific, Citirail CREX, and Iowa Interstate. Standard DC units will be offered as well as DCC units with ESU Sound.


Early design drawing for GTTX version shown as an example. Production car will come in multiple versions.

The General American G85 85-foot flatcar will be released as a WalthersMainline model with an expected availability of late-February. Based on a General American prototype built in the 1960s, they carried container and trailer traffic from 1961 through the 1980s. Five different body configurations, featuring trailer hitches or container pedestals as appropriate, will be released. Road names for the first release include ATSF, GTTX (yellow), GTTX (brown), Penn Central, REA Express, Southern Pacific, and VTTX.



Four different 60-foot Pullman-Standard flat

cars are scheduled for release from Walthers this summer. The cars are from the same family, however the deck details vary depending on the intended service of each car. Flat cars equipped for trailer loading with a hitch and rails (above) will be available decorated for Santa Fe and Canadian Pacific.

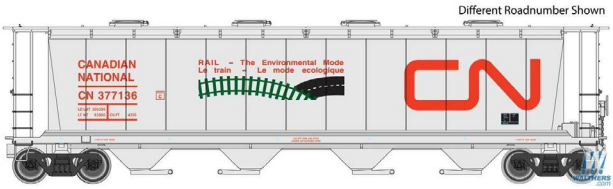
A TTX HTTX car designated for heavy loading has two center and two outside tie-down channels.

Wisconsin Central and TTX VTTX cars assigned to container service have a side-mount lever-style handbrake and special bolsters for 20-foot and 40-foot containers.

A flat car for general service with two center tie-down channels will be available decorated for MTTX Trailer Train. An undecorated version will also be available. All of the flat cars in this series will ride on 70-ton roller bearing trucks with 33-inch machined metal wheelsets.

Walthers is planning a June release for this 59-foot cylindrical covered hopper car. The

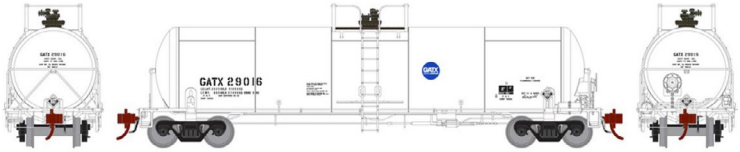
Mainline series model is based on a 4550 cu. ft. prototype with four discharge bays as manufactured by National Steel Car. Features include a see-through roof walk, knuckle couplers, and 36-inch machined metal wheelsets. Cars with trough hatches will be available decorated for BNSF, Canadian Pacific, Canadian Wheat Board CNWX (two schemes), and NdeM-National Railways of Mexico.



Cylindrical hoppers with round loading hatches will be available for Canadian National and Toronto, Hamilton & Buffalo. For additional information on all Walthers products contact a dealer or visit walthers.com.

Yarmouth Model Works is selling a selection of cast resin parts that enable modelers to create accurate Canadian-built 40-foot boxcars. The HO scale parts are designed for use with IMWX, Red Caboose, Branchline Trains, and InterMountain Railway freight car models. Shown above is a pair of 5-panel Superior doors and NSC ends for a boxcar with a 10-foot 6-inch interior height. Additional parts available include a variety of ends, doors, and both Hutchins and Murphy roofs. For more information including an illustrated catalog visit yarmouthmodelworks.com/index.php/ModelDetailParts/FreightCarParts.

N SCALE PRODUCT NEWS

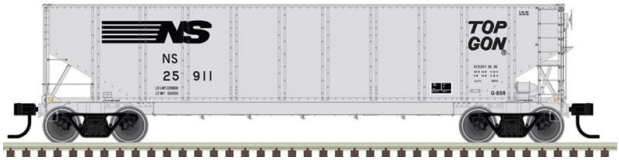


New N scale models coming from **Athearn** next January include a group of General American Tank Corporation (GATC) 20,000 gallon tank cars. The models will be available decorated for GAMX, PPG Industries, Occidental Chemical, and three different GATX schemes.

A 50-foot FMC outside post steel boxcar with non-terminating ends and double Youngstown sliding doors is also set for release early in 2019. In addition to the Western Pacific car shown, the N scale model will be available decorated for British Columbia Railway, Burlington Northern, Chicago & North Western, Chesapeake & Ohio, Northern Alberta Railway, Amador Central, East St. Louis Junction, Galveston Wharves, Southern Pacific, Wisconsin Central, and Longview, Portland & Northern. For additional information on all Athearn products contact a dealer or visit athearn.com.

Atlas plans to introduce a new N scale Santa Fe class BX-166 boxcar during the third quarter of 2018. The ready-to-run model will have separately

applied uncoupling levers, air hoses, etched metal crossover platforms and 100-ton trucks with 36-inch metal wheels. A variety of Santa Fe paint schemes will be offered including cars with a 24-inch herald, early and late Q heralds, plain ATSF cars with no herald, and SFLC Berwind C and Berwind J repaints.



Also scheduled for release during the third quarter are N scale Norfolk Southern class G-86R TopGun coal haulers with new road numbers. The Atlas Master series model will have etched-metal brake wheel platforms, detailed internal bracing, and knuckle couplers. For more information contact an Atlas dealer or visit atlasrr.com.

Broadway Limited Imports is scheduled to release a group of EMD F3 diesel units next month. The N scale models will feature BLI's Paragon3 Sound and DC/DCC operating system. Both A and A/B sets will be available.models include wire grab irons, battery operated interior lighting, and truck-mounted knuckle couplers. Road names include Union Pacific (Overland scheme), Southern Pacific (Lark scheme), Southern Pacific (Sunset Limited scheme), Illinois Central, and Rock Island (Golden State scheme).

Decorating schemes include Pennsylvania Railroad (Brunswick green with a single gold stripe), Santa Fe (red and silver passenger Warbonnet), Chicago, Burlington & Quincy; Great Northern (Empire

Builder scheme), Southern Pacific (Black Widow), and Union Pacific. For complete details contact a dealer or visit broadway-limited.com.

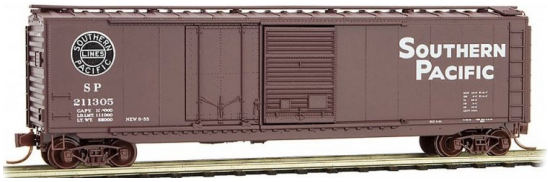
Fox Valley Models has N scale covered hoppers that feature newly tooled roofs, wire grab irons and hatches with etched metal running boards.

In addition to the twin-bay 3,000 cu. ft. car shown at top, Fox Valley also has triple-bay covered hoppers rated for 4740 and 4750 cu. ft. capacity.

Fox Valley has announced plans to rerun its N scale GEVO locomotives. ES44C4 units will be available with three new numbers each for Florida East Coast, Citirail, and BNSF with a new PTC antenna. GE Evolution ES44AC Hybrid locomotives will be available decorated for CSX Safety Train, Iowa Interstate (red/yellow scheme), and CSX Heritage Chessie System. Delivery is planned for mid-2018. For additional information, including available road names for the covered hopper cars, contact a dealer or visit foxvalleymodels.com.

New N scale models from **Micro-Trains Line**

include this Chicago Burlington & Quincy 70-foot heavyweight baggage car. The model is based on prototype No. 1540 that was built in 1922. The car was refurbished in the 1940s and saw service through the 1960s.



New freight cars from Micro-Trains include this Southern Pacific 50-foot boxcar. The class B-50-35 prototype was built in the 1950s with a (then) new plug door and a conventional Youngstown sliding door.

This N scale model is based on a Burlington Northern 40-foot drop-bottom gondola. The ex-Great Northern prototype was given a fresh coat of BN paint in 1977. For information on all Micro-Trains Line models contact a dealer or visit micro-trains.com.

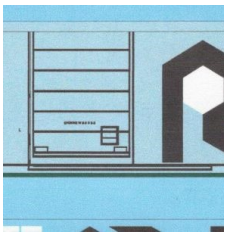
ScaleTrains.com has announced plans to release six new road numbers for its N scale Rivet Counter version of the GTEL 8,500 horsepower Big Blow Turbine. The new group is scheduled for release this summer and will include locomotive No.30 that features the unique intake housing and long pipes on the roof of the B-unit.

Also scheduled for release this summer is a Rivet Counter N scale Gunderson 5188 cu. ft. covered hopper. The production run will

include three different body styles, two different hatch types, and two outlet gate options. Multiple road numbers will be available for BNSF-Santa Fe, Northern Pacific, BN, and BNSF Heritage schemes. For additional information on all ScaleTrains.com products visit scaletrains.com.

NEW DECALS, SIGNS AND FINISHING PRODUCTS

Great Decals is selling white O scale lettering sets for Virginian bulkhead flat cars. In addition to the Virginian road name, set #142 includes car classes, road numbers, dimensional and capacity data, and build and painted dates specific to these cars. Each set will correctly letter two cars. Great Decals also has S scale lettering for Richmond, Fredericksburg, and Potomac boxcars. The white lettering set (#134) was produced from new RF&P artwork. It has sufficient material to decorate one 50-foot boxcar and includes an RF&P herald, road name, numbers for sides and ends, and dimensional data. For additional information including ordering details visit Bill Mosteller at greatdecals.com.



Mask Island Decals displayed two new HO scale lettering sets at the recent Amherst Train Show. They included a Route Rock for a 40-foot blue El Reno rebuilt boxcar (above). The second new HO scale set is for Norfolk & Western with the 'hamburger' logo for an 86-foot auto parts car. For additional information visit maskislanddecals.com.

DISCLAIMER .....

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VIEW READER COMMENTS
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Briefly noted at press time ...

American Model Builders has released a LaserKit for an HO scale Midland Valley Wood Cupola Caboose. Laser-cut components follow tab and slot construction with metal and cast resin details. This is a prototype-based body kit without trucks, couplers or decals...

Proving that manufacturers do listen to factually based information from knowledgeable modelers, **Bowser** has modified the details and road numbers on several previously announced HO scale British Columbia Railroad and Iowa, Chicago & Eastern SD40-2 locomotives. For more information including release dates contact a Bowser dealer...

Centralia Car Shops has announced N scale 13 Double-Bedroom Sleepers decorated for Pennsylvania Railroad (two schemes), New York Central (two schemes), Southern Pacific (three schemes), Long Island Railroad, Ferrocarriles Nacionales de Mexico, and Ringling Bros. and Barnum & Baily Circus...

KatoUSA is working on an HO scale Amtrak Superliner II Transition Sleeper with a stepped-roof. Also coming soon are new road numbers for Kato's Superliners in Phase VI paint. For N scale modelers, Kato plans to reissue its SD70MAC decorated for Alaska Railroad and in BNSF's Swoosh scheme...

Paul LaCura has accurately detailed kits for HO scale Union Switch & Signal Class 5 Target Signals. Info at spdaylight.com/class-5 ...

SELECTED EVENTS

March 2018

(Many events charge a fee. Check individual info website for details.)

AUSTRALIA, VICTORIA, WODONGA, March 17, Open House hosted by Murray Railway Modellers at the Club Room, Wodonga Showground. Info at wodongashow.org.au.

CANADA, ONTARIO, COPETOWN, March 4, Protoype Modellers Show. Info at facebook.com/CopetownShow.

CANADA, ONTARIO, TORONTO, March 17, Toronto Railway Prototype Modellers Meet, at Humber College, North Campus, Building B, Rooms B201-B220, 205 Humber College Boulevard. Info at torontoprototypemodellers.wordpress.com.

CALIFORNIA, BAKERSFIELD, March 10-11, Train Show sponsored by Golden Empire Historical & Modeling Society at Kern County Fairgrounds, 1142 South 'P' Street. Info at gehams.org/bakersfield-train-show.

COLORADO, DENVER, March 3-4, Rocky Mountain Train Show, at Denver Merchandise Mart, 451 East 58th Avenue. Info at rockymountaintrainshow.com.

FLORIDA, PALMETTO, March 10-11, Model Train Show, at Bradenton Area Convention Center, 1 Haben Boulevard. Sponsored by Real RailRailroad Education and Learning Center of Florida.

ILLINOIS, BELVIDERE, March 24-25, Model Train Show and Sale, sponsored by Rock River Valley Division, NMRA. Belvidere North High School, 9393 Beloit Rd. Request info from Joe Whinnery, 815-398-8973.

ILLINOIS, SPRINGFIELD, March 25, Annual Train Fair, sponsored by Springfield Railroad Society, at Illinois State Fairgrounds, Orr Building. Info a springfieldtrainfair.com.

MISSOURI, SPRINGFIELD, March 24, 40th Annual Train Show, sponsored by Ozarks Model Railroad Association, Springfield Expo Center, 635 St. Louis St. Info at omraspringfield.org.

NEW MEXICO, LAS CRUCES, March 17-18, Open House, Swap Meet, and Operating Session; sponsored by Southern New Mexico N Scalers, at Southern New Mexico Fairgrounds (white Quonset), 12125 Robert Larson Boulevard. Request info from Mike Fifer at 575-526-8834.

NEW YORK, BATAVIA, March 25, The Great Batavia Spring Train Show, at Richard Call Arena, Genesee Community college, 1 College Road. Info from David Napper at dncnapper@gmail.com.

OHIO, GREENVILLE, March 4, Model Railroad Swap Meet, at Darke County Fairgrounds, Youth Building, 800 Sweitzer Street. Info from Joe Worz at josephbw@hughes.net.

OHIO, SALEM, March 22-24, 26th Annual Midwest Narrow Gauge Show, at Timberlanes Complex at Stables Inn, 544 East Pershing Street. Info at portlandlocomotiveworks.com/events/26th-annual-midwest-narrow-gauge-show.

OREGON, PORTLAND, March 10, Model Railroad Swap Meet, at Jackson Armory, 6255 NE Cornfoot Road, 9:30 am to 3 pm. Information from capt.brigg@pacificcascaderailway.com .

PENNSYLVANIA, MALVERN, March 23-25, Valley Forge RPM Meet, at Desmond Great Valley Hotel & Conference Center. Info at rpmvalleyforge.com.

SOUTH CAROLINA, NORTH CHARLESTON, March 17-18, 2018, Spring Train Show, sponsored by Charleston Area Model Railroad Club, at Danny Jones Armory Park, 5000 Lackawanna Blvd.. Info at chamrc.com.

VERMONT, ST. ALBANS, March 12, 31st Annual Model Railroad Show, sponsored by Northwestern Vermont Model Railroad Association at Collins Perley Sports & Fitness Center, at Interstate 89, Exit 19. Info at nwvrailroad.org.

WISCONSIN, CEDARBURG, March 11, 23rd Annual Model Railroad Show & Swap Meet, sponsored by Metro Model Railroad Club, at Circle B Recreation Center, 6261 Highway 60. Info at metrorrclub.org.

WISCONSIN, ONALASKA, March 17-18, 37th Annual La Crosse & 3 River's Model Railroad Show Including Doll Houses and Miniatures, New Location: Onalaska Omni Center, 255 Riders Club Road.

April 2018, by location

CALIFORNIA, SAN BERNARDINO, April 28, Western Prototype Modelers Meet, Santa Fe/Amtrak Station, 1720 West 3rd Street. Info at railroadprototypemodelers.com.

GEORGIA, SAVANNAH, April 14, Savannah Railroad Prototype Modelers Meet, at White Bluff Presbyterian Church, 10710 White Bluff Road. Hotel accomodations at Marriott Spring Hill Suites Midtown, 11317 Abercorn Street. Info from Dennis Blake at seaboard_1966@yahoo.com.

MICHIGAN, WYOMING (metro Grand Rapids), April 14, Spring Train Show, sponsored by Grand River Valley Railroad Club, at HSB, 5625 Burlingame Ave SW. Request info from Ken Skopp at kwskopp@gmail.com.

MINNESOTTA, WOODBURY, April 7, Train Show & Sale, sponsored by Newport Model Railroad Club, at Woodbury High School, 2665 Woodlane Drive. Info at newportclub.us.

OHIO, MARION, April 26-28, Central Ohio RPM, at Marion Union Station. Info at facebook.com/groups/438383252883060/about.

PENNSYLVANIA, MONACA, April 15, Beaver County Spring Model Train Sale, sponsored by Beaver County Model Railroad & Historical Society, at 1700 Old Brodhead Road. Info bcmrr.railfan.net.

VIRGINIA, ROANOKE, April 21-22, Coalfield Railroads RPM & Scale Train Show, at Valley View Holiday Inn. Info at facebook.com/TheCoalfieldRailroadsRPMMeetAndScaleTrainShow.

Future 2018, by location

AUSTRALIA, NSW, ALBURY, LAVINGTON, May 23-24, Annual Train Show, hosted by Murray Railway Modellers Inc., at Mirambeena Community Centre, 19 Martha Mews. Info at murrayrailwaymodellers.com.

CANADA, BRITISH COLUMBIA, BURNABY, May 4-6, 2018, 3rd Annual 7th Division PNR Modellers Meet, at Simon Fraser University (Burnaby Campus), West Mall Centre. Info facebook.com/RailwayModellersBritishColumbia.

CALIFORNIA, SANTA CLARA, May 24-26, O Scale West, S West & Narrow Gauge Meets, at Hyatt Regency Hotel, 5101 Great America Parkway. Info at oscalewest.com.

ILLINOIS, COLLINSVILLE (Metro St. Louis), July 20-21, Railroad Prototype Modeler's Meet co-hosted by NMRA Gateway Division, John Golden, and Lonnie Bathurst, at Gateway Convention Center, One Gateway Drive. Favorable rates are available at Double Tree Hotel next door to the convention center. Info at icg.home.mindspring.com/rpm/stlrpm.htm.

NEW ZEALAND, MOSGIEL, May 12-13, Dunedin Model Train Show, at Taieri Bowling Club, 12 Wickliffe Street. For info send email to dunedinmodeltrainshow@gmail.com .

MARYLAND, ROCKVILLE, August 22-26, 2018, 50th O scale National Convention, Co-sponsored by NMRA MER, Standard Gauge, Narrow Gauge, P48 and Traction modelers, at Rockville Hilton Hotel, 1750 Rockville Pike. Info at 2018oscalenational.com/newsletters/september-2017-newsletter.

MISSOURI, KANSAS CITY, August 5-12, 2018, NMRA National Convention and National Train Show. Host hotel is Westin Kansas City at Crown Center. Info at kc2018.org.

OREGON, PORTLAND, May 30-June 2, Stumptown Express, PNR 2018 Regional Convention, Red Lion Hotel on the River, 909 N Hayden Island Drive. Info at pnr2018.org.

VIRGINIA, FISHERSVILLE, May 6, 32nd Annual Shenandoah Valley Model Train & Railroading Show sponsored by Augusta County Railroad Club at Augusta Expo, 277 Expo Road. Info at acmrrc.org.

Beyond 2018

UTAH, SALT LAKE CITY, July 7-13, 2019, NMRA National Convention and National Train Show. HQ hotel is Little America Hotel. Info at nmra2019slc.org.

MISSOURI, ST. LOUIS, July 12-18, 2020, NMRA National Convention and National Train Show. HQ hotel is Hilton St. Louis at the Ballpark. Info at gateway2020.org.

CALIFORNIA, SANTA CLARA, 2021, NMRA National Convention. ■

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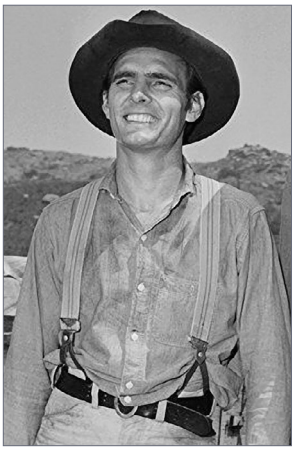
REVERSE RUNNING commentary

Model Railroad Hobbyist | March 2018 | #97

RATE THIS ARTICLE

Joe Fugate applies the Chester Principle to the hobby...



Chester Goode, Marshal

Dillon's sidekick in the first eight seasons of the long-running TV series "Gunsmoke," had one very odd costume point about him.

Chester, a somewhat over-cautious character, always wore *both* a belt and suspenders.

You know Murphy's Law, right? It's generally stated as: "Anything that can go wrong will go wrong." Chester clearly respected Murphy!

I've been a model railroader for many decades now, and over the years I have come to do certain things that may seem like overkill at first – but as with Chester's belt-and-suspenders, they're designed to be an effective counter to Murphy.

So I'm here to tell you, the antidote for Murphy is what I'm dubbing *the Chester Principle.*

The idea behind this principle is simple: assume Murphy is right and it's going to fail. Now ask yourself: knowing that it's going to fail, what, if anything would you do differently?

▶ STEPPING OUTSIDE THE BOX WITH A CONTRARY VIEW

What can you do as a preventive measure to head off failure, or what can you do to make it easier to debug and fix if it does fail?

Let's look at some examples.

I hate mystery shorts. Things ran fine yesterday, but now when I turn the layout on, there is a mystery short (mumble).

When wiring, I've come to assume Murphy is right – my wiring is going to fail with a mystery short, like it or not. Knowing this, how do I prevent a mystery short, and how I make it easy to find and fix a mystery short when it does occur?

There are two reasons to gap your track: expansion joints and electrical gaps. Expansion joints need room to move – that's why they are there – so I *never* fill those gaps.

But electrical gaps *must never close* – if they ever do, instant short! So I now *always* fill all electrical gaps with gray styrene from Micro Engineering bridge scraps. I glue the styrene in with super glue, let it set up, and then trim it to shape with a fresh sharp X-Acto blade.

Next, I want things to be easy to diagnose and debug, so I connect all track feeders to terminal blocks fed from my power bus. If I develop a mystery short, all I need to quickly narrow down and find the short is a screwdriver rather than wire cutters. Once I remove the feeder to the piece of rail that has the short, bingo! I've isolated it. Fix the short and then screw the feeder back in place.

I never hide my feeders. For debugging purposes, I want the feeders to be visible. Yet I hate ugly track feeders, so what to do?

I solder my feeders onto the *backside base* of the rail. As a result, the feeders are invisible from the aisle. Yet if I need to find them, I just take a hand mirror and run that along the track from the back and voila! There are the feeders, plain as day.

This just begins to scratch the surface of all the Chester Principle practices I've developed. The next time Murphy raises his ugly head, konk him with the Chester Principle, and send him packing! ☑

DERAILMENTS

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VIEW READER COMMENTS
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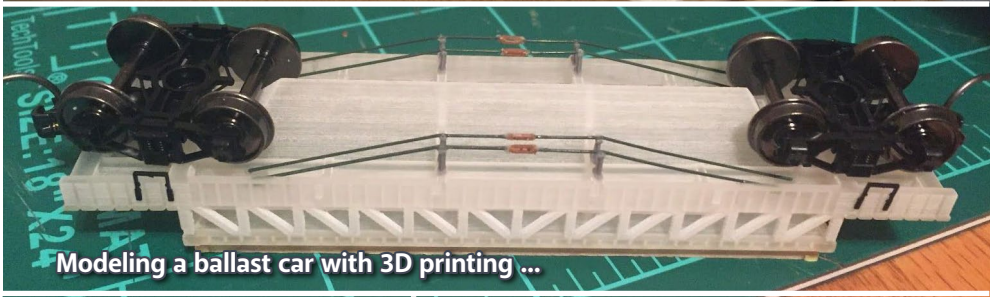
You think your track is bad ...

Here is a compilation showing some of the worst railroad track locations in the world. Pretty amazing ... ■

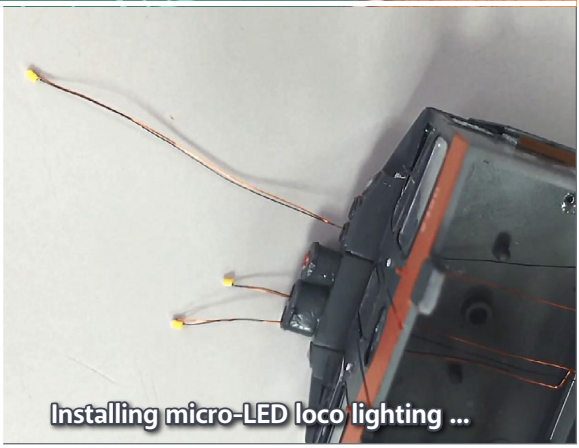
BIZARRE FACTS AND HUMOR (SUPPOSEDLY)

Coming next issue ...

Doug Midkiff's concept for his N scale Arizona & California RR ...



Modeling a ballast car with 3D printing ...



Installing micro-LED loco lighting ...

... and lots more coming in the April MRH!