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Workshop tips

25 ways

to make your model railroad better



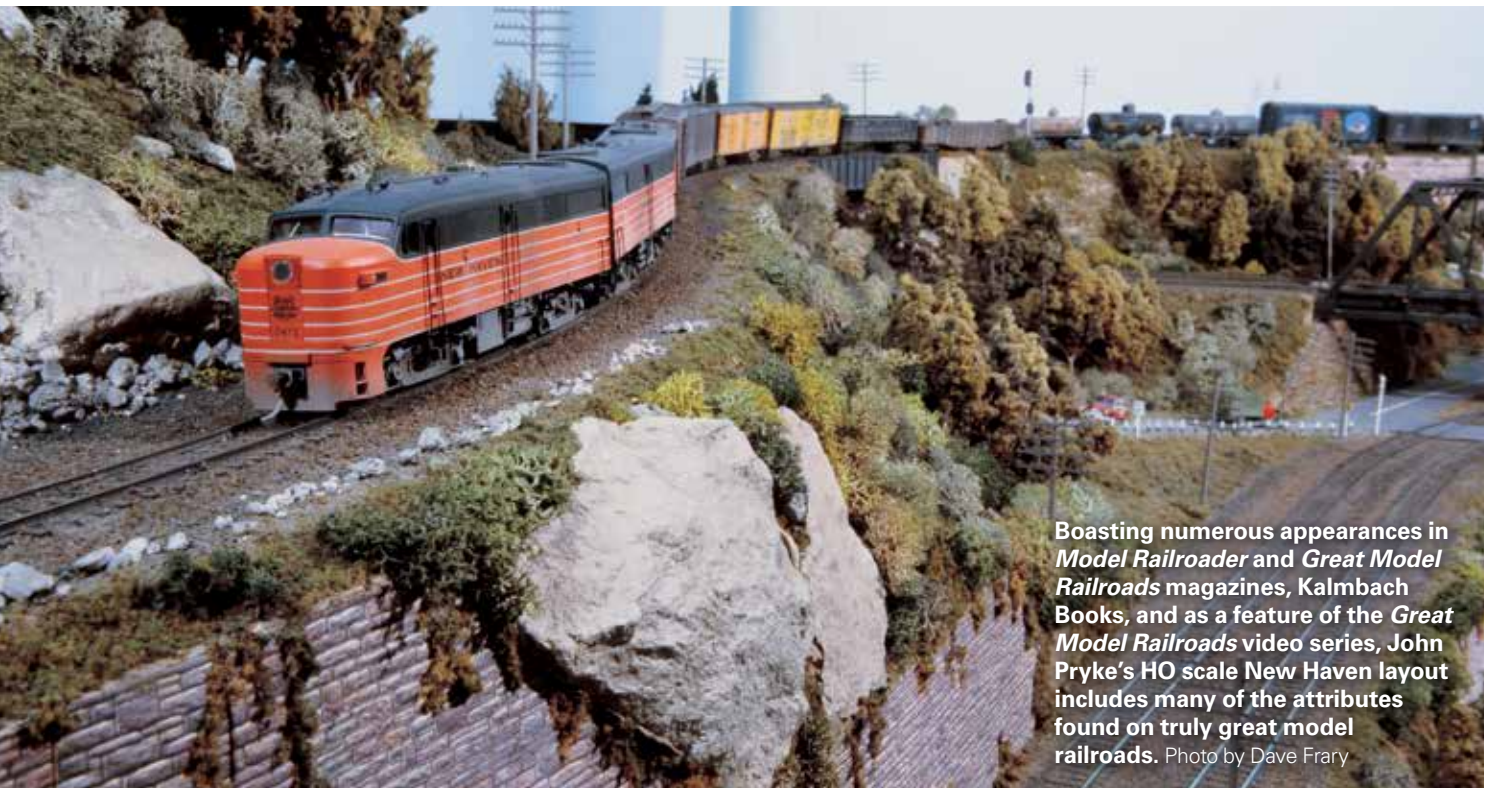
- How to take your model railroad from good to great
- Features a handy checklist for planning your layout
- Suggestions for improving the space around your railroad
- Includes information about additional planning resources

Five things you can do to create a layout that's remarkable, inspiring, and fun to operate

By John Pryke

Photos by the author unless noted otherwise

MAKE A GREAT MODEL RAILROAD



Boasting numerous appearances in *Model Railroader* and *Great Railroads* magazines, Kalmbach Books, and as a feature of the *Great Model Railroads* video series, John Pryke's HO scale New Haven layout includes many of the attributes found on truly great model railroads. Photo by Dave Frary

There are some truly great model railroads within our hobby. These layouts appear on the covers and in the pages of our favorite magazines, and in some cases the owners even have videos made to feature them.

What is it that separates these distinguished layouts from those we've labored over for years? More importantly, what steps can we take to improve our ability to build the next great model railroad?

We'd all like a simple answer, but there just isn't a single attribute that defines a great model railroad. However, there are a few suggestions you can use to start the transformation:

- Create a neat, clean, and comfortable layout space.
- Include realistic detailing that's easily viewed.
- Use a variety of natural colors to craft scenic terrain.

- Stick to a specific prototype and/or time.
- Plan for reliable and prototypical operation.

All of these elements need not be present to create a great model railroad. Choose the two or three that interest you the most, and you're on your way to making a layout like those that delight and inspire us. Let's take a look at these attributes one by one. **MR**

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Looking for more layout ideas and inspiration? *Model Railroader* subscribers have access to more than 500 track plans in the on-line Track Plan Database at www.ModelRailroader.com.

1. Create a neat, clean, and comfortable space for your layout

Many layouts in the United States are built in basements – areas that may be unfinished and also used for storage. However, the concrete walls and floor, rafters with insulation, and single-lightbulb fixtures create a dim and often damp space in which to work. Making your basement into a neat and orderly train room is a great way to help make your layout look more inviting.

Walls. The first step is finishing the walls. After you've checked your local building code and secured the proper permits, start by installing 2 x 4 studs, spaced 18" apart, against the concrete walls. You'll want to complete this framing with insulation and drywall, as if you were building a new room. Where your walls form a corner, consider coving them with thin tempered hardboard or a similar flexible board to eliminate an unrealistic 90-degree joint behind the layout. Finish the edges like drywall so they are smooth.

The easiest way to color the wall is to roll on a coat of light blue latex paint to simulate "sky" behind the layout. Another option is to create a color-graduated wall, simulating the actual color of the sky: light blue at the horizon and a much darker blue if you look directly overhead.

Backdrop. When the paint dries, use spray adhesive to fix commercial or custom backdrops to the wall. In either case, you'll want to trim away the printed sky portions that don't match your backdrop color. You can also add clouds to the wall above the backdrop by dabbing on paint with a sponge or with stencils.

Carpet. To make operating your layout easy on your feet, legs, and back, lay some indoor/outdoor industrial-grade carpet on the concrete floor. A dark, solid carpet color (gray or navy blue) won't distract the eye from the colors on your layout.

Hidden storage. When you complete your benchwork and roadbed, the legs and structural members supporting it may be hidden by a drape made of inexpensive dark cloth stapled to the edge of

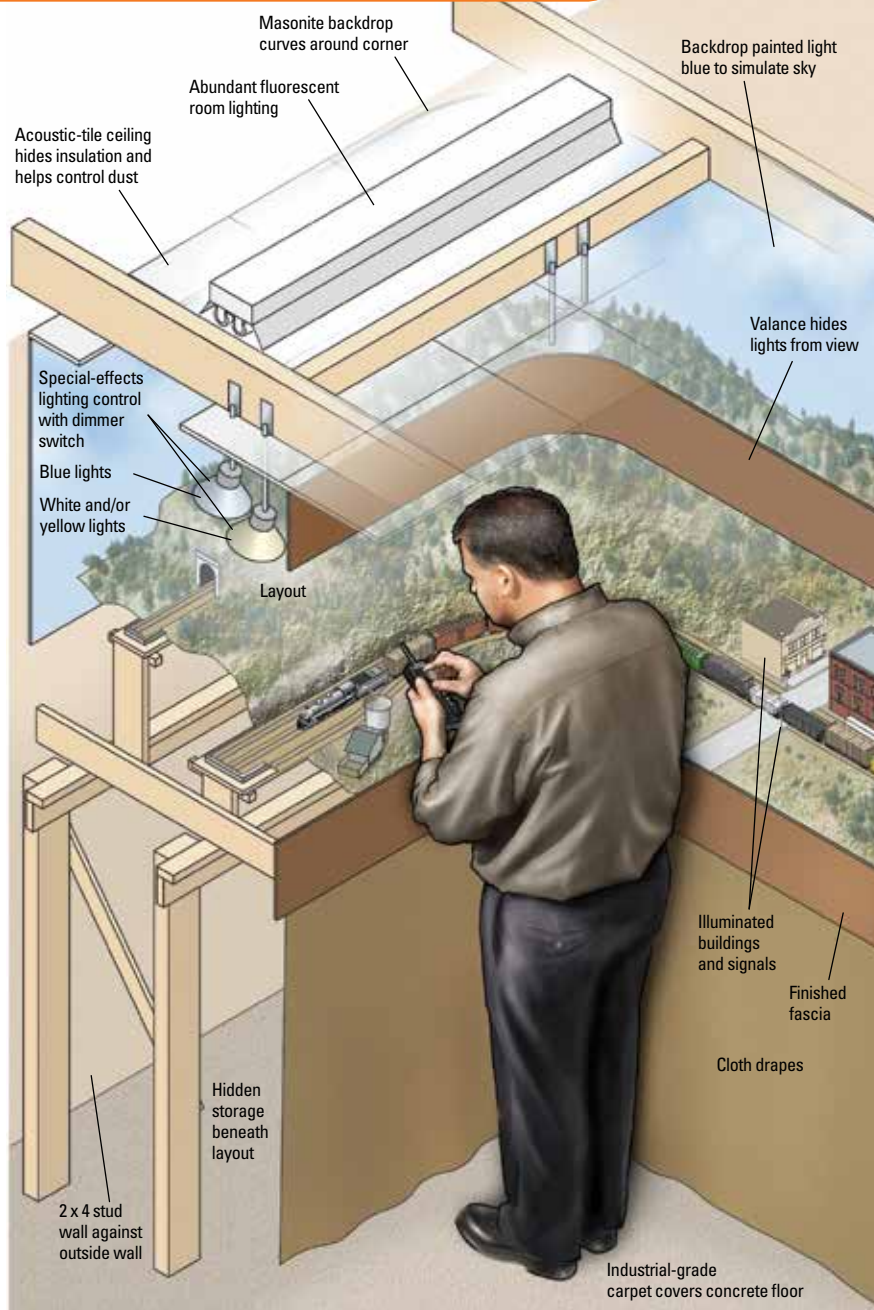


Illustration by Rick Johnson

the layout. Shelves to store supplies can be built under the benchwork.

Ceiling and lighting. Acoustic tiles hung underneath the floor joists help keep dust off your layout. You'll also want to install lighting fixtures with diffusers in the ceiling to provide even lighting over the entire area. Fluorescent lighting is the most economical, so consider using cool white, warm white, or combination of both bulb types in each fixture. Compact fluorescent bulbs can even

replace incandescents used in small fixtures such as track lighting.

You can also add additional lighting above the layout to create special effects. For example, you can simulate changing daylight conditions by using blue and white colored lights hidden behind a hardboard valance.

Using electronic dimmers to control the intensity of colored lights creates dramatic effects that are heightened when you also include illuminated buildings and signals.



These beautiful passenger cars are exact models of the New Haven RR's crack express, the Merchants Limited, as it appeared in 1948. Each car has a detailed interior, which can be seen through its windows.

What makes this car truly great is its interior. The tables have separate tablecloths and individual place settings. Every knife, fork, and spoon was individually made from silver wire. Even the chairs are wire frames with separate seat cushions.

2. Include realistic detailing and points of interest

Including details and various points of interest that visitors can easily enjoy is another way to enhance your layout. Fine details can be integrated into nearly every aspect of a model railroad, including trackwork, motive power, rolling stock, structures, and scenery.

Passenger cars. Many come with a one-piece, single-color, plastic interior. With the roof off, use a fine brush to paint the interior prototypical colors. If the car has no interior, you can craft one using sheet styrene and cast furniture, available from various parts manufacturers.

While there are reference books to help you determine the

specific interior colors for your equipment, you can generally paint partitions cream, beige, or light blue; the upholstery dark green, dark blue, or maroon plush; and the tabletops white. You can also add other details such as plates, made with a paper punch and aluminum foil, and window shades, cut from a strip of green or tan construction paper.

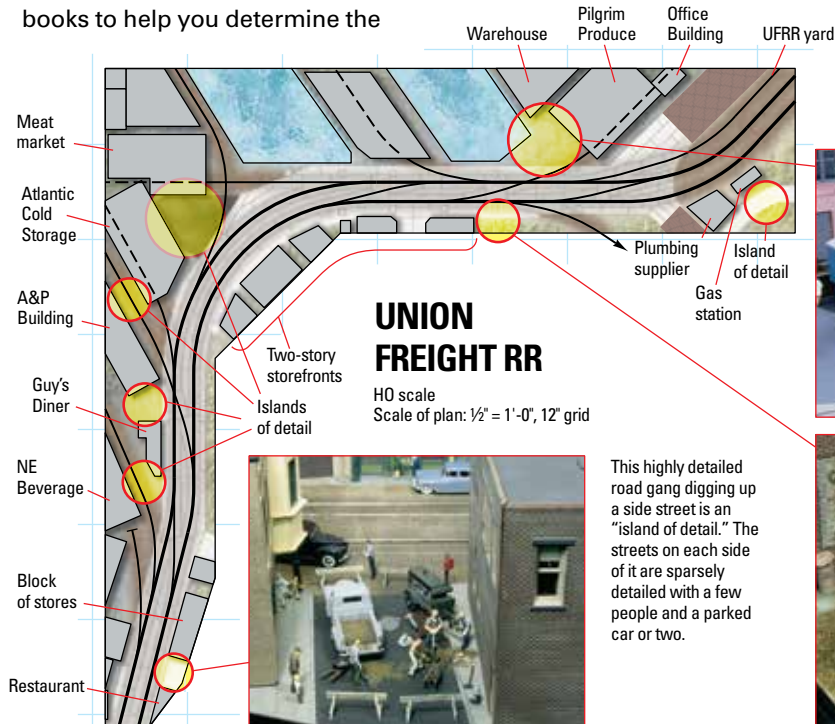
In addition to detailing passenger car interiors, you'll also want to consider adding external details.

Scenery details. Since scenery covers your entire layout, superdetailing every rock, tree, and bush in

rural areas or every street in an urban setting would be a huge undertaking, and make the layout look cluttered. A more practical idea is superdetail small areas, creating "islands of detail." This lets viewers skim over less-significant areas and focus on the highlighted scenes.

In rural areas, the "islands" might consist of a farm field being planted, billboards on country roads, or a trackside industry with a siding and freight platform. Urban scenes may consist of a street under repair, a backyard garden, or trucks unloading at a commercial market.

The proper separation for your islands of detail depends largely on the terrain you model. A good rule of thumb is to allow 12" to 18" between scenes in rural settings and 6" to 12" in urban or town settings.



Trucks are busy unloading freight at a commercial city market. The Coastal Express Trailer backs into a loading bay, while a warehouse foreman requests a bill of lading from another truck driver. Photo by Dave Frary



This highly detailed road gang digging up a side street is an "island of detail." The streets on each side of it are sparsely detailed with a few people and a parked car or two.



Many city lots have small patches of vegetation hidden behind buildings. Here you can see a small garden fenced off from the street.



Two New Haven DL-109 diesels carry the Federal Express out of Boston's South Station on the author's HO layout set in September 1948. The New Haven switched color schemes in 1944, so the lead unit in its 1944 Hunter Green-with-aluminum-striping scheme is as prototypical as the Pullman Green-and-gold trailing unit which was delivered in 1941. Photo by Dave Frary



Even though Eric Brooman's HO scale Utah Belt isn't based on a specific railroad, it has detailed diesel power, rolling stock, and structures adhering to prototypical standards. Photo by Eric Brooman

3. Adhere to a specific prototype and period

Most great layouts depict either a real railroad or a freelance road that follows prototype practices.

There are technical and historical societies devoted to most major railroads in the U.S. that offer members a wealth of modeling information. Mechanical drawings and paint schemes of motive power, rolling stock, and railroad structures as well as track and yard diagrams are also available to help you make your layout closely resemble a specific prototype.

Avoid anachronisms – items on your model railroad from the wrong period. For example, if you model the steam-to-diesel transition era in the late 1940s-early '50s, you don't want cars and trucks from the 1970s on your layout roads. Check the road names on your freight cars, and survey the type of rolling stock you have on your layout. Eighty-five-foot-long container cars and all-door boxcars didn't appear in trains until the 1980s and '90s and don't belong with wood reefers, single-sheathed boxcars, and a caboose.

A 1947 Chevrolet Sport Line sedan passes a billboard advertising Spam as one of America's treats. These details, plus the white posts with steel cables, complete this accurate period scene.

Period details. In addition to the locomotives and rolling stock, the scenery and details on your layout should match the railroad and time you're modeling. The scenic terrain may be dictated by the prototype – mountains for the Rio Grande, desert for the Santa Fe, and rolling hills and rivers for the Pennsylvania are some typical examples.

What isn't so obvious is the accuracy of the details within the scenery. On a steam-era layout set in 1949, an SUV, Corvette, or over-the-road truck with a 53-foot trailer are as out of place on the roads as a billboard for the Pepsi Generation. Determining the details that should be there requires some research. It isn't that difficult and is often an exercise in which you learn more than you thought you would.

Period research doesn't necessarily require a trip to the library. In your attic or basement there may be a pile of old magazines (such as Life, Time, and National Geographic) going back as far as the

1940s. In these issues you'll readily find a wealth of period detail including pictures of contemporary cars and structures, products that were advertised on billboards, and examples of clothing styles and colors for miniature figures.

At railroad shows and swap meets, you may also find vendors who sell old photos of your favorite prototype. Also, be sure to look through your own collection of old photo albums, model magazines, and books.

The Internet is also a great resource for information. Search it for photos, as well as data on when things existed.





4. Creative use of various natural colors

Rutland Ten-Wheeler no. 74 rumbles across a stone arch bridge on Lou Sassi's West Hoosic Division. Lou's layout was set in the fall, and he used the color of autumn in New England effectively. Photo by Lou Sassi

The colors and architecture of the buildings – brick, concrete skeleton, a green iron front, stucco, and even a bright blue diner – add color to this urban scene depicting Boston.

Photo by Dave Frary

You've probably determined the terrain surrounding your railroad, but have you thought about how color will help it stand out? Let's look at three examples of scenic color.

Eastern forest. Most Eastern layouts have hillsides with green trees and streams with blue water, right? With the exception of evergreens, the color of deciduous trees and bushes changes with the seasons. In the fall they blaze with red, orange, and yellow.

To accurately re-create fall scenery you'll want to reference photos of a natural-growing fall terrain. Over the course of several weeks, shoot images of the same location or area to see how colors change with time.

Southwestern desert. If you model a Southwestern railroad that runs through a desert, your scenery can still be colorful even though it's different from New England in the

Pelle Søbørg's former HO scale layout captured modern Union Pacific action in the West. He used a variety of scenery colors and natural rock to create an expansive desert scene. Photo by Pelle Søbørg

fall. Unfortunately, most people think a desert is an endless expanse of yellow sand and rocks. There's plenty of color in the desert if you know where to look. The rocks and surrounding mountains have shades of gray, ochre, yellow, orange, and dark red in them. There are often fantastic rock formations of differing colors, which you can replicate on a backdrop.

Most desert vegetation is either dark green scrub or light green cactus. If your railroad climbs into the mountains, however, trains will be surrounded by an increasing number of evergreens. Often found growing within the evergreens are some mountain deciduous trees whose leaves change from green to orange and red in the fall.

Urban scenery. If you have urban scenery on your layout, color can be used to make it stand out. Many railroads ran through the older sections of cities – factories, warehouses, and tenements – where buildings were made entirely of brick or cast-concrete skeletons with brick curtain walls.

Brick comes in a variety of colors – dark red, light red, beige, off-white, and yellow. Most brick structures have decorative granite lintels and sills above and below the windows, and the brick wall may have architectural shapes, such as curves above windows, that are defined by the use of different-color bricks. Building walls are great places to advertise products, and any wall without windows is often covered with poster ads.



5. Reliable and prototypical operations

Great looks and flawless operation denote a great model railroad.

Reliable and realistic trackwork.

In recent years, the quality, realism, and reliability of prefabricated track has improved greatly. HO scale track comes in rail sizes ranging from code 55 to code 100. If you prefer to hand-lay your track, weathered rail is available, along with a variety of switch and crossing kits.

The introduction of Digital Command Control (DCC) has also simplified the wiring required by older cab- and block-control systems, in addition to forging the way for authentic sound and lighting effects in many new locomotives.

Once installed, your track must be cleaned and maintained to ensure that trains run smoothly and without derailments. Depending on how often you operate and how well you've protected the train room environment, track cleaning may be only a few times each year.

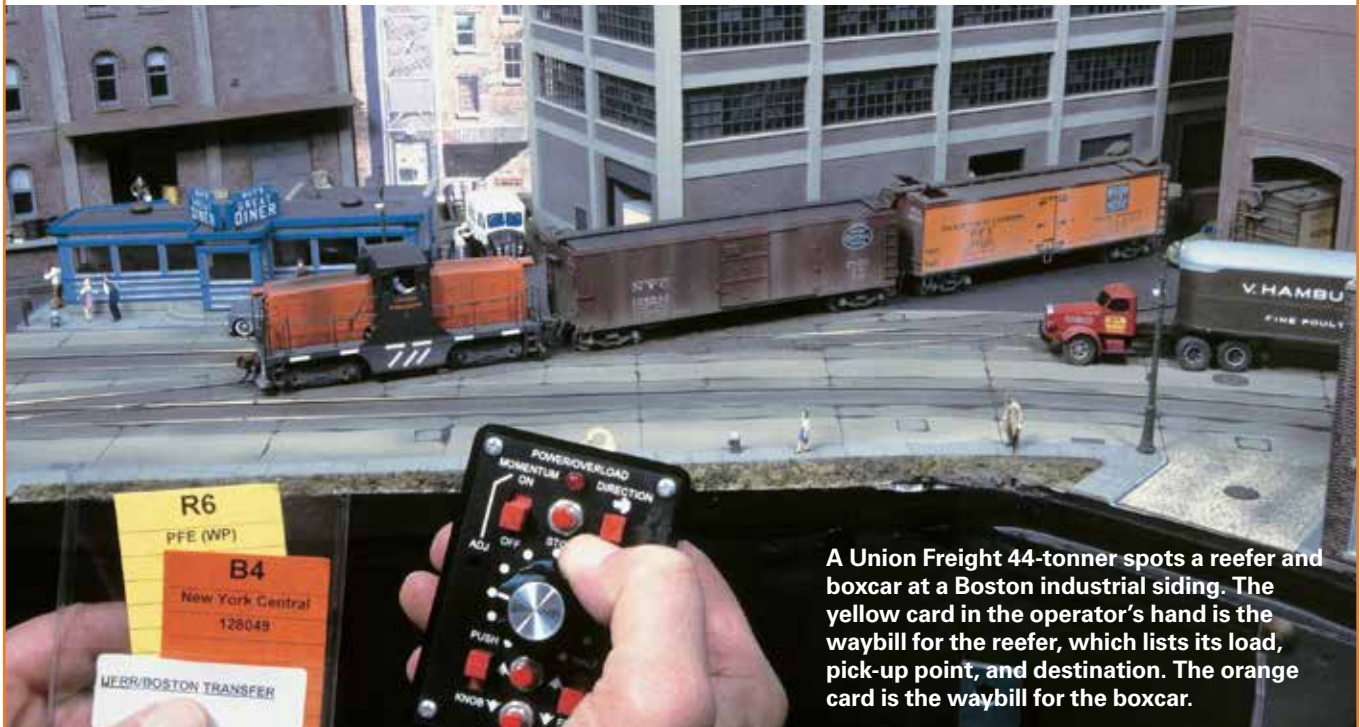
Prototypical operation. As in the prototype, moving passenger and freight trains from one location to another should be the center of your operation. This usually requires a timetable, which can take several forms. The simplest is a sequence timetable, which defines a number of consecutive time periods and

	DISPATCHER	NEW HAVEN	PROVIDENCE	BOSTON
T-1	<p>Cab A: Move Yankee Clipper from New York (block 51) to New Haven and hold in blocks 3 and 4.</p> <p>Cab B: Move Local from Providence (block 30) to Attleboro (block 33) and hold.</p>	<p>Clear blocks 45, 3, and 4 for inbound Yankee Clipper from New York.</p> <p>Move DL-109 from ready track to block 10 and hold.</p> <p>Clipper arrives from New York.</p>	<p>Dispatch Boston Local to Attleboro via blocks 29, 30, and 31.</p> <p>Begin making up Mainline Freight for New Haven on blocks 21 and 22.</p> <p>Clear blocks 31, 30, and 29 for inbound Boston-Providence Local.</p>	<p>Get B&A 2-8-4 from roundhouse. Begin making up B&A Freight on block 38 (12 cars).</p>
T-2	<p>Cab A: Move MU cars from New Haven (blocks 5 and 6) to Mt. Vernon (block 47) and hold.</p> <p>Cab B: Move Boston-Providence Local from Boston (block 44) to Providence; terminate in blocks 29 and 30.</p>	<p>Clear blocks 5, 6, and 46; dispatch MU cars to Mt. Vernon.</p> <p>Remove EP-4 from Clipper; store on ready track.</p>	<p>Receive Boston-Providence Local in blocks 29 and 30, seize and hold.</p> <p>Continue making up Mainline Freight.</p>	<p>Dispatch Boston-Providence Local to Providence via blocks 44, 46, and 37.</p> <p>Clear blocks 37, 46, and 44 for inbound local from Providence.</p> <p>Continue making up B&A freight.</p>
T-3	<p>Cab A: Move Eastbound Peddler from New Haven (block 8) to block 16 and hold.</p> <p>Cab B: Move Providence Local from Attleboro (block 33) to Boston; terminate in block 44.</p>	<p>Dispatch Eastbound Peddler to Providence via blocks 8, 11, and 13.</p> <p>Move DL-109s from block 10 onto Yankee Clipper and hold in blocks 3 and 4.</p>	<p>Reverse RS-1 on Boston-Providence Local. Recouple to other end of train and store in blocks 29 and 30.</p>	<p>Receive local from Providence in block 44; seize and hold.</p> <p>Continue making up B&A freight.</p> <p>Move New Haven 4-6-4 from roundhouse; couple onto the Federal in block 41.</p>

This sample of a sequence timetable shows how train movements relate to each other across locations and times.

those train movements on the main line, in yards, and on sidings that take place during each period. Depending on the number of people it takes to run your railroad, the timetable may be coordinated by an operator or by a dedicated dispatcher. The timetable can be as short or as long as you want, covering any period from a few hours to a full "day." It's possible to add a fast-time clock plus departure and arrival times to your timetable to make it more sophisticated.

To make your railroad's freight operations even more realistic, you can create a card-order system, which assigns one or more loads of freight to individual freight cars, along with the pick-up and destination points for each load. A "waybill" listing the load(s) to be carried by each car follows that car around your layout; pockets on the fascia make this easier. The routing of individual freight cars on your model railroad can be part of the waybill, or incorporated into your timetable.



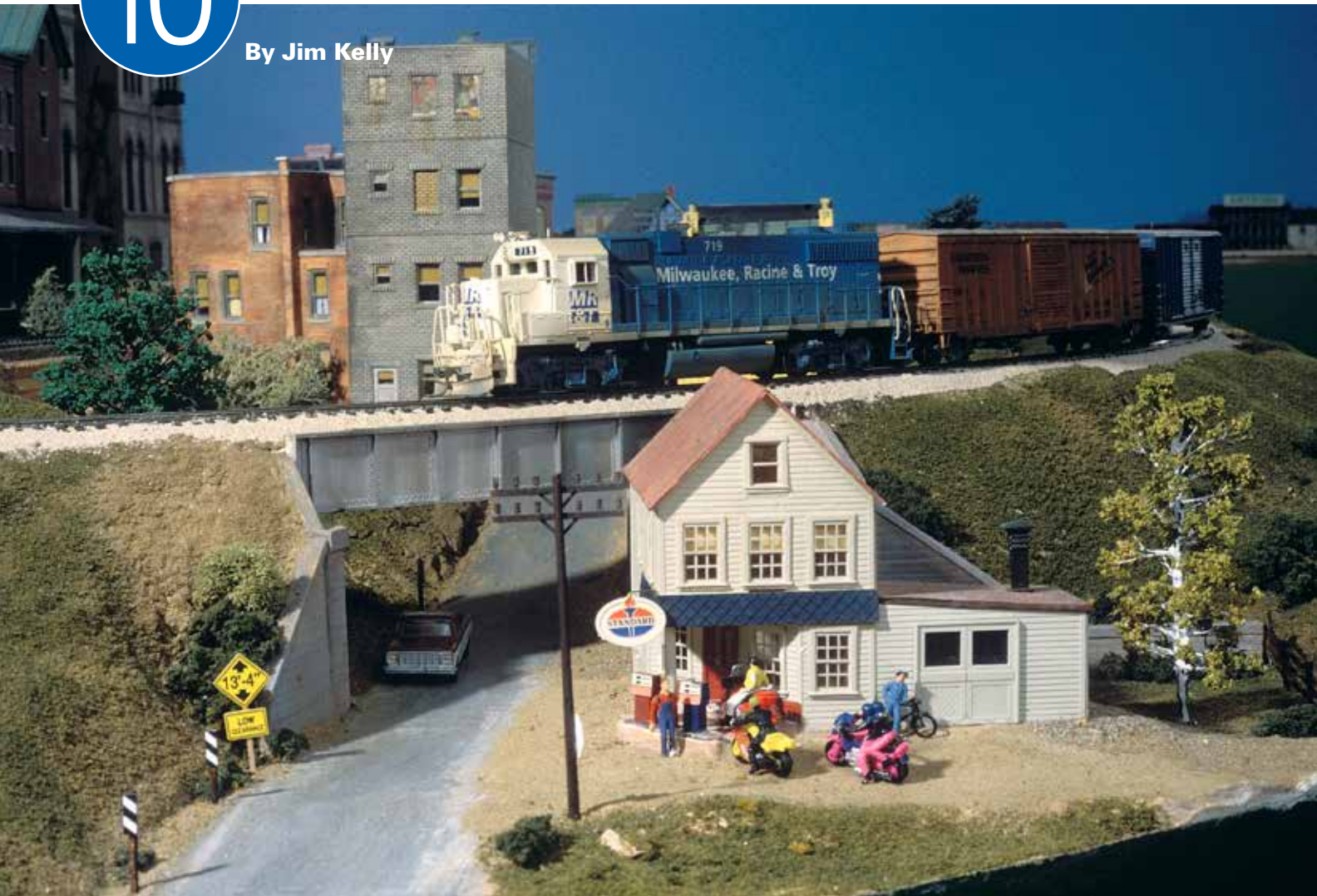
A Union Freight 44-tonner spots a reefer and boxcar at a Boston industrial siding. The yellow card in the operator's hand is the waybill for the reefer, which lists its load, pick-up point, and destination. The orange card is the waybill for the boxcar.

Design a better layout

10

principles (and a checklist) to help you plan a great model railroad

By Jim Kelly



Congratulations! You've already taken the most important steps in designing a great model railroad layout. You're reading and thinking about it. The more planning you do, the better. Obviously, giving a lot of thought to the top of the layout, what you'll see, is most important, but it's best to go beyond that to the benchwork, the wiring, scenery, and all the rest.

Take legs or other supports, for example. Where should they be and how few can you get by with? (They get in the way when you're crawling underneath!) It's easier to move a joist that's in the way of a switch machine on paper than on the layout itself.

A drafting board and a pad of graph- or tracing paper will help you plan in

layers, isolating the problems to be solved. Or you can go high-tech, using one of the track-planning computer programs available for purchase from a variety of vendors on the Internet.

In the sidebar on page 12, I've listed some track planning books which you'll find useful. Start with John Armstrong's *Track Planning for Realistic Operation*, the classic in the field.

Better layout design has nothing to do with the layout's size, shape, or cost. A 4 x 8-foot layout can be a planning gem, while a huge, basement-filling railroad can be a disaster, and vice versa.

Ultimately, it all boils down to concept and purpose. It just so happens that's the first of the 10 basic planning principles I'll describe here. **MR**

Model Railroader's own HO scale Milwaukee, Racine & Troy RR is freelanced, but one could easily assume it's based on an actual railroad. Designed by former MR editor Andy Sperandio, the MR&T is believable because everything about it is consistent with its theme: a regional railroad set in the 1990s, running from Milwaukee, Wis., to Fort Madison, Iowa, to connect with the Santa Fe.

Bill Zuback photo

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Seven railroads you can model has track plans in HO and N scales. Download by clicking the "Shop" tab at www.ModelRailroader.com.

1 Get real

In one sense, the prototype modeler has it easy since so much information about many of the real railroads (photos, timetables, rosters) is available. That said, you don't have to precisely model a specific prototype. I can think of lots of examples of outstanding freelanded lines, starting with Allen McClelland's Virginian & Ohio or Bill Darnaby's Maumee Route. These layouts work because the designers have thought through history, location, routes, traffic, locomotive rosters, and more.

However, neither approach is inherently better. For example, a so-called Santa Fe layout running everything from Ten-Wheelers to SD70s in a sampling of every paint scheme the railroad ever applied would look a little odd. On the other hand, a totally freelanded railroad (let's call it the Kentucky & Virginia) set in 1980 with a fleet of six GP40s, four SD40-2s, and several EMD switchers, all of them painted in the same plausible scheme, could be a quite believable railroad.

3 One scene at a time

Real scenes, crowded

industrial areas in particular, often are haphazard and artless. The best model railroads generally improve upon that. Good layout designers do for us what great photographers and painters have always done: they frame and compose scenes.

Bob Hayden and Dave Frary, who usually work together, often think of planning in terms of areas they want you to focus on, separated by neutral areas where there's nothing much to capture your attention. On a model railroad we usually want to call attention to the tracks and the trains. We model the ditches, fences, section houses, and other details along the rights-of-way. We include the baggage wagons and benches on station platforms. They're important to complete our portrait of a railroad. We place less emphasis on elements in the scene that are not railroad-related.

2 Dump the spaghetti

Lots of model

railroaders cram in too much track. The result is a bowl of spaghetti that makes no sense to the viewer, has no room for scenery, and is no fun to operate. Turning to prototype practice here will help us build more-satisfying layouts. Track costs real railroads a lot of money to lay, and then the maintenance expenses keep on coming, so naturally they prefer to get by with as little track as possible, particularly when it comes to turnouts.

The same logic applies to model railroads. Even if money isn't an important factor, most of your maintenance requirements will come at turnouts. If a single track can serve several industries, so be it. Why lay a maze of tracks that your trains will have to snake through? Not only will keeping such a principle in mind make your track configurations more realistic, it'll also introduce interesting switching challenges you wouldn't have otherwise considered.

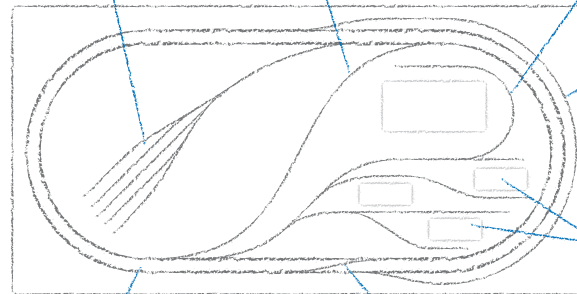
Improving a 4 x 8 HO track plan

Preliminary plan

Can't do much with a short five-track yard, each track holding only one car.

This track ties the sides of the layout together visually and makes it look like one crowded town with a loop of track around it. It also introduces the wiring complications of a reversing loop.

This curve is way too sharp to get a car around it. What's your minimum radius for industrial track?



We don't need a passing siding on a double-track main line.

Where's your scenery? It seldom works well if added as an afterthought.

Too many switches and tracks to get to these industries.

Why a double-tracked main line on such a small layout? (Might be okay if that's your prototype or you're representing a high-speed cross-country carrier.)

Crossover is a good idea, if you really want a two-track main. (But in that case you should use two.)

Improved version

This is a good start on designing a neat railroad.

We can spot any type of car at this team track.

Now we have a reason for a passing track, which doubles as a runaround track.

Nice place for an enginehouse. Don't forget fuel and service.

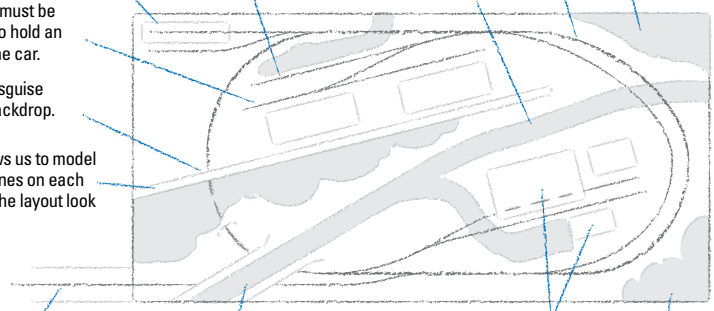
Roads and driveways allow truck and auto access. (You also need some on the other side of the layout.)

Our railroad has to curve because this lake lies in its path.

This tail track must be long enough to hold an engine and one car.

Need a way to disguise this hole in the backdrop.

A backdrop allows us to model independent scenes on each side and makes the layout look larger.



Connection to XYZ RR and rest of world. We can use it as a fiddle track or to take us to a small staging yard.

A highway bridge over a railroad track always makes an interesting scene, as does a highway on a hill dropping down to a town.

Acme Manufacturing is a complex that uses several types of loads.

This mountain forced the line to curve.

Illustration by Rick Johnson

4

Plan for operations

Whether you ever actually operate your layout or not, you'll design a more-satisfying railroad if you plan it with operations in mind. It will look more realistic simply because it's designed to do things that real railroads do. This holds true for switching layouts up to multi-level basement empires.

Planning for operations also simplifies the rest of your planning. It

causes you to think about what kinds of trains you'll want to run on the layout (local freights, high-speed passenger trains) and how many, and that determines what kinds of engines and cars you'll need, which in turn determines what kinds of yards and tracks you should have.

Planning for operations leads to other important design considerations. For example, most of us want to walk along with our trains, so we

want aisleways parallel to the layout edges that will allow us to always be within sight and in reach of our trains in a continuous fashion. We don't want to watch the train disappear into a tunnel and then have to walk halfway around the layout and back the way we came to catch up with it again. Nor do we want to climb up on the layout or swing in on a grapevine every time we need to line a turnout or clean up a derailment.

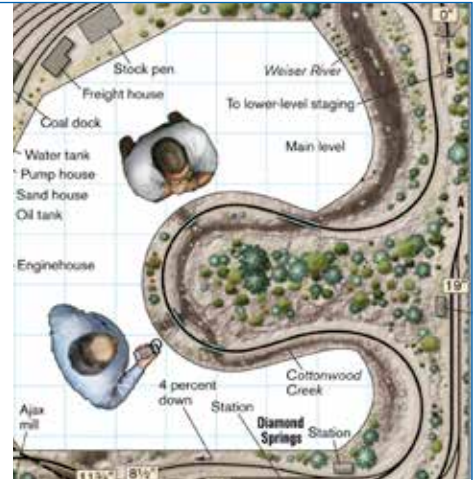
5

People space

A model railroad ought to be a place you enjoy being, a place where you can operate trains without bumping elbows. It ought not to make you feel like a mouse caught in a trap.

Most of us plan for walk-along operation, which means we need to think about moving people around just as much as we do the trains. Then there are the inevitable guests and open houses. Thirty-inch aisleways are about as small as you can go if you expect two people to get past each other; 36 is better yet.

(You can assume that you and most of your friends are only going to get bigger over the years.) You can squeeze down to 24" in short stretches, but the traffic there can be only one-way. You can work in passing pockets where one person can "take the siding" while the other goes through. Duckunders, which often would be better called "crawl under," are best avoided, and it's best not to expect your operators to have to progress from one operating pit to another and pop up like prairie dogs.



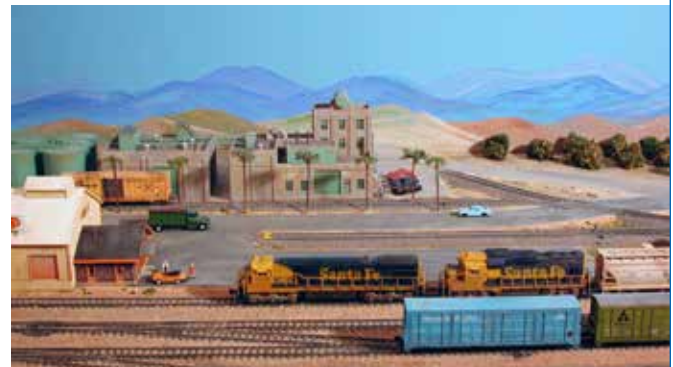
Drawing by Rick Johnson and Jeff Nepper

6

Backdrops



Backdrops. Without a backdrop (above), the viewer's eyes can wander, not focusing on the trains and foreground we've worked so hard to detail. Once the



background clutter is removed, by adding a backdrop, the viewer's attention is focused on the railroad and our exquisite craftsmanship! Photos by the author

In planning a model railroad, our goal is to design a 3-dimensional representation of reality incorporating tracks, trains, buildings, and scenery. To complete the picture, we need to suggest what lies beyond the immediate foreground. That's where backdrops come in. Even a simple blue backdrop is better than none at all because it performs a

backdrop's first mission – hiding items, such as water heaters, furnaces, and concrete-block walls. (The second mission is suggesting things you *do* want to see, such as hills and distant buildings.)

For relatively little work, backdrops pay huge dividends, and the smaller the layout, the more effective a backdrop can be. Double-sided

backdrops (a.k.a. scene dividers) can work wonders on a 4 x 8-foot layout; the scenes on each side can be miles apart and represent different areas and topography (e.g., mountains on one side and a city on the other). The same flexibility can be imparted to large layouts by running backdrops down the middle of peninsulas.

7

Staging

If your trains are to run beyond the layout, they need someplace to go (preferable to plunging to the floor at both ends of the main line). Enter the concept of staging tracks, similar to the wings on a theatrical stage. It's here that the trains await their turn to step out on the stage and participate in the drama that is an operating session.

Staging extends time on a layout in a way similar to the way in which backdrops extend space. As a general rule staging needs to be hidden from those viewing the layout; otherwise, the concept is defeated. At the same time, it needs to be accessible. Your trackwork can be bulletproof, your coupler

heights can be perfect, and your wheels can be perfectly in gauge, but sooner or later you'll have derailments on your staging tracks. Crawling under a layout and trying to untangle a 20-car derailment on a staging track is no fun at all.

Staging tracks can take the form of huge off-scene yards or be just a track or two that accesses the layout through a hole in the backdrop. A long staging track can hold several trains that will appear on the layout in order as an operating session proceeds. This we call serial or linear staging. If you change out equipment by hand on staging tracks, then we call them fiddle tracks, a term we owe to the British.



Setting the scene. If you want to run trains realistically, you'll likely want to include staging. This photo, taken on the Milwaukee, Racine & Troy (Kalmbach Publishing Co.'s employee club layout), is typical of a hidden (but accessible) staging yard: track, subroadbed, and trains. **Strictly functional.** Bill Zuback photo

Design checklist

- I know where my railroad is located and when.
- Trains will appear to be going from one place to another.
- The railroad goes "beyond the basement."
- Every track is there for a reason.
- I've made a list of the trains I'll run.
- Curves are large enough.
- Aisleways are large enough.
- Turnouts are within easy reach.
- Places where I'll be uncoupling cars are easy to get to.
- I've avoided laying straight tracks parallel to the layout's edges.
- I've considered layout height.
- There's sufficient clearance where tracks cross over one another.
- I've figured out track elevations for all areas.
- Grades will work.
- My yard(s) has a drill track.
- My passing sidings are long enough for my trains.
- I have some scenic features between the edge of the layout and the tracks.
- I have at least one large industry with multiple switching spots.
- I have at least one team track.
- I've planned in highways, roads, and parking lots.
- I've planned for backdrops and will install them early.
- I've thought through wiring and where I'll install gaps. – J.K.

8

Sharing the road

It's important that our railroad extend "beyond the basement" to the rest of the world, but we also need to think about how it relates to the non-railroad portion of the transportation system in scenes we are actually modeling. In the 19th century, that was usually either water transportation (canals, ferries, and ports) or horses and wagons. Today, water transportation is bigger than ever, but the path of transportation that most affects us is roads and highways.

You really need to plan for those roads, parking lots, and driveways before you start building. We can cheat and still get the effect – a road can be a bit narrower than prototype. A factory might employ a hundred workers, but allowing for a parking lot to accommodate a half-dozen cars is OK if it's suggested more parking lies "just around the corner." Some of the most interesting scenes involve the intersections of rail and highway transportation, whether at grade or separated by bridges.

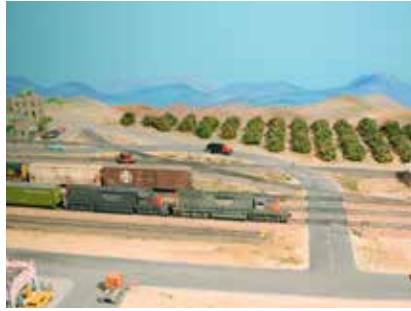
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Higher is better



Low level. This gives you a birds-eye view, and that's fine, but don't complain about having to crawl underneath the layout to wire it.

Why build a layout high? First of all, the trains look more realistic because you're seeing them as you usually see their real counterparts. Also, the transition from model railroad to backdrop is far less obvious. We become less aware of those sharp (by actual railroad standards) model curves because we're looking across them rather



Mid-level. The author suggests "sternum height." You get a realistic look at the trains, plus room below the layout for troubleshooting.

than down on them. Also, a taller layout is easier to work under when you have to troubleshoot wiring, tune switch machines, and so forth.

Since we aren't all the same height, you'll have to what works best for you. I'm 5'-10" and sternum height (50") works well for me. Build the railroad much higher, though, and reaching into it to throw turn-



Eye level. Highly realistic, but scenes can't be deep because your reach will be impeded by trains, structures . . . and your tummy!

outs and uncouple cars becomes awkward at best.

Eye-level scenes are dramatic on the high points of layouts with grades, but avoid complex trackwork and deep scenes at those heights. Also, avoid coming so close to the ceiling that the scene appears cramped. You first may need to put the highest scenes lower down.

10

No Cheating!

Early in your planning you need to set the standards for your railroad, and then you need to stick to them. Lots of planners begin with the best of intentions but then start compromising. "It won't hurt to have a 20"-radius mainline curve here, even though my minimum is 24"." Pretty soon you have a railroad that's bound to disappoint. Your minimum-radius curves,

maximum grades, minimum-length sidings, and all the rest depend on many things, including the period you're modeling, the sizes and types of equipment you'll be running, how long your trains will be, and a number of other factors. The many available track planning books will help you set these standards. The point is, stick to them! Don't undo your careful planning.



Uh oh! Sooner or later the compromises you make will come back to haunt you. Plan ahead, set your standards (curves, grades, etc.), and stick to them.

Getting started

Track Planning for Realistic Operation, Third Edition. Written by the late John Armstrong and first published by Kalmbach Publishing Co. in 1963, this is the granddaddy of track planning books and the one you should begin with. John's approach to designing model railroads was simple: Understand what real railroads do; follow their leads.

Over the years, Kalmbach Publishing Co. has produced dozens of books on all aspects of model railroading, including many devoted to track planning, collections of new plans, as well as plans previously published in *Model Railroader*. To get them, visit www.modelrailroader.com and click on the "Shop" tab. – J.K.

- *Shelf Layouts for Model Railroads*, by Iain Rice
- *Track Planning for Realistic Operation, Third Edition* by Tony Koester
- *Basic Trackwork for Model Railroaders*, by Jeff Wilson

10 tips for staging yards

From benchwork to track, how to make offstage yards operate flawlessly

By **Tony Koester** • Photos by the author

The hidden, stub-ended staging yard was relatively unexplored territory in model railroading when I incorporated it into my HO scale Allegheny Midland layout in 1973. Very few, if any, model railroads totally depended on this style of staging for operations back then.

I quickly discovered that hidden staging was ideal for my situation because it saved space and kept the trains out of view, giving the impression they were miles away. So when it came time to design staging yards for my current HO scale Nickel Plate Road layout, I knew a hidden staging yard would once again be in the plans.

Certainly, hidden, stub-ended staging yards are limited in terms of operation since trains can't continuously cycle through and re-appear onstage. However, on my NKP layout there is no need for continuous running or turning trains during an operating session. Trains come out of the east- or west-end staging yard, run across the railroad, and end their runs in the hidden staging yard at the other end of the line.

Drawbacks and benefits

Even though early tests of the hidden staging yard have been largely error-free, I realize that a derailment will happen at some point. In such rare cases, I will

move any trains between me and the derailed equipment out of the way, then fish out and rerail the cars. It will take only a few minutes longer than dealing with similar problems in a fully accessible, visible staging yard.

I'm not concerned about derailments in the hidden staging yard, though. Like my current NKP layout, the AM had one readily accessible and one hard-to-reach staging yard. Years of experience showed that the better use of space gained by burying a staging yard far outweighed the occasional hassles. The new and improved design for the NKP's hidden staging yard should prove even more trouble-free.

1

Bulletproof benchwork



The key to a smooth-operating hidden-staging yard is good benchwork. Most of the benchwork on my HO scale Nickel Plate Road layout was made using pseudo 1 x 4s (cut from 3/4" AC grade plywood). I space the joists no more than 16" apart to prevent the 3/4" plywood top from sagging over longer spans.

2

Roll-out storage



With the basic benchwork completed, I built storage shelves underneath. Bad idea! The shelves were located in places I had to access to attach feeders to bus wires and install switch motors.

To resolve this, I used the 16"-wide plywood shelves to build cabinets. Then I added hardboard backs to the cabinets and painted them before attaching casters. Now I can roll them of the way when I work under the layout.

3

Subroadbed & roadbed



Several steps help minimize expansion and contraction on my layout. Before I begin building benchwork and installing Homasote (or HomaBed) roadbed, I let the materials dry in the basement for several months. I also cover all exposed surfaces with latex paint and keep the basement dehumidified during the summer months.

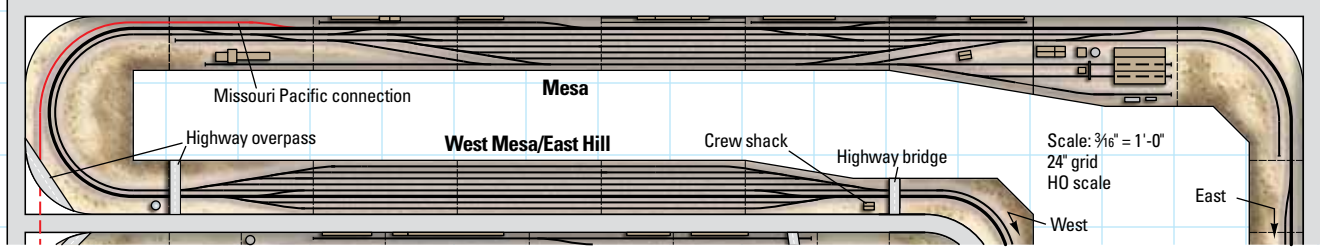
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Double-ended staging

Another option is a visible double-ended yard. David Barrow used this on his former Cat Mountain & Santa Fe layout. It simulated an outlying holding yard where trains waited to enter the main classification yard. With the double-ended yard, operat-

ing sessions could continue with waybills being cycled in real time.

Having several staged steam trains sitting out in the open isn't realistic, though. A solution would be to get locomotives from a nearby engine terminal prior to departure.



5

Turnouts



For my hidden staging yard, I wanted reliable turnouts with points having a solid current path independent of contact with the stock rail.

I used Peco's large-radius code 100 turnouts. Since the turnouts are hidden, their large rail and British-style curved frogs aren't visible. As a test, I shoved a string of full-length passenger cars through the yard ladder at high speed without so much as a click from the flange hitting a point or a frog, let alone a derailment. For insurance, I added Atlas code 100 rerailers between every other section of flextrack.

6

Switch motors

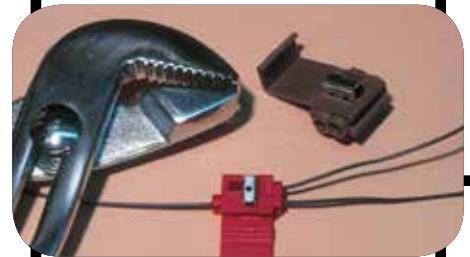


I got fine performance from dozens of Tortoise switch motors on my old Allegheny Midland, and I use them on the lower level and lower staging yards on my NKP layout. I like them because they have enough power to operate Peco's snap-over point mechanism (it's easy to remove the Peco toggle springs, though).

However, I'm trying to keep the depth of items hanging down from the upper-deck roadbed to no more than 2" – the depth of under-cabinet fluorescent fixtures. Since installing horizontal mounting brackets added complexity to the project, I've tested other switch motors including Lemaco and Fulgurex. I don't recommend the above-the-ties points linkage that comes with the Lemaco motor. Instead, I rigged a fully concealed rod like those used on the Tortoise motors.

7

Feeder wires



Although code 100 rail is too heavy for use on the Nickel Plate Road (I'm using code 70 on the main and 55 elsewhere), I wanted to use the strongest rail I could in staging. Since I had plenty of Atlas code 100 flextrack left from the staging yards on my old layout, I simply reused the track on the NKP.

Rail joiners can't always be counted on to conduct electricity, so I soldered an 18 gauge wire to every rail, then connected these feeders to 10 gauge bus wires with 3M Scotchlok insulation displacement ("suitcase") connectors. I've never had one fail yet.

Now on ModelRailroader.com

Looking for additional staging yard ideas? Read Andy Sperandio's "Three types of staging yards" at www.ModelRailroader.com.

8

Occupancy detection



It's important to know what's where on hidden tracks. Since I had good luck with Irdot infrared detectors (from Micro Mark, <http://www.micro-mark.com>) on the AM, I'm using them even more extensively on the NKP.

I wanted to avoid having the detection circuitry tied in with track power. I prefer to keep all staging tracks electrically dead to prevent the needless heating of decoders, protect engines from electrical glitches and AC power surges, and to keep the sound systems of staged locomotives turned off.

The Irdot-1 and -2 modules shine an infrared beam upwards. If a car or locomotive is above the beam, the light is reflected back to a detector, which turns on a warning light-emitting diode. (Before installing the mid-level subroadbed over the staging yard, I painted its bottom surfaces flat black to prevent false detection.) Since the Irdot is self-contained, no light source needs to be placed above the detector.

9

Air rights



Building the superstructure for Cayuga over the east-end staging yard required thought. There was no room between staging tracks (spaced 2" apart) for vertical support posts, and there's only 2¼" of space between the outside edges of the ties on the first track and the benchwork edge.

To resolve this, I erected 39"-long 1 x 4 plywood joists over the staging yard. These span between the 2 x 4 stud wall and 1 x 2 risers along the front edge of the benchwork.

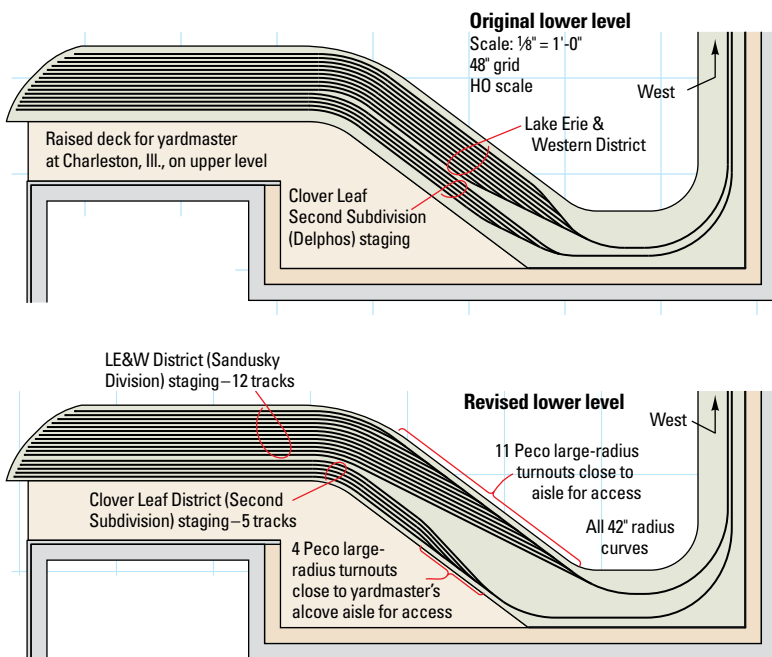
I extended the risers through notches in the yard roadbed down to the underlying 1 x 4 benchwork grid. I cut the risers a bit shorter than the actual deck separation distance so that only the horizontal joists (and not the tops of the risers) would contact the subroadbed. The overlying structure could be adjusted to the correct height and kept level.

10

A change of plans

I redesigned the original east-end staging yard throat so all turnouts would be located near the front or rear edges of the benchwork. The original staging yard throat was based on conventional ladder designs, but this placed most of the turnouts too far in from the aisle to maintain or replace them after the overlying town's benchwork was in place. The new design (below) makes it easier to reach the turnouts for maintenance and replacement. (The four turnouts in the Second Subdivision five-track staging yard can be reached via the Charleston yardmaster's alcove.)

The downside to this yard design is that some tracks are long while others are a bit short. I'll stage short passenger trains and local freights on the shorter tracks.



Illustrations by Rick Johnson