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Arriving at Summit on
Andy Sperandeo's HO
railroad. See page 8

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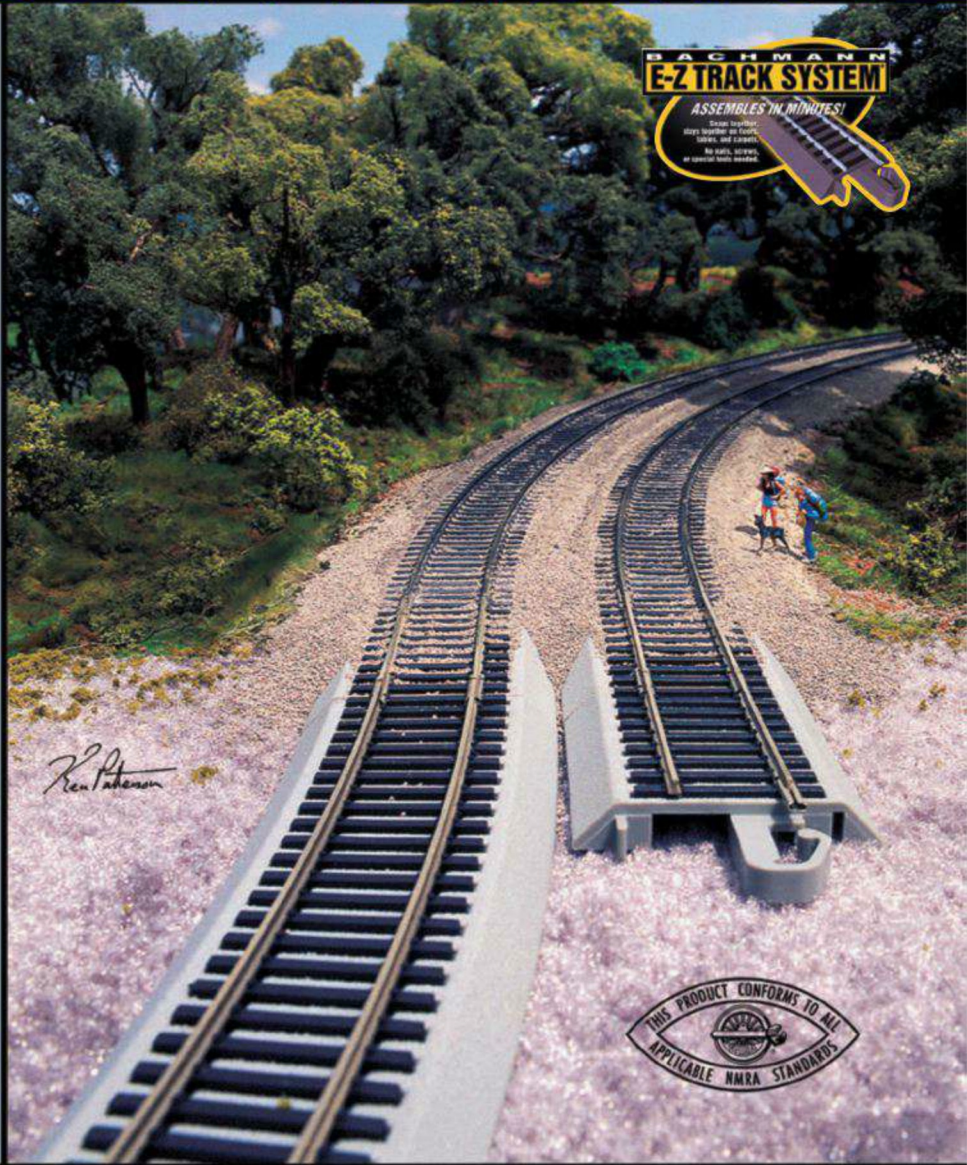


FROM DEEP PILE TO DEEP WOODS

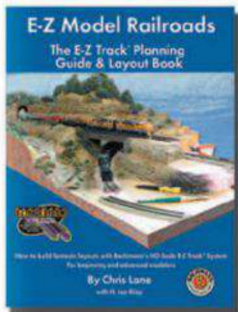
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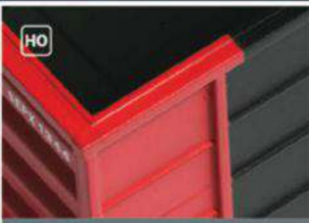
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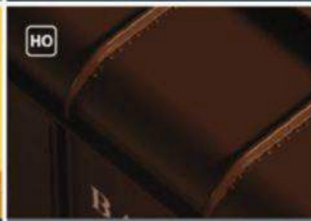
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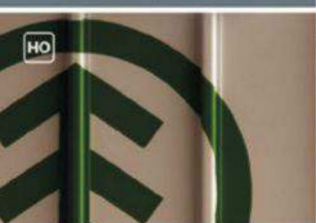
48' Depressed Center Flat Car



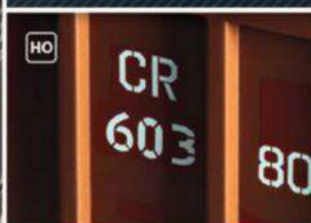
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2012

6 Editorial
Aiming at two targets
Tony Koester

COVER STORY

**8 Cajon Pass: San Bernardino
to Summit in 1947**
Designing a layout to operate like a famous piece of
a famous railroad
Andy Sperandeo

16 Versatile room-sized layout
Two upper-Midwest railroads cross in a typical town
Iain Rice

**20 One club layout with
two objectives**
A layout planned for both operation and shows
Kevin Geiger

26 Railroading on an apartment shelf
An HO short line that fits neatly along a
living-room wall
Russ Rettig

**30 Add operations with an auto-rack
unloading terminal**
Spotting bi- and tri-level cars is more challenging
than you think
Jim Lincoln

34 Photoshop as a planning tool
Digital image-editing software can help you test
new structures, backdrops, fascia colors, and more
Jim Six

On the cover: Andy Sperandeo provides the inside story
on designing his HO scale Atchison, Topeka & Santa Fe
layout depicting Cajon Pass in 1947. Andy Sperandeo photo

Photos and art, clockwise from top: Bernard Kempinski,
Rick Johnson, Cliff Powers, and Timothy J. Horton



Page 38: Modeling American Civil War railroads can be a rewarding challenge.

38 Modeling Civil War railroading
Bernard Kempinski's O scale tribute to the United
States Military RR's Aquia Line
Gerard J. Fitzgerald

46 Bedroom-sized two-railroad town
Reedley, Calif., was served by the Santa Fe and the
Southern Pacific
Byron Henderson

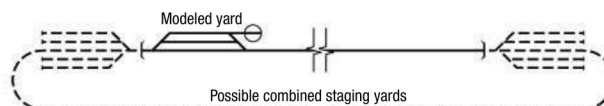


Page 50: More layout space with a double mushroom.

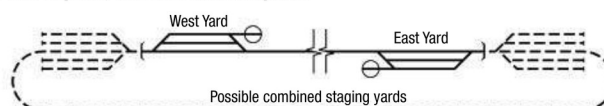


Staging yard types and locations

1 Point to point, one classification yard



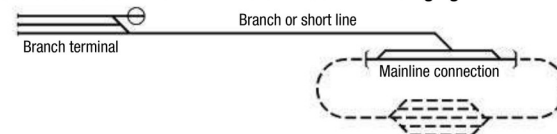
2 Point to point, two classification yards



3 Branch or short line, center and end staging



4 Branch or short line to main line connection with staging



Page 58: Placing staging yards is key to layout design.

50 Climbing 2,500 feet in a double mushroom

The challenges of a large multi-deck N scale railway system

Mark Dance

58 How to place staging and fiddle yards

Ways to maximize the mainline run of your layout

Tony Koester

62 Expanding a layout's potential

Modeling big-time railroading in Maine

Mike Confalone

70 How to avoid the detailing trap

Planning ahead to make more progress

Lance Mindheim

74 Mountain vs. prairie railroading

Adapting a track plan for a flatlands railroad to one set in the mountains

Bill Darnaby

82 An inside perspective

Establishing a dramatically different viewpoint

Paul J. Dolkos



Page 82: Offer a different view of your model railroad.

88 READER FORUM Sharing questions and ideas

92 PLANNING TIP Aisles as human passing tracks Perry Squier

98 REAR PLATFORM Sharp curves Tony Koester

Model Railroad Planning

2012

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Editorial

Aiming at two targets



This very interesting junction on the Cincinnati Northern Model Railroad Club's sectional HO layout (see the article on page 20) could be modified to allow the line coming up from the bottom center to cross over the main line at grade to the right of the water tower. This would turn the junction into a foreign-road crossing rather than a branch of the home road. Lou Sassi photo

Kevin Geiger's article about the thinking behind the Cincinnati Northern Model Railroad Club's dual-purpose HO layout – he's quick to point out that the article, like the layout, was a joint project of the club as a whole – is one of the most instructive sectional club layouts I've ever seen. It caught my eye during the National Train Show at the National Model Railroad Association's 75th anniversary convention in 2010 in Milwaukee, and I was delighted when club members agreed to share their planning deliberations with MRP readers. A few months later, Lou Sassi was headed for Cincinnati for another photo shoot, so we had him stop by to photograph the layout.

Lou's photo of downtown Paulding, Ohio – a familiar-looking Midwestern town – shows one of the layout's most interesting design features: the junction. A key modification to the original track plan that caught the eye is visible just under the three-track signal bridge at upper right: separating the main lines so it appears that the inner line is a separate subdivision.

If I were building this layout for my own use, I would shift the line just to the left of the residential street so that it intersects the main to the right of the water tank. I would also install a

diamond so the trains on this line could slither across the CN main, thus making it a second railroad rather than a CN branch. Interchanges with foreign railroads are among the most prolific traffic generators one can model, so I'd also include a connection between the lines where cars could be swapped.

Don't take this as criticism of what they did. In fact, it represents praise, as they have built a railroad that has tremendous potential as built, yet can be modified in a number of subtle ways to meet individual objectives.

Best of all, the railroad has met their very demanding if divergent objectives, as you'll read beginning on page 20.

One size doesn't fit all

The just-for-fun photo of an N scale Civil War-era train on one of Bernie Kempinski's O scale flat cars of the same vintage (see Gerry Fitzgerald's article that begins on page 38) brought to mind equipment being transported by rail to what had to have been the first-ever live-steam meet. Similarly, it's a dramatic testimonial to the vast difference in sheer mass and volume between N and O scale models.

I mention this difference because I believe that the growth of our hobby

will depend to a large extent on attracting a number of the baby boomers who are at or nearing retirement age and are looking for a creative way to spend their leisure time and disposable dollars. My guess is that they will be attracted to the larger scales – S (1:64) on up to No. 1 scale's 1:32 and even F scale's 1:20.3 – because of concerns about being able to see details, work with small parts, and so on. I doubt that the dominance of HO and good showing of N scale will be eclipsed by another scale, but I also think that N and HO will be a hard sell to a boomer.

But larger-scale models are, well, larger, and a model's volume increases by the cube: A model twice as long is also twice as wide and high, hence eight times larger than its smaller counterpart. (That's what makes building a radio-controlled model airplane to exact scale a tad tricky: The wing area of a half-size model, for example, is only one-fourth of its full-size prototype.) Thanks to some clever engineering and manufacturing advances, today's small models perform as well or better than their larger-scale equivalents of a decade ago, but I suspect size will often win the day when an older person is contemplating which scale to embrace.

This leads us to smaller larger models. That is, those who are attracted to the colorful steam locomotives of the 19th century will also find that equipment was markedly smaller and shorter back then, so it will handily negotiate curves that are alarmingly tight by modern standards. Narrow gauge models, notably O scale models built to run on HO gauge track (called On2½ or On30) or Fn3 (1:20.3 models built to run on No. 1 gauge track) allow one to model in a large scale using equipment and curves that are about the same size as those employed by a smaller scale.

I've always been a big-engine guy – size matters, beaucoup horsepower is good. But I have to confess that I'm very impressed with the handsome locomotives and historic era Bernie has chosen for his latest modeling project. That he vaulted to O from N scale is beside the point, I think.

Mountains not for mountains

When Bill Darnaby and I were chatting about what he might have done in his basement had he been inclined to model a mountain railroad, our thoughts turned to ways to illustrate his key learning points. Without thinking, I fired off an email



The difference in size of N and O scale models is dramatically illustrated by this photo of equipment on Bernie Kempinski's spectacular 1:48 Civil War-era railroad (which is detailed on page 38). Bernie Kempinski photo



Maumee L-class Mountains (4-8-2s), based on an Illinois Central design, would not be ideal candidates for a mountain railroad, as their 70" drivers were chosen to hustle fast freights across the prairies. Locomotives with driver diameters in the low 60s would be more appropriate. Bill Darnaby photo

suggesting that he find a spot on his Maumee Route layout and fake a mountain-railroading photo using one of his big L-class Mountains.

No response.

Then the light went on: The Illinois Central 4-8-2s were technically "Mountains," but their 70" drivers were designed to hustle freight at relatively high speeds over Midwestern flatlands. A guy who, like me, operates a fleet of 69"-drived Berkshires that only vaguely resemble their mountain-bred ancestors with 63" drivers should have known better.

I then sent an e-mail to Silent Bill saying, "Never mind."

"I wondered when that would dawn on you," he replied.

Before you're tempted to fire off a missive pointing out that, for example, some of the Rio Grande's Mountains had large-diameter drivers, bear in mind that our objective here is to offer middle-of-the-road advice. There are always exceptions, but the farther you venture out into Exception Land, the more your hands will have to wave wildly around as you explain to curious onlookers what on Earth you are trying to do.

Andy Sperandio retires

Midway through the production of this issue, my good friend and colleague Andy Sperandio retired after a 32-year career at *Model Railroader*. Since the inaugural 1995 issue of *Model Railroad Planning*, Andy has been the editorial director, MRP's main man at Kalmbach's headquarters in Waukesha, Wis. All those years, I counted on his expert advice and counsel.

Andy remains just a quick e-mail or call away, and he has turned over the coordinator's role to MR managing editor David Popp, also a good friend and associate I enjoy working with on "Trains of Thought" commentaries and other MR projects. Nonetheless, I will miss Andy's knowledgeable eye poring over every aspect of MRP's content, and I thank him for his untiring efforts to ensure each issue of MRP meets your, and my, expectations. **MRP**

Tony

Cajon Pass

San Bernardino to Summit in 1947

Designing a layout to operate like a famous piece of a famous railroad

By Andy Sperandio // Model photos by the author

I was really going to Tehachapi, but my timing was off. I'd driven through the night from Fort Ord, Calif., after reading a magazine article about Atchison, Topeka & Santa Fe and Southern Pacific operations on the SP's line over Tehachapi Pass. Trouble was, it was still dark when I got there. I looked at a map and decided to go on to Summit, at the top of the Santa Fe's line over Cajon Pass. I'd get there about dawn, I figured, spend an hour or so, then double back to Tehachapi.

Cajon fascinated me, however. It was May 1971, and the old track layout from the 1940s and before was still in place. The drama of Santa Fe and Union Pacific trains conquering the grade with plenty of second-generation diesel power was impressive. And *then* they rolled past the wye where steam helpers had turned to return downhill, and past the sidings where freights testing air brakes and turning up retainers had waited for the likes of the *Chief* and the *Grand Canyon*. I was in no hurry to leave and spent most of that Saturday at Summit.

I barely got back to Tehachapi while there was still enough light to photograph a couple of trains negotiating the eponymous Loop at Walong. But as interesting as that was, Tehachapi was the Southern Pacific's, while Cajon

belonged to my favorite, the Santa Fe. The UP trains sharing the AT&SF line on trackage rights added to its appeal.

I was still serving in the Army and a long way from building a layout, but after that day I knew what I wanted to model. Sometimes people ask how I chose this prototype, and I usually answer that Cajon Pass chose me.

The First District

The double-track main line from Barstow, Calif., west to San Bernardino was, in the old nomenclature, the First District of the Los Angeles Division, part of the Coast Lines Grand Division of the AT&SF. San Bernardino was the division headquarters, boasting two busy freight yards, an impressive Mission Revival passenger station and division office building, a massive locomotive shop, and a large roundhouse that serviced road power for freight trains in all directions and helpers for the climb up to Summit.

There were two ways west to Los Angeles from "San Berdoo." The shortest, the Second District, skirted the foothills of the San Gabriel range through Pomona and Pasadena to reach downtown Los Angeles from the northeast. It hosted most of the famous Santa Fe passenger trains to and from Chicago, but its own steep grades



meant that most freight traffic went the other way.

That other way was the Third District, which passed through Riverside and a relatively easy climb of Santa Ana Canyon to enter L.A. from the southeast. Along the way it connected to the Fourth District, the "Surf Line" to San Diego.

But my focus is on the First District, and really only the first 26 miles or so of its 82-mile run to Barstow, where it gets out of the Los Angeles Basin by climbing Cajon Pass from San Bernardino to Summit. That includes the 2.2 percent eastward helper grade, and above Cajon station, a notable horseshoe curve named for pioneer railfan Herb Sullivan and a separate line through two short tunnels.

The original main line (completed in 1885) was two miles shorter, but at the expense of a 3 percent grade from Cajon to Summit. After the second track was added in 1913, extending the



2.2 percent grade to Summit, the first track was used as the westward main line. That let trains descend instead of climb the steeper incline, although that descent posed its own challenges.

Because the new line with the easier grade was on the “north” side of the original track, relative to the Santa Fe’s east-west timetable directions, left-hand running became the norm on the First District’s double track between San Bernardino and Thorn, a spot east of Summit in the high Mojave Desert.

At that point, just over 40 miles from Barstow, the railroad built a flyover. The climbing westward line ascends an earthen ramp to through-girder bridge aA40x, which crosses over the descending eastward line. Eastward trains return to right-hand running from the flyover all the way to Barstow, while westward trains shift to left-hand operation by passing over the bridge.

About three miles timetable east (geographically north) of the flyover is

1. The prototypical track layout at Summit was the key element in the design of Andy Sperandio’s HO scale Cajon Pass layout. With all the tracks and most of the turnouts of the real station, it supports multiple train movements as shown here. The westbound *Super Chief* overtakes a Union Pacific freight waiting in the westward siding, while an eastbound perishable train arrives on the eastward main and a helper engine waits on the west leg of the wye.



A pair of 3800-class helpers shoves up the grade behind the Summit depot. After the helpers move out of the way, the way car will be allowed to roll down to its train. Andy can duplicate this move on his layout. Robert Hale photo

The layout at a glance

Name: Atchison, Topeka & Santa Fe Ry.

Scale: HO (1:87.1)

Size: 38'-6" x 44'-6"

Prototype: First District of the Los Angeles Division

Locale: Cajon Pass in Southern California

Era: 1947

Style: linear walkaround, partially multideck

Mainline run: 280 feet (Third District staging to Barstow staging)

Minimum radius: 32"

Minimum turnout: no. 6½

Maximum grade: 3 percent

westward, 2 percent eastward

Train length: 22 cars with 3-unit

diesel and 2-10-2 pusher

Benchwork: L-girder

Height: 38" to 66"

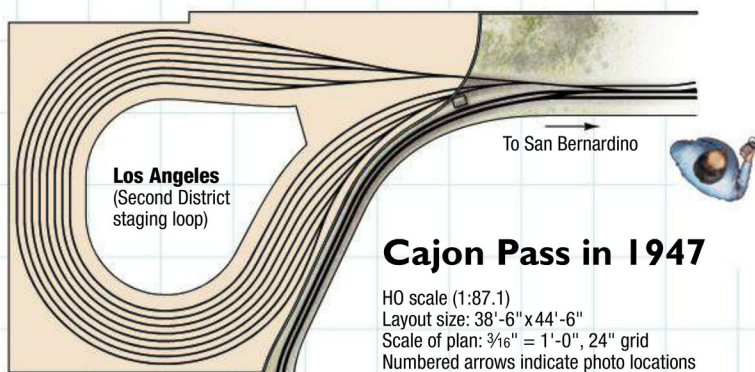
Roadbed: HomaBed on ¾" plywood

Track: handlaid codes 83, 70, and 55

Scenery: plaster-impregnated gauze over web of cardboard strips (to come)

Backdrop: sheet styrene

Control: NCE Corp. Digital Command Control



Cajon Pass in 1947

HO scale (1:87.1)

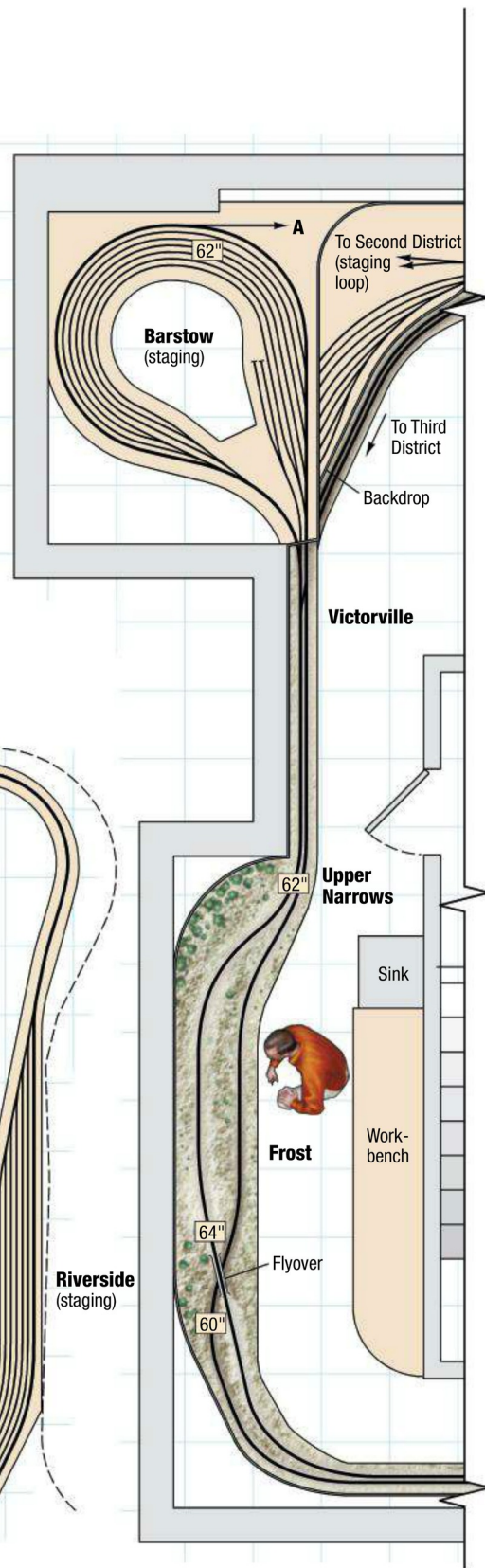
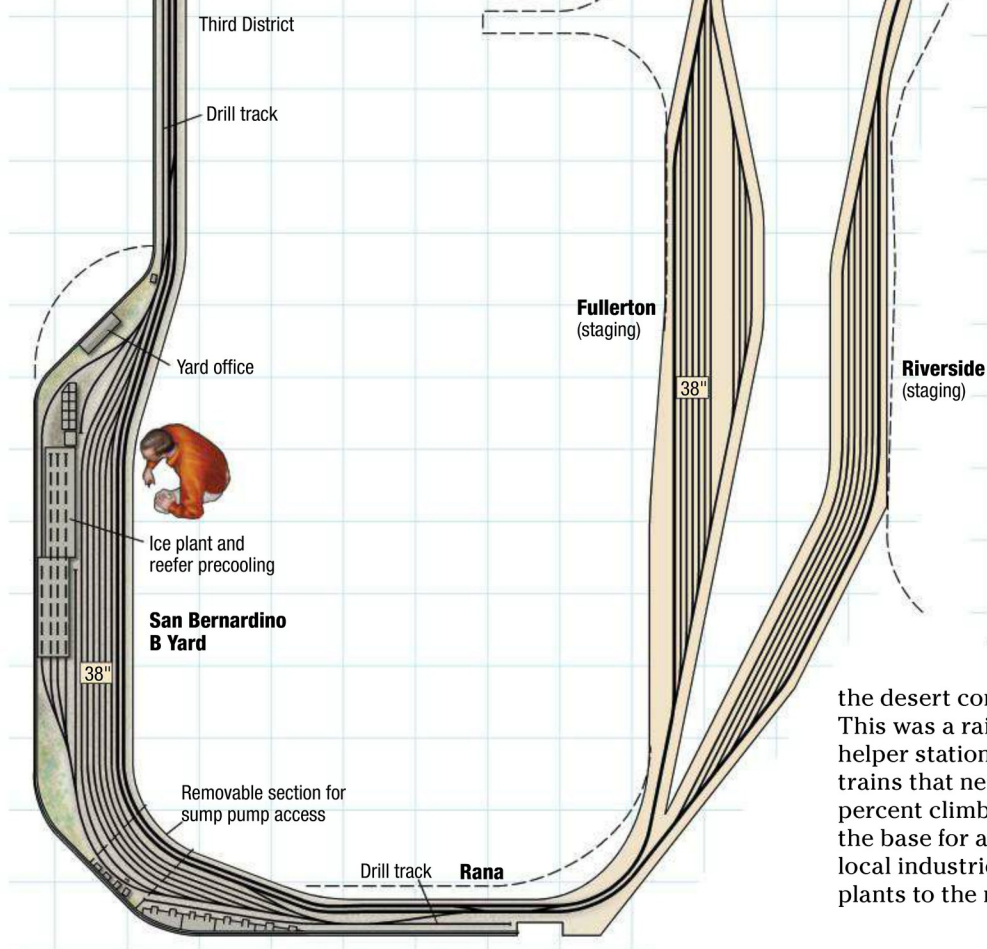
Layout size: 38'-6" x 44'-6"

Scale of plan: ¾" = 1'-0", 24" grid

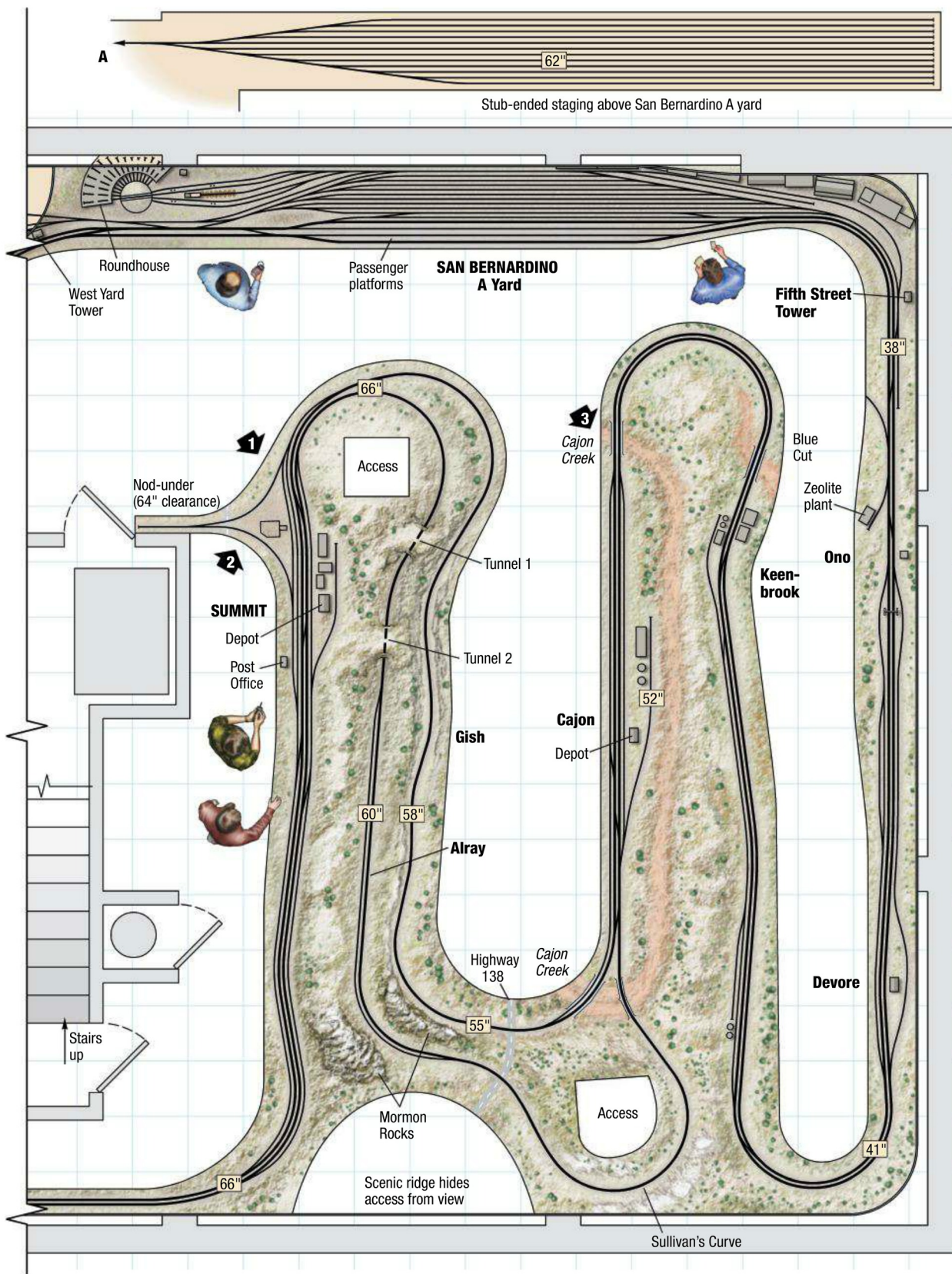
Numbered arrows indicate photo locations

Illustration by Rick Johnson

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the desert community of Victorville. This was a railroad water stop and a helper station for the few westbound trains that needed help up the 1.6 percent climb to Summit. It was also the base for a switch engine serving local industries, especially cement plants to the north (timetable east).



Though I started out focused on San Bernardino to Summit, as I developed my layout plan I decided to include the flyover and Victorville too.

Summit first

The epic poets would always begin *in medias res*, in the middle of things. In

the same way I'll begin describing my layout plan at Summit, where I quite deliberately started drawing.

In several earlier and unsatisfactory versions, it was usually the location and arrangement of Summit that made me unhappy. It's a planning challenge because it needs long sidings to

operate like the prototype, plus it has that wye. So what if I start with what looks like the best location for Summit, I asked myself, and see where I can go from there?

Since Summit would be the highest point on the layout – elevation 66", my eye level – I thought the wye could



2. The rear end of the same train shown on the cover arrives at Summit. The model railroad is designed to feature prototypical Santa Fe train operations in 1947, such as pushers like the 3881 helping eastbound freights up the 2 percent grade from San Bernardino.



This closer look at Sullivan's Curve, named for famed rail photographer Herb Sullivan, shows a 3800-class 2-10-2 pushing on the rear of an eastbound freight. Cars near the front of the train are visible around the curve above the cab of no. 3934. Once the scenery is complete, a similar camera angle will be possible on Andy's layout. Herb Sullivan photo

extend across an aisleway and still allow a "nod-under" clearance of 64" for operators passing underneath. But that assumes someplace for the tail track to end up on the other side of said aisle.

Looking at my basement plan – generous for a condo, but not unusual for Wisconsin – the end of the mechanical/stairway enclosure seemed like a good anchor to support the tail of the wye. I chose the wall I did so I could place the wye at the end of a peninsula, so engineers would have room to walk around and follow their trains.

This put the operator/viewer position on the south side of the track at Summit, just like I wanted. The slopes of the mountains generally rise behind the tracks when you face in that direction, which is good for scenery modeling. Also, you look at the more interesting track side not only of the Summit depot, but of all the other stations except the big one at San Bernardino. Those two things were much more important to me than having timetable east to the right (though it is), and even the orientation of San Berdoo station became a plus for my design.

I started construction at Summit, mainly to be sure I was happy with the high elevation and to see how my wife Arlene and the occasional visitor would put up with nodding under the wye. I

think it's successful on all counts, but I also built three 10"-high operators' steps to be able to work trains at Summit from an apparent height of 56".

Those long sidings

Summit needs long sidings because eastbound freights with pushers have to pull past the crossover east of the depot to let the helper cut off and back the way car (Santa Fe-speak for caboose) into the spur known as the "engine track." The helper leaves the way car there parked on a grade and moves to the west on the eastward main track. The rear-end crew then lines the switch and releases the hand brake to let the way car roll back to their train. If it doesn't coast far enough, the helper is now behind and can give it a nudge.

"Did he say 'hand brake'?"

Okay, it's really a pin between the rails that a motor raises to axle height to hold the way car while the helper uncouples and moves into the clear. I worked this out almost as soon as I had that spur built, and I described it in "A Tortoise hill brake" in the November 2001 *Model Railroader*.

Westward trains need a long siding too. They also stopped east of the crossovers to make an air test and set retainer valves – which kept air pressure in the cylinders when the brakes were released – before starting down the 3 percent grade. If a train had help from Victorville, it was usually in the form of a doubleheader, and the helper would cut off and pull ahead to pick up a clearance from the operator allowing it to return to San Bernardino.

I set the length of my passing tracks by deciding in advance on a "design freight train" made up of a three-unit Electro-Motive FT diesel road engine (Santa Fe 100-class), 22 40-foot refrigerator cars, a 3800-class 2-10-2 pusher, and a standard steel way car. I've seen on other HO layouts that any train of 20 or more cars looks "long" running through scenery, especially when you're close enough so that you don't see both ends of the train at once.

Except for a much shorter overall length and the omission of one crossover west of the depot, my track layout at Summit is a close copy of the prototype. That's generally true of the stations of Alray, Cajon, and Keenbrook too. I figure that with a realistic track arrangement, the model trains can only do what the big ones did.

Down the hill

Coming down from Summit to Cajon, the westward grade is 3 percent. This

Why it's 1947

As Cajon Pass picked me to model it, so 1947 thrust itself upon me as a modeling period. After settling on the First District as a prototype, one of my first research goals was to acquire Los Angeles Division employee timetables from the late 1940s. I knew I wanted to model the steam-to-diesel times of the Santa Fe, and on the LA Division those were all but over by the early 1950s.

Within a year I had a photocopy of Time Table 131, effective August 31, 1947. After gleaning as much information as I could from 131 and many other sources, I decided that 1947 was an excellent choice.

Take the passenger trains. Warbonnet diesels were already well established on the stainless steel streamliners by 1947, but there was still plenty of work for 4-8-4s. The *Super Chief*, *El Capitan*, and *Chief* rated all-lightweight consists, but lesser trains were mixtures of old heavyweights and newer lightweight cars. That all suited my modeling interests perfectly.

On the freight side, 100-class FTs had been running into San Bernardino and turning back east since the end of World War II. There weren't always enough diesels, however, so 3800-class 2-10-2s still got occasional calls to go east as road power. First District helpers were almost all steam until late in the year, and all freight trains on the Second and Third Districts were steam-powered. This also suited my tastes.

Looking beyond 1947, I saw that every new diesel delivery meant fewer assignments for steam locomotives. And on the Union Pacific side of things, the UP's South Central District into Los Angeles via trackage rights over the Santa Fe's First District was dieselized in 1948. (The UP brought steam helpers back to Cajon during the Korean War, but by then there was a lot less Santa Fe steam.)

Operationally, in 1947 the Santa Fe still ran by its 1927 *Rules and Regulations of the Operating Department*, and I found a good copy of that. But in 1948 it introduced a new book of rules, and I didn't want to try to straddle the two in layout operations.

I've never tried to make one of those bar graphs showing changes over time in locomotives, rolling stock, and operations. I just studied the history of the Santa Fe and the UP and found I'd be quite happy modeling 1947. – A.S.

line is separated from the eastward track by as much distance as I thought I could manage to make it evident that they were built at different times.

In reality there was a curving siding at Gish, actually a segment of the earliest main line, that became a passing track when the main was straightened. I omitted it mainly to leave more space between the separate grades, and operationally it was always on the short side and a hard place to control a heavy freight train.

The series of S curves in the downhill line models an actual engineering feature: Shorten this track by taking out all the curvature, and the grade gets even steeper.

A broad curve leads to the switch for the westward passing track at Cajon and the upper crossing of Cajon Creek. Then the two lines join as conventional double track for the rest of the way to San Bernardino.

Steam-powered downhill freight trains with retainers turned up were required to stop at Cajon for 10 minutes to be inspected and let their wheels cool. The Santa Fe pioneered the

dynamic brake for diesel-electric locomotives. That made train handling easier, but even diesel-powered trains made these stops if the tonnage was too great or if the dynamics weren't working on all units. If first-class trains were due, the freights could clear the main in the Cajon siding.

Heading west down the hill, trains crossed Cajon Creek again and passed through Blue Cut, named for the color of the rock in its slopes. Keenbrook had only an eastbound siding, so the next place a westbound train could clear the main track was Devore. There, trains using retainers had to make another 10-minute stop. There was also a siding for eastward trains that curved behind the interesting concrete depot. That building was still standing in 1947, but closed, its windows boarded over.

In reality there was a "signboard station" called Verdemont between the Devore sidings and another set of passing sidings just above Ono. I've compromised by omitting Verdemont and having just one set of sidings between Devore and Ono.



3. Andy enjoys building track from scratch and has handlaid all the track on his layout so far. Here are two Santa Fe-design no. 6½ turnouts at the lower (west) end of Cajon station. On the left is a standard turnout, and on the right a spring switch for the heading-out end of the westward passing siding.

Ono had a small train-order office, the first one out of San Bernardino, and a spur to the Culligan Zeolite Co. plant, the only active industry on the line between San Bernardino and Victorville. Zeolite is a water-softening salt that was collected in evaporation ponds and bagged for shipment in boxcars. A longer spur, which I'm extending off the layout, led to the Western Stove Co. That had actually been a munitions plant during World War II, but it was defunct by '47 and the railroad was using the spur to scrap steam locomotives.

At Fifth Street Tower, all westward freights crossed over the eastward

main line under the protection of interlocking signals and entered the A Yard north of the passenger station.

The elevation at San Bernardino is 38', low but a good height for seated operators. Somewhere along my main line I'm sure that all model railroaders can find their perfect layout height.

Back up the hill

Westward freight trains departed from the Precooler or B Yard along the Third District after being given fresh road power and helpers pushing ahead of the way car. The road power west from San Bernardino was primarily 100-class diesels, supplemented by

3800s as necessary. Helpers were mostly 3800s, although other steam engines were used as needed, and diesels occasionally helped as well.

After coming around the curve at West Yard tower and taking the eastward main track through the passenger platforms, the trains hit the grade below Ono. On my layout the climb is mostly a steady 2 percent, compensated on the major curves.

The most restrictive aspect block signals on the eastward grade could display back in 1947 was a single yellow light, indicating "proceed at restricted speed." That was done to keep trains moving as much as possible. The red aspect – indicating "stop and proceed at restricted speed" on a block signal with a number plate – could safely be dispensed with because the grade greatly shortened stopping distances for trains heading uphill.

Nevertheless, trains with steam helpers often stopped at Keenbrook, where there were water plugs at both ends of the siding for refilling tenders. If there was an opportunity in the timetable, freights could stop on the main for water, or they could use the siding if first-class trains were due.

The only other water stop before Victorville was at Cajon, but the westward siding there had been shortened after a major washout along Cajon Creek in 1939, making Keenbrook more convenient for watering pushers on longer freights. Therefore, I deliberately made my westward siding at Cajon too short for my design freight train, a great opportunity to reflect history in the track plan.

Freight trains also stopped when necessary to take siding for first-class trains, the passenger and mail-and-express runs. The First District's double track was operated under current-of-traffic rules, meaning faster trains didn't use the opposite main to pass slower ones. Instead, the freights used the passing sidings to clear the times of the first-class schedules. This brings some of the challenge and crew involvement of timetable-and-train-order procedures to operation on double track.

Past Cajon the eastward main realistically swings away from the westward line, crosses Cajon Creek, and climbs around Sullivan's Curve. This horseshoe curve and its approaches account for much of the two-mile greater distance on the eastward line between Cajon and Summit. It was that extra travel that made it possible to hold the grade to 2.2 percent. The distance is greater on

my layout too, so my 2 percent eastward climb continues to Summit.

With that greater length I've incorporated the eastward passing siding at Alray, just below the two short tunnels. Then the two main lines become parallel once more as they curve into Summit.

To Victorville and beyond

Having made it to Summit again, I'll skip past it to the (timetable) west end of the layout. "Skip" is the word, as my plan omits Lugo, Hesperia, and Thorne to jump right to the flyover at Frost. I originally thought to have the main lines immediately enter staging after Summit, but I wanted to use the basement alcove for a return loop, so the "air rights" above the B Yard looked like a good location for a simple, turnout-free high desert scene. This will be the only part of the layout that's openly double-decked.

Contemplating the end loop at Barstow, I had the idea to increase the east-end staging capacity by hanging a stub-end yard off the outer track of the loop, in a valence suspended above the A Yard. For trains to pull around the loop and back into those stub tracks, they'd have to be running right-handed as they entered staging.

And that's how the flyover made it into my track plan as a prototypical solution to a layout challenge. A short but steep downgrade to an elevation of 60" gets the eastward track under the westward, and sets the height of Victorville and the east-end staging.

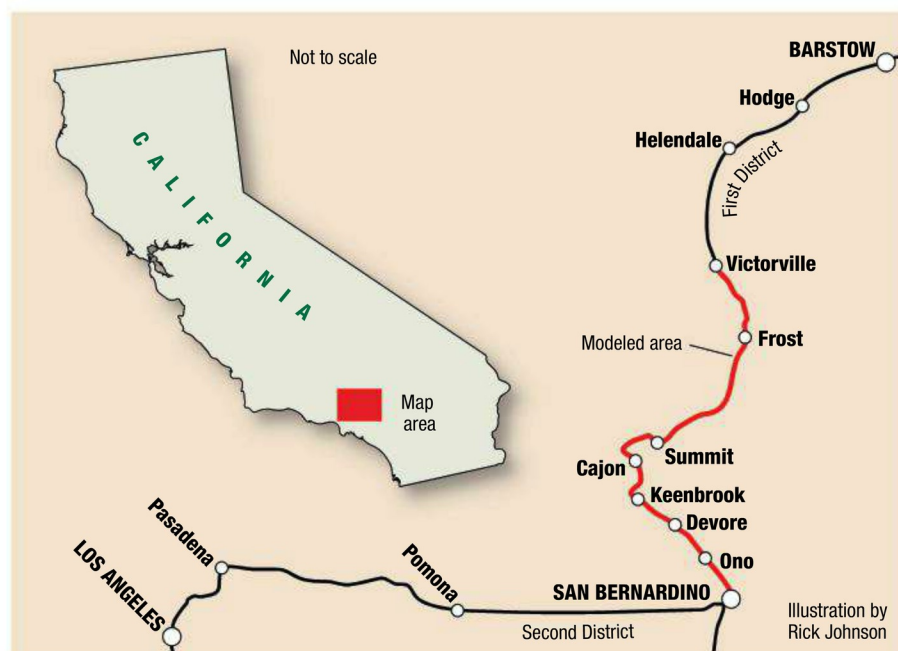
My version of Victorville will be just a suggestion of reality at the entrance and exit of the staging loop. I'll use silos from the Victorville cement plants to hide the disappearing track, and to provide a little more switching work for the otherwise underemployed First District locals, as well.

San Bernardino and the west

Admittedly the First District main line isn't going to offer the usual model railroad array of local switching spots. But my friends know I'm a yard guy, and San Bernardino will have reasonable versions of both yards.

The shop buildings will be on the backdrop behind the A Yard, and the passenger depot will be "in the aisle," with only the station tracks and open platforms along the front of the layout. I know I'll be omitting an impressive and characteristic structure, but it would take up too much space in front of an operating freight yard.

The A Yard handled primarily westward traffic, including dispatching



"Fruit Pickup" turns to distribute empty reefers and bring back loads of perishables. The B Yard handled eastbounds, including precooling and/or icing those perishables and assembling them into GFX (for "Green Fruit Express") trains to go east. San Bernardino will provide plenty of my favorite kinds of switching interest.

The west-end staging includes two reverse loop arrangements. Parallel balloon tracks under the Barstow loop will represent the Second District, and a big loop with through staging yards wrapped around the legs of the Summit peninsula will represent the Third.

Loop staging does take up more space than stub staging, but it's much more practical for the heavy passenger traffic of the 1947 Santa Fe and Union Pacific. The ability to turn long passenger consists on the track and send them back in the opposite direction more than justifies the real estate. And loops are perfect for the fruit turns, too, because the difference between empty and loaded reefers is simply a matter of car-routing paperwork.

Anyway, the Third District loop's location is more or less "free," because the scenic portion of the layout above it is so much higher than the 38" elevation of the staging.

Where it stands

At this writing I've built the two peninsulas and handlaid all the track from Summit down through Keenbrook. The track is wired for NCE Digital Command Control, and I've proven that pusher operations with the design freight train are completely practical. That means after many trips, nothing's

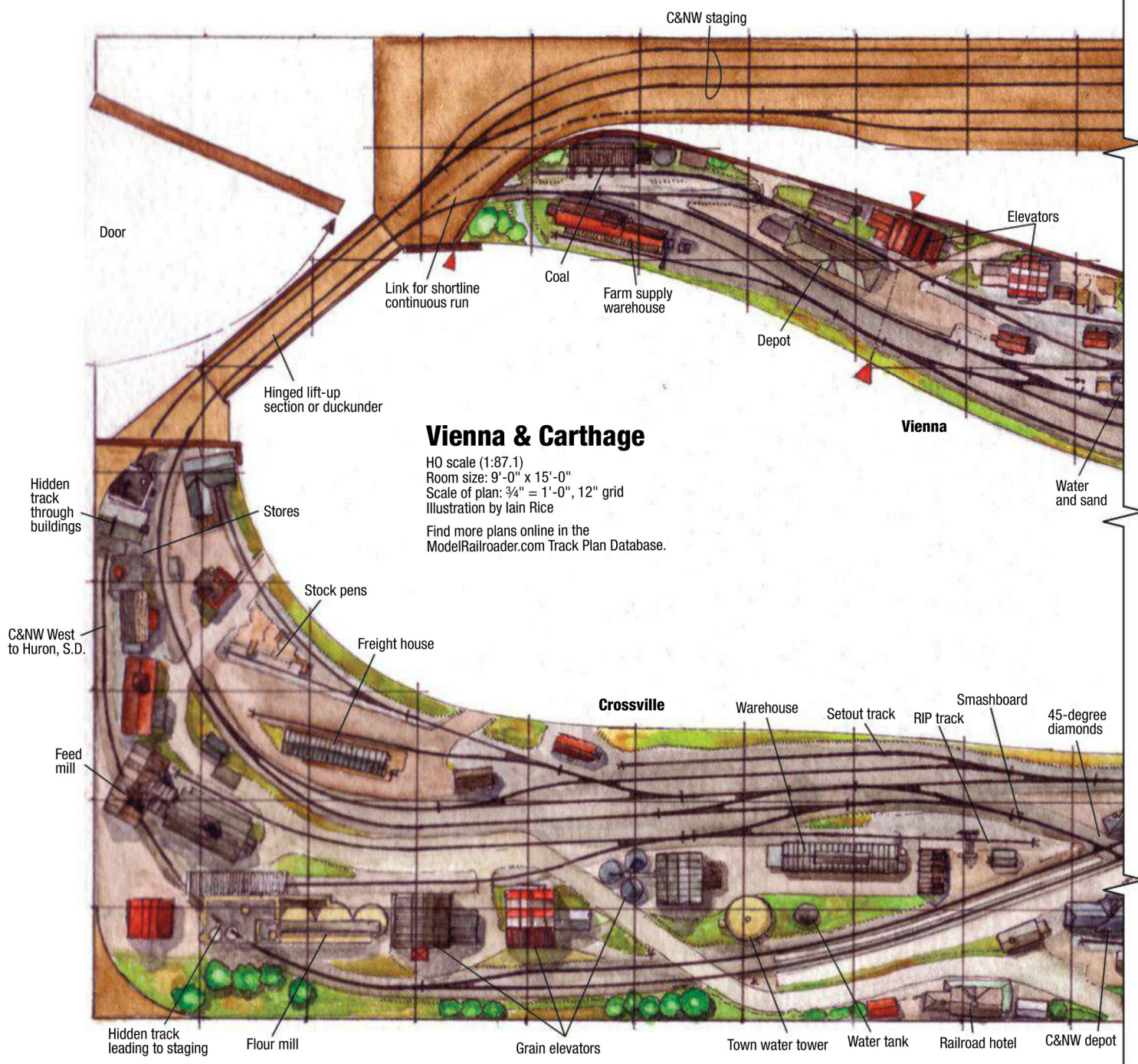
ever hit the floor. That's true even though there's no scenery yet except for some mocked up with kraft paper at the west end of Summit.

Now that I'm retired, I'll be extending the benchwork around the walls using mostly cantilevered construction. I'll get to build more track – I'm hand-laying because I really enjoy it – and I'll make signals and scenery higher priorities. I expect lots of fun ahead, going Santa Fe all the way. **MRP**

Andy Sperandeo retired in August 2011 after 32 years at Model Railroader magazine. He plans to use his retirement to spend more time on the construction of the model railroad you see here.

Learning points

- Taking a field trip may inspire you to rethink your primary modeling objectives.
- Modeling a popular location like Cajon Pass may still allow a unique interpretation based on personal objectives and preferences.
- Modeling a mountain pass adds operating interest and slows down operations, hence adding to the length of a run.
- Starting construction with a key geographical area like Summit provides a good sanity check on the entire project.
- What some may see as "chores" – like handlaying track – may turn out to be a very enjoyable part of layout construction.

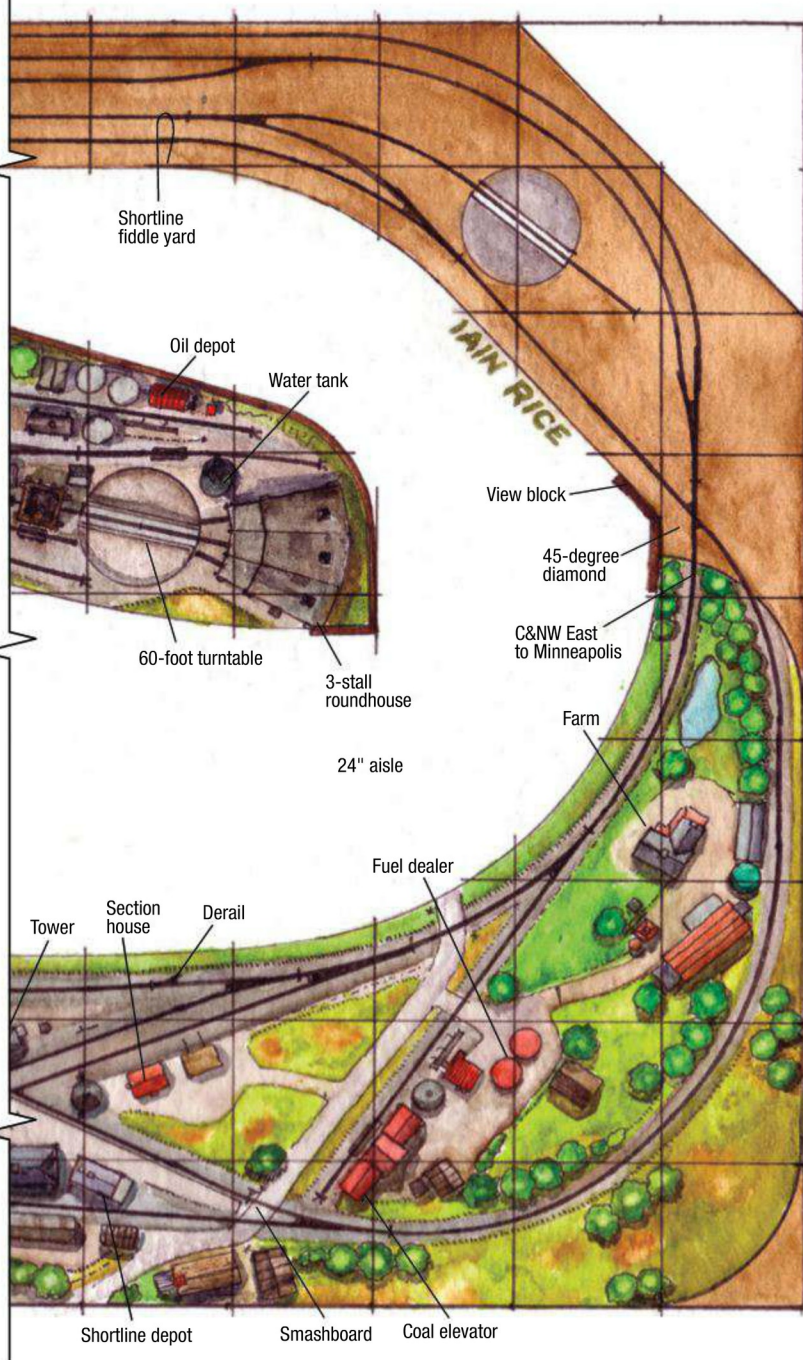


Versatile room-size layout

Two upper-Midwest railroads cross in a typical town

By Iain Rice

I've always held that designing a smaller layout is more demanding than planning a big one, as every inch counts. This is particularly true where the layout has to cover all the bases of prototype operation from long-distance and local passenger trains, through freights as well as peddlers serving local industries, general merchandise less-than-carload-lot (LCL) traffic, mail and express, and special ladings like milk or livestock. And don't overlook the servicing of the locomotives hauling all this traffic. Each of these functions demands the provision of suitable facilities on the railroad, which is difficult to arrange on a small site without unrealistic crowding.



The track plan at a glance

Name: Chicago & North Western and Vienna & Carthage RRs

Scale: HO (1:87)

Size: 9'-0" x 15'-0"

Prototype: C&NW plus freelanced short line

Locale: South Dakota-Minnesota border

Era: late 1940s to early 1950s

Style: single deck

Mainline run: C&NW 39 feet, V&C 42 feet end-to-end, 37 feet continuous

Minimum radius: 30" (main), 27" (short line)

Minimum turnout: no. 6 (main), no. 5 (short line, yards)

Maximum grade: none

Track: codes 70 and 83 flextrack

Train length: 6 to 10 feet

So what sort of a model railroad can you pack in this space, and what sort of operation will it offer?

A versatile layout

In the normal course of operations on a full-size railroad, a train will be doing one of three things: highballing, switching, or waiting on a siding (for a scheduled departure time, a connection, or a meet with an opposing train on single line). In the real world, waiting is a big part of the railroading game.

All other operational functions of a full-size railroad are geared to enabling trains to do these three things. Locomotives will visit engine terminals for servicing and repairs, passenger cars will be cleaned and restocked, reefers will be iced, and defective cars will be repaired often on a RIP (repair-in-place) track or set out on a siding. Meanwhile, maintenance-of-way crews and their equipment will be deployed to keep the line in good order. And, on those hopefully rare occasions when it all goes truly pear-shaped, the wrecking gang will be called out and given a priority path to the scene of the mishap.

To replicate the basic three states of train operation on our model railroads, we need to provide four types of track: a main line for highballing, yards and/or industry spurs for switching, sidings where trains can sit and wait, and off-scene staging or fiddle yards from which trains enter or leave the modeled area.

Organizing such varied track arrangements on a large basement model railroad isn't usually too much of a problem. On a small layout in a

Full-size railroads, as opposed to models, are rarely short of real estate, and many facilities sprawl over large areas. And it seems that the more recent the time frame, the more things spread out – not surprising in these days of mile-long blocks of double-stacks, grain hoppers, or unit coal trains. Go back 60 years when freights were shorter and locals roamed the rails, and things become a lot more manageable.

Similarly, many passenger trains consisted of two or three head-end cars trailed by one or two often-empty coaches. In this transitional era, power could be either surviving steam or modest consists of compact but colorful first-generation diesels. Such

trains are the bread and butter of a room-sized model railroad.

And that's what this is – a modest layout designed to represent a "typical American railroad" (if there is such a thing) for my friend Andrew to fit in a 9 x 15-foot spare room. That 135 square feet could also be found in a compact one-car or half of a two-car garage, an attic space, or a smaller basement.

A mainline radius of 30" is no problem, either practically or visually, and the train lengths in the range 6 to 10 feet that can be accommodated are long enough for realistic consists in HO. Also on the plus side, a mid-sized compact layout like this makes for an achievable one-person project.



One of the C&NW's high-drivered class D Atlantics (4-4-2s) pauses briefly at Wittenberg, Wis. This is the sort of compact but glamorous motive power Iain had in mind when designing this track plan. Photo courtesy Chicago & North Western Historical Society

spare room, however, it's more of a challenge if things aren't to get unrealistically crowded. Achieving maximum operational variety combined with realism in a small space is all about making an apt choice of prototype and location and selecting Layout Design Elements (LDEs, visually and operationally recognizable models of actual locations) that live convincingly together while ticking all the operational boxes.

A designer's best friend

When it comes to LDEs that pack a lot of operational bang for the prototypical buck, that characteristic Midwestern scenario where two railroads cross at grade and interchange cars has a lot to offer. A diamond implies two through routes, so you're going to have at least some track on which to highball, with the added drama of being able to watch trains hammer across the diamond, plus the scenic and operational bonus of an interlocking plant of some sort.

Add on to that an interchange track and you have a switching area that can handle pretty much any type and quantity of car and lading. Prototypically spice the mix with a small interchange yard, and you've got yourself a classification area as well as a place for trains to wait, ticking another basic operational box. Locate your interchange on the edge of a town and you can mix in a freight house,

team track, and industry spurs for more switching opportunities.

Moreover, the crossing doubles your choice of prototype to model, as you'll usually be modeling the trains of at least two railroads. This offers not just variety in equipment and paint schemes, but also the chance to model two very different styles of railroad: a major carrier and some lesser railroad, or a main line crossed by a branch, a mining or logging railroad, or even an interurban.

The other bonus a crossing introduces is that of conflicting train movements. This is something the prototype strives hard to eliminate, but it's bread-and-butter to model railroaders. Where would we be without opposing trains, switching moves that tie up main lines, and peddlers and drag freights trying to keep out of the way of passenger trains or symbol freights?

Of all the operating conflicts on a full-size railroad, a crossing with another railroad is the most intransigent, as it's a place where the other guy can hold you up without you being able to do a thing about it. Having a crossing on the layout can also introduce another job – tower operator – while serving as a linchpin around which to build the whole operating scheme of the layout.

Selecting the location

Contrasting trains are one of the potential benefits of these railroad

meeting-places. Given an equipment druthers list running from turn-of-the-century steam well into its twilight phase to gleaming E or F units fresh out of Electro-Motive Division's LaGrange, Ill., factory, then planning the layout around equally contrasted railroads is an obvious ploy, with a minor branch or short line tiptoeing across the high iron of a busy Class 1 main line.

In the Midwest, there are lots of rambling branch lines to choose from, mostly worked by the C&NW or Chicago, Burlington & Quincy, but fewer independent short lines. Those smaller roads that I did find in the pages of Lucius Beebe and Charles Clegg's classic *Mixed Train Daily* and Don Ball's *America's Railroads* included some very appealing prototypes, such as Iowa's Manchester & Oneida; Indiana's Louisville, New Albany & Corydon; and Minnesota's Duluth & Northeastern, which used steam well into the 1960s.

These lines struggled on into the post-World War II era with classic Americans (4-4-0s), Ten-Wheelers (4-6-0s), or Consolidations (2-8-0s) powering short freight or mixed trains featuring wood passenger cars and sway-backed cabooses. Mind you, it wasn't only the one-horse short lines that featured elderly equipment picking its way through the weeds. Many of the branch lines of the Midwestern Class 1 roads looked much the same!

Learning points

- It's hard to define "typical" when it comes to American railroading.
- The Midwest offers myriad "rambling branch lines" from which to choose a suitable prototype to model.
- The earlier the modeled period, the smaller the equipment and the shorter the trains – an advantage for small- to mid-size layouts.
- Short lines and branch lines often featured smaller motive power and passenger equipment, which means trains fit into shorter yard, passing, and staging tracks.
- Two railroads crossing at grade double the opportunities for modeling variety and create a versatile "industry" – the interchange.

So, in search of a setting for the widest possible variety of equipment in the context of a believable Midwestern setting, I elected to base my layout plan on the edge-of-town crossing of a freelance independent steam-worked short line with a single-tracked main line of the C&NW. That ruled out the double-track Chicago-Omaha trunk route, so I looked farther north and selected the long, looping arm of the Dakota main around the area of the Minnesota-South Dakota state boundary.

The crack train in those parts was the very modelable six-car Chicago-Huron, S.D., *Dakota 400*, introduced in 1950 complete with E units and streamlined cars. By contrast, at this time the *Dakota's* main also saw several steam-hauled long-distance passenger trains, including train 515/516, the *Minnesota and Black Hills Express*. It took two not-very-express-like days to pick its way from Chicago to Rapid City, S.D., but it offers a good excuse to run a Pacific and heavyweight cars.

To complete the contrast between the two railroad elements of my room-sized slab of South Dakota, I've given them two very different formats. The fictional short line is essentially end-to-end, although a continuous connection is possible, as shown dashed on the plan. I've christened it the Vienna & Carthage, which links two real places and has a grandiose ring to it. The line runs from its terminus point out on the remote prairie at Vienna via the railroad town of Crossville, S.D. (fictional, but located somewhere west

of Arlington), where, after crossing the C&NW, it theoretically continues southwards toward Carthage but actually runs into an active fiddle yard.

The C&NW, by contrast, is an oval continuous-run track served by an off-scene ladder. The two routes cross twice: once visibly in Crossville and once discreetly in the offstage area, which brings the Carthage fiddle yard to the front of the mainline staging tracks for better accessibility. Vienna, the short line's northern terminal, is fully modeled on a narrow peninsula in the center of the room. Being designed in a British context, the Vienna scene is contrived as two portable layout sections to take to the many exhibitions that form such an important part of the model railway hobby in England where I live.

A very ordinary railroad

This is a straightforward exercise in transition-era model railroading. Track on the short line could be laid with Micro Engineering's code 55 and 70 flextrack with plenty of weeds among the ballast, with much-more-substantial-looking code 83 on the main line. The C&NW has a passing track here for east- and westbound trains to meet or pass; the resulting pair of 45-degree crossings would all be laid in the heavier rail.

The depot serving both lines was inspired by the C&NW prototype at Wyeville, Wis. I show train-order signals and semaphores on the main line and smash boards for the freelanced V&C short line. The interlocking tower would



The Chicago & North Western and subsidiary Chicago, St. Paul, Minneapolis & Omaha both served Wyeville, Wis., shown here circa 1917 looking northwest up the Omaha toward the Twin Cities. The joint depot inspired the crossing on Iain Rice's HO scale track plan. Photo courtesy Chicago & North Western Historical Society

be a C&NW structure, as would be the section house and water tank.

The V&C's Crossville terminal is ordinary enough: a three-track yard with a setout spur, a RIP track, a small freight house, some stock pens, and a shack for the agent. Local industries include a fuel depot, a storage warehouse, a feed mill, and a row of four grain elevators, the end-but-one in the row straddling the hidden-return section of the C&NW. This track also sneaks through several town structures on its way to staging.

Also ordinary is the simple stub-end shortline terminal at Vienna, although the small timber coal dock and three-stall roundhouse might call for some scratchbuilding or kitbashing. The turntable is a 60-footer, just big enough to handle the V&C's projected roster of a Bachmann 4-4-0, a 4-6-0, and a 2-8-0. The track running behind the depot to serve yet more grain elevators depicts a classic prairie-railroad arrangement.

All in all, this is a very ordinary slice of history, the essence of the traditional common-carrier railroads that served the America heartland for more than a century. In that respect, I suppose this plan can lay claim to being the "truly typical" piece of railroad that the friend I conceived it for was looking for. All I have to do now is get him busy building – and negotiate running rights for my old brass C&NW Atlantic! **MRP**

Iain Rice, well known for his flowing and creative track plans, is a regular contributor to MRP.



One club layout with two objectives

The Cincinnati Northern is a sectional layout planned for both operation and shows

By Kevin Geiger // Photos by Lou Sassi

Back in 1999, the Cincinnati Northern Model Railroad Club was without a permanent home, so we committed to constructing a portable HO scale layout that could be set up in a member's

basement for operation or taken to shows for display. However, the club's principal goal – to model and operate the Cincinnati Northern RR as it would have existed in the 1950s had the Cincinnati-to-Jackson, Mich., operation

not merged into the New York Central System – seemingly conflicted with this new call for a continuous-running display layout.

The general feeling was that significant compromises would be needed to simultaneously meet both objectives. Nevertheless, we proceeded to build a single layout designed for both prototypical operation and public display.

For operation, our members wanted to maintain the flavor of western Ohio's north-south freight and passenger service. We wanted small operating



2. Electro-Motive Division F7 A and B units ease past the coal dealer in Paulding. The railroad is set in the steam-to-diesel transition and based on the premise that the Cincinnati Northern didn't disappear into the New York Central System.

travels through an interlocking plant, loops around, reverses its path through the interlocking, and finishes where it began.

The plan provides a modest amount of switching in town and includes an industrial spur that runs into a center peninsula. The plan also features a double-track main line entering and exiting the interlocking tracks.

One member suggested that it would make the interlocking more interesting if we had a double-track main enter from one end and two single-track mains enter from the other. The challenge here was to make the single tracks diverge enough to appear as individual main line routes rather than double-track.

We concluded that by removing the loop and connecting the end points with a staging yard, we could stage both north and south traffic out of the same yard into the interlocking. At the same time, double-ended staging provided the connection for two-way continuous operation during public shows.

The original plan showed tracks shifting from the outside to the inside of the layout to allow room for the industrial spur to climb and pass over the main en route to the peninsula. We included a large gentle curve to avoid aligning tracks parallel to the table edges. Placing a stream and a wooded embankment between the two single track lines solved the problem of the tracks looking like a double-track main. The stream also justified the inclusion of bridges similar to those used along the prototype Cincinnati Northern RR.

Finally, after a year and a half of designing, we had a track plan that not only met our operating goals but also provided viewer aesthetics. And though the plan doesn't perfectly match any one area of the prototype Cincinnati Northern RR, it loosely resembles the town of Paulding, Ohio.

Learning points

- Seemingly conflicting goals – such as realistic operation and show running – can be resolved with a carefully designed plan.
- Unconventional solutions to common issues may offer benefits.
- Layouts designed to be portable must be bulletproof.
- Operating the O-shaped layout from both inside and outside requires inverting the movable control panels to maintain track/panel orientation.
- Basing the railroad on a specific prototype guides subsequent decision-making.

1. An Electro-Motive Division E7 leads a Cincinnati Northern passenger train through the interlocking plant at Paulding, Ohio. This sectional HO layout was designed to accommodate realistic operation while allowing for continuous running during public shows.

sessions that could involve two or three simultaneous trains and provide nominal challenges for our club. For show operation, we wanted trains to run continuously in both directions so meets would occur frequently.

Still the question remained, "How much could we actually model on a portable layout?" That's where our effort to develop a track plan began.

Modifying a track plan

Club members spent most of 1999 perusing layout-design books for a plan that met our goals. Finally, one of our members stumbled upon a C-shaped point-to-loop layout with an intriguing track arrangement located in a town. It's a plan by Jeff Madden that first appeared on page 121 in the March 1991 *Model Railroader*. In this plan, a train begins in staging at one end,

Dividing the plan into sections

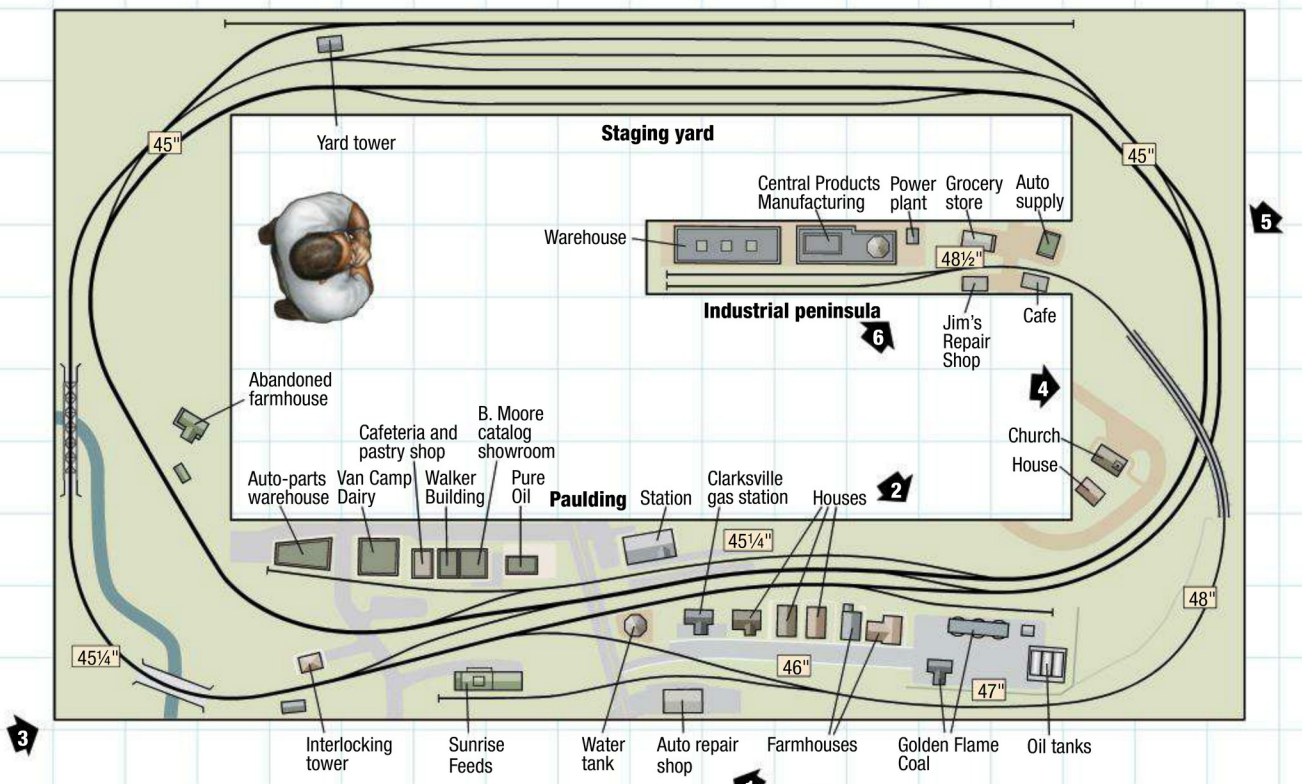
The next step was to decide how to construct the layout. We envisioned moving the layout in two minivans with the aid of one or two additional smaller vehicles. The cargo space of the minivan I owned was 6 feet long by 4 feet wide by 4 feet tall, so we used these measurements to govern the standard dimensions for the layout sections.

Nine sections and a modest amount of storage could fit into the approximate payload dimensions of two minivans if we kept height restrictions within reason.

We initially planned to fabricate a rail system for the back of the minivan using structural aluminum shapes. But one of our club members donated a new 6 x 10-foot trailer before we needed to transport the sections. So we used aluminum angles as rails to slide the sections into the trailer.

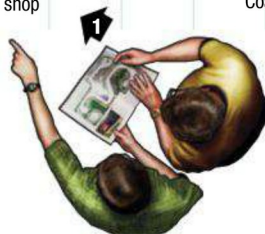
Control and trackwork

For the most part, we planned to use freight and passenger cars typical of the 1950s. Eight- to 10-car trains



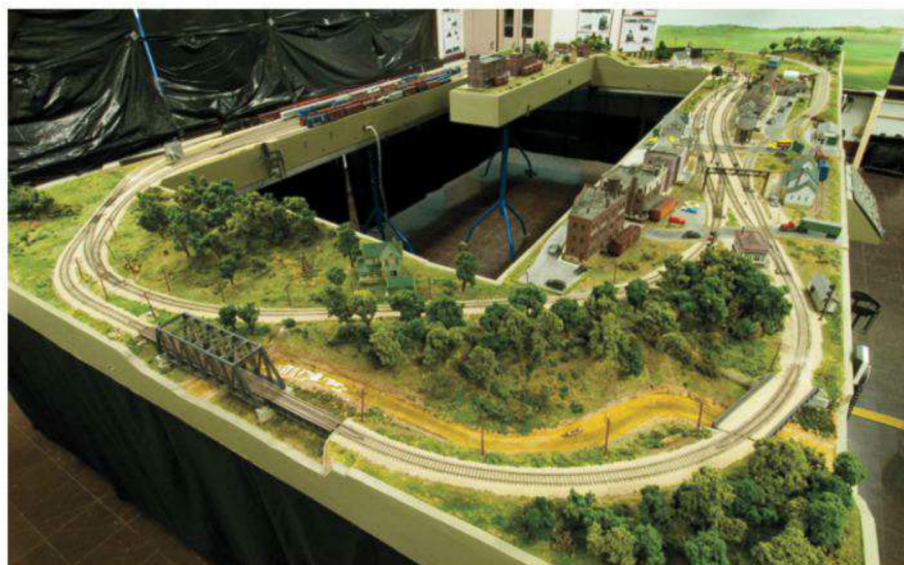
Cincinnati Northern in the 1950s

HO scale (1:87.1)
 Layout size: 9'-10" x 16'-6"
 Scale of plan: 3/8"=1'-0" (12" grid)
 Numbered arrows indicate photo locations
 Illustration by Roen Kelly
 Find more plans online in the
 ModelRailroader.com Track Plan Database.



The layout at a glance

Name: Cincinnati Northern
Scale: HO (1:87)
Size: 10 x 17 foot
Prototype: Cincinnati Northern RR
Locale: western Ohio
Era: 1950s
Style: donut, sectional
Mainline run: 45 feet
Branchline run: 20 feet
Minimum radius: 30" (main);
 20" (branch)
Minimum turnout: no. 5
Maximum grade: 2.5 percent
Train length: 6 to 8 feet
Benchwork: sectional on
 aluminum framework
Height: adjustable from 38" to 60"
Roadbed: cork
Track: Atlas code 83
Scenery: foam
Backdrop: none
Control: Lenz DCC



3. This overview of the layout provides little hint of its sectional nature and shows how scenes were divided by low wooded hills and diverging single-track mains.

with locomotives and a caboose seemed reasonable for the layout. Locomotives would be small- to medium-size late steam and four-axle first-generation diesels, but a few six-axle diesels have also appeared. While an 85-foot passenger car defined

our minimum curve radius, we were more concerned how the wheelbase of the 2-8-0s and 2-8-2s might work with our turnout sizes.

For the medium-sized steam locomotives, turnouts would need to be no. 6 or larger on the main line.

No. 4s would be acceptable only in tight locations on spurs where a switcher would likely be the only locomotive to enter. The minimum radius would be 30", with the exception of tight spur tracks where passenger equipment would not pass through.

After finalizing the track plan and section sizes, we then considered which products and techniques to use. When I look back to the selections we



4. This posed “publicity shot” with a CN Mountain heading up the industrial branch shows how much scenic interest is generated on a flatlands railroad by having a grade separation.

made in 2000, I’m amazed at the progress of the hobby.

For example, by 2000 the National Model Railroad Association (NMRA) had already announced the Digital Command Control (DCC) standards, and systems were in their infancy. We weren’t hesitant about using DCC on our portable layout because of the convenience for operation and wiring. However, making the final decision of which brand to buy took considerable research and discussion.

Also, at the time, code 83 track was just becoming common. We evaluated samples from several manufacturers, but it was still a tough decision to use code 83 track. We knew how dependable code 100 could be, and while code 83 was closer to being a prototypical “weight,” we saw it as lighter and more susceptible to damage and wear.

In the end we chose Atlas code 83 flextrack and turnouts. Our intention was to use no. 6 turnouts everywhere, but we had locations by the staging yard where we needed a pair of no. 5 turnouts and some curved turnouts as well. Atlas did not make no. 5s nor curved turnouts. Walthers did, but we had to modify them to work well with DCC.

Changes in layout construction techniques also had us looking for a few track-laying solutions. Extruded-foam insulation board scenery and benchwork was more common by the mid-1990s. Although we had used foam board on a small give-away layout for a



5. A switcher retrieves an empty boxcar from the industrial complex on the branch while a United States Railroad Administration light Mountain rounds the bend.

local show, we weren’t quite sure how we would mount Tortoise switch motors under the layout.

Ultimately, we cut a small piece of $\frac{3}{4}$ " plywood, roughly 4" square, and mounted the roadbed and turnout to the top side and the Tortoise on the bottom. We then cut a recess into the top surface of the foam board for the Tortoise to fit through and glued the complete unit in place. We made a template for cutting and drilling the plywood squares, speeding up the installation process.

Section support and alignment

In more than one case, we used atypical approaches to solve common issues related to assembling sectional or modular layouts. For example, most modular layouts tend to use legs fastened to the individual sections or adjoining sections. Our club decided to use a skeleton frame that would yield a simple, level tabletop. The sections

simply rest on top of the skeleton frame. Our intent was to adjust the skeleton tabletop from a height suitable for small children up to eye level viewing for adult model railroaders.

One member drew up a skeleton table made of horizontal 2"-square aluminum tubes as the tabletop, supported by tripod legs with a telescoping center shaft, making the layout height fully adjustable. Tripods also have adjustable feet, making it easy to level the layout. Two parallel horizontal square tubes run down the long sides of the layout with 90-degree sleeves providing points for two shorter tubes to run down each of the end sections. Fabricated by a craftsman who produces portable conveyor systems, the long tubes fold up for easy transport.

During set up, members can assemble the entire skeleton tabletop in 10 to 15 minutes using bolts and



A pair of pins at one end of each section ensures that the layout fits together snugly and in perfect alignment. Control panels can be mounted inside or outside the layout for shows or operating sessions.



The railroad is supported on an aluminum frame, which is carefully leveled before the layout sections are slid into place. Fine adjustments are made at the foot of each tripod leg.

wing nuts. It then takes another 10 to 15 minutes to adjust and level the assembly. The telescoping tripods allow us to set the layout height as high as 60" or as low as 38". To maintain trouble-free operation, we level the skeleton frame during every set-up.

The skeleton tabletop is so secure that we've eliminated the use of connector tracks and even rail joiners between sections. Instead, we use a bushing and pin arrangement. We added $\frac{1}{4}$ " hardboard to the $\frac{3}{4}$ " section-end plywood to make a 1" depth on either side of the section joints. Next, we clamped the sections together on the leveled tabletop skeleton. We drilled holes through both section ends to accommodate two 1"-long brass bushings with a $\frac{3}{8}$ " inside diameter,

one bushing in each of the two abutting section ends.

With the sections still clamped together, we slid the first of the brass bushings into position and used epoxy to bond it into the plywood edge of one section. Before the epoxy set, we pushed a long $\frac{3}{8}$ " pin through the bushing to provide an alignment pin for the adjoining bushing. We slid the second bushing over the pin, inserted in the plywood on the adjoining section, and bonded it with epoxy. After the epoxy set, we fastened $\frac{1}{4}$ " hardboard cover plates to the inside face of each section over the bushings.

We cut $\frac{3}{8}$ " stainless steel rod into 2"-long pins with slightly tapered ends. We lightly sanded the outside of the pins to allow them to slide easily into the bushings, but the fit remained snug. Two pins (four bushings) align each pair of adjoining sections.

The club built the layout in the same sequence it would be assembled for display or operation. First, we assembled the skeleton frame before building all of the section plywood "boxes" and adding a 2" foam insulation board base. We then placed the sections on the aluminum frame and added all bushings and pins. After installing the alignment pins, we clamped the sections together until we could lay all of the roadbed and track.

During tracklaying, we used continuous pieces of track to span the section joints. After installing all of the rails, we cut gaps at these section joints. However, the clamps remained in place until after we added scenery.

Finishing the framework

We used high-grade, seven-ply birch plywood to cover all exterior edges and foam board. At the corners of the sections, we miter-cut the plywood and added a small gusset plate to keep

everything square. We painted the plywood a light green to blend with the overall scenery and avoid distracting viewers' eyes from the layout scenes.

We recessed all of the switches and connectors into the layout fascia to keep the outside measurement of each section within the defined specifications. Other features, such as throttle holders, cup holders, and the two control panels, are quickly removable for transport.

Electrical

The club uses a Lenz DCC system to control trains. Regulated computer power supplies, mounted in a drawer of a wheeled cabinet, provide power for electronics and switch motors. Signal logic and control electronics are mounted in two boxes underneath each of the town sections. The signal logic circuits and infrared detection circuits were designed and custom built for the layout. We constructed a custom electronic logic board, mounted in the interlocking control panel, to route control between the panel and the Tortoises at the ends of the interlocking tracks.

We used Tortoise switch motors, which are controlled by toggle switches mounted on the panels and the layout fascia, to line the switches on the layout. Electrical power routes between sections through 25-pin computer patch cords. We equipped these patch cords and panel tether cables with thumbscrews to avoid inadvertent disconnects.

Determining the proper locations of the control panel proved to be a dilemma that required a unique solution. While an oval-shaped layout allows club members to remain inside the layout, which works well for shows, it doesn't work well for operating sessions. That's when someone suggested adding two control panels: one to provide operation of yard ladders and mainline crossovers, and one to provide tower control for the interlocking plant.

One member devised a method of mounting control panels that can be attached to either side of the layout. For operating sessions, the control panels are mounted on the outside of the oval near the interlocking plant and yard towers. All operators are stationed outside the oval and are free to walk around the perimeter to follow their trains. If a tower operator isn't available, train operators have easy access to the two tower panels.

For shows, the control panels turn vertically – not horizontally, as they



6. The layout's portable nature in no way compromised the club's attention to detail, including telephone poles, signs, and foliage. Locating the joints between sections was a key design challenge.

need to correlate to actual track arrangements – and are mounted on the inside near the towers. This allows club members to control trains while facing and talking to viewers.

It seemed logical to mount the control panel's connectors on the inside to avoid errant disconnects during shows. Aesthetically, the connectors are hidden away from viewers.

We're still working on one additional control problem, and that is with curious, small fingers throwing the spur switches on the outside of the layout. Currently, we put masking tape over these recessed switches, but we plan to install a disabling switch that will turn off all exterior-mounted toggles.

During a show, an operator will typically move to the outside with the viewers to perform switching operations. Since the operator now needs to pay closer attention to the trains, his eyes are directed toward the layout and not easily distracted by a viewer. At the same time, if a viewer shows interest, he can follow the operator and discuss running trains while standing close to him.

As a plus, with DCC outlets both inside and out, a young viewer can be handed a throttle and operate a train with the assistance of a club member. When it comes to promoting our hobby, there's nothing better than allowing a child to operate a train!

Operating the layout

For club members, one of the more important and enjoyable aspects of the layout is the operation. Passenger, freight, and local trains originate from the yard. Local freights work in the center of town, as well as at the coal distributorship and the industrial spur.

One of the railroad's most interesting features is the working interlocking plant. The entire triple-track line from one end of the town to the other is an interlocking section, with interlocked track switches and signals at both ends. The tower operator lines the track switches and clears the signals from a control panel attached to the fascia.

This panel features toggle switches to operate the turnouts and color-coded push buttons to control the signals. In addition to these controls, white light-emitting diodes (LEDs) mounted on the track diagram show the alignment of each switch, while red, green, or yellow LEDs show the signal aspects. Spurs leading to industries and the peninsula aren't part of the interlocking. Instead, crews operate these track switches using toggle switches mounted on the front fascia.

The interlocked section connects to a double-track main line at one end and, at the other end, to two single-track main lines. There are three entrance signals, one for each approaching line. These are mast signals with three

searchlight heads. The two-headed exit signals are on a pair of signal bridges, one at each end of the interlocking.

In addition to these signals, there are five dwarf signals to allow switching movements against the flow of traffic. All the signals are Oregon Rail Supply products, and the signal bridges were kitbashed from Atlas kits. The bridges are of Pennsylvania RR design but are widened to accommodate a broader track spacing.

Our interlocking adds a lot of interest to operating sessions. But for shows where trains run continuously on two loops, we can turn on an automatic setting that clears the signals through the interlocking.

Both goals achieved

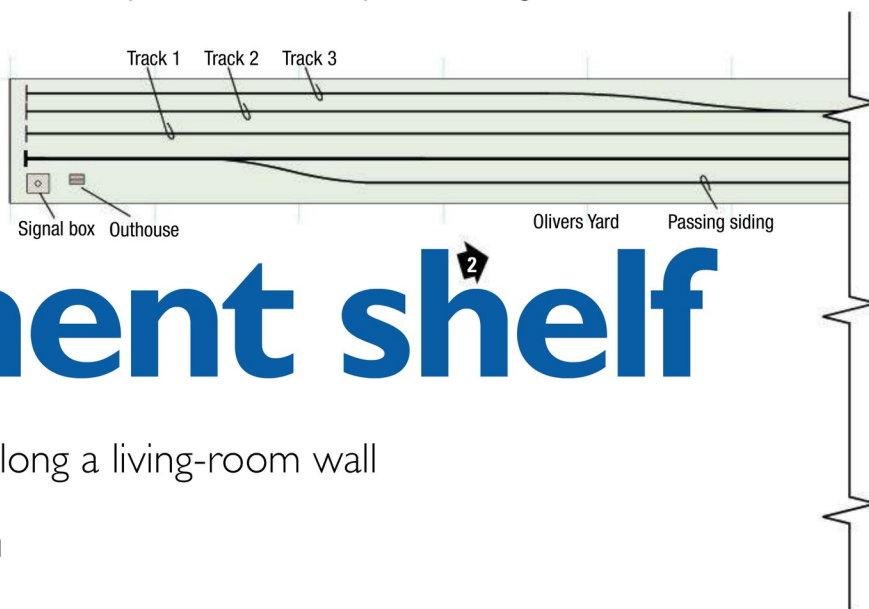
With this layout we've achieved our two goals of having a railroad that keeps the general public entertained at shows yet can support realistic operation for club members. Additionally, this plan could be a good design for a permanent home layout. **MRP**

Kevin Geiger, wife Ginny, and their two teenagers live near Cincinnati, where he is part owner of a construction company. Kevin has been a member of the Cincinnati Northern Model Railroad Club since 1988 and has served as its president. Kevin stresses that this article was a joint effort of the entire club.



I. Grand Trunk Western GP38 no. 5808 ventures into South Bend while working the interchange on Russ Rettig's HO scale Grand Trunk & Indiana. The layout is 2 x 16 feet and occupies one wall of his apartment living room.

Railroading on an apartment shelf



An HO short line that fits neatly along a living-room wall

By Russ Rettig // Photos by the author unless noted

The Grand Trunk & Indiana RR is a freelanced HO railroad representing what's left of a 11.3-mile short line originally named the New Jersey, Indiana & Illinois RR. The NJI&I was built by the Singer Sewing Machine Co., which named it for the three states in which it had factories. It was never intended to serve those three states, though. Its primary purpose was to link Singer's plant in South Bend, Ind., with the Wabash RR at Pine, Ind.

The line was owned in succession by the Wabash, Norfolk & Western,

Conrail, and finally Norfolk Southern. Today, NS operates only a short portion of the original line, serving the *South Bend Tribune*. [For another track plan based on the prototype NJI&I, see the August 2011 *Model Railroader*. — Ed.]

My HO edition of the GT&I is 16 feet long, representing about two miles of the prototype. Half of the layout is Olivers Yard; the other half represents South Bend.

Construction

I built the original GT&I, described in the December 1986 MR, in a spare

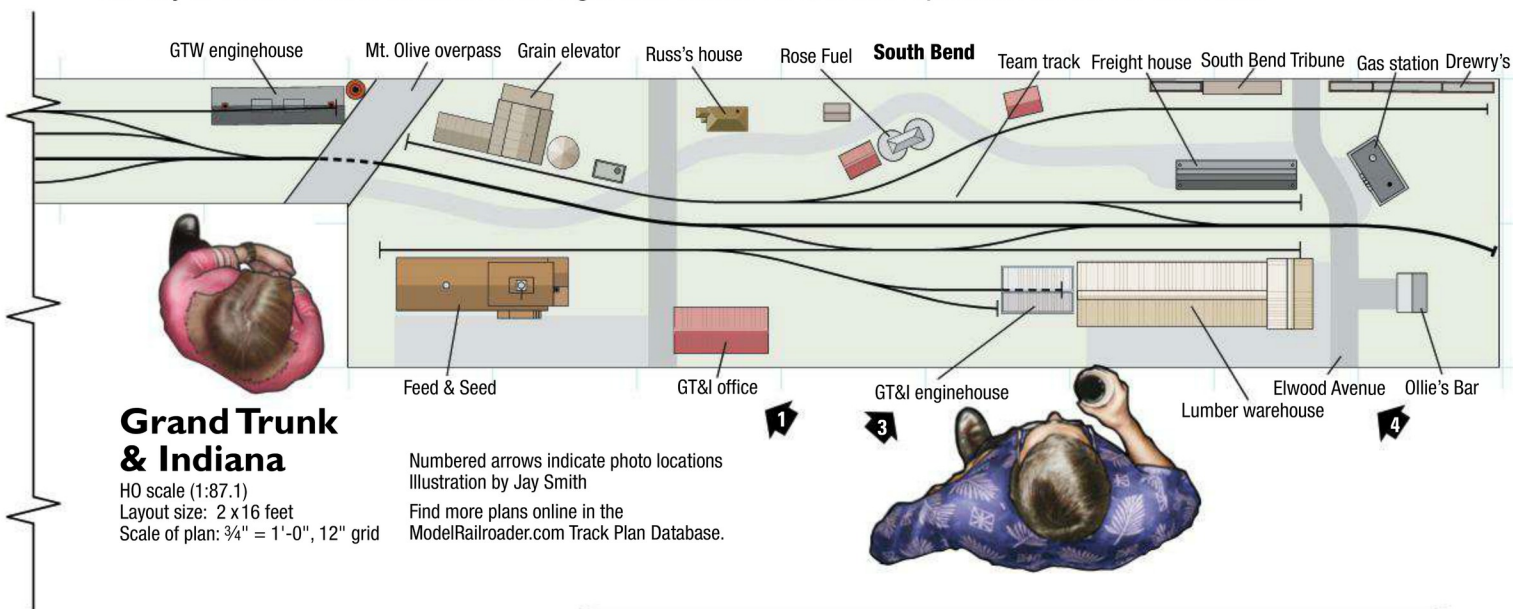
bedroom measuring about 11 x 15 feet. This area allowed a reasonable representation of an 11-mile short line.

My current layout is much smaller, built as two narrow 8-foot-long sections. South Bend is a sandwich of ½" Homasote glued to ¼" plywood, 2 feet wide. Olivers Yard is ⅛" cork glued to a 1 x 10 plank. Both sections are framed by 1 x 3 lumber and supported by shelf brackets along one wall of my apartment's living room.

This layout was originally designed for block control with a walkaround throttle. A little over a year ago, I



2. This overview shows the entire Grand Trunk & Indiana layout, based on the prototype New Jersey, Indiana & Illinois. The city of South Bend is modeled at the right end; Olivers Yard, at left, represents the rest of the world.



became fascinated with locomotive sound systems and decided to go with a Digital Command Control system. Once I saw how easy NCE Power Cabs were to install, and how nicely their Power Pro throttles fit in my hand, I jumped right in.

I used Atlas code 83 flextrack and no. 4 turnouts on the entire railroad, with one exception. "Mike's Switch," which leads into the GT&I enginehouse in South Bend, is a no. 6 that Mike Papp gave me when I discovered I was one turnout short. If I were to do it all over again, I'd use only no. 6 turnouts.

Layout at a glance

Name: Grand Trunk & Indiana
Scale: HO (1:87)
Size: 2 x 16 feet
Prototype: New Jersey, Indiana & Illinois RR
Locale: north-central Indiana
Era: late 1970s
Style: single deck
Mainline run: 16 feet
Minimum radius: 18"
Minimum turnout: no. 4

Maximum grade: none
Train length: 8 to 10 cars
Benchwork: 1/8" plywood plus 1/2" Homasote with 1 x 3 frame
Height: 53"
Roadbed: none
Track: Atlas code 83
Scenery: flat terrain
Backdrop: painted hardboard
Control: NCE Digital Command Control



3. Russ prefers compact power to complement the layout's small size, including these Alco switchers idling at the GT&I enginehouse in South Bend. He switched from DC to DCC to take full advantage of onboard sound systems.

A manual uncoupling tool

I made an **uncoupling** tool for my GT&I switching layout from three components: a no. 18 tapestry needle that's cemented into a 3" piece of plastic tubing from radio-control aircraft control cable using cyanoacrylate adhesive, and a cap sold as a plastic handle for a mini toggle switch.

I use Kadee "scale" whisker couplers, usually no. 153. To uncouple, I create slack by slowly reversing the engine. As soon as the couplers start to open, I insert the needle between the knuckles. I then move the needle back and forth a tad as the engine slowly starts to move forward, and the couplers separate. If I'm backing a cut of cars into a yard track, I stop on the yard lead, insert the tool, and pull forward a tiny bit until I can swing one of the couplers to the side. I then slowly back up while holding the coupler slightly to the side, which delays the uncoupling.

I have several of these tools at Olivers Yard and in South Bend, so there's always one nearby. It costs only about \$3 to make a half dozen of these handy little uncoupling tools. — Russ Rettig



Russ removes the trip pins from his Kadee knuckle couplers, since he doesn't use magnets. Instead he uncouples cars with this tool, made from a tapestry needle inserted into a grip made from a length of plastic tubing. Tony Koester photo

What little scenery I needed I fashioned from various Woodland Scenics products that I had on hand. I also had a box of trees from Scenic Express that John Cernak built for me and planted around on the layout.

There's no raised roadbed anywhere, as this is all that's left after the line was neglected and abandoned by other railroads. To reflect this lack of maintenance, the ballast is a mixture of leftovers from previous projects.

I had to build the layout to fit the restricted space that was available. Since this location was over my couch and a bookcase, I had to make sure the layout was high enough to be out of the way of other activities. Yet it had to be a "workable" height for both construction and operation. I chose 53" as a good compromise.

Track plan and operation

My track plan is simple, starting with a three-track yard at Olivers. The main line extends down to the end of the yard. A passing siding can also be used as a runaround or engine escape track. The Grand Trunk Western has a one-stall enginehouse at the north end of the yard. I separated the yard from South Bend with an overpass, which



4. The South Bend portion of the railroad features six industries plus a freight house and team track, providing plenty of switching. The overpass at far left serves to separate the downtown area from the interchange yard.

provides a nice view block between the two scenes.

South Bend, Ind., sees less rail shipments than in its glory years, but the *South Bend Tribune* still receives rolls of paper in 50-foot boxcars, as it has for as long as I can remember. There are a total of six industries as well as a team track and a freight house for less-than-carload-lot (LCL) cargos. The GT&I makes a living bringing cars from the yard and spotting them at industries. Once they're loaded or emptied, they are returned to the yard. These cars go to the back of the yard and cycle through until they are needed again. These classification duties are the job of the GTW.

I like to use compact motive power, as it seems to operate better through no. 4 turnouts and around sharp curves. That's why I use EMD and Alco switches and EMD GP9s, GP38s, and GP40s. Since this is a small railroad, I try to use short rolling stock as well. I can put a lot more 40-foot boxcars on a 6-foot yard track than 86-foot auto racks or high cubes.

Kadee scale "whisker" couplers are mounted on all of my rolling stock. I trim off the metal trip pin, as I don't use uncoupling magnets. Instead, I

uncouple using a small tapestry needle with a handle made of radio-control aircraft control-line tubing. (See "A manual uncoupling tool" at left.) All of my turnouts are lined using Caboose Industries ground throws, which I have used for more than 25 years.

This layout is designed for operation by one person, but, thanks to DCC, one operator can now work the GTW yard job while the GT&I switches South Bend. Since the entire railroad is run under "yard limits" rules, which require crews to be able to stop within half of their sight distance, both have to look out for each other. Normal speeds are less than 15 mph.

The new dimension of sound has slowed everything down considerably. For example, when changing direction, the engineer now comes to a complete stop, lets the engine rpm drop down to idle, reverses direction, and then slowly starts the train again.

Fun then, fun now

This switching layout has been fun to build and continues to be fun to operate. If it weren't for great friends, my first Grand Trunk & Indiana would never have been built 25 years ago, and the same holds true today. Jim

Learning points

- Even a small apartment may offer sufficient space for a layout big enough to accommodate more than one operator.
- The advantages of DCC aren't limited to larger layouts.
- An overpass is a good visual divider for geographically separate areas of a layout.
- No. 4 turnouts may be a bit too sharp for best performance, even with short rolling stock.

Brenock, John Cernak, Tom Johnson, Mike Papp, and Quintin Schini have all been fantastic in helping me build the 2011 version of the GT&I. **MRP**

Russ Rettig, who worked for the Penn Central, Conrail, Santa Fe, and the Grand Trunk Western as a block operator and train dispatcher, is now semi-retired and works in the security industry. He started with a Lionel set on a 4 x 8 sheet of plywood but switched to HO. A GTW timetable that featured the then-new Detroit, Toledo & Ironton herald led him to create the GT&I.



This view toward the unloading tracks at East Brookfield, Mass., shows the track layout, a light pole for night operations, and two leased (by the East Brookfield & Spencer RR) RTEX Electro-Motive Division locomotives.

Add operations with an auto rack unloading terminal

Spotting bi- and tri-level cars is more challenging than you think

By Jim Lincoln // Photos by the author

Auto-unloading terminals haven't received a lot of coverage as an industry to model. There's a good reason for this: An auto-unloading terminal takes up a lot of real estate.

So why use valuable layout space to model one? Spotting a train of auto racks for unloading is much more complicated than is first evident. Operationally, it's a great candidate for a model railroad.

Auto racks

Auto racks, which come in two- and three-level variants (referred to as "bi-levels" and "tri-levels"), are built atop 89-foot flatcars. Since that's more than a foot each in HO scale, auto racks require a lot of layout space.

Over the last few decades, auto racks have been built enclosed to keep vandals or debris from damaging the new vehicles before they arrive at their

destinations. Even with enclosed superstructures, it's simple to tell bi-level and tri-level racks apart by their reporting marks. Most auto racks are owned by Trailer Train, which assigns TTGX reporting marks to bi-level racks and ETTX reporting marks to tri-levels. Exceptions include cars owned by Canadian Pacific, Canadian National, Providence & Worcester, and Norfolk Southern. The latter are new articulated cars that can be either bi- or tri-levels.

Those who are enamored by the articulated "Auto-Max" cars should be aware of restrictions that may be in place on the prototype route being modeled. Auto-Max cars are considerably taller than standard articulated auto racks.

Even when modeling a prototype that allows excess-height cars, running test trains before investing in a lot of this equipment is a good idea. The

ideal test train has both auto racks and loaded double-stack cars with two stacked high-cube containers.

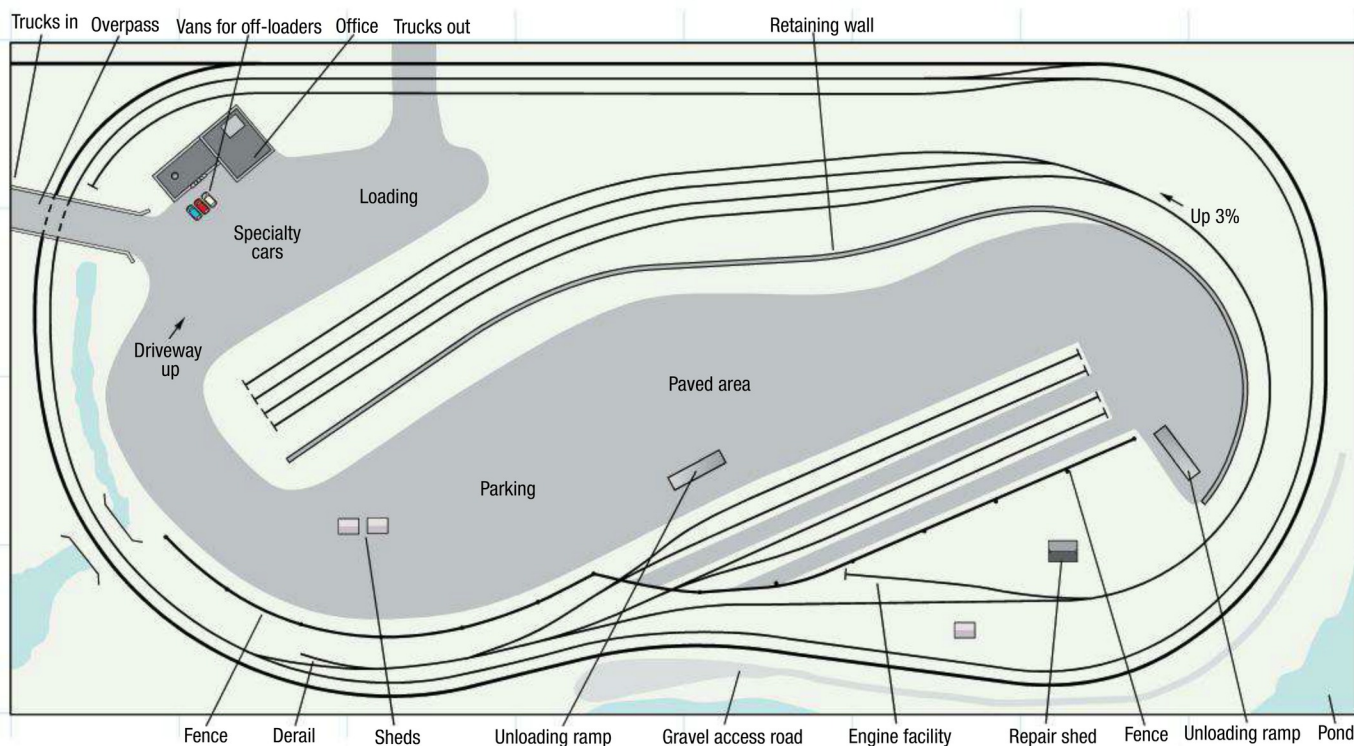
In N scale, auto racks are available from Con-Cor, Micro-Trains, and Red Caboose. Models in HO are available from numerous manufacturers, including Walthers. InterMountain makes HO auto racks with end doors that open. Atlas O makes articulated cars in O scale.

Although many auto racks appear similar, there are many different versions and car types. Your trains will be more realistic if you choose models depicting a variety of prototypes.

Prototype unloading terminals

In the Framingham, Mass., area, there were two unloading terminals: the Constructive Placement (CP) yard and another in Westborough.

The CP yard had four tracks, each with spots to unload 10 racks, plus

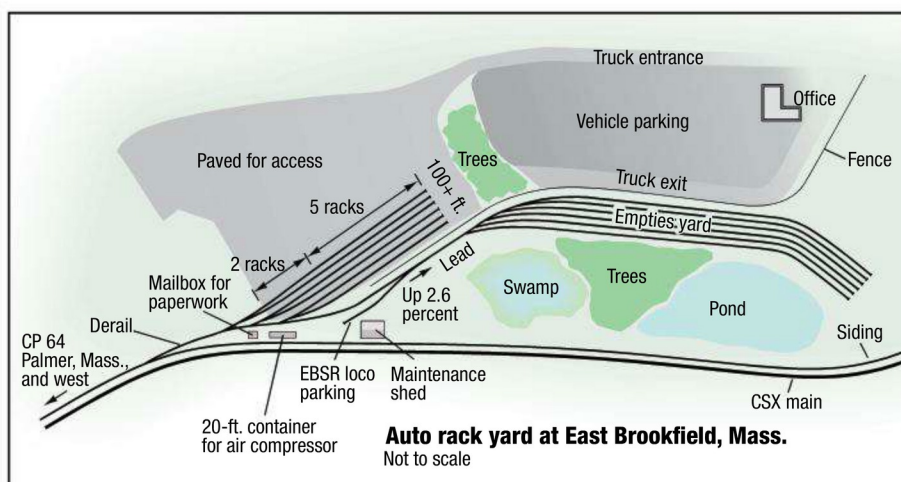


East Brookfield & Spencer RR

N scale (1:160)
Layout size: 4 x 8 feet
Scale of plan: $\frac{7}{8}$ " = 1'-0" (12" grid)
Illustration by Jay Smith

Find more plans online in the
ModelRailroader.com Track Plan Database.

6" x 72" 3-track staging cassette



Auto rack yard at East Brookfield, Mass.
Not to scale

The track plan at a glance

Name: East Brookfield & Spencer RR (EBSR)
Scale: N (1:160)
Size: 4 x 8 feet
Prototype: Shortline railroad
Locale: eastern Massachusetts
Era: modern
Style: tabletop
Mainline run: 22 feet
Minimum radius: 15"
Minimum turnout: Peco code 55 "small"
Maximum grade: 3 percent
Train length: two locomotives, 20 auto racks

space to unload two racks on each of the two lead tracks. So two of the tracks could hold 10 cars and two could hold 12 cars. Train crews also left space between the blocks of auto racks and at the ends of the tracks for unloading. The length of each track was about 19 auto racks long, or more than 1,800 feet, which in HO scale is more than 20 feet!

The total capacity of the yard was 44 racks. This yard required a switching lead equal to at least 50 racks or

4,750 feet. This lead would measure almost 55 feet in HO scale and more than 29 feet in N scale.

Modeling the complete terminal in HO would require about 75 feet. In addition to the unloading yard, this space also includes the four-track storage yard for outbound empties and inbound loads and the main line.

The Westborough yard

The auto-unloading terminal in Westborough, Mass., has a more

model-railroad-friendly arrangement. The unloading tracks were essentially the same length as those in CP yard, but there were six of them. This required a long switching lead, but the storage yard was adjacent to the auto-unloading yard, making the terminal more compact.

Trains entered the four-track storage yard by means of electrically locked switches at each end of the yard. Each switch was also electrically linked to a derail, which had to be



When Jim visited the East Brookfield yard in May 2010, he found REX GP38-2 no. 1274 (formerly Phelps Dodge PHDX 1) and SW1200RS no. 1273 is parked in the unloading facility after a busy night's work.

closed to unlock the switch. The distance from one turnout to the other was about a mile, or more than 30 feet in N scale and close to 60 feet in HO, not including the added length for the switching lead.

Operations

You may now be thinking, "Why waste so much space on something so operationally dull? Auto racks all look the same, so I can just shove the loaded cars in and pull the empties out, right?"

It's not that simple. Vehicles can't be backed off auto racks, particularly not over the narrow connecting ramps between five auto racks. When a train arrives and is ready for spotting, it needs to be rolled past a trainman on the ground who looks inside each auto rack to see which direction the vehicles are facing.

Each terminal has its own jargon for this direction. At the CP yard, there was a post on the north end of the yard, so auto racks with north-facing automobiles were "posts" and those with south-facing automobiles were "reverses." In other yards, auto racks may be called north and south or east and west.

As the train rolls by, the trainman looks into each car for headlights and notes the type of auto rack. At the CP yard, headlights meant a "reverse" and taillights a "post." Trains arrived with vehicles facing different directions loaded on different types of auto racks. It wasn't uncommon to have a switch list noting, "Post Bi, Post Tri, Reverse Tri, Reverse Bi," etc.

Since the vehicles must be driven off the auto racks, bi-levels and tri-levels must be grouped together for

unloading. This makes switching auto racks a challenge. Normally, unloading areas are arranged with space for five racks in each block, but it's possible to unload automobiles from either end of the block. In the case of the CP yard, we would look at our list and the available spots and switch cars accordingly. In one block we could have either five post or reverse bi-levels or tri-levels.

It's possible to mix bi-levels and tri-levels within a block, but each type of auto rack must be grouped together facing the opposite direction so automobiles can be driven out of each end. For example, a block could include two post bi-levels and three reverse tri-levels. Since the automobiles can be unloaded from both ends of the block, this arrangement works.

While the loaded auto racks may arrive in random order, empties must be blocked by rack type – bi-levels with bi-levels and tri-levels with tri-levels. Depending on how the previous crew spotted the auto racks for unloading, pulling the empties so they're blocked appropriately can either be a straightforward or a complicated task.

Modeling ideas

An auto-unloading terminal also offers some interesting detailing projects. The yards themselves aren't cluttered; you're not going to spread around a lot of debris to make a model terminal look realistic! An unloading yard is kept neat, since any damage to the new automobiles would be paid for by the terminal company.

This means that the details that are there stand out. Drivable unloading ramps, a must-have for any model of an auto-unloading terminal, are the main

attraction. Walthers and Heljan have produced unloading ramps in HO. TrainCat Model Sales makes an etched-brass kit of a Wilson's Auto Ramp in HO, N, and Z scales. As you can see from the photos in this article, there are numerous other details that will really make your model come alive.

If you're interested in modeling a terminal to scale size, you could build a respectable model of the Westborough yard for an N scale modular layout. You'll need 33 feet to model the yard from the west switch to the east switch. The tail track could be hidden and curve off behind an industry, as it does on the prototype.

Filling a 4 x 8 with the EBSR

Since most of us don't have that kind of space, we need to figure out how to compress an auto-unloading terminal and still have it function prototypically enough to be interesting. Enter the East Brookfield & Spencer RR (EBSR).

The railroad's sole purpose is to switch the CSX Auto Unloading Terminal in East Brookfield, Mass. The EBSR leases two units – REX 1273 and 1274, an Electro-Motive Division SW1200RS and GP38-2 – from RailTex. An extremely short line, the EBSR has track stretching from the turnout off the siding on CSX's Boston line at milepost QB 63.1 to the end of the auto rack storage yard tracks, about three quarters of a mile.

The East Brookfield terminal and the EBSR were born from CSX's desire to move the Westborough terminal. With growing concern over environmental issues and interest in real estate around Beacon Park yard, CSX wanted to move some facilities out of Boston-area congestion. In addition to

Learning points

- The apparent uniformity of the auto racks belies a highly varied and challenging series of car-spotting moves.
- Both inbound and outbound auto racks have to be switched into appropriate blocks.
- Vehicles are driven forward off the auto racks, so the racks have to be oriented properly but need not be turned for unloading.
- An auto rack unloading terminal would make an excellent candidate for a modular layout.
- It's practical to fit a functioning N scale unloading terminal on a 4 x 8-foot sheet of plywood.

the auto-unloading terminal, this plan included intermodal and Trans-flo terminals as well as the Beacon Park engine terminal, which turns and services the intermodal train power. Plans are in place to move the Trans-flo facility to Westborough, and the intermodal operations to an expanded Worcester Yard.

All of these moves were made possible by the initial move of the auto-unloading terminal to the new location in East Brookfield. With the transfer of switching responsibilities to EBSR, CSX insulated itself from any future downturn in auto traffic.

The diagram for the East Brookfield terminal on page 31 looks like it was created by a model railroader. The unloading tracks are only five auto racks long. Inbound loads arrive on the siding adjacent to the terminal, and the outbound empties are put into a "hidden staging yard" up a 2.6-percent grade on a curve around a small pond.

For modeling purposes, we can cut down the number of spots needed in the unloading tracks to a three- or four-rack capacity. We could also have the switcher block the empties and shove them onto the siding next to the main line – back onto the arrival track.

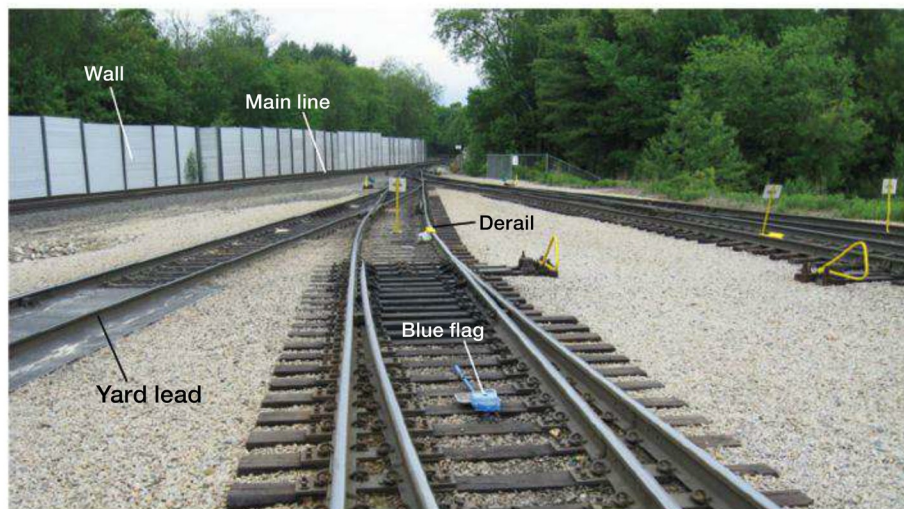
The East Brookfield terminal makes a good candidate for a 4 x 8-foot railroad in N scale, as the plan on page 31 shows.

Switching the terminal

The N scale plan captures almost all of the key features and operational realities of the prototype and allows broad, sweeping curves (the minimum curve radius is 15", the maximum is 40"), so your model auto racks will look really good. For staging you can add turnouts at the back of the layout that lead to detachable 6" x 72" cassettes. With the cassettes you can add some passing manifest or intermodal freights as well.

I designed the plan to emulate the operation of the prototype as closely as possible while still having trains run around the main line. You'll notice that there's no access to the main line (outside track) from the siding going eastbound – along the bottom of the plan. This prevents any inadvertent errors while crews switch trains in the auto-unloading terminal.

An operating session could start with CSX auto-rack train Q264 coming in on the siding from the left (east-bound). The crew would pull the engines up to the air-compressor shed and stop to let off the conductor. They would then move the engine around



This view to the west at East Brookfield shows the yard lead on the left, the permanent blue flag, and the flip-up derails at the end of each turnout. South of the main a sound-attenuating wall buffers the noise of the 24-hour operations.



A Wilson's Auto Ramp can be used to unload from either end of all tracks. Once positioned, the ramp is raised on jacks for stability.

back and add more racks to the train, making sure the switch is lined for the "staging track" in the rear. Next the crew would pull the train ahead to the end of the track, or until the end of the train clears the turnout into the unloading yard. The other end of the track should have just enough room to cut the locomotives off.

After that the crew could make up a switch list indicating the automobiles' facing direction and the type of auto rack. Next, the EBSR crew takes over, moving their locomotive out of the servicing track to shove the auto racks into the unloading yard. There could also be some empties in the unloading yard that need to be pulled and shoved up the hill for storage until the outbound train arrives. Once they have blocked the empties, they can park the EBSR engine. Next the CSX crew doubles up the empties for the west-bound trip.

Feel like running some westbound intermodal trains? Do what the prototype does: Hold Q293 (the

westbound rack train) at CP 64 (the crossover from siding to main) until the intermodal traffic passes. On the prototype this traffic could last for hours, so you'll have plenty of time on the layout to assemble your trains off detachable cassettes.

Play and display

I hope you now share my view that an auto-unloading terminal can add a surprising amount of operating interest to a model railroad. An auto-unloading terminal also offers interesting detailing opportunities and makes a great place for us to spot and display all of the outstanding models of the auto racks that are so common on modern railroads. **MRP**

Jim Lincoln, an assistant conductor on Boston's Massachusetts Bay Transportation Authority, is now modeling the Delaware-Lackawanna in O fine scale (Proto:48). He wrote about modeling a corn syrup transloading terminal in Model Railroad Planning 2010.



This composite image shows a proposed scene at South Claypool on Jim Six's HO scale New York Central layout. Jim started with a photo of his terrain and track, and with

Photoshop Elements, added the elevator, fascia, trees, and sky to the photo. All Jim has left to do is scratchbuild the structure and reproduce the scene on his layout.

Photoshop as a planning tool

Digital image-editing software can help you test new structures, backdrops, fascia colors, and more

By Jim Six // Photos by the author

Veteran modelers will tell you that layout planning continues well after layout construction has started. I'm four years into the construction of my HO layout, and I can assure you those modelers are correct.

I'm a "visual" person, but there are limits to how many proposal diagrams I'll bother to prepare. I also don't like to spend too much time on things that are temporary and destined to be discarded. For example, many model railroaders build cardstock mock-up

structures as a planning tool. They want to visualize how their structures will fit into and look on the layout.

But these mock-ups take time to build and will eventually be discarded. This is time that might be better spent on other projects. In the time it took to build some of the elaborate mock-ups that I've seen, I could have built and installed the actual structure.

Two-dimensional mock-ups

It's true that mock-ups can keep us from spending time building structures that won't meet our needs. I therefore

Learning points

- Building anything more than once takes extra time.
- It still pays to mock up structures and scenes to ensure everything will fit as planned, but this can now be done digitally in two dimensions.
- Adobe Photoshop Elements is a highly capable image editing and drawing tool that is much less expensive and complicated than the professional version.
- Fascia colors, and even the fascia itself, can be created and “painted” virtually with photo-editing software.

go through the mock-up phase of planning and testing, but not by using cardstock mock-ups. Instead, I use Photoshop Elements image-editing software to test-fit “real” structures on my layout and determine if those particular structures will work for me. This process takes significantly less time than I’d need to build physical mock-ups, and it also provides much more detailed and helpful information.

At the 2011 Great Lakes Model Railroad Symposium in Elkhart, Ind., *Model Railroad Planning* editor Tony Koester said that Photoshop Elements has become as useful as a hobby knife in his modeling endeavors, and that those who ignore this fantastic tool do so to their own detriment.

I agree. I’ve done many clinics at numerous conventions and events on how to use Elements to create photo backdrops for layouts, and how to make scale signs and decals from digital photos. However, there are other great applications, such as creating building siding from photos of actual structures. Another is using Elements to test-fit structures into an unfinished part of the layout. Still another is to test various fascia colors without ever opening a can of paint.

Let me provide a quick overview of this program. There are two versions of Photoshop offered by Adobe. The more powerful (and more expensive) version is intended for businesses such as publishers and photo labs. The “light” version is Photoshop Elements, intended for consumers like you and me. I have both but no longer use the full version, as Elements does everything I need and is more user-friendly.

Photoshop Elements has been available for several years and has undergone many updates. The current



The Wolcottville elevator is along the former Pennsylvania RR’s Grand Rapids & Indiana line. According to the elevator operator, the elevator in this April 2007 photo looked pretty much the same in the mid-1950s, the era Jim models.



This is the part of Jim’s layout where he plans to install the grain elevator. He sculpted the terrain from ceiling tiles to replicate the gently rolling flatlands.

release of Elements, version 10, typically sells at Best Buy, the Apple Store, or directly from Adobe.com for about \$100. However, I still use version 2.0, which came packaged with my first digital camera. I’ve tried more recent releases and found no reason to upgrade, so I suggest finding a version compatible with your computer on eBay. A friend recently bought Elements 2.0 for \$10.

Test-fitting structures

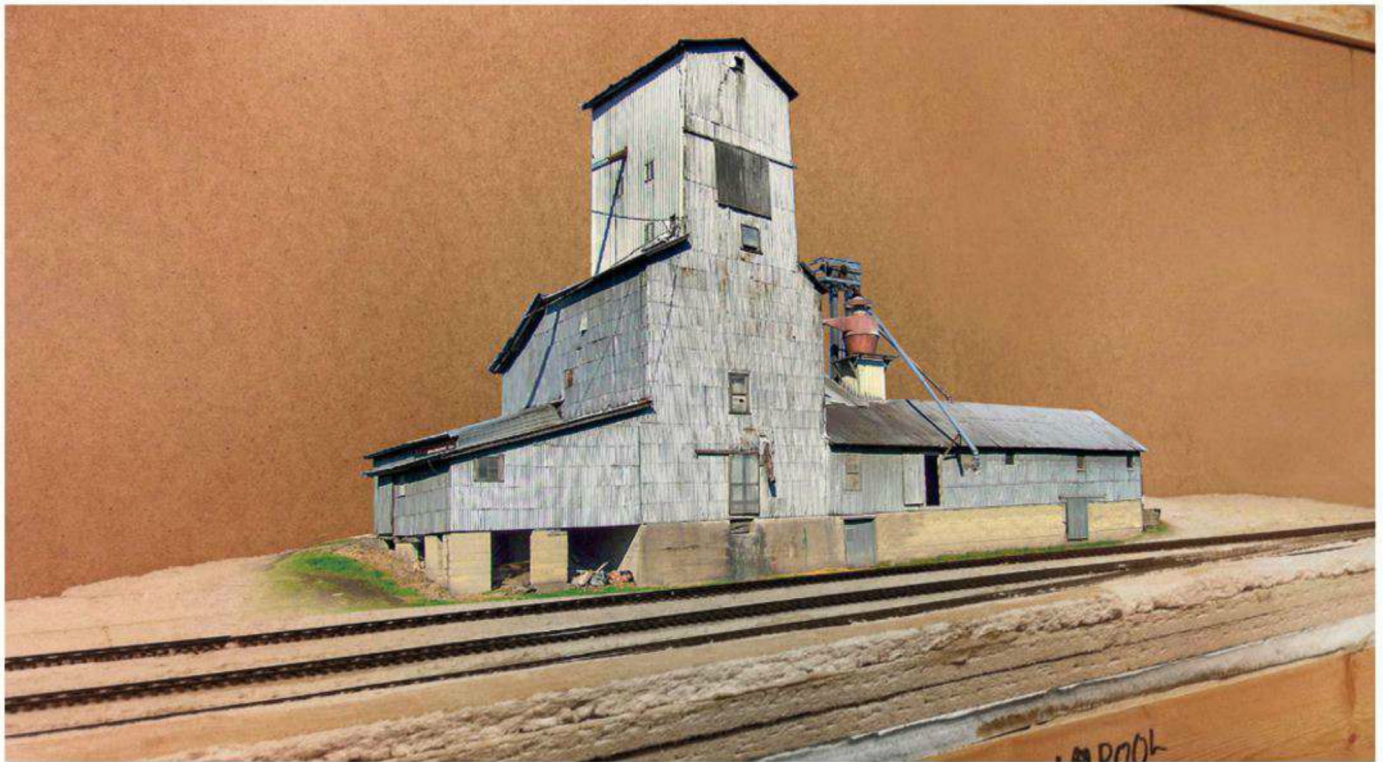
My New York Central Michigan Branch layout, as seen in MRP 2010, serves rural northeastern Indiana, with small industries in the towns along the way. On the south side of Claypool, Ind., just across the Nickel Plate tracks from the NKP-New York Central depot, I installed a siding “on spec.” Since the terrain rises from the siding track to

the backdrop a few inches away, not just any rail-served customer will fit there. It would have to be long and narrow, but not unrealistically so.

Grain elevators and feed mills are common industries in towns like the ones I model. In my opinion, one can never have too many elevators, so I set out to find one to fit my Indiana siding.

Twenty minutes east of home is Wolcottville, where a small elevator sits along the former Pennsylvania RR’s Grand Rapids & Indiana secondary route north into Michigan. The Wolcottville elevator is of a much older design than today’s modern elevators. This is just fine with me, since I’m modeling 1955. I took several digital photos at various angles.

Next, I photographed the part of the layout where the elevator would be located. I looked over the prototype



This is the same area as shown in the photo on page 35, after Jim superimposed the prototype photo of the Wolcottville elevator onto the photo of his track. This test showed Jim that the elevator would be a good fit for the location.



Jim shot this photo in the part of northeastern Indiana through which the railroad he models once ran for eventual use as a layout backdrop. Using Photoshop Elements, he dropped it in behind his composite test image.

photos I had taken and selected the one that would best line up with my layout photo. I then opened the digital files for both the prototype photo and the layout photo in Elements.

To test-fit the Wolcottville elevator to the layout, I cropped and copied the elevator from a copy of the prototype photo (always work from copies, not originals) and pasted it onto the layout photo to see how it would look. I sized it and moved it around until I found where it seemed to best fit.

This is a simple process for anyone with basic Photoshop experience. Keep in mind that whenever you paste all or part of one photo on top of another,

you create a new “layer,” which you can edit without affecting the other layers. I erased most of the image surrounding the elevator, exposing the layout under it. (Only when all changes have been made should you combine the layers by “flattening” the image.)

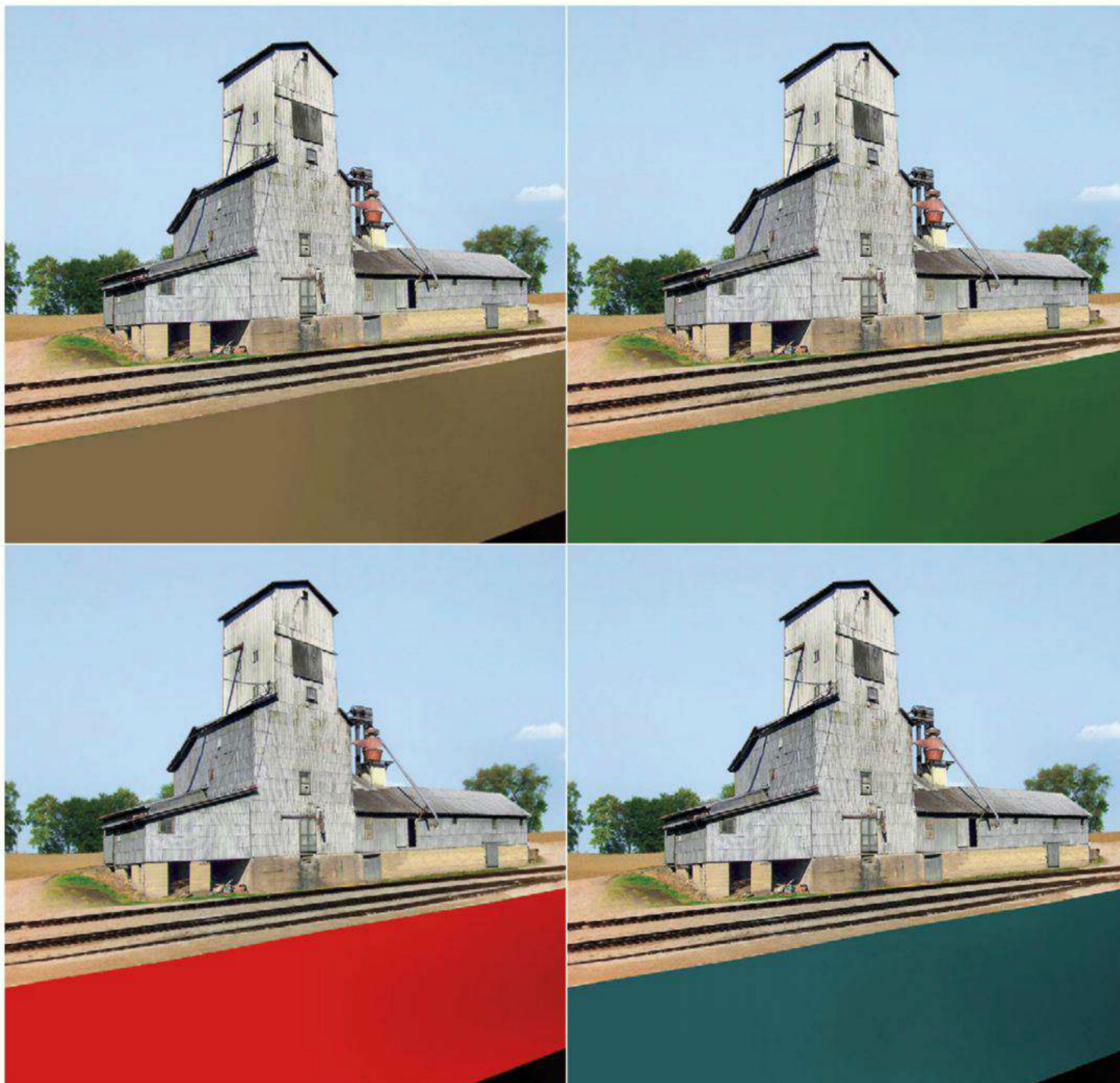
When you’ve completed the process described here and have decided on a structure to model, you can get extra mileage out of your prototype photos by printing them out and dry-mounting them to cardstock, then propping them up alongside the sidings that will serve these industries. This will show your operating crews what you have planned and will be more informative

than a trackside label simply stating, “Future grain elevator.”

Choosing a fascia color

After seeing how well the prototype elevator looked “on the layout,” I wanted to push this technological tool to see what else it could do for me. At the time these photos were taken, I had not installed the fascia nor picked a color to paint it. I could use Elements to create a virtual fascia and then “paint” it with a variety of colors.

Using Elements’ Magnetic Lasso tool, which helps you to select an area of an image following the edges of existing shapes, I outlined the fascia



Jim wanted to select a fascia color that would look good with his prairie scenery. These four images created in Photoshop Elements let Jim test various colors even before the fascia was installed.

area. I then deleted all image pixels within the outlined area and filled it with various color candidates using the Paint Bucket tool.

I started with an olive drab color, as David Barrow recommended in the first issue of MRP. It looked good, but I wanted to try a few other colors. My

goal was for the fascia to blend in with the layout and not call attention to itself. But the real test would come only after the scenery was in place, and I wanted to install and paint it now.

I chose a prototype scenery photo I had taken for possible backdrop use and inserted it as a virtual backdrop into my composite image, layering it behind the layout photo, Wolcottville elevator photo, and digital fascia. I then erased the hardboard backdrop from the layout photo, thus exposing the prototype sky and tree line beneath it. The result was a very plausible rendition of how my NYC Michigan Branch just south of Claypool might

look, and helped me pick a fascia color that would look good with the scenery.

Give digital modeling a try

With some simple Photoshop Elements skills, you can test various scenes on your layout digitally, so you don't have to devote a lot of time and materials only to be dissatisfied with the results. This truly is model railroading in the digital age! **MRP**

Jim Six, a regular contributor to Model Railroader and Model Railroad Planning, has long advocated using digital photography and photo-editing software to improve one's modeling.

Now on ModelRailroader.com

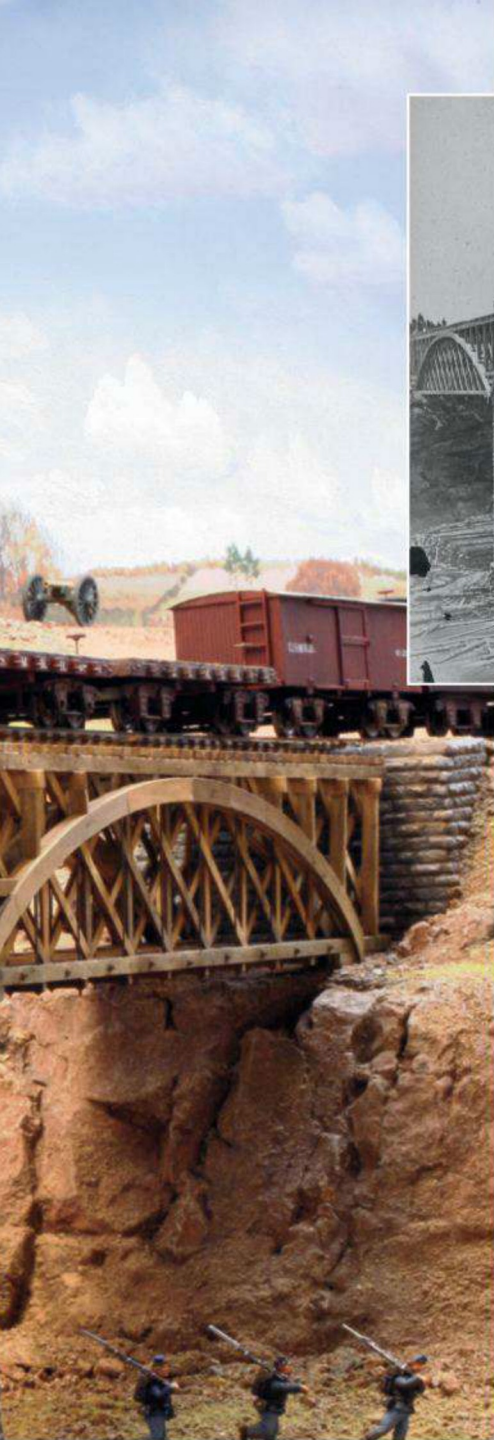
Interested in seeing more of author Jim Six's New York Central Michigan Branch layout? *Model Railroader* subscribers can get his track plan at ModelRailroader.com.



Modeling Civil War railroading

Bernard Kempinski's O scale tribute to the USMRR's Aquia Line

By Gerard J. Fitzgerald // Model photos by Bernard J. Kempinski



1. Bernie Kempinski is bringing the Civil War era to life on his O scale railroad. He scratchbuilt the arched bridge over Potomac Creek, a selectively compressed signature scene, from basswood and brass wire. National Archives photo

There is a great fascination with the American Civil War on the part of the general public, and recently model railroaders and model manufacturers have chosen to develop related projects and products.

Military modeling and gaming

Bernie Kempinski, a noted model railroad author and craftsman, has always been interested in military history, and when he moved to northern Virginia, close to numerous historic battlefields, archives and museums, he began to study the intricacies of the Civil War. At about the same time, Bernie became interested in model railroading, a hobby he found was just as intriguing as military war gaming and modeling. In time, he combined all of these interests to model Civil War railroads. (Learn more about Bernie's specific interests on his blog, usmrr.blogspot.com.)

Since he was heavily involved in N scale war gaming with miniatures, Bernie made his first attempt to model Civil War railroads in N scale. He began with a small test layout with a loop of handlaid track. The railroad was to feature a small scene from the famous supply depot at City Point, but he shelved the project once he discovered the N scale equipment, especially 4-4-0 steam locomotives available for this time period, did not operate up to his expectations.

Instead, he continued with many other N and some HO scale projects, including a number of modules recreating the Chesapeake & Ohio, the Soo, and various parts of the steel

industry. This included an HO diorama based on a USMRR car ferry built for the Lyceum, the City Museum of Alexandria, Va. (See "Civil War Alexandria waterfront diorama: An HO scale salute to Herman Haupt and the USMRR" in the October 2000 issue of *Model Railroader*.)

Bernie also seriously considered building a large scale (1:32 proportion) Civil War layout because of the availability of military figures and supporting detail parts. He realized a large scale layout might have to be more of an "animated diorama" than an operating model railroad because of the amount of space required for even a small scene. Moreover, the absence of suitable standard gauge 4-4-0 steam locomotives and appropriate rolling stock meant he would need to rebuild static models to make them operable.

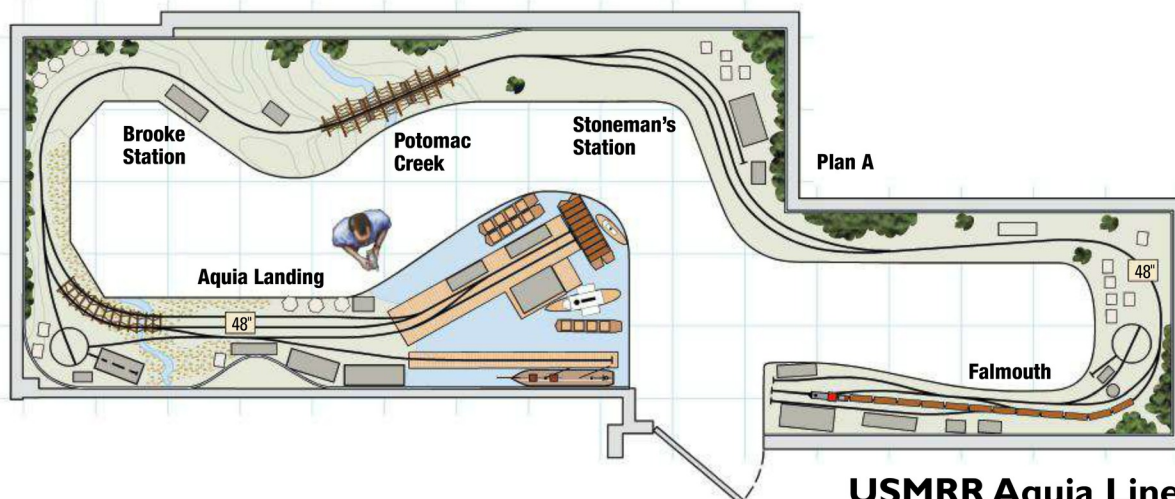
Unable to find a successful entry into Civil War railroading, Bernie decided to build a 300-square-foot layout depicting the Denver & Rio Grande Western near Tennessee Pass (featured in *MRP 2006*).

In 2008, Schneider Model Railroad-ing (SMR) began importing O scale locomotives and cars that were suitable for modeling the Civil War. Bernie initially purchased an SMR engine "for display purposes only." However, he was impressed by the on-track performance of the model, so he decided to change scales and eras yet again.

To a large degree, Bernie attributes the start of his latest endeavor to an all but forgotten 42-year-old West Point graduate and Pennsylvania RR railroad engineer named Herman Haupt. Bernie

Known as one of the first "modern" wars, the American Civil War introduced the development and field deployment of various technological marvels such as iron-clad ships, rifled artillery, telegraphy, observation balloons, and the tactical and strategic use of railroads to move men, animals, and supplies. During the ongoing hostilities, the iron horse played a crucial role in the prosecution of the war north and south of the Mason-Dixon Line. Today, most historians agree that the creation of the United States Military Railroads (USMRR) in 1862 was a crucial step in bringing about the Union victory.

Layout evolution



USMRR Aquia Line

O scale (1:48)

Plan A room size: 10 x 32 feet

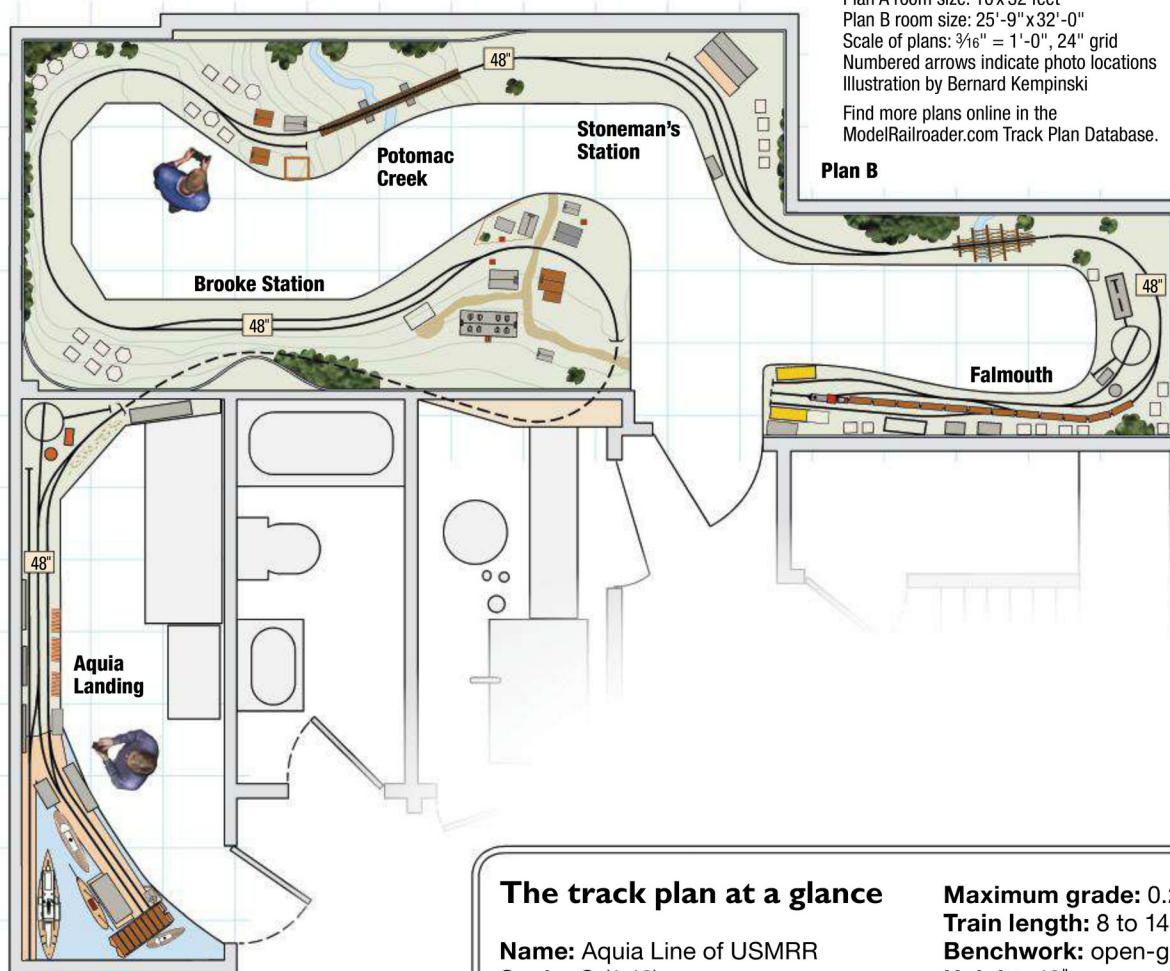
Plan B room size: 25'-9" x 32'-0"

Scale of plans: $\frac{3}{16}$ " = 1'-0", 24" grid

Numbered arrows indicate photo locations

Illustration by Bernard Kempinski

Find more plans online in the
ModelRailroader.com Track Plan Database.



As the author discusses on page 44, the layout's design progressed through three iterations to increase the mainline run while enhancing the prototypical focus and scenic potential. This required expanding it from 11 x 30 to 30 x 32 feet using two rooms.

The track plan at a glance

Name: Aquia Line of USMRR

Scale: O (1:48)

Size: 30'-0" x 32'-0"

Prototype: U.S. Military RR line

Locale: eastern Virginia (Stafford County)

Era: March 1863

Style: single deck

Mainline run: 130 ft.

Minimum radius: 28"

Minimum turnout: no. 5

Maximum grade: 0.25 percent

Train length: 8 to 14 28-foot cars

Benchwork: open-grid

Height: 48"

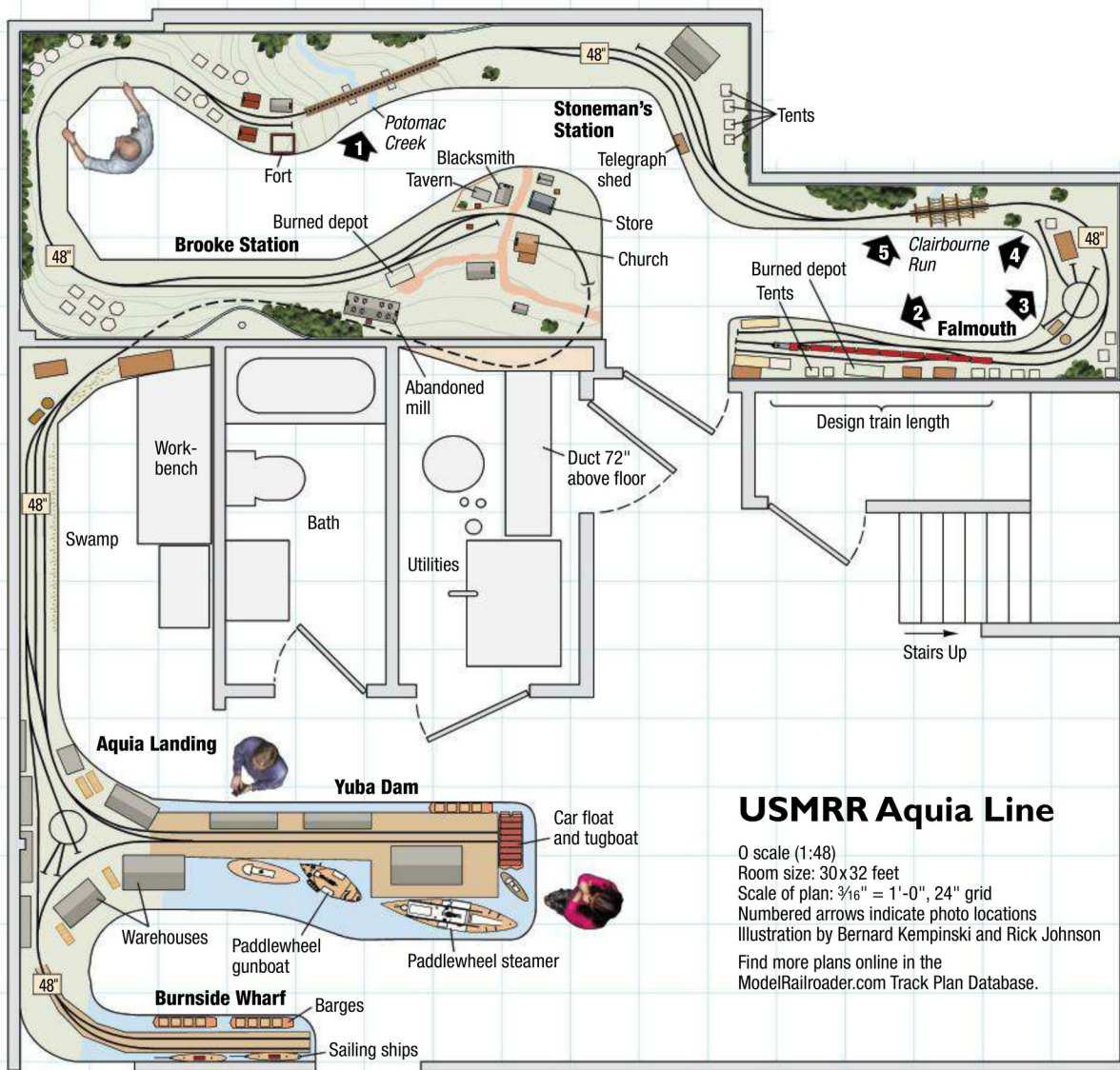
Roadbed: $\frac{1}{8}$ " plywood on pine spline or foam

Track: handlaid code 100

Scenery: foam, cardboard web

Backdrop: styrene and $\frac{1}{8}$ " hardboard

Control: EasyDCC with wireless throttles



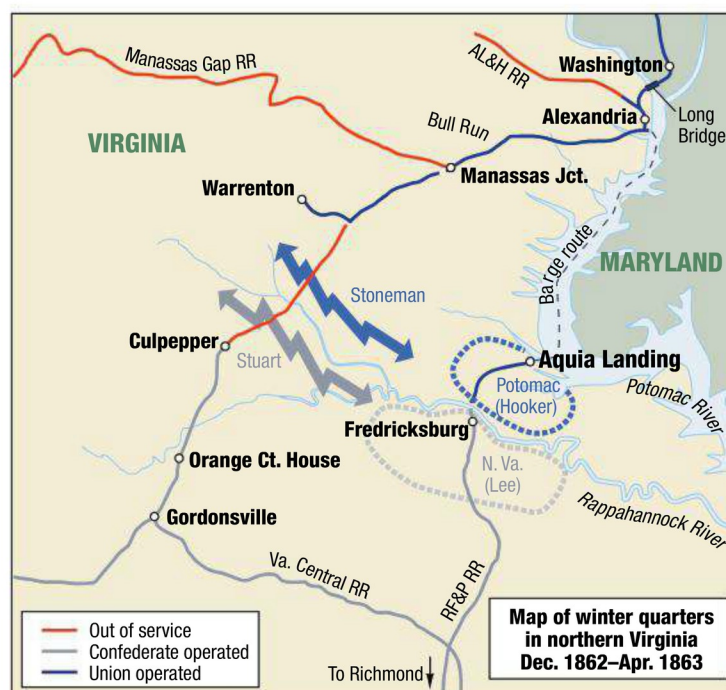
uses Haupt's railroads in Virginia as the foundation of the layout.

Attractions and challenges

Beyond the historical significance of the Civil War, there are a host of other reasons a model railroader might consider modeling the wartime period. Practically speaking, a lot of railroad and scenic elements can fit in a small area because Civil War-era locomotives, cars, and other railroad equipment are relatively small.

Most boxcars are only 28 feet long, and a typical 4-4-0 locomotive is less than a foot long in O scale. Train lengths at the time were also modest, with 8 to 16 freight cars per train. Throughout the war, engines were predominantly 4-4-0s, with 4-6-0s, 0-8-0 Camelbacks, and 0-8-0 "mud diggers" used occasionally. Smaller equipment allows for tighter radii.

Although building a Civil War-era prototype layout might seem onerous,





2. The devastation of The Civil War is evident in this view of Rogers-built 4-4-0 *Leach* passing the burned-out depot at Falmouth, Va. It was destroyed as Confederate forces retreated in 1862.



3. This image of the engine terminal at Falmouth shows the *McCallum* backing onto the turntable. No turntable was located here on the prototype, but Bernie needed a way to turn locomotives at this end of the railroad.



4. Handsome 4-4-0 *McCallum*, built by Mason, leads a train across the Clairborne Creek trestle. Brigadier General and military engineer Herman Haupt developed the W-bent design to expedite wartime construction.

there are many resources readily available. Anyone thinking of modeling the war would want to study the photographs Matthew Brady and Maj. Andrew Russell took of Civil War railroads. Union operations in eastern Virginia were particularly well documented. The prototype photos included here provide just a small sample of what's available at the National Archives and Records Administration (NARA).

Official records from both sides of the conflict, also in the archive, in addition to various other sources provide detailed descriptions of operations on the USMRR. Due to demands of military operations, Civil War railroads were very busy, yet this is the period when timetable and train-order operations were just beginning.

Although some aspects of modeling the war are easily accommodated, others remain more difficult to resolve. For example, mid-19th century railroads used stub switches. These must be handlaid, although a few manufacturers custom-build stub switches; SMR makes them in O. Additionally, many trackside details we're used to seeing, as well as automobiles, electric lights and signals, and even knuckle couplers, didn't exist.

Bernie found an array of military miniatures he could use to make the layout come to life while remaining true to 19th-century scenes. A few retailers offer an appropriate line of Civil War-era figures, military equipment, and scenery items. Musket Miniatures specializes in HO items, and GHQ specializes in N. Narrow gauge model manufacturers also offer a variety of components that are readily adapted to an earlier period. Bernie uses figures and details from scales ranging from S (1:64) through 40mm (1:43) to force perspective on the layout.

Planning a 19th-century layout

Bernie began construction on the USMRR Aquia ("uh-kwy-yuh") Lines in 2009. With any well-planned layout, the track plan has evolved to enhance how it looks and operates. As a result, he has expanded the layout twice, including a side effort to reconstruct his finished basement to make more room for a larger model railroad. See page 40.

As it turned out, the layout redesigns and space requirements were some of the easiest challenges to solve. Conversely, the limited availability of Civil War-era rolling stock and structures in O scale required that Bernie kitbash and scratchbuild many components. Bernie is also handlaying the track.

One of the most impressive aspects of the layout is the backdrop, which gives the railroad its museum-quality appearance. To create the backdrop, Bernie merged traditional painting and landscape approaches with state-of-the-art computer and printing technologies. In addition to cloud and sky features, Bernie's backdrop also incorporates the color prints of Civil War illustrator Brian Kammerer to represent specific details such as buildings, ships, and tents.

A key aspect of layout design is determining the minimum curve radius. The SMR engines can negotiate 28" curves. To ensure that all of the elements of the layout met his standards, Bernie built a 10-foot test section to evaluate operation on the minimum radius, link-and-pin couplers, and stub switches, among other features. At the end of this test section, he also built a reversing loop formed by 28" curves.

Once he knew these things would work, Bernie then turned his attention to scratchbuilding cars. First, he designed prototypical trucks to ensure accuracy and good performance. Pulling and backing up a train of eight cars around the curve and through the turnouts proved to be very reliable, but pushing cars with the extended coupler above the cowcatcher was troublesome. This meant that he would have to turn the engines at one end of the railroad.

The addition of a wye would've been the simplest solution, but the required space just wasn't available. Instead, Bernie installed a turntable based on a prototype at Manassas, Va. At a result of this addition, the modeled USMRR Aquia Line isn't true to the prototype. Owing to space constraints, he also had to accommodate changes at the engine terminal and extensive fortifications at Falmouth; the mills at Brook and Accokeek; the location of the wye; and Burnside wharf. Even so, the layout includes two signature scenes along the prototype line – the busy waterfront with car ferry and the famous bridge over Potomac Creek.

Bridging Potomac Creek

The Aquia Lines ran just 13 miles. Supplies, ammunition, foodstuffs, animals, and men arrived by ship from various northern ports. Barges sailed from the Union depot at Alexandria, Va. The layout includes the four stations that were south of Aquia Landing: Brook, Potomac Creek, Stoneman's, and Falmouth. All of these stations are modeled to varying

Herman Haupt: engineer, officer, inspiration

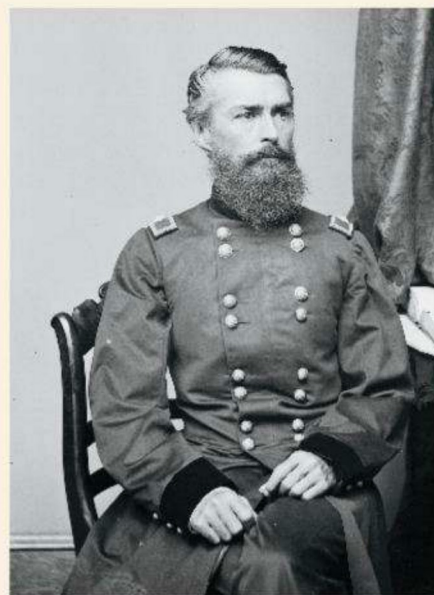
Herman Haupt's involvement in the Civil War

came through secretary of War Edwin Stanton in January of 1862 to help manage the newly created United States Military RR. Haupt, who graduated from the United States Military Academy at West Point in 1835, was a superb engineer, an inspired teacher, and by most accounts a railroad genius. He carefully recruited an assortment of civil and military engineers, frontier woodsmen, skilled craftsman, and freed slaves to create a military railroad construction corps, which ultimately achieved astounding engineering and railroad construction feats.

The story of the USMRR in Virginia throughout 1862 and 1863 is the story of Haupt. One of his first major achievements was reconstructing the Richmond, Fredericksburg & Potomac, which the Confederate Army destroyed late in 1861, from Aquia Landing to Fredericksburg including the famous bridge over the Potomac Creek and another large trestle over the Rappahannock to Fredericksburg.

While the original Potomac Creek Bridge took three years to build, Haupt and his men were able to build a trestle there in less than a week by using locally harvested logs for lumber. Abraham Lincoln, after riding over the bridge, commented to his cabinet, "That man Haupt has built a bridge across Potomac Creek, about 400 feet long and nearly 100 feet high, over which loaded trains are running every hour, and, upon my word, gentlemen, there is nothing in it but beanpoles and cornstalks."

Haupt's genius applied both to organizational as well as engineering skills. By prefabricating common railroad components in Alexandria, his men could rapidly repair and rebuild destroyed bridges and track. When called for, his men were equally efficient at destroying strategic lines so that Confederate forces would not benefit from the Union Army's labor and resources. Haupt also applied the Pennsylvania RR's organizational strategy to the USMRR using timetable and train-order discipline to operate the railroad. His legendary strong will was needed on more than one occasion as he clashed with Union generals over interference with railroad operations, which he believed his sole responsibility. – G.F.



National Archives photo

degrees of historical accuracy, although Potomac Creek is modeled simply as a stub siding that's not long enough to host meets.

The big bridge at Potomac Creek is both a signature scene and an important temporal marker. Visitors with a sharp eye for detail and an intimate understanding of the war's various campaigns will be able to place the layout chronologically. There were actually five different bridges across this creek. In choosing one bridge in particular, an arched-truss design built in early 1863, Bernie has set the time modeled to the late winter/early spring of 1863.

The first bridge was the arch truss built by the Richmond, Fredericksburg &

Potomac and demolished by the Confederates as they retreated in late 1861. The second design is the best known of the structures that spanned the creek. Haupt quickly built the "corn stalk, beanpole bridge" in May 1862, which was made famous by President Lincoln's remarks upon his visit to the front.

The bridge impressed not only the President but also various military observers from Europe who traveled across the Atlantic to take notes on technological, strategic, and tactical evolution of the war. Unfortunately, this structure was destroyed under General Burnside's orders in July 1862, much to the consternation of Haupt and his engineers. Haupt's men



Stoneman's Station, named for a Union general, was a typical U.S. Military RR stop during the war. Wooden hardtack boxes, each containing 50 pounds of infamous army "bread," were stacked 16 high. National Archives photo



This photo of Aquia Landing and Yuba Dam was taken from a ship in the Potomac River. The railroad float in the foreground was made from three barges lashed together. Railroad cars are visible on the wharf. National Archives photo

installed a new trestle in the same spot in November of that year.

In late March 1863, Haupt replaced that trestle with an arched-truss design that rested on the existing stone piers. Haupt chose this particular design to avoid the possibility that flash floods carrying debris from all the timber that the Army was cutting for firewood would sweep away the trestle's wood pilings. This is the bridge that Bernie has built from scratch. This bridge was disassembled by the USMRR when they left for the Gettysburg Campaign in summer of 1863. In June 1864, the USMRR Corps built yet another trestle.

Bernie selectively compressed his bridge so that it is half the length of the original. By using the arched bridge instead of the trestle and barren trees as a scenic guidepost, Bernie indicated that the layout and railroad operations are set between March and early April 1863. Had he used trees in bloom or green trees, the setting would have been late spring or early summer.

While the bridge at Potomac Creek is an important aspect of the layout,

the waterfront will arguably be the centerpiece, a scene that highlights the importance of ships (both steam and sail) and Union naval forces in the war.

Layout design

The 13-mile line was originally designed for a small basement room. But as Bernie began building benchwork, he quickly recognized that he couldn't accomplish all of his goals in the original space. The layout moved through three stages of design in a relatively short period of time.

In moving from the first rectangular plan to the final design, Bernie expanded the length of run between various points and paid more attention to historical records to increase the prototypical focus of the layout. With each expansion, he added space to accommodate more structures and main line run, and – perhaps most importantly – to expand the area for scenery on the layout.

The first version of the Aquia Lines was in an 11 x 30-foot room closed off from the rest of the finished basement. In this plan, Bernie located Aquia Landing

and Falmouth back to back. Despite the modest footprint, there was plenty of room for modeling and operation.

As construction continued, Bernie pondered the benefits of a longer main line and physically separating the rail-marine component from the rest of the layout. Lengthening the main line required expanding the layout into his workshop, where Aquia Landing would reside on a narrow shelf. This provided an additional space of roughly 6 x 15 feet for a shelf that widened as it entered a corner space by the doorway.

For the scene to be effective, Bernie needed to build hidden trackwork through a closet, behind the scenery, and through another wall into the workshop. In order to hide the track and conceal the holes in the closet, Bernie reluctantly included a non-prototypical tunnel. (Serendipitously, the hidden track has become an operational enhancement by adding extra time to the schedule.)

The next expansion came after Bernie saw an exhibit featuring 1/4"-scale ship models at National Museum of American History in Washington, D.C. After studying the exhibit, he realized he needed more space for the harbor scene – even 19th-century O scale ships can be measured in yards. The larger scene meant that part of the layout would be in the media room, an area that had until then had been a railroad-free zone. After invoking the spirit of Manifest Destiny and providing his wife with a convincing explanation, Bernie removed a room wall to allow the wharf area construction to begin.

The layout now occupies a space 30 x 32 feet in two rooms. By placing only two tracks on the 4 x 14-foot wharf, the scene has ample room for ship models and wharf structures.

Even so, the expanded harbor scene required compromises. Instead of being about a mile downstream, Burnside wharf is connected by a wye at the base of the original wharf. Space limitations also required Bernie to compress the wharves to about half their original length.

This is the first section of the layout visitors see when descending the stairs into the basement. Period photos of major ports show a forest of masts and rigging reflecting the complexity of 19th-century sailing vessels. A variety of vessels dropped anchor at this Union post, including traditional sailing vessels, paddle wheelers, and perhaps most interestingly, the steam tugs and Schuylkill barges that sailed down from Alexandria with boxcars full of supplies.



5. The *Whiton*, a Mason 4-4-0, passes the picket camp near Clairborne Creek. The pickets regularly rotate as bridge guards, so this camp is basic compared to more elaborate quarters at their main winter camp.

Operational aspects

This layout is designed for operation. The expansion of the Aquia wharf area provides a much larger area to stage trains, and both the dock and Falmouth have turning facilities to prepare locomotives for their next departure.

Through numerous research visits to the National Archives, Bernie has records of all the trains that ran on the railroad during the period he models. This includes train orders, conductor logs, engine and car rosters, timetables, and a variety of letters and maps.

During this period of the war, trains moved to the front with an efficiency and rapidity that reflected the vision of Herman Haupt. The railroad barge transit from Alexandria via Washington, D.C., could move an average 16-car train directly to Aquia Creek and finally on to Falmouth in as little as 12 hours. U.S. Army historians have noted “in 1863, the Aquia Creek line was averaging 800 tons of supplies (or 80 railroad cars) per day.”

During operating sessions, train length will be relatively short – about eight cars – but the large scale of the models themselves supports operating possibilities that might make 20th-century modelers jealous.

Bernie devised a simple but effective link-and-pin coupler system using track nails that works well. Because the link-and-pins are not as simple to operate as knuckle couplers, the layout design ensures that tracks where

switching takes place are close to the front fascia for easy access.

In addition, Bernie devised a working brake system on his rolling stock. This system is more than novelty – with at least one siding situated on a grade, it’s an operating necessity. In addition, the USMRR imposed a 5-mph speed limit on the entire railroad. Adhering to that limit will help lengthen the run and will give the operators a chance to enjoy the sound-equipped engines.

To date, test runs with visiting operators in abbreviated sessions revealed that one person can handle the throttle and coupling chores, although the aisles are wide enough for two-person crews. Formal operating sessions will involve four or five people, including a dispatcher. Future plans call for a working telegraph system using replicas of the actual paperwork to guide operations.

A wise choice

In electing to model 1863, Bernie has wisely chosen the most important year of the war. At the year’s start, Union victory was far off at best. By that July 4th, simultaneous Union victories by General Ulysses S. Grant at Vicksburg and by General George Meade at Gettysburg marked the turning point of the war.

The railroad operations at Aquia Landing during the earlier part of the year also contributed to the Union’s

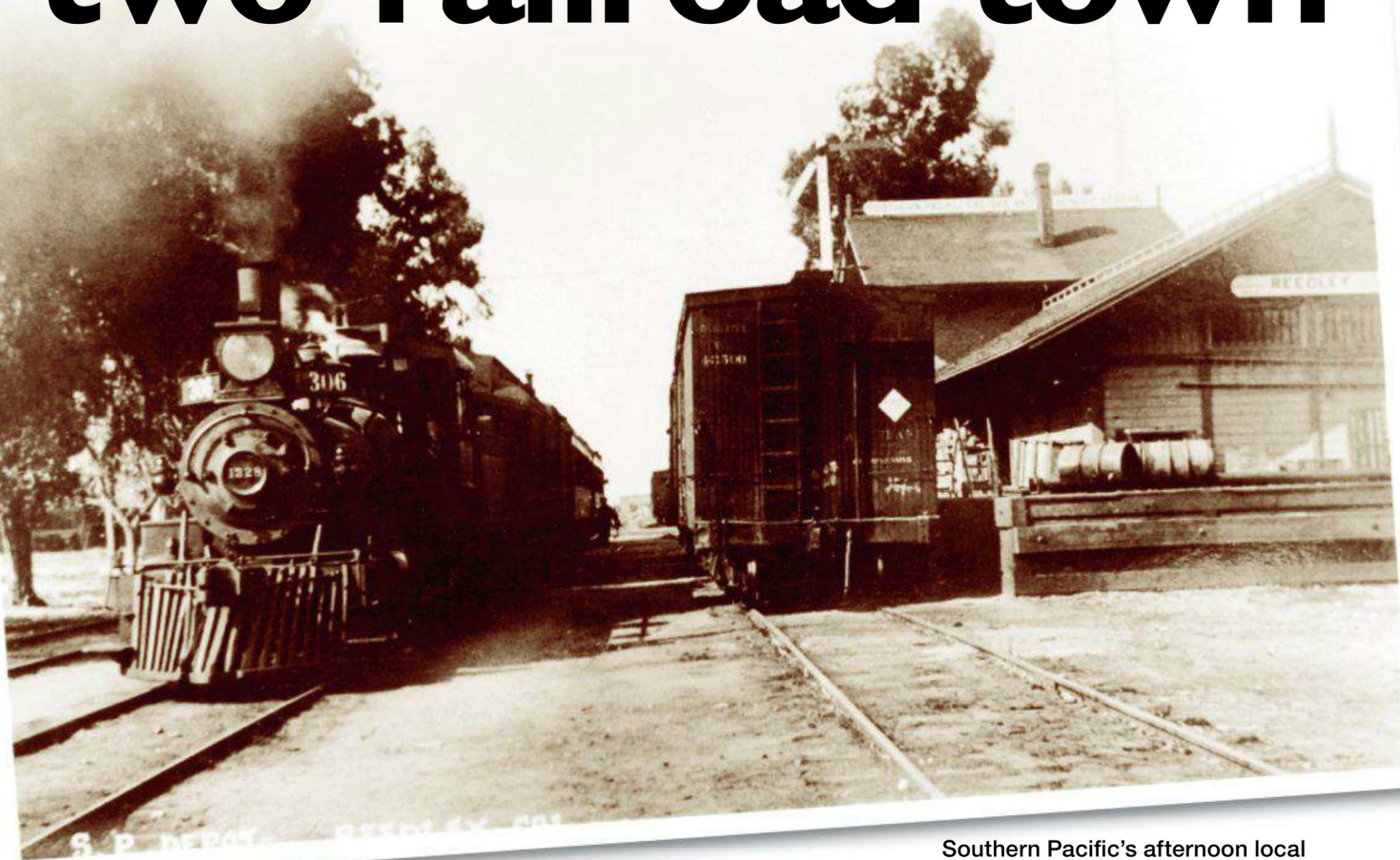
victory. Soon Union forces would be on to Richmond. And soon some of these historic events will be re-created in Bernie Kempinski’s basement. **MRP**

Gerry Fitzgerald, a former associate editor of the Layout Design Journal and a founding editor of the ACL-SAL HS online modeling magazine, models the Chesapeake & Ohio in April 1943. A resident of Charlottesville, Va., he holds a Ph.D. in the history of technology and medicine and currently divides his time between the University of Virginia and George Mason University.

Learning points

- The Civil War period is well documented, a boon to the scale modeler.
- The availability of a key type of locomotive may make a difficult project much more attainable.
- Research is not only crucial to the accurate depiction of historical events but also as interesting and rewarding as the modeling.
- Building test sections to check minimum-radius requirements and unique equipment designs is a must.
- Modeling wartime traffic is a lot like war gaming, but with mobile models.

Bedroom-sized two-railroad town



Reedley, Calif., was served by the Santa Fe and the Southern Pacific

By **Byron Henderson** // Photos by the author

Sometimes the first order of business when I've been working on a custom model railroad track plan with a client is a search for a suitable prototype. For this HO scale project, my client desired a 1950s location in the eastern San Joaquin Valley of California that could logically host both the Atchison, Topeka & Santa Fe Ry. and the Southern Pacific RR while serving a variety of industries. The layout's focus was to be on industrial switching, but

with main lines that could support through freight and passenger trains.

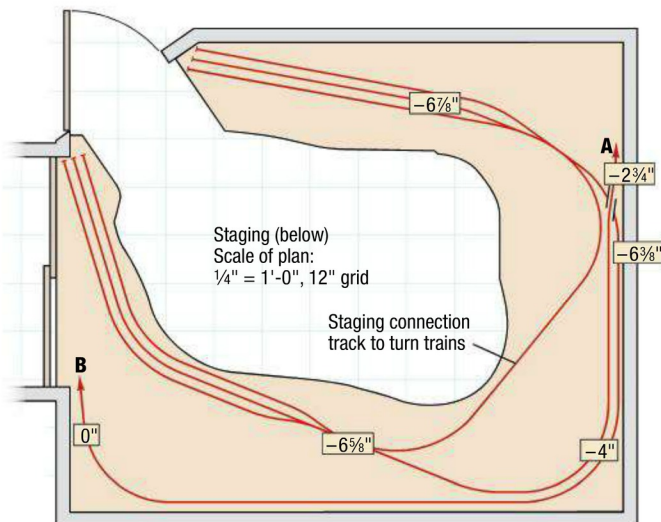
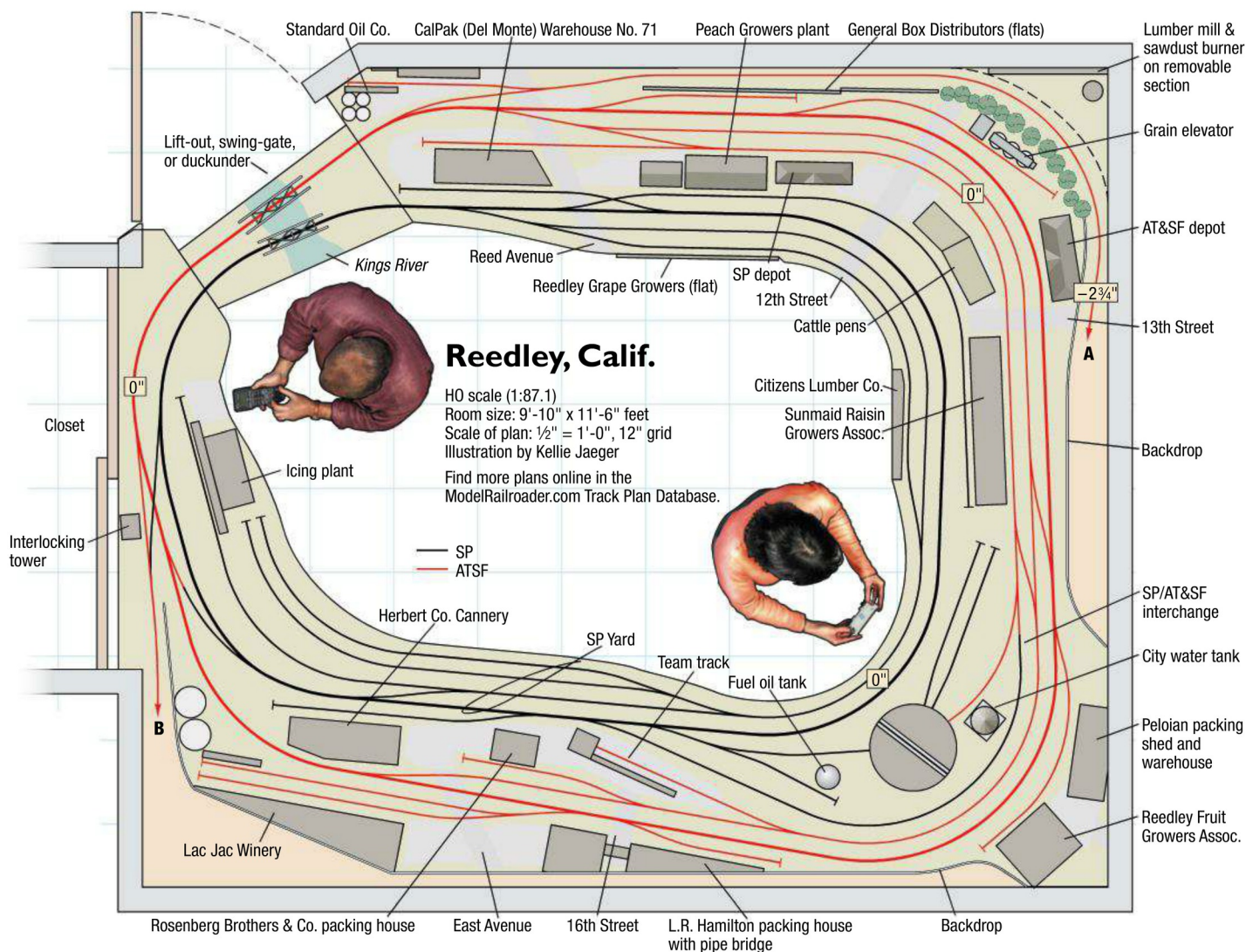
In a modest spare-room space of about 115 square feet, we needed one location where the railroads were in plausible proximity. I had worked recently on a similar theme for the nearby Visalia Electric (see *Model Railroad Planning 2009*), so I had a good understanding of the possibilities in the general area. While the Santa Fe and Southern Pacific roughly paralleled one another in a number of

Southern Pacific's afternoon local passenger train no. 306 departs Reedley behind 4-4-0 American no. 1328 in this undated period photo. The agricultural town of Reedley, Calif., featured both the SP and the Atchison, Topeka & Santa Fe, and is the focus of this spare-room-sized HO track plan. John Bergman collection

places, the room constraints focused the search on a few towns where the two railroads have their tracks parallel and side-by-side.

Reedley, a railroad town

Reedley, Calif., was already established as a wheat-growing center when the Southern Pacific arrived in 1888, and it soon became a two-railroad town when the Santa Fe laid its tracks parallel and less than 100 feet away in 1897. Nearby water projects irrigated



The track plan at a glance

Name: Reedley, Calif.
Scale: HO (1:87.1)
Size: 9'-10" x 11'-6"
Prototype: Atchison, Topeka & Santa Fe and Southern Pacific
Locale: central California
Era: 1950s
Style: around-the-walls
Mainline run:
 32 feet (AT&SF),
 27 feet (SP)

Minimum radius:
 24" (main),
 18" (industrial tracks)
Minimum turnout: no. 4
Maximum grade:
 3 percent (staging yard leads)
Train length: 10-12 cars

the surrounding farmlands that eventually produced grapes, peaches, figs, apricots, and other types of produce in abundance.

Packing plants and warehouses grew up along both railroads, and a few industries were crammed into the narrow space between the two rail lines. These were served on separate side tracks by both railroads. Initial

shipments were mostly dried and canned fruit. Also in the 1950s (the era depicted on the layout), fresh fruit was being shipped in iced reefers.

Choosing a layout footprint

With the prototype selected, the next task was determining the footprint of the layout in the space. A desire to operate at least occasional

passenger traffic required a mainline minimum radius of 24" for both railroads. Although I tried alternatives with a narrow peninsula reaching into the center of the room, these ideas restricted the aisles and caused congestion for multiple operators.

So the final choice was an around-the-room arrangement with a duck-under or movable section across the



doorway, which provided a continuous running capability that was also highly desired. Although the two railroads passed arrow-straight through Reedley in real life, layout room constraints dictated curves in each corner to wrap the town into the space.

Prototype – and then some

The final track plan captures some signature elements of Reedley, in particular the jointly served industries between the AT&SF and SP tracks. As in real life, both railroads approach town on separate bridges over the Kings River. The modeled bridges are much reduced from their real extent, but the layout focus was to be on operations and the town itself, not scenery. The bridge scene also helps separate the “north” end of the layout from the “south” end.

I used period Sanborn Insurance Co. maps of Reedley (available through my public library) to establish the general arrangement of industries. Entering town from compass northwest at the King’s River, the track configuration and industry locations resemble the real thing. Produce packing houses and related industries predominate, but my client also wanted a few other favorite freelanced industries and railroad facilities that didn’t actually exist in Reedley.

From the bridges clockwise to about the Santa Fe depot, the layout captures the prototype industries standing between the tracks which are served by each railroad. Squeezed between the AT&SF and the SP, these are tight spots for the models, but the real buildings had long and narrow proportions for the same reason. Industries along the backdrop are represented by flats and other structures using space-saving techniques.

This early view of an Atchison, Topeka & Santa Fe local in front of its depot dates to about 1915. The four-car train’s consist includes a Railway Post Office, a baggage car, and two coaches hauled by a 4-4-0 American. A horse-and-buggy at the left stands by to meet arriving passengers. John Bergman collection

Adding the goodies

Past 13th Street, the layout becomes more freelanced to accommodate a non-prototypical (but high fun-factor) engine servicing area planned around a Walthers 90-foot turntable. This is primarily oriented to the SP, but there’s also a Santa Fe connection to allow its locomotives to be turned occasionally.

A long interchange track between the SP and AT&SF may not have been present in real life, but it offers additional operating interest. In particular, since the icehouse is located on the SP and most of the packing houses are on the AT&SF (at least on the layout), it’ll be interesting to handle these reefers back and forth through the interchange for icing. The actual interchange and icing took place in larger nearby yards.

A freelanced lumber mill appears in the background, probably on a removable piece of scenery to allow emergency access to the staging tracks below. Around the corner, there are some other freelanced industries representing actual businesses.

A large winery, inspired by the one located at Lac Jac a couple of miles northwest of Reedley, anchors the corner of the layout. In reality, both railroads served the winery, but here the Santa Fe does the honors.

Stretching reality

Beyond Lac Jac we come to a last major departure from reality. To connect both the Santa Fe and Southern Pacific to the hidden staging, the plan needed a double crossover. Nothing like this existed nearby, but it’s a compromise the client was willing to accept. A freelanced interlocking tower adds to the railroad atmosphere, if not to the fidelity of the scene.

Upon emerging from staging, trains either come directly into the tower’s interlocking plant or cross a bridge to reach this location. Trains may be routed to either the Santa Fe or Southern Pacific through the interlocking. The routes across the interlocking have sufficient clearance between the parallel tracks to allow trains to operate simultaneously on both the AT&SF and SP loops.

Down to staging

In keeping with the topography of the area, the visible deck is completely flat (except for the depressed river). Getting down to staging therefore requires some steep grades and some traffic-pattern trade-offs. Both tracks descend behind the backdrops to enter their respective staging yards below. The connection near Reed Avenue is roughly where the Santa Fe’s Wahtoke District branched away. It’s somewhat



Santa Fe’s Reedley, Calif., depot was a large structure. Looking down the platform we can see the angled operator’s bay, an elevated trackside freight platform, and a large freight-house addition at the far end. John Signor photo



This aerial view shows the production buildings at the large Lac Jac winery northwest of Reedley. It includes a number of fruit processing buildings and other structures with light-colored roofs to help reflect the heat. It was served by both railroads. Dr. James Lancaster collection

disguised by stacks of wooden field boxes around the box factory.

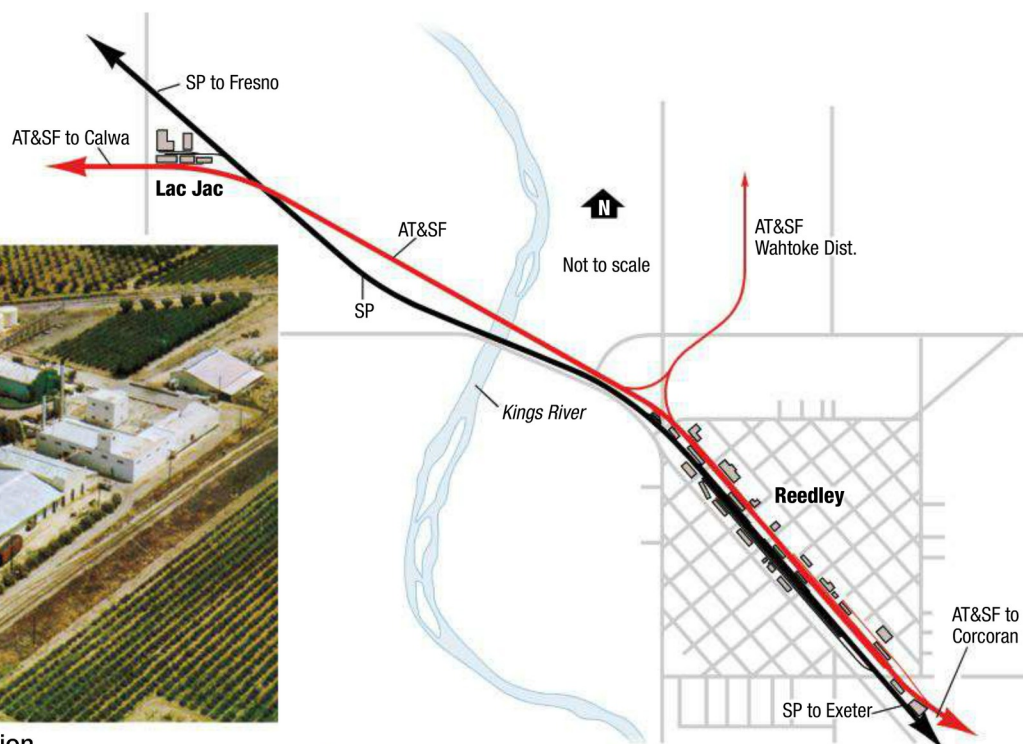
The other staging connection diverges between the tower and winery to slip behind the backdrop in a reasonably stealthy fashion. Both staging grades are a rather challenging 3-percent, but this gives plenty of hand clearance. Slightly lower grades would be possible, but the trade-off would be a bit less reach-in clearance in staging.

Without crossing the doorway again at a lower level, the plan is limited to stub-end staging. But I added some flexibility by including a connecting track that allows trains to be backed between the two staging yards. This move turns the trains so they're ready to reappear on the layout with the locomotive leading.

The connection track joining the two staging yards runs along the front edge of the benchwork, allowing easy access so trains can be "fiddled" (rearranged) a bit if needed. For major consist changes, however, it would be better to bring the trains up to the visible layout between sessions.

Operational variety

In the 1950s, Reedley was probably served by local freights dispatched from nearby yards on both the Santa Fe and the Southern Pacific. But it



The Southern Pacific's Reedley depot had a green shingle roof that adds a nice bit of color to the building. An elevated freight platform is built around this end and along the track side. Here, too, there's a bay window in the operator's office and a lower-quadrant train order signal. John Signor photo

might be more interesting to have the SP side served by an assigned local switcher, while a turn job originates from staging to handle the work on the AT&SF side. Through SP manifest trains can then make set-outs and pick-ups from the small yard.

Passenger service on these secondary lines was limited by the 1950s, but it's certainly enticing to have a couple of colorful passenger trains from both railroads make scheduled appearances that require the freight crews to stay on their toes. An occasional fruit extra could also stop to pick-up outbound loads during the harvest season when the railroads were working day and night to keep the perishables moving.

Having two railroads to work with offers plenty of operating interest and modeling challenge, even in this modest space. **MRP**

Byron Henderson is a custom model railroad layout designer (www.layoutvision.com) from San Jose, Calif. He is also editor of the Layout Design SIG's (www.ldsig.org) Layout Design Journal and is a frequent contributor to MRP.

Learning points

- An area where two railroads operate in close proximity offers enhanced modeling opportunities.
- A single busy town can be a good choice for a mid-size layout.
- Single-ended staging yards are more flexible when joined with a connecting track for turning trains.
- Resisting the urge to fill the room with benchwork better supports multiple operators.



Climbing 2,500 feet in a double mushroom

1. Fairbanks-Morse units haul train No. 81 up the brutal Farron Hill on the way to the summit of the Monashee mountains on Mark Dance's N scale layout. By slanting the backdrop inside the mushroom-shaped peninsula, he was able to model this spectacular sloping scene on the outside of the upper deck.

The challenges of a large multi-deck N scale railway system

By Mark Dance // Model photos by Timothy J. Horton

In the 1890s, the discovery of precious metals in British Columbia triggered a flood of people seeking their fortunes in western Canada. Competition for the newly discovered resources was fierce, and railway speculators and their civil engineers faced a daunting physical landscape in the mountainous southern boundary region.

Genesis of an N scale railway

I became aware of these railways when I stumbled upon a wonderful book on the rail barge operations of the interior lakes. *Railways of the West Kootenay, Part 1*, by Gerry and Corwin Doeksen described short trains being loaded, locomotive and all, on barges for their trips up isolated branch lines.

The book turned out to be one of a colorful series on railway operations in the area. When connected to the storied Kettle Valley Subdivision to the east, the Canadian Pacific's Kootenay lines tapped the new province's mineral wealth.

In 2000, we moved into our new home, which had an insulated and heated two-car garage. By 2005, I finally had time to begin construction of my N scale Columbia & Western Ry., named in recognition of the first rail line built in the area.

Design objectives

While I was setting out to closely recreate the CP's operations in the area, I decided to make a trade-off between exact replication and a model railroad that works well, is enjoyable and interesting to operate, and is visually dramatic. Thus I prioritized my objectives:

- Capture the prototype operations that existed from the 1950s through the '70s, erring on the side of maximum functionality by reinstating tracks and trains that were abandoned by 1970.
- Compress and reorient prototype track plans where necessary to retain the prototype functionality.
- Focus on making the model railroad attractive, with scenery representative of the area.

The climb to Farron Summit

As I studied the prototype, I knew I wanted to model its climb up to Farron Summit in the Monashee Mountain

range. Farron's pusher operations, CP's term for helpers, were stationed at the summit (elevation 3,977 feet). The pusher locomotives were dispatched to the east or west as needed. The helper servicing facilities at the summit had to cope with deep snowdrifts in the winter. This image set the layout's winter season at Farron. It also provides a reason to operate snow fighting equipment.

In contrast, I also wanted to include the Slocan Branch with its rail barges traveling on Slocan Lake, which was the last surviving operation of its type. As the map on page 56 shows, these barges and small tugboats served the isolated Kaslo Subdivision at the other end of the lake.

Since the 1950s, the picturesque division point at Nelson (elevation 1,929 feet) on the shores of Kootenay Lake had been home to CP's Fairbanks-Morse (Canadian Locomotive Co.) locomotives. The railroad's C-Liner cab units and H-series hood units were in abundance. In the late 1960s and early '70s, Nelson was also visited by General Motors Diesel (Electro-Motive Division of Canada) and Montreal Locomotive

Works (Alco of Canada) locomotives, as well as visitors from the south in Great Northern's Big Sky Blue and successor Burlington Northern's Cascade Green.

The diesels eliminated the need for pushers on the prototype. However, by reopening the copper mines west of Grand Forks, I could reinstate pushers to help heavy ore trains to the summit before they coasted down to the giant smelter at Trail (elevation 1,444 feet).

A "double-mushroom" design

The design pointed to an N scale, around-the-walls-plus-peninsula, multi-deck design. A multi-deck plan with a peninsula would allow a good mainline run, and in N scale adequate visual separation between decks seemed less of an issue.

Suitably armed with actual track plans and bridge drawings from CP's archives, I first tackled the critical deck-to-deck clearances. The objective was to have the switching at Nelson, Castlegar, and the pulp mill at Kraft occur at a convenient height of 42" with hidden storage underneath Castlegar. Initial sketches of the staging and



A rather short Canadian Pacific train No. 81, led by a trio of Fairbanks-Morse units, was photographed on Farron Hill in the spectacular scenery of southern British Columbia in August 1974 just west of Coquendahl by the late Dave Wilkie.



These two photos show the double mushroom peninsula in the middle of the C&W. Top: The Kaslo and Slocan Subdivisions, on the upper and lower decks respectively, face inward while the Boundary Subdivision on the middle deck faces outward. Bottom: Inside the mushroom, Mark is standing on the lower pull-out step as he switches Nakusp on the upper deck (elevation 72").

Learning points

- Southern British Columbia offers numerous interesting modeling opportunities and challenges.
- A helper grade to a summit can serve as the main operational focus on a layout.
- A properly engineered access gate can solve a major design problem.
- A "double-mushroom" plan for the peninsula proved a key part of achieving the layout's overall design objectives.
- A snow scene may provide an additional job as a snowplow is called into service.

storage yard area (see "Separate your storage and staging functions" on page 57) placed the space-consuming but necessary helixes at either end of Castlegar.

The climb up both sides of Farron Hill could take place on a second deck and use the prototype's 2.2-percent grades to good advantage. Calculations showed that with a single-deck transition scene at Shields, I could limit any hidden mainline run to only two helix turns as trains climbed from deck one to deck two. This would take a minute or two at prototypical N scale speeds – acceptable but on the outer limit. So two decks around the outside of the room with staging underneath would work, and my focus turned to making the best use of the center of the room.

A primary objective was to model the isolated rail barge operation. I could imagine an enjoyable evening switching this branch by myself. Was it possible to physically isolate that branch from the rest of the layout to simulate the isolation of the actual Slocan and Kaslo Subdivisions?

It could be done if a smaller room were located in the middle of the garage. Then the missing piece fell into place: I could use the rail barge to transfer trains from one deck to another. This led me to a "double-mushroom" design – one mushroom above another when viewed in cross-section – for the central area of the garage. The climb to Farron would be facing outwards and the isolated Slocan and Kaslo Subdivisions facing inwards, one above the other, sandwiching the Farron climb.

That looked good in sketches, but four questions remained: How would the branch leave the main line and pierce the mushroom? How would people enter the mushroom? Could my crew comfortably operate on the various decks? And how would full trains be loaded on and off the barge?

The key gate

The first challenge – getting trains inside the mushroom – could be solved with a swing gate across the main aisle at South Slocan Junction. Conventional wisdom is to forego gates because of reliability and maintenance concerns. However, it seemed to me that careful construction would bring the ends of the gate and mating benchwork into proper alignment by the closing action of the gate itself. Then latches would lock the gate into position. Considering the huge gain in operating potential, gates seemed worth the effort and risk.

One complexity at South Slocan was accommodating a small storage yard for exchanging woodchip hoppers between the Kraft mill job and the Slocan way freight (local). This would require cars to be left on the gate while it was moved. I was also concerned about the gate blocking the main aisle. The gate therefore needed to be convenient to open and close from either side, and it needed to move smoothly and remain level as it moved to keep any cars in the yard in place.

Part of the solution came when I saw a motorcycle sitting upside down with its empty forks in the air. There was the perfect bearing for the gate! It would rotate smoothly and carry a large overhanging weight, and it included two bearings and an axle. After further consideration I decided

the front forks of a bicycle would be strong enough, so I made a trip to my local bike shop, hacksaw in hand, to obtain the South Slocan gate bearing.

Spring-loaded ball detents allow operators to easily open and close the gate from either side, yet these detents positively align the tracks when the gate is closed.

I cut matching curved hardwood runners on my band saw, using a homemade trammel to get exact radii, and mounted the female runner on the main benchwork and the mating male runner on the end of the gate.

Then I drilled two shallow holes in the female runner for the ball detents on the gate to engage and precisely position the closed gate. A bit of silicone grease on the hardwood cuts down on wear.

The gates have been in operation for four years and work reliably. It helps that the benchwork is quite rigid, being made with structural members laminated from $\frac{3}{4}$ " plywood secured to the concrete floor.

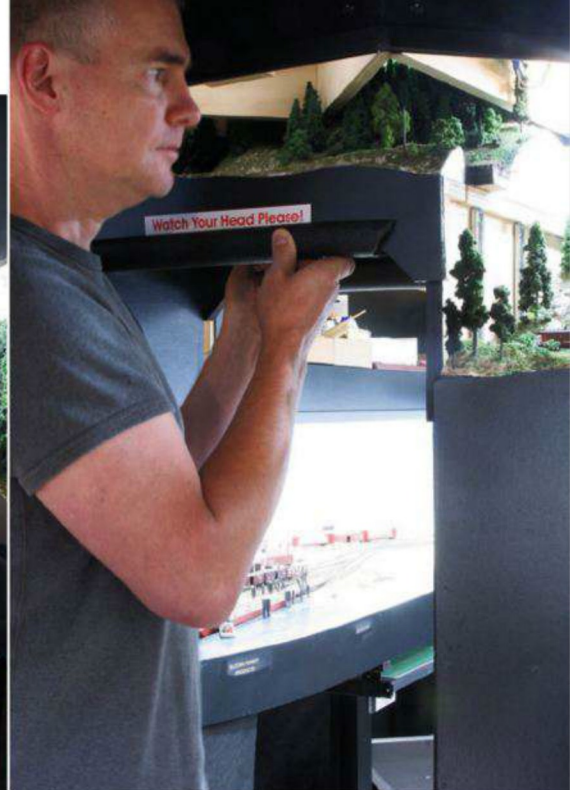
Entering the mushroom

The second challenge was getting people into the mushroom. The track on the middle deck of the mushroom would be about 54" from the floor at the logical place for people to enter the mushroom. I wanted to provide a duckunder there, or preferably a nod-under, but the elevation of Rosebery on the top deck limited what was feasible.

In most areas of the garage, the ceiling height is a generous 8'-6", but I wanted the overhead garage doors to remain functional. This required a suspended 7-foot ceiling in the north half of the garage. By allowing a minimum of 12" for benchwork thickness, valances, and the track at the Nakusp end of the third deck, the track at Rosebery would be 72" above the floor. A thin-profile lift gate under Rosebery for people entry into the mushroom might work. A lift gate with 10" of vertical travel would provide a workable duckunder in its closed position, but a much more convenient 5'-1" nod-under when lifted.

To ensure precise track alignment, the lift gate and matching benchwork have mating vertical tapers. The male tapers are mounted under the gate and the female tapers are on the fixed-benchwork. The weight of the gate itself causes secure and precise alignment when it's lowered.

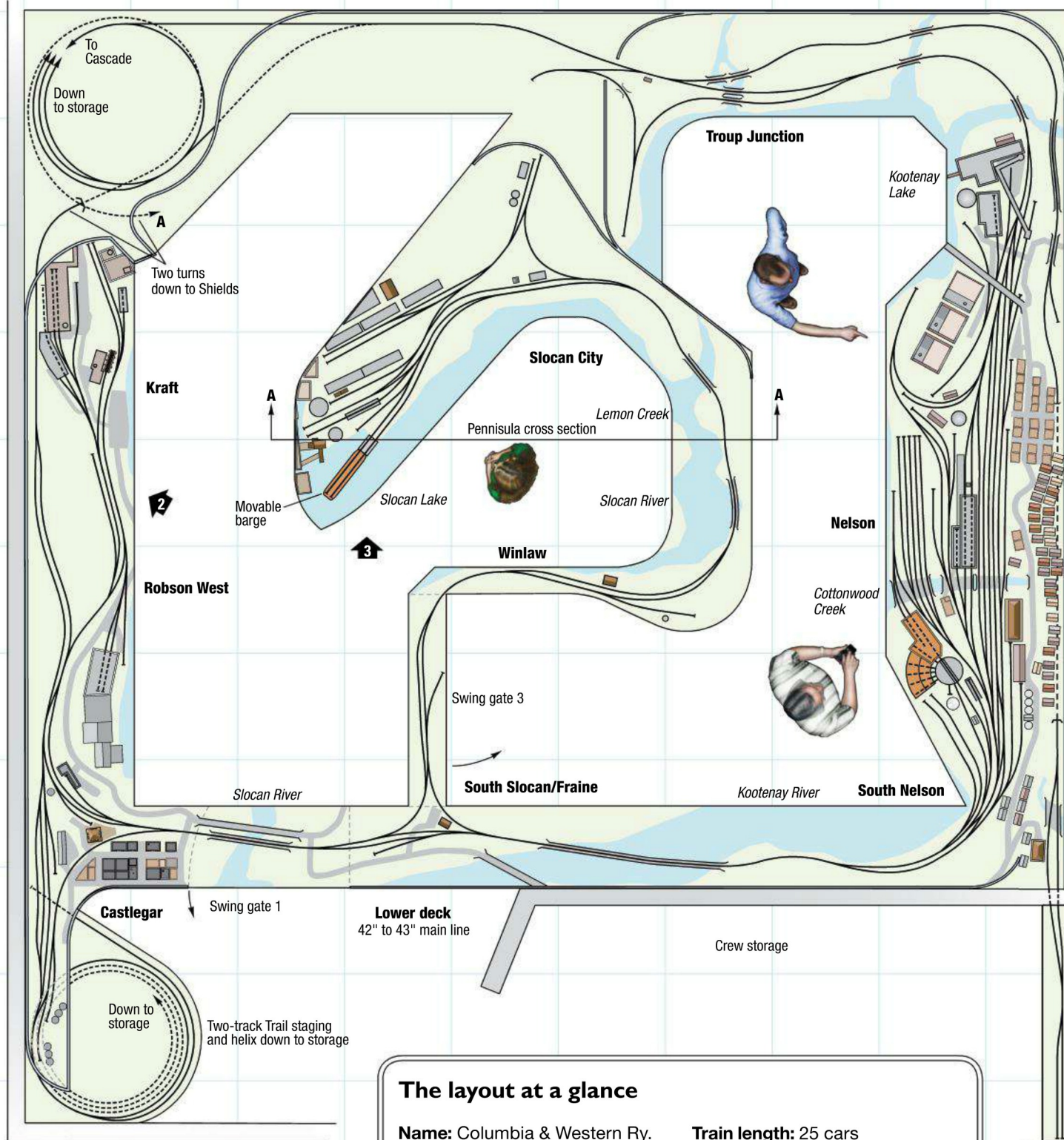
The final lift gate challenge was the backdrop, which needed to vary in height with the gate. I solved this by
(Continued on page 56)



Mark built swing and lift gates to allow access while maximizing operations. Left: Train traffic into the mushroom is by way of a swing gate at South Slocan. The ball detents and hard wood runner visible on the gate lock into matching parts mounted on the benchwork. A bicycle neck bearing smooths the gate's pivoting motion. Right: A short lift gate facilitates entry into the mushroom. When down, it's a 4'-3" duckunder; raised, it's a 5'-1" nod-under.



2. That's Mark pulling out the storage transfer table to manually index it to a lead track. The smoked Plexiglas on the front folds down for improved access; when the storage lighting is turned off, this window is opaque. Castlegar and its large pulp mill occupies the middle deck, while Cascade is on the top deck.



Columbia & Western Ry. in British Columbia

N scale (1:160)
Room size: 19'-6" x 20'-10"
Scale of plan: 3/8" = 1'-0", 24" grid
Numbered arrows indicate photo locations
Illustration by Jay Smith

Find more plans online in the
ModelRailroader.com Track Plan Database.

The layout at a glance

Name: Columbia & Western Ry.

Scale: N (1:160)

Size: 16'-6" x 19'-6"

Prototype: Canadian Pacific

Locale: southern British Columbia, Canada

Era: October-November 1970

Style: multiple-deck on walls, plus double-mushroom central peninsula

Mainline run: 220 feet

Minimum radius: 15"

Minimum turnout: no. 6

Maximum grade: 2.5 percent

Train length: 25 cars

Benchwork: open grid and open grid on T girder

Height: deck elevations are 42", 54", and 72"

Roadbed: cork

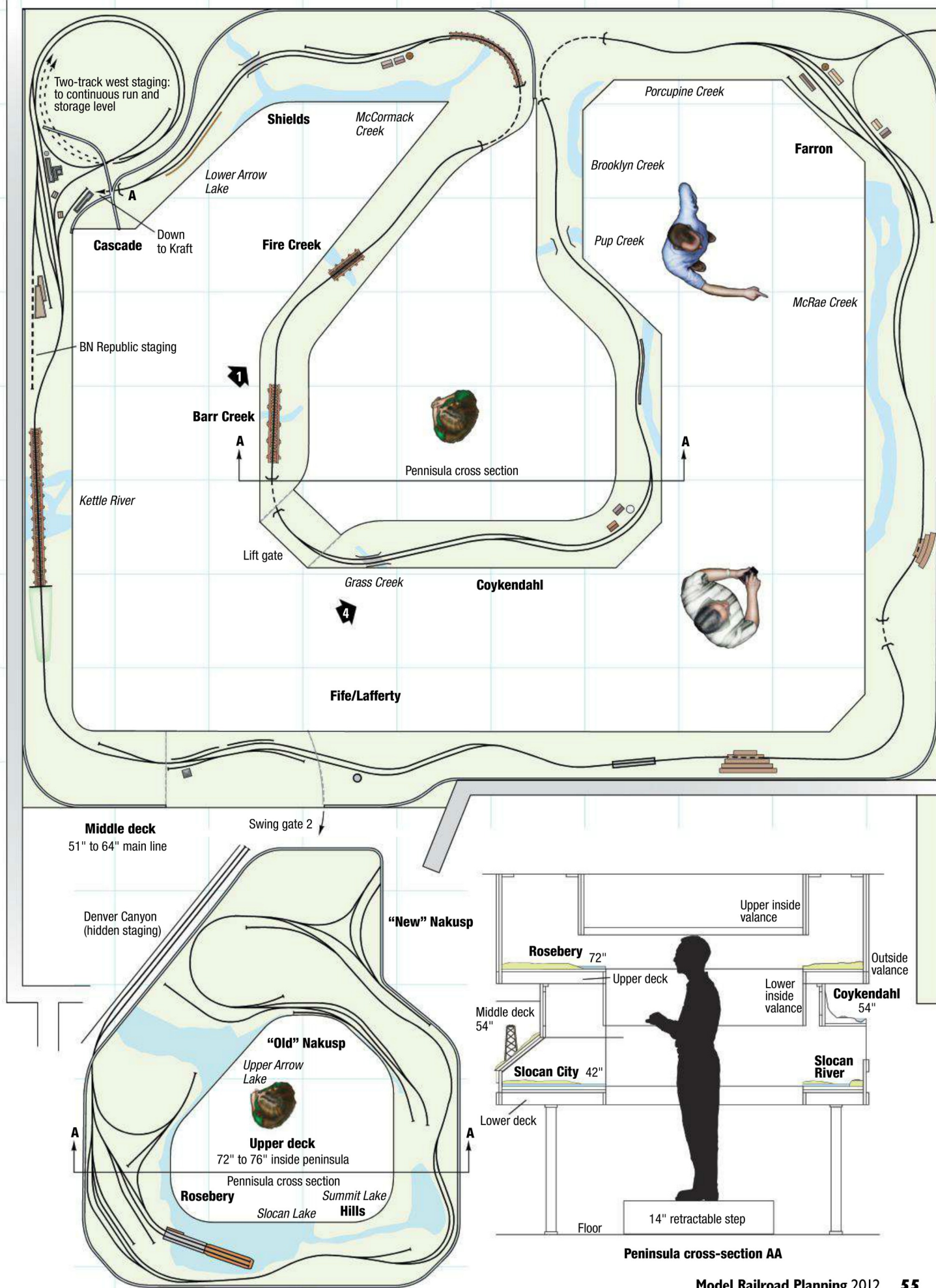
Track: Peco code 55

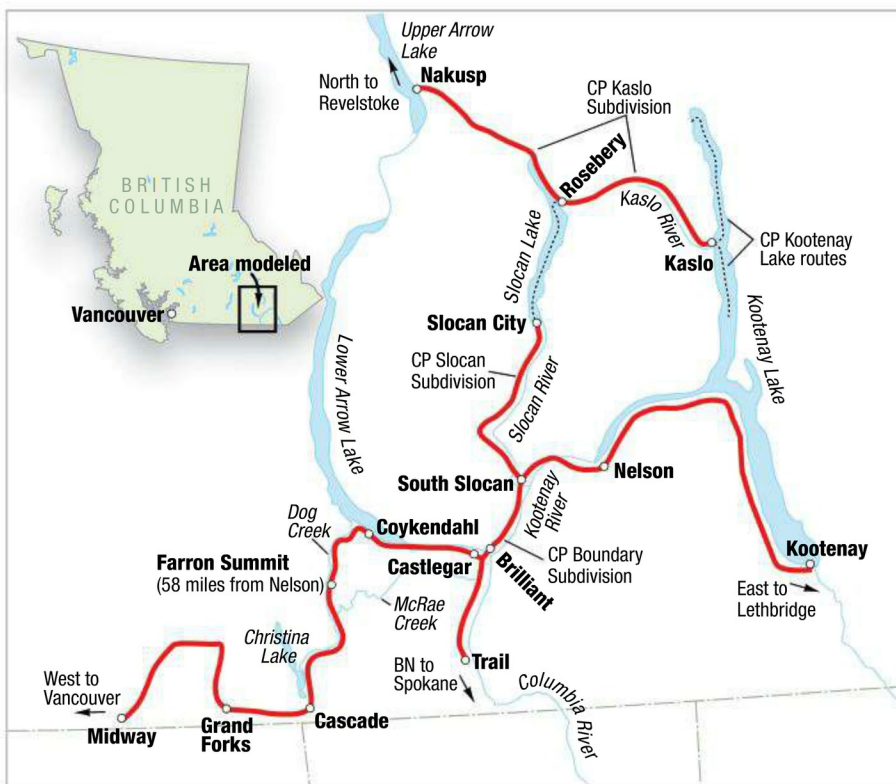
Scenery: Sculptamold over plaster cloth; cast and carved rocks

Backdrop: hand painted linoleum (back side)

Control: Digitrax Digital Command Control (DCC) with radio throttles

BN
Spokane
staging





(Continued from page 53)
using a plastic shade so the backdrop bends backward as the gate is lifted and pulls taught when it's lowered.

Operating in the mushroom

Once inside the mushroom, operators can comfortably operate on both

the Slocan Subdivision (42" lower deck) and the Kaslo Subdivision (72" to 76" upper deck). In 1970 operations these remote subdivisions hosted only one train at a time. Thus, my operators would be operating either on the lower deck or the upper deck, but not on both at the same time.

3. H16-44 no. 8727, built by Jeff Briggs from a Kaslo Shops kit, switches its train onto a barge at Slocan City. This scene is inside the mushroom on the lower deck. After the barge is loaded, the tug *Iris G* will take it up Slocan Lake to Rosebery, located on the upper deck directly above this scene.

I decided to provide a movable 14" step that extends out to cover the entire floor of the mushroom when it's needed to operate the upper deck. This step can then be rolled out of the way to operate the lower deck.

I built the step as a hollow box sitting on casters and running on a 2" x 4" guide rail. For stability, the casters are sprung so that a small weight on the step causes the platform to settle to the floor, forming a stable, unmovable surface for operators.

Operational car barges

The fourth challenge was to make the car barges operational. With an eye to robust operation, I made my barges from 5/8" hardwood wrapped in thin styrene. Slots for the rails were cut into the decks using a saw blade mounted on an indexed grinding table. The result is precisely gauged track that's powered with brass wipers on the back of each barge. These wipers contact a pair of brass pilings when the barge is pushed against them.

Following prototype plans and photos, I constructed the two slips

Separate your storage and staging functions

Staging has become a sub-specialty within layout design. Everyone seems to have their own opinion, so fiddle yards, hidden or visible staging, through or continuous vs. muzzle-loading and helix staging each have their proponents and applications.

My approach to staging involved several points:

- the substantial amount of real estate involved in staging for multiple 25-car trains, especially as a percentage of the space I had available
- traffic flow with trains cycling between different end points: east and west, east and south, and west and south
- the deck-to-deck height between the staging yard and other decks
- the time required for a train to move from a staging yard to the active portion of the layout.

These requirements initially led to a single through staging yard and turning loop that could feed each of the three different ends of the active layout. Putting this staging on the lowest deck made the most sense. It increased the layout density in the room, but I had to use helixes to get the trains up to the active decks. I located the staging along the longest wall available, about 25 feet.

I've been intrigued by the use of traversing tables for staging ever since John Signor showed how he did it in the

December 2000 *Model Railroader*. This method removes the need for multiple turnouts and their automation, and it can increase the usable length of a staging yard.

Charging down that design path, I discovered an additional benefit: By locating the entrance and exit tracks to the traverser at the front of the benchwork, all of the tracks are readily accessible for maintenance even with a limited deck-to-deck clearance of 6".

The big disadvantages of a lower-deck traverser table were the need to pull it out into what could be a crowded aisle to select a track, and the longer-than-desired hidden helix runs from staging to the active layout. However the top of each helix had room for west and south staging tracks just out of sight of the active layout. Adding additional tracks at the continuous run connection from Troup Junction halfway up the larger helix serves as east staging.

Separating the storage and staging functions allows the large central storage yard to feed much simpler distributed staging tracks immediately adjacent to their on-stage entry points ready for use during operations. This arrangement minimizes hidden running during operating sessions, provides for rapid restaging of through trains between sessions, changing consists as desired, and preserves on-layout storage for excess rolling stock. – M.D.

from soldered brass and bolted them securely to the benchwork. Running trains across these slips and onto the barges is a real treat for the operators, and the appeal of this isolated branch with its operating rail-to-water connection makes this branchline run one of the most popular jobs on the layout.

Deep vertical scenes

Another design challenge was accommodating the vertical scenes of the high bridges above Lower Arrow Lake on the middle deck. Even when selectively compressed by 30 percent, the bridges still require nearly 12" of space below the rails. When this space is added to the benchwork, the deck-to-deck clearances are a problem.

I achieved the required vertical separation by sloping the backdrop behind Slocan City and bringing the bridges to the front of the middle deck. In effect, the middle deck in this area is built as a tilted open-grid frame that's suspended between the lower and the upper decks.

The entire mushroom is very stiff because of its round shape and firm attachments to the floor and ceiling. It easily supports my weight at any point without any noticeable deflection. I must point out that double-mushroom geometry is very complicated, and I could not have constructed it without accurately designing everything on a computer. Even then, the sloped and



4. Extra 4052 East, loaded with copper ore bound for the smelter at Trail, has stopped for a brake test at Coykendahl. The train has just left narrow Pup Creek and is now stopped on the hillside above Lower Arrow Lake. The South Slocan swing gate has been opened and swung into its recess under the benchwork.

curved backdrops took considerable test-fitting and trimming to achieve the desired final fit.

Initial operations

The layout was fully operational by mid-2008, and I held the first operating session that September. I've started using a software-driven timetable and train-order dispatching system. It uses a 5:1 fast clock and will eventually feature operating train-order signals. My next major goal is to construct all the high bridges.

A short video of the layout can be seen at youtube.com/user/mark-dance63. And more photos of the Columbia & Western are posted at flickr.com/photos/27907618@N02/. **MRP**

Mark Dance lives in Vancouver, B.C., with his wife, Christiane, and three children. He has been an N scale modeler for 36 years; the C&W is his fifth layout "but first one of any significance." Mark has a degree in mechanical engineering and spent 20 years as a product designer/inventor and manager.



Staging and fiddle yards, such as this one on a former iteration of David Barrow's Cat Mountain & Santa Fe, can be essential parts of operation on a model railroad. Tommy Holt photo

How to place staging and fiddle yards

Ways to maximize the mainline run on your model railroad

By Tony Koester

Photos by the author except where noted

A staging yard is a place where trains are held before they enter or when they leave the scenicked portion of a model railroad. Complete trains are staged (assembled and parked) before an operating session begins. Some staging yards are of a through design, allowing trains to be reused during an operating session, but without being worked in the staging yard. Since the main idea behind staging is to simulate trains coming from or going to distant locales, most staging yards are hidden from view behind a fascia or curtain, or even located in a separate room.

If trains are reworked off of the scenicked section of the layout during an operating session, that is called a fiddle yard. The person who works on these trains may be called, in fellow model railroader Lee Nicholas' colorful term, a "mole." This is much like being a yardmaster who switches cars into trains in a modeled classification yard, with one big difference: Some cars may be removed from the railroad and placed in storage drawers or on shelves, and new cars added to the mix. Fiddle yards may or may not be scenicked, and they may have operating engine turning and storage tracks.

Form follows function

A goal of a layout designed for operation is to minimize the number of "model railroad thoughts" each crew-member is forced to cope with. If whatever a person is asked to do is analogous to something a professional railroader has to do, we're in good shape. Lining switches, obeying signal indications, blowing the whistle, checking a timetable, and opening and closing a throttle are all legitimate railroad tasks. But one thing a pro doesn't do is to run a train beyond the scenery.

Ideally, movements in or out of a staging or fiddle yard are handled by

one designated person so that road crews have a realistic trip over the railroad. (See Andy Sperandio's "The Operators" commentary in October 2007 *Model Railroader*.) This isn't a bad job, however, as the lack of realism is offset by the sheer number of trains that person gets to operate.

It follows that we want to maximize the run through the scenery and minimize the run between the spot where the road crews get on or off their trains and where those trains are staged. That is, we want road crews to enjoy the satisfaction of a successful run over the entire district or subdivision with no hint of the world behind the black curtain.

Additionally, to ensure maximum mainline run, we want to locate staging yards that represent the rest of the rail network just beyond crew-terminal yards. By locating modeled and associated staging yards close to each other at one or both ends of the railroad, we use less of the main line's total length to connect them.

Between-session changes

Another reason I prefer to locate staging yards immediately adjacent to working yards is ease of re-blocking train consists between operating sessions. I prefer stub-ended staging yards, which means trains have to be backed out of staging tracks between sessions so I can reverse the positions of locomotives and cabooses.

Since the two modeled classification yards on my layout are close to the east- and west-end staging yards, I can easily back each train into an open track and add or subtract cars to achieve a desired train length. I can also turn steam engines as required.

While I'm doing that, I re-block the train to make it practical for the yard crew to switch each train efficiently. Note that the same re-blocking and train-length adjustments would be required for a through (double-ended) staging yard with rare exceptions – unit coal trains and all-reefer blocks come to mind.

Muzzle-loading staging yards

When I designed my old HO scale Allegheny Midland layout back in 1973, the idea of staging was just catching on. Allen McClelland had made good use of it on his well-regarded Virginian & Ohio layout and was already expanding on the concept. But the idea of what came to be called a muzzle-loading staging yard – that is, one made up of stub-ended rather than through tracks – was largely untested.

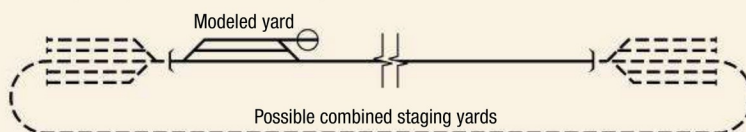
Staging yard options

Passive staging or active fiddle yards should be located so as to maximize the mainline run. Placing staging just beyond a yard, as shown below in examples 1 and 2, makes it easier to change consists between operating sessions. A hidden mid-layout staging yard, as shown in example 3, can temporarily hold trains to lengthen their runs. This

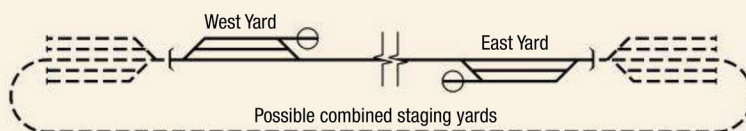
type of yard could be a helix, and an operator can work with other trains while those in staging "add miles." Yet another option (example 4) is to place staging just beyond a mainline junction that feeds a modeled branch. The double-ended staging yard allows mainline trains to make branchline set-outs and pickups in both directions. – T.K.

Staging yard types and locations

1 Point to point, one classification yard



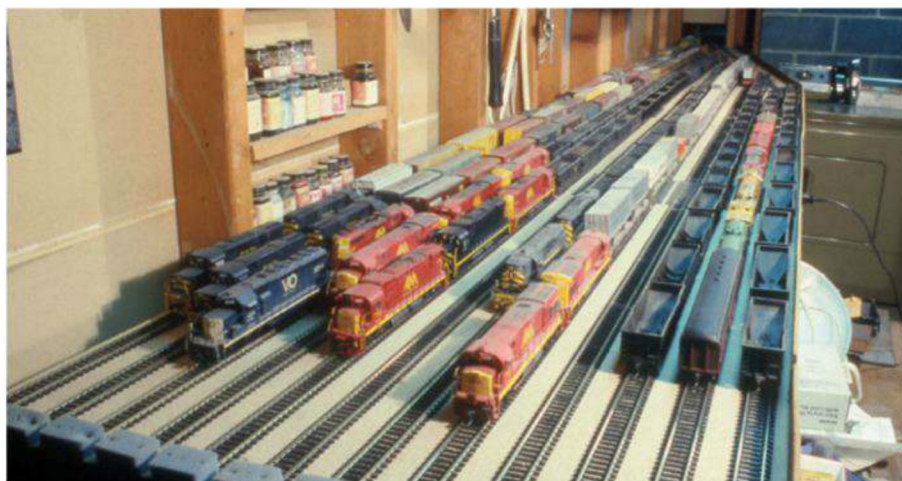
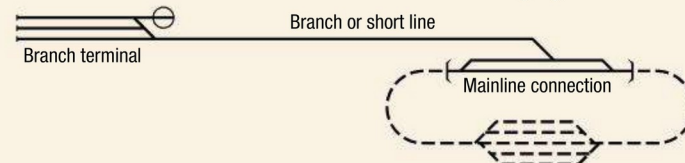
2 Point to point, two classification yards



3 Branch or short line, center and end staging



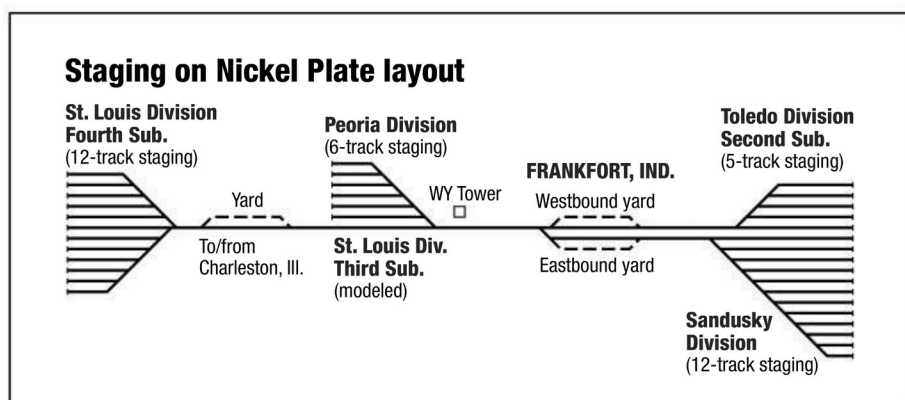
4 Branch or short line to main line connection with staging



The north-end staging yard on Tony's former Allegheny Midland began as a short six-track yard but was soon expanded to 12 longer tracks (as seen here), which were later doubled in length to accommodate even longer trains.



The east-end staging yard on Tony's Nickel Plate layout is open to the aisle on the front and end, but it's dimly lit with the support members painted black to avoid calling attention to the off-stage trains.



This schematic shows how the four staging yards that comprise the unmodeled segments of Tony's NKP layout are located close to the two division-point yards, ensuring maximum mainline length. Having staging yards next to modeled yards also makes re-blocking trains easier.

The muzzle-loading idea seemed workable to me for a host of reasons. I had no desire to reuse trains during an operating session, as they were assumed to have continued on to distant destinations. A stub-ended yard could fit on a relatively narrow shelf, whereas return-loop staging yards required a huge footprint. And stub yards used track length more efficiently in that there was only one yard ladder rather than two.

I also employed this approach to staging on my current HO layout. East-end operations are supported by one 17-track staging yard, accessible on two sides from the aisles. Five of those tracks represent the Nickel Plate Road's Toledo Division, and the other 12 represent the Sandusky Division. Both divisions are east of downtown Frankfort, Ind., a small city I've modeled on my layout.

At the west end of Frankfort, there's a six-track staging yard representing the Peoria Division. The roadbed and surrounding benchwork on both of

these staging yards are open to view from the aisle to make them accessible, but they are dimly lit to avoid drawing attention to trains that supposedly aren't there.

The portion of the Third Subdivision of the St. Louis Division that I've modeled runs west out of Frankfort, covering more than eight scale miles of main line to Charleston, Ill. West of the crew-terminal yard at Charleston is the Fourth Sub, represented by another dozen staging tracks.

Combining functions

Not everyone has room for even one major yard, let alone a pair of them plus the supporting staging yards. Not to worry; one yard can perform the functions of a through staging or fiddle yard and not one but two crew-terminal yards, as Jim Six has done on his Michigan District of the New York Central layout. One end of Jim's HO track plan is reproduced on the next page, but you can read about the entire project in MRP 2010.

Jim enjoys operating his railroad, but he derives at least equal enjoyment from building models and creating realistic scenery. He therefore took pains not to "over-build." That is, he kept the footprint of his railroad rather modest. That, in turn, led to disguising the staging/fiddle yard as a through yard representing both ends of this branch. This hybrid design means that trains can be staged here, but they could also be switched in real time as a fiddle yard or as either of two modeled terminal yards.

Visible staging

Life would indeed be dull if we agreed on everything. I'm a strong advocate of hidden staging or fiddle yards, as I want trains to appear to come from or go to some distant location. That's hard to achieve if everyone can see the trains-in-waiting sitting right out there in the open.

But hidden yards have one potential liability: They're hidden! This can make maintenance and re-railing cars difficult, and operators may be spooked by not being able to easily see their trains. There are ways around the latter problem, including closed-circuit video or separate rooms for the staging or fiddle yards, but let's assume that you're in favor of a visible, open staging yard.

That doesn't have to detract from realism if you're modeling a relatively modern era. For several iterations of David Barrow's Cat Mountain & Santa Fe layout, he built staging yards that were right out in the open. In many locations, the Santa Fe and other modern railroads used outlying yards to hold trains until they could be accepted in the classification yards or crews could be called.



Tony's 12-track west-end staging yard, which represents that part of the NKP's St. Louis Division west of Charleston, Ill., is located at 68½" above the floor and hence could be hidden from operator view with a low fascia.

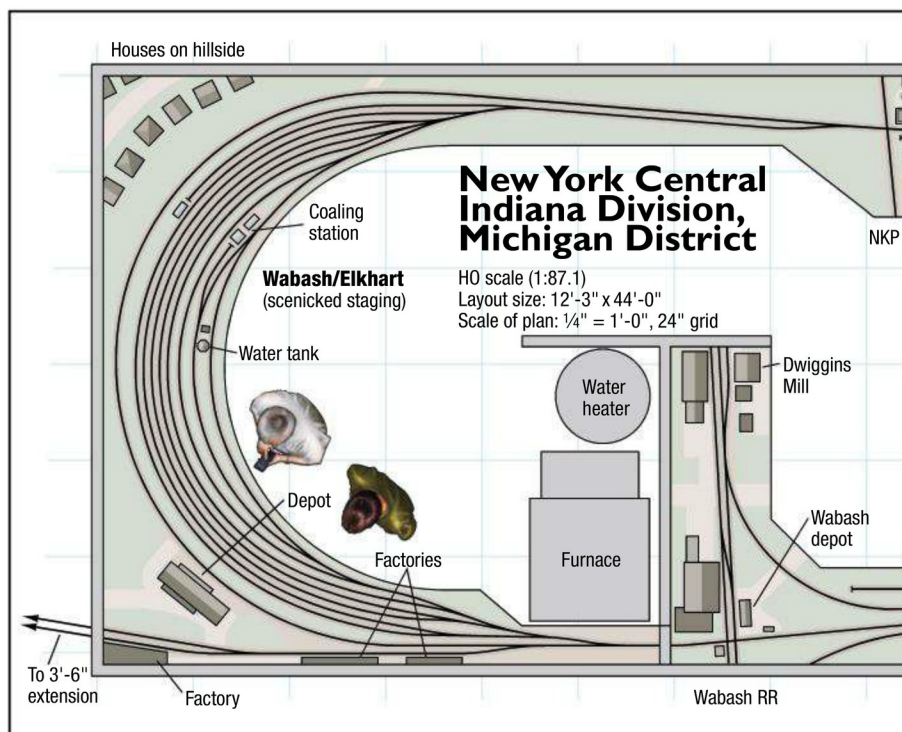
Learning points

- Staging or fiddle yards should be located so as to allow the maximum mainline run.
- It's good practice to avoid having road crews deal with hidden staging yards; if possible, make this a separate job.
- Having a visible, open staging yard doesn't necessarily compromise realism for a relatively modern railroad.
- Staging yards and modeled classification yards can be combined.
- Locating a hidden yard in the middle of the mainline run can create operating options.

David has since decided that he now prefers walk-in staging, with the staging yard in another room. This ensures excellent accessibility yet keeps off-stage trains hidden from view.

Staging in the middle

Model Railroader's publisher, Terry Thompson, came up with an idea for placing a staging yard in the center of a branch line that runs from a junction with the main line (which could be a staging or fiddle yard) to a terminal town. He can lengthen the run on the branch line to any desired interval simply by running a train into staging and leaving it there for a predeter-



To conserve space, Jim Six built a through staging yard representing both ends (Wabash and Elkhart, Ind.) of a New York Central branch, and it can also be switched in real time as a classification yard.

mined time. He could run a train north from the mainline junction into staging, walk to the other end of the railroad, and switch the town with a second train that had arrived previously.

When the switching is done and southbound train is assembled, he could then return to staging and run the northbound train into the end-of-

branch town. That meet would allow the southbound branch train to head out of town and into staging. While the southbound train cooled its heels, he could return to the branch line's end point to work the newly arrived train – and so on. So one person could crew at least two trains in a logical and run-extending sequence. Clever! **MRP**



1. An Allagash Alco Century 420 passes through the Maine village of Weld on Mike Confalone's dramatically revised HO railroad. Mike's new plan features a busy regional railroad in the 1970s.

Expanding a layout's potential

Modeling big-time railroading in Maine

By Mike Confalone // Photos by the author

In early 2009, I began to have second thoughts about the long-term viability of my HO scale model railroad. Several years of effort planning and building my Woodsville Terminal prototype-based, freelanced shortline railroad and neighboring prototype Lamoille Valley RR hung in the balance. By the time summer rolled around, the New Hampshire- and Vermont-based

Woodsville Terminal had joined the ranks of the fallen flags, and the new Maine-based regional Allagash Ry. (AGR) was born.

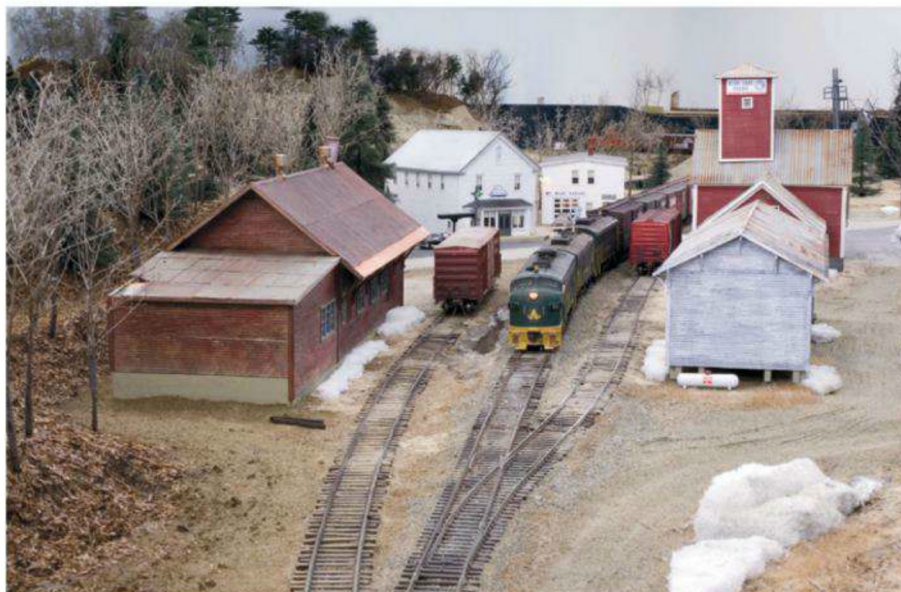
A change of heart

When I informed a number of friends about the change, the response was generally one of quiet dismay and surprise. I'd worked hard to achieve something that had registered well

with fellow modelers [see MRP 2007 and *Great Model Railroads 2010*. – Ed.] Why the drastic change?

I didn't fully realize the root cause of the internal turmoil I was experiencing until MRP editor Tony Koester pointed it out to me. He knew I was a railfan and really enjoyed the drama of "big-time railroading" with multiple diesel consists and heavy traffic. I was a train-chaser at heart who appreciated the visceral nature of the track-side experience.

The Woodsville Terminal was an interesting short line with lots of character, but it was a hand-to-mouth operation, moving at a snail's pace.



2. Allagash train MD-1, powered by the railroad's last three active F7s, threads through Weld, Maine, in April 1977. Weld is a real town in Maine, and two of the structures here – Weld General Store and the Mt. Blue Garage, the white buildings behind the train – are models of actual buildings still in use.

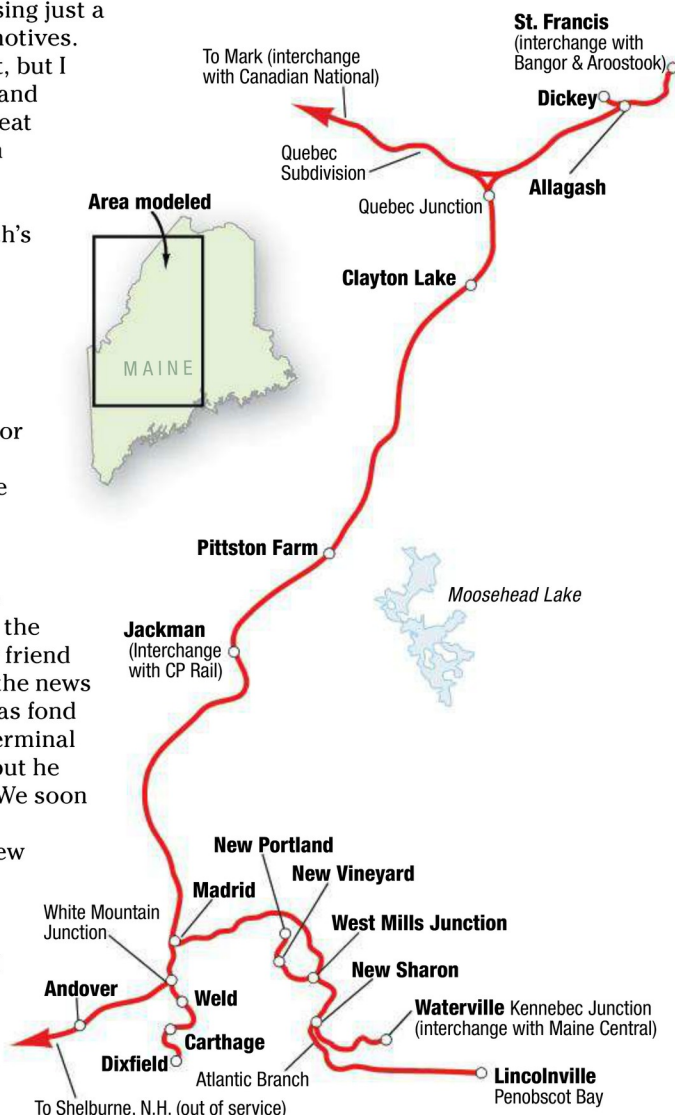
In addition, my locomotive roster was very limited, comprising just a few hand-me-down locomotives. This was sufficient at first, but I was a big-time diesel fan and grew up reading about great model railroads like Allen McClelland's Virginian & Ohio, Tony's Allegheny Midland, and Jack Ozanich's Atlantic Great Eastern, among others. I wanted a proto-freelanced railroad with a full and varied locomotive roster, lots of traffic, and important connections with the major railroads in the region.

I pulled the plug on the Woodville Terminal and never looked back.

Down East to Maine

Within days of making the final decision, I called my friend Joe Posik. He didn't take the news particularly well, as he was fond of both the Woodville Terminal and the Lamoille Valley, but he quickly climbed aboard. We soon became immersed in the business of making the new railroad a reality.

While on vacation on the Outer Banks of North Carolina in August 2009, I spent downtime combing over maps of Maine and discussing the plans with Joe by phone. A major weight

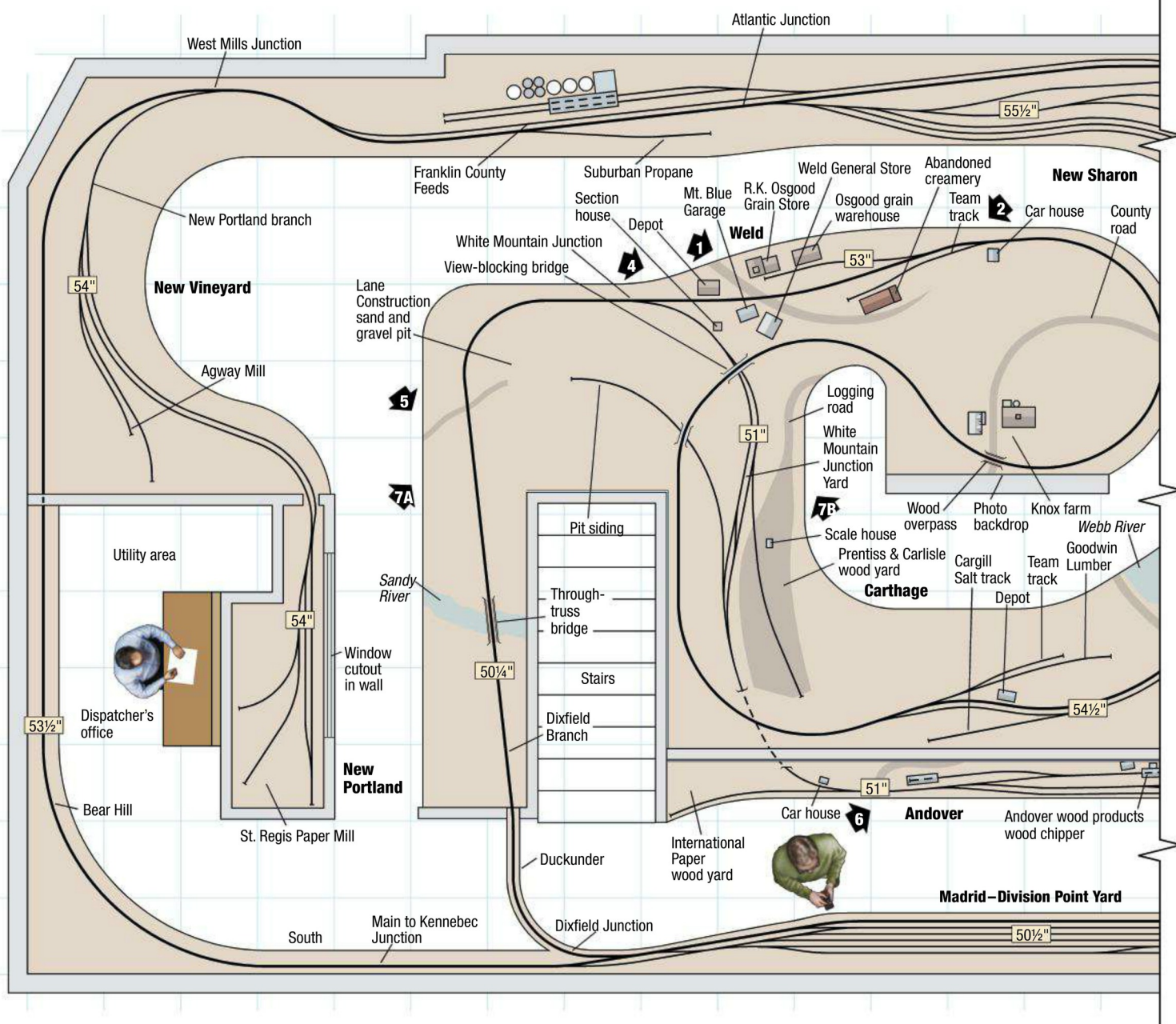


Learning points

- It pays to listen to your inner muse.
- A freelanced railroad gains credibility and plausibility by reflecting the appearance and operating patterns of other railroads in the modeled region and era.
- The car and locomotive roster should also reflect regional characteristics.
- Even a highly prized scene from a previous railroad may not be suitable for inclusion in a new layout.
- Studying local prototypes and taking field trips to the modeled area can pay big dividends.

One or two trains per day, hauling light traffic and running at slow speed, just didn't provide much excitement, so operational interest is somewhat limited. In a nutshell, the novelty of the down-on-its luck short line was wearing off.

I tried to add to the operation by fabricating more traffic (unit woodchip trains, for example), but it began to feel a bit contrived. I was trying to force-feed a big-time diet to a small-time railroad, and it wasn't working.



The layout at a glance

Name: Allagash Ry.
Scale: HO (1:87)
Size: 24'-0" x 58'-0"
Prototype: proto-freelanced
Locale: northwestern Maine
Era: 1977
Style: linear walkaround
Mainline run: 125 feet

Branchline run: 175 feet
Minimum radius: 50" (main); 15" (branch)
Minimum turnout: no. 6
Maximum grade: 1.6 percent
Train length: 25 cars
Benchwork: open-grid, 3/4" plywood subroadbed

Height: 50 1/4" to 57 1/2"
Roadbed: cork on plywood
Track: code 70 flex track
Scenery: extruded-foam insulation board and florist foam
Backdrop: digital photos of actual scenes in Maine
Control: Digitrax DCC

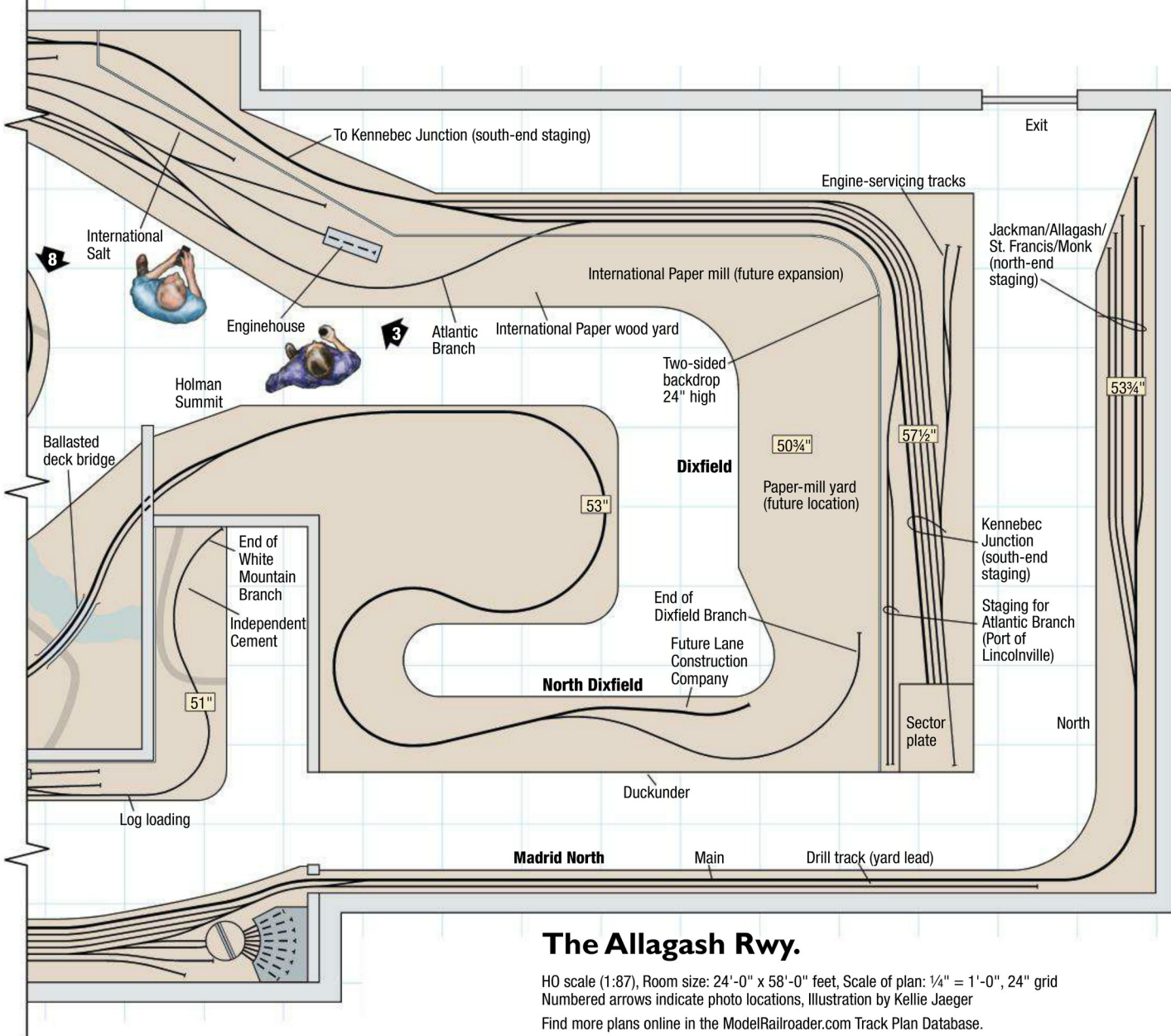
had been lifted, and I was full of excitement once again. By the end of the trip, the route and scope of the new Allagash were clearly defined.

The railroads of Maine have always been a draw for me. Over the years, I've spent time railfanning there, walking in to remote places to experience heavy railroading in the wilds.

Historically, Maine has been a major source of rail traffic. In the late 1970s, the period I'm modeling, Maine was the top paper-producing state in the country. The Maine Central (MEC) and Bangor & Aroostook (BAR) railroads moved much of that paper, and the raw materials to make it. I wanted big-time traffic, and for these reasons, Maine

seemed like a great place for a proto-freelanced railroad.

I located the railroad in the northwestern side of the state, away from the MEC and BAR. The Allagash staked a large swatch stretching from extreme northern Maine along the St. John River at its namesake town of Allagash down through remote logging territory.



The Allagash Rwy.

HO scale (1:87), Room size: 24'-0" x 58'-0" feet, Scale of plan: 1/4" = 1'-0", 24" grid
 Numbered arrows indicate photo locations, Illustration by Kellie Jaeger
 Find more plans online in the ModelRailroader.com Track Plan Database.

A branch to St. Francis connects to the BAR, while a connection with the Canadian Pacific is made at Jackman. The Quebec Sub continues north and west of Allagash, making a connection with the CN at Monk, Quebec.

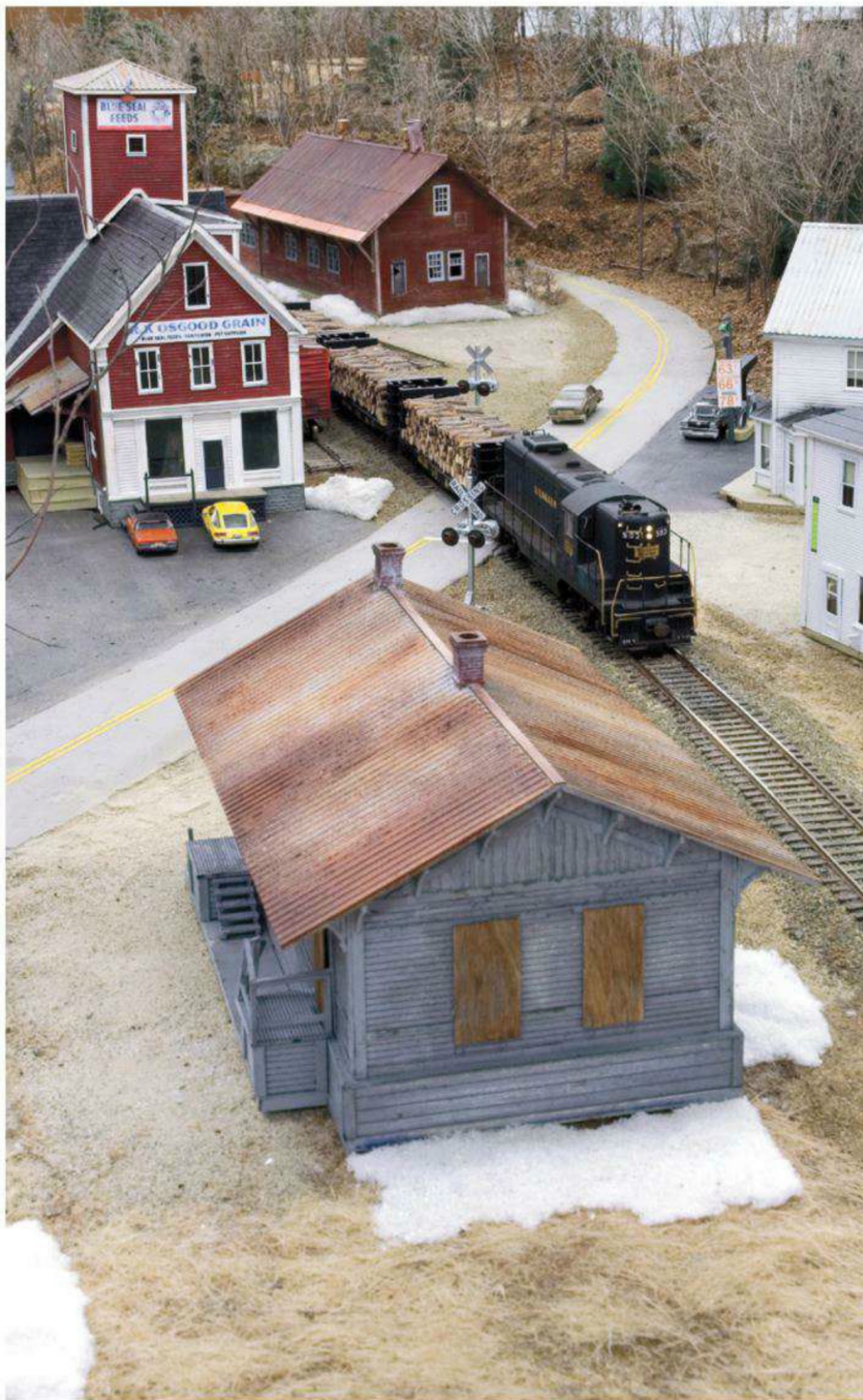
South of Allagash, the main line drops down into Sandy River & Rangeley Lakes country at Madrid. From here, the main continues south to a connection with the MEC at Kennebec Junction, just outside Waterville, while branches to Dixfield and Andover probe deep into the Maine back country. At New Sharon, the Atlantic Branch breaks off and heads toward the Maine Coast to AGR's port facility at Lincolnville.

Planning the traffic base

The Allagash's traffic base was perhaps the most important driver of the plan for building the railroad.



3. The compact yard at New Sharon is home base for the New Sharon Switcher, as well as a set of road power that makes the daily run down to the port at Lincolnville over the Atlantic Branch (seen in the foreground curving out of view). The large Franklin County Feeds mill looms in the distance.



4. With a single Geep for power, the Carthage Turn has a couple of loads of wood in tow as it crosses the main road through Weld en route to Madrid Yard. A sign at the general store shows that in April 1977, a gallon of regular gas would set you back just 63 cents, a far cry from today's prices!

I decided that AGR traffic would mimic that of neighboring BAR and MEC, but with some notable differences.

With the paper and wood-product industries being such a big part of the fabric of Maine, I located several paper mills on the AGR. With that came the planning of traffic for the mills. Pulpwood, wood chips, oil, and chemicals make up a major part of AGR-shipped

raw materials needed for paper making. Finished paper shipped from the mills is also a major traffic source.

Grain is another big industry in Maine. In the 1970s, the local poultry industry was booming, with inbound grain products from the Midwest to mills on the MEC and Belfast & Moosehead Lake railroads providing a significant source of traffic. The

Allagash shares in this traffic. I made plans for a big customer, Franklin County Feeds, at New Sharon. The mill here is based on a prototype on the MEC in both form and function. An Agway mill is planned for New Vineyard, and another, smaller mill may be added at a future date.

Over the years, sand and gravel have been transported by Maine railroads. Tapping into the expansion of Interstate 95 in the 1970s, the AGR takes this to a new level with the operation of unit sand trains from a Lane Construction pit at Sandy River to another Lane facility located somewhere on the MEC (off-layout staging). Other traffic on the AGR consists of bagged grain, propane, bulk road salt, cement, dimensional lumber, veneer logs, and more.

Though Maine isn't known for mining, there have been several examples of copper and zinc mining over the years, some involving rail transport. An actual massive copper and zinc discovery in northern Maine in the late 1970s gives the AGR an opportunity to move copper and zinc ore concentrate destined for export to Europe. This provides another way to differentiate AGR traffic from that of the BAR and MEC.

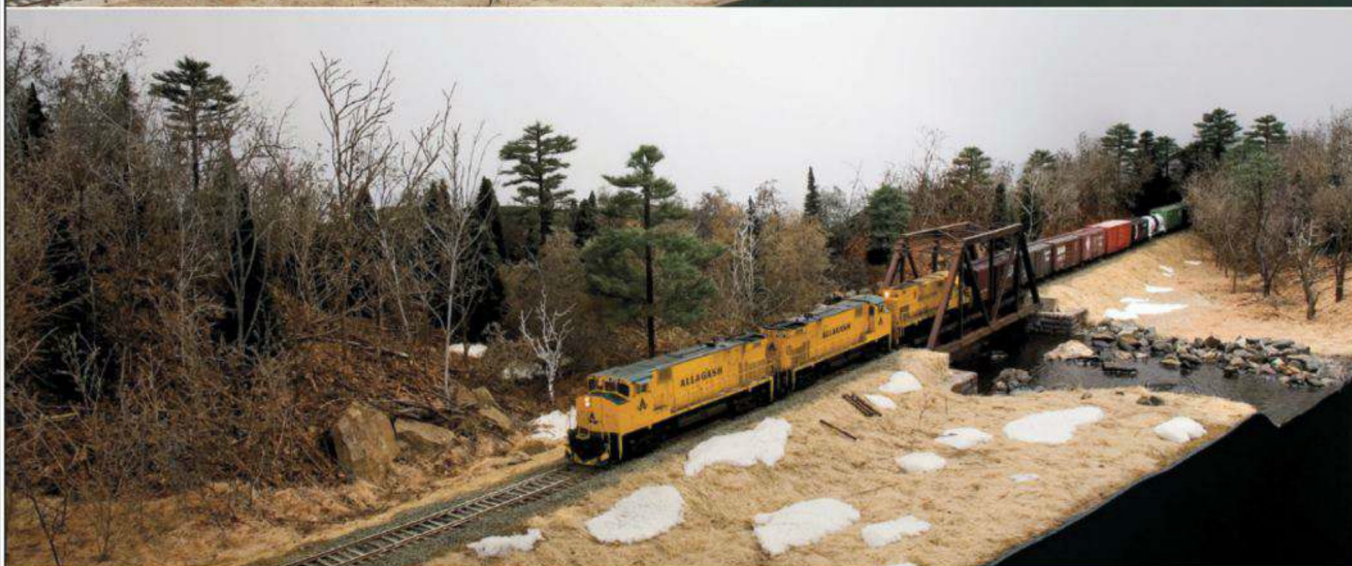
Planning signature scenes

Despite the desire to move on and do something new and exciting, I dreaded the possibility of having to demolish the old railroad. I therefore decided to keep the areas on the old layout that were scenicked and simply re-brand them as parts of the Allagash system. Fortunately, the scenery in northern New Hampshire and Vermont is similar to that of northwestern Maine, so the switch was relatively easy.

The covered-bridge scene didn't fit the image of a modern regional railroad [see "Building a bridge to the future" – *Ed.*], so it had to be replaced. Two other scenically complete areas were re-named: Woodbury is now Andover, and Granite Junction became White Mountain Junction. At Andover, the old wood-fired power plant was replaced with a small wood yard. No changes were needed at White Mountain Junction. At both sites, the scenery, including photo backdrops, was a perfect fit for northern Maine.

After the AGR's route and traffic base were firmly established, I finished the design of the railroad and then the benchwork. An important part of the planning process was determining where to place signature scenes and structures to establish the railroad's time frame and geographical location.

Building a bridge to the future



5. Top: The Fisher covered bridge at East Wolcott, Vt., was a signature scene on Mike's old short line, but the span was out of place on his new regional railroad.

The famous Fisher covered bridge scene on the Lamoille Valley RR was a prototype signature scene, with a scratchbuilt replica of the actual covered bridge structure built by Rich Cobb [see the December 2008 issue of *Model Railroader* – Ed.]. A quick analysis of the plausibility of retaining it confirmed that the bridge simply had to go, as this line – now part of the Allagash's Dixfield Branch –

Above: Allagash train MD-1 (Madrid–Dixfield) is south-bound on the Dixfield Branch as it crosses the new steel truss over Sandy River on a gray day in April 1977.

would host heavy, higher-speed trains of pulpwood, paper, and chemicals. Moreover, the covered bridge suggested backwoods short line, not robust regional.

I replaced the bridge with a modified Central Valley steel through-truss span. I remodeled the river and removed the site-specific photo backdrop. The current scene bears little resemblance to the old one. – M.C.

Sandy River. In Maine, river crossings are common, and this heavily revised scene was inspired by a photo taken by George Pitarys of an MEC train at Bancroft, Maine. A steel truss bridge crossing at Sandy River replaced the previous covered bridge scene on the old layout. The river represents a typical Maine waterway in early spring, with plenty of rocks and moving water.

Weld. Joe and I visited Weld as part of a tour of the route of the Allagash in April 2010. Weld is a perfect

example of small-town Maine and begged to be modeled, but with a railroad running through town, of course! Modeling Weld included building several of its prototype structures, including the Weld General Store and Mt. Blue Garage, both scratchbuilt by Rich Cobb. To these I added the R.K. Osgood Grain building, a converted freight house, a boarded-up depot, and an abandoned creamery. A road, working crossing flashers, a maintenance-of-way car house, and other details round out the scene.

Knox Farm. Barns and farms are part of Maine's landscape, and I wanted the Allagash route to reflect this. The inspiration and planning for the scene at Knox Farm came from a similar scene on the MEC in a photo taken at East St. Johnsbury, Vt., by Dave Albert. This particular scene required careful planning, not only to ensure that the scenic treatment reflected the sometimes hard, rural nature of life in Maine but also to hide a scenically challenging peninsula-end turn-back loop.



6. Andover on the White Mountain Branch was formerly called Woodbury, the heart of Mike's old Woodsville Terminal short line. That line is now just a marginal branch

on the Allagash, but it still generates enough traffic to justify a regular turn from Madrid. Alco RS-1 101 has just switched out the Androscoggin Co. chip loader.



Carthage. Carthage is a good example of how desolate parts of Maine can be. Climbing up out of the paper-mill town of Dixfield, the railroad threads a rock cut, emerges from the woods, and crosses a deck bridge over a local road to reach a remote passing siding and lonely depot, which now serves as a maintenance-of-way base. Behind the depot, local woodcutters load pulpwood by the single car.

New Sharon. A major industrial center on the Allagash, New Sharon is home to the Franklin County Feeds mill, a Suburban Propane terminal, an International Paper wood yard, and a road-salt loading area. In addition, the AGR has a compact three-track yard and single-stall enginehouse and modest diesel servicing facility. The New Sharon Switcher is based here and services the local industry at New Sharon. In addition, it sets up trains to and from Lincolnville, as well as the nightly turn to Madrid to Kennebec Junction, and the peddler local that comes down to New Sharon from the paper mill at New Portland.

Functional yards

Building a larger railroad with considerably more traffic pointed to a need for both on- and offstage yards. I wanted to run trains approaching 25 cars, which required adequate staging yards at both ends of the railroad and a major classification yard to make and break up trains.

The staging yards are located at the south end (Kennebec Junction and Lincolnville, the offstage interchange



7. Top: Dixfield-Madrid train DM-2 sports an all-yellow consist led by Alco C-420 208 as it heads past the entrance to the Lane Construction Co. sand and gravel pit. Above: The high-level view shows a single Alco C-420 on the "Sandman" as it works the pit. Across the aisle is the main line at New Sharon.



8. With a pair of brand-new Allagash 50-foot paper cars on the head end, a veteran F7 and one of just two remaining Alco RS-3s still in the original black-and-gold scheme power train DM-2 around the big horseshoe curve at Knox,

named after the old farm on the hill. This scene disguises a peninsula-end turn-back curve. The barn and farmhouse were scratchbuilt based on prototype structures in the area; Mike used a real photo for the backdrop.

with MEC and Atlantic Branch port facility, respectively) and the north end (Allagash/Jackman/St. Francis/Monk, the offstage interchange with CP, BAR, and CN, respectively). Both yards employ space-saving sector plates.

Madrid is the division point on the railroad, dividing the Northern and Southern (modeled) divisions. Madrid Yard is the main classification yard for traffic coming off the Dixfield and White Mountain branches, as well as mainline traffic to and from both the north and the south. This long, narrow (18") yard has five tracks, and will eventually have a fully equipped diesel-servicing terminal and eight-stall enginehouse. Madrid Yard is the pulse of the railroad, with near constant activity during a typical operating session.

One of the key features of the yard's design was the inclusion of an 18-foot drill track (switching lead) at the yard's north end. This allows the yard switcher to constantly drill cars without fouling the main.

The diesel roster

Planning the Allagash Ry.'s locomotive roster was perhaps the most

enjoyable of the myriad tasks required to get a new proto-freelanced railroad off the ground. After designing both retro and modern-day heralds and paint schemes, Joe and I got down to the business of determining what locomotives a railroad like the Allagash might have operated in 1977.

We looked to neighboring railroads MEC and BAR for inspiration while simultaneously trying to give the AGR fleet its own character. Electro-Motive Division F-units were high on the want list. The MEC had F3s, but they were gone by the late '60s. The BAR, however, had a number of F3s still in daily service in 1977, so we opted for a lone F3 and a trio of F7s. These, along with a few GP7s, would handle traffic on the branches to the paper mills and other secondary service.

Second-generation GP38s came next to handle mainline trains. On the Alco side, a stray pair of RS-3s still holds on, while Alco switchers and a couple of RS-1s handle yard chores and some local work. These choices were all fairly consistent with those made by the MEC and BAR.

To set the AGR apart, we made room for a small fleet of Alco Century 420s to team up with the GP38s on road trains, thus making it the only northern New England road to roster second-generation Alcos. Satisfied with the C-420s, and after Alco had shut its doors for good, the AGR added to the mystique by purchasing three Montreal Locomotive Works (MLW) M-420s, which are the

newest power on the railroad. In a joint effort with CP Rail, they'll provide power for the unit export ore train.

Any regrets?

I sometimes ponder what I might have done differently had I planned for the Allagash from the beginning. I'm happy to report that I don't think I would have changed much at all.

A large, un-scenicked section of the old Lamoille Valley RR, which is now part of the AGR's Dixfield Branch, was torn out and rebuilt in the spring of 2011. Some of the curvature was too severe to support a railroad of the size and scope of the AGR. Also, the construction techniques I used back then needed upgrading. Beyond that, there was nothing major that I felt needed to be changed.

The AGR provides a good balance of mainline and branchline action, lots of switching, a challenging track profile, big-time traffic, a variety of Maine-specific industries, and an interesting operating scenario. From a planning perspective, I believe the railroad is a success.

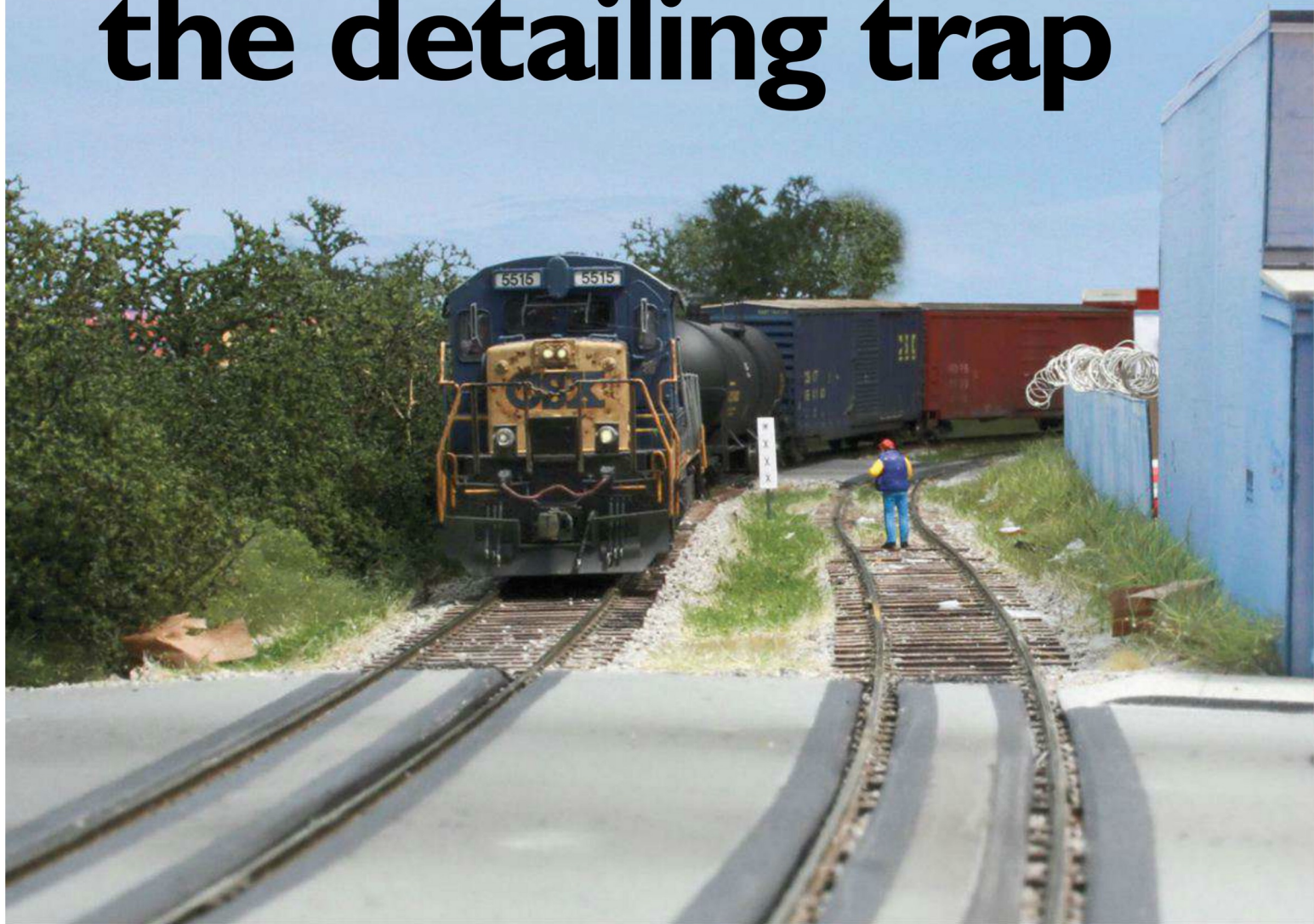
We already have several operating sessions in the rearview mirror, and judging by the smiles on the operators' faces, I can say that, with few exceptions, the railroad works well. **MRP**

Mike Confalone is a regular contributor to Model Railroader and MRP. He is the publisher of Railroad Explorer Magazine and several books on railroading in the Northeast.

Now on ModelRailroader.com

See video of an Alco C-420 and Electro-Motive Division GP38 leading train DM-2 through Weld, Maine, on Mike Confalone's Allagash Ry. at www.ModelRailroader.com.

How to avoid the detailing trap



Planning ahead to make more progress

By **Lance Mindheim** // Photos by the author except where noted

The level of detail we choose to include on our layouts, and where and when we choose to apply it, are planning decisions that often take place subconsciously. As modelers we tend to categorize ourselves as detail-oriented, happy with a less-intense representation of a railroad, or somewhere in between. How we plan to incorporate our detail preference is such an important consideration that it merits promotion to a conscious decision.

Why? After the initial excitement of building that first bit of benchwork

fades, most of us want to see progress. We want to be able to see that we're well on our way toward getting trains running from point A to point B.

If we feel that we're moving toward that objective, our morale stays high, and we march blissfully onward. But if we become bogged down in myriad small details as time moves on, the construction and finishing slows and progress can be measured in feet instead of scale miles. That's when the hobby starts to feel like drudgery – more like a job than an enjoyable and rewarding pastime.

Measuring progress

Rather than selecting a single point on the detail continuum that represents a compromise, we can balance how we approach the various levels of layout detailing. Long stretches can be constructed relatively quickly using “representational” or (to use David Barrow’s term) “minimalist” scenery while, at the same time, smaller key scenes can be highly detailed.

Representational modelers are a stress-free lot, and why shouldn't they be? Their progress is lightning fast, and they quickly get to their end game



Detail modeling, like this scene on Lance Mindheim's HO layout, involves the smallest of elements modeled as accurately as possible. The results are visually striking, but they're time-consuming to produce, which risks frustration before trains are running.

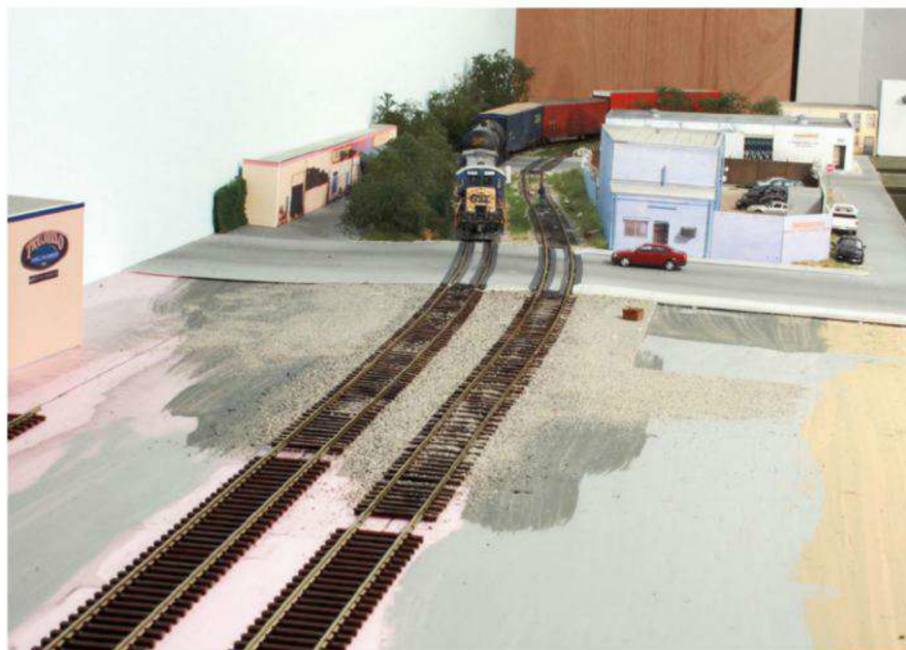
of running trains by utilizing various sizes of boxes, cans, and cardboard tubes with hand-made signs to represent the industries. To avoid confusion, some modelers even go as far as spray painting all the parts of a single industry with a specific color.

However, the detail modelers and to some extent even the "good-enough" crowd risk getting bogged down and losing interest if years pass before they have enough of the railroad completed to begin operating sessions.

If one's mind set is that every nut and bolt must be in place at milepost



A representational approach to layout construction uses bare bones stand-ins for model elements. Generally, these place-holders are the same size and shape as traditional models but contain minimal detail and are often left unpainted. This approach appeals to modelers whose primary interest is operations.



Lance has fully detailed the scene beyond the street and grade crossing for photography, but the foreground area has temporary track and building mock-ups. Combining detail approaches allows you to have the best of two worlds: getting trains running early in the process while having fun doing detail work.

Learning points

- Approach a project's detail level to ensure progress, thus keeping interest and morale high.
- Not everything has to be done to the same level of detail, especially at first when getting trains running is a good initial objective.
- Getting bogged down in a detailing project can derail progress on the entire layout.
- Stand-ins, such as temporary track and structures, can support rapid layout progress without compromising end goals.

Whatever our modeling pace, we're continually faced with the question of detail vs. progress. If we lean too far toward the intensely detailed approach, we run a real risk of getting bogged down, not being able to run trains in the foreseeable future, and eventually losing interest.

As a detail-oriented modeler who enjoys realistic operation, I was faced with exactly that dilemma. I wanted to complete a highly detailed layout but didn't want to wait forever to get it. Fortunately, my approach to detail level isn't an all-or-nothing proposition.

There's no reason why some portions of a layout can't be representational while other portions are finished to a high level of detail. In addition, few components of a model railroad are permanent. Elements initially constructed using a representational approach can be replaced later with new elements containing more detail. With that mind set, even detail and good-enough modelers can have their cake and eat it too.

The same goes for beginners who are just learning about the hobby. Anyone can start with an operational layout and minimalist scenery and gradually transition it into a fully detailed, operating model railroad as their resources and skills allow.

Two weeks to operation

On my Downtown Spur layout (in *MRP 2009*), after the benchwork and rough scenery base were complete, I temporarily laid Atlas code 83 flextrack, loosely holding it in place with a few spots of white glue. I laid all of the track in one weekend. My switch points were lined manually by flipping them with a fingertip. The following weekend I installed the wiring, which was a simple task with Digital Com-



Combining representational and detailed modeling allows for a fully operational layout very early on. Here Kevin Leyerle (red shirt) and Keith Jordon are participating in a weekend of operating sessions on Lance's layout. Top: The use of representational track and labels at future industrial sites allows switching operation in areas yet to be detailed. Bottom, another portion of the same run finds the crew operating on a fully detailed section of the layout.

95.22 before moving to milepost 95.23, things will grind to a halt. Waiting for the day when the trains will run could be a long wait, indeed.

A challenge arises

But what happens when we want to have our cake and eat it too? What if we want to get trains running as soon as possible so we can enjoy prototypical operations with our friends and

still want to have a highly detailed layout as well?

Experience has taught me to take advantage of the energy boost that comes with getting trains running early on. But if one expects the layout to display a high level of detail before regular operating sessions begin, that just isn't going to happen. There are only so many hours per day that can be devoted to leisure-time activities.

mand Control (DCC). So two weeks after the benchwork was up, I was able to run an operating session.

I spent an evening later that week labeling 3 x 5 cards to represent the key industries along the line and placed them next to their respective spur tracks. These cards were gradually replaced with 3-D mock-ups that I constructed by gluing photographs to styrene shells.

One of my two goals for the layout – being able to run trains – was thus met very early on, which kept my interest high. With the pressure off, I could turn my attention to my second goal of detailing the layout at leisurely pace. I started at one end of the layout and gradually replaced the temporary track with much more detailed track and ballast. I also began building more detailed finished structures that replaced the initial mock-ups. In the meantime, train operations continued while I was detailing the layout.

Worth the extra cost

Yes, there's a slightly increased cost associated with building portions of the layout twice. But for most small to moderate-sized model railroads, these extra costs are negligible, and they're spread out over a long interval.

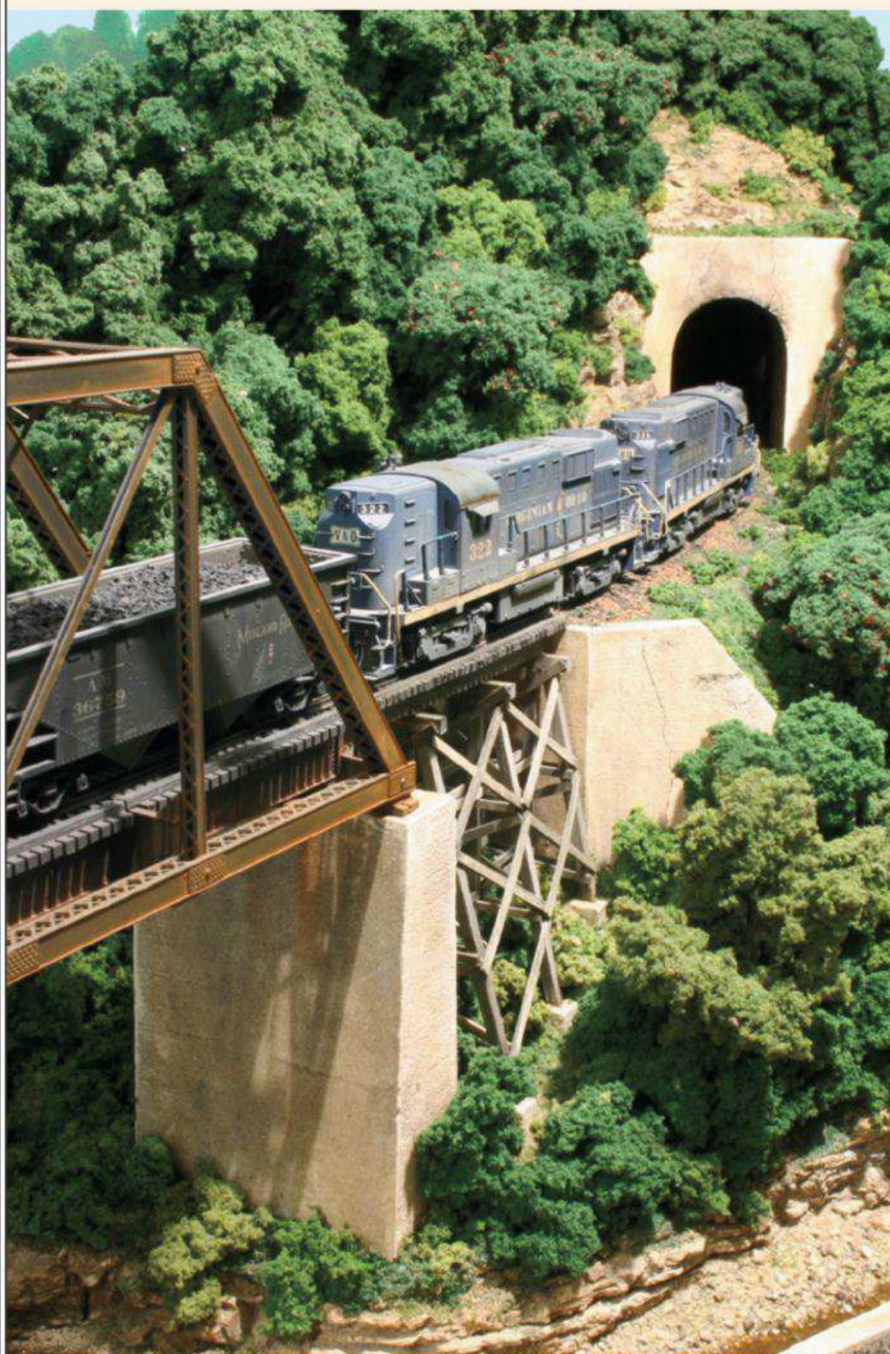
The two weeks spent constructing the representational trackwork and mock-ups were a drop in the bucket compared to the benefits in terms of sustained interest and increased morale. By mixing how you approach the construction and detailing of your railroad, you really can have your cake and eat it too. **MRP**

Lance Mindheim, a frequent contributor to MRP, lives in Silver Spring, Md., with his wife, Cathy, and son, Zachary. He's the owner of the Shelf Layouts Company Inc. (www.shelflayouts.com), a custom layout building and design firm. His Miami-themed HO scale Downtown Spur layout appeared in Model Railroad Planning 2009. More photos of his layouts can be found on his personal website, www.lancemindheim.com.

//On our website

If you're interested in seeing more of Lance's superb modeling, his "Voodoo & Palmettos" article about his HO scale East Rail modern industrial railroad on a shelf was published in *Great Model Railroads 2009*. It can be found on the *Model Railroader* website, ModelRailroader.com.

The "good enough" concept



Paul Dolkos photo

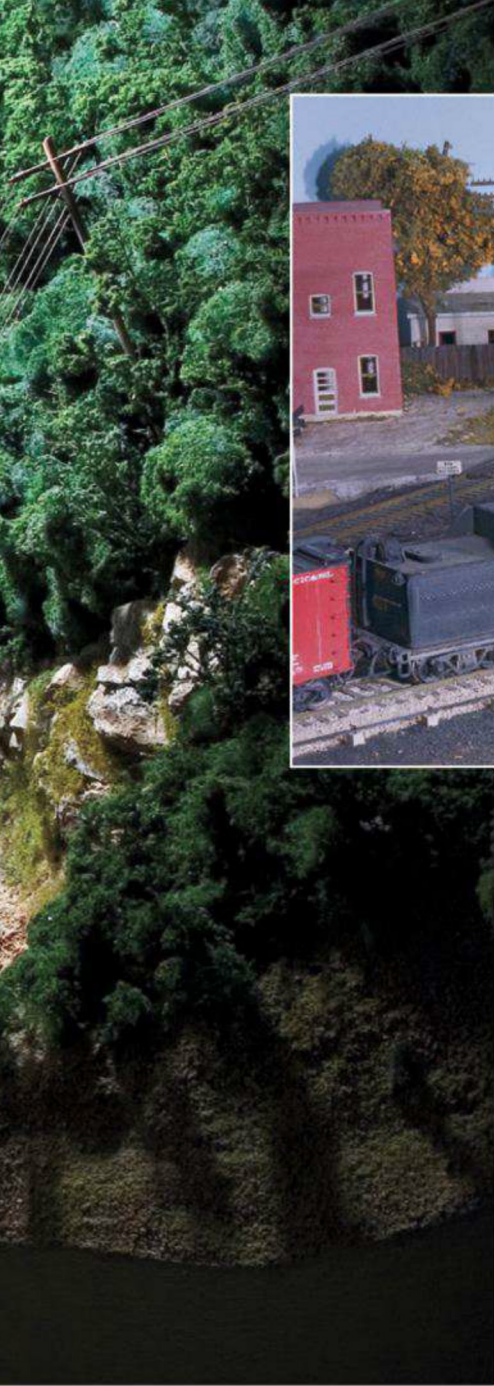
When one considers how to manage the scope of a project as potentially complex as building a model railroad, he should establish practical limits to the amount of detail applied to everything on the layout. Each aspect of the railroad from scenery and structures to track and rolling stock should be roughly equal in quality to every other. The term "good enough," as used by Allen McClelland, describes his approach to modeling the famous Virginian & Ohio. He achieved an amazing compromise between reasonable levels of detail and progress. Using this principle, if a model passes muster from a normal viewing distance and is detailed comparably to others on the layout, it's considered good enough, and one can move on to the next task. It's evident here that even though the models in this scene of the second V&O layout Allen built aren't detailed down to the last nut and bolt, the overall effect is superb. – *Tony Koester*



Mountain vs. prairie railroading

Adapting a track plan for a flatlands railroad to
one set in the mountains

By Bill Darnaby



Which is most appealing to you: the slower pace of railroading through rugged mountains (as in Bob Sobol's photo of David Stewart's O scale Appalachian & Ohio, left) or the challenge of flatlands railroading with frequent interlocked crossings (as in the author's photo of his HO scale Maumee Route, above)?

hand-written train orders to govern train movements, as one needs sufficient time to issue orders while trains are moving on the layout. There should also be enough stations where orders can be received and passing tracks for trains to meet and pass to make the governing timetable realistic and challenging for road crews.

A narrow-shelf, walk-around layout was high on my priority list to allow crews to follow alongside their trains and be where the action is when meeting other trains or switching towns. I also wanted a 42" minimum radius to avoid excessive overhang at the front and rear of large steam locomotives. My L-shaped basement's height, width, and locations of the entrance and fireplace foundation created additional design constraints.

Maximizing space utilization

Once all of these things were in sharp focus, the track plan fell into place. The only way to maximize the length was to go around the perimeter of the basement and along one central peninsula as many times as height constraints allowed for multiple decks. Any other footprint would waste space and detract from the length of run.

Years earlier while making design proposals for a huge HO layout for the Midwest Railroad Modelers in Batavia, Ill., fellow model railroaders and I observed a predictable relationship between available square footage and

mainline length. Given a 42" minimum radius and narrow-shelf construction, fellow hobbyist Bill Neale found that 200 square feet yielded an HO scale mile of track on a single deck for reasonably shaped rectangular spaces more than 800 square feet in area. This depends on using the entire perimeter wall and only one peninsula with its space-consuming turnback "blob."

This relationship held true in my 1,100-square-foot basement. I squeezed 10 scale miles of main line on two decks that spiral gently upward from west to east. This works out to .91 miles per 200 square feet. My design is therefore not 100 percent efficient, probably the result of the odd shape of my basement, but I met my design objective of long runs and plenty of passing tracks for meets.

Of course, some fundamental changes are required to convert a Midwestern plan into a mountain railroad. First, the crossings and interchanges with other railroads have to disappear, as level crossings don't happen in the mountains. Second, most of the industries vanish, as mountain railroads are isolated, and there are few population centers to support manufacturing industries.

Why model the mountains?

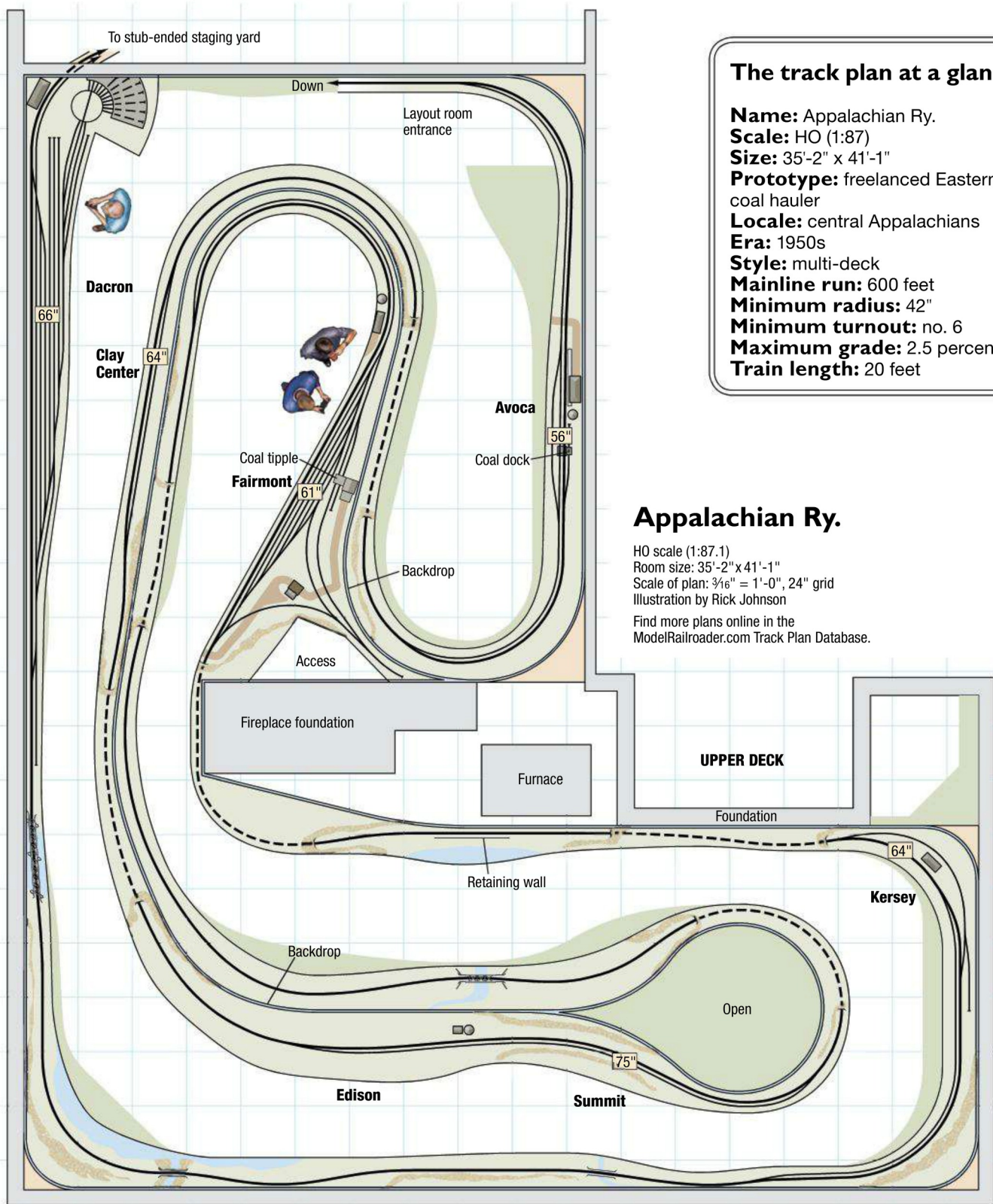
So what are we left with? For starters, a lot of people enjoy modeling mountain railroads because of the scenery, interesting helper operations,

It's been said that linear, narrow-shelf layouts are suitable only for modeling flatland railroading. I'll attempt to dispel that notion by illustrating how my Cleveland, Indianapolis, Cincinnati & St. Louis RR (Maumee Route) track plan, shown in *Model Railroad Planning 1995* and MRP 1998, works equally well for a mountain railroad loaded with operation.

For comparison with the "mountain plan," you'll find the Maumee Route track plan at ModelRailroader.com.

Maximizing mainline run

I designed my HO scale Maumee to maximize the length of the mainline run for trains. This is desirable for timetable and train-order operation, which utilizes dispatcher-dictated,



The track plan at a glance

Name: Appalachian Ry.

Scale: HO (1:87)

Size: 35'-2" x 41'-1"

Prototype: freelanced Eastern coal hauler

Locale: central Appalachians

Era: 1950s

Style: multi-deck

Mainline run: 600 feet

Minimum radius: 42"

Minimum turnout: no. 6

Maximum grade: 2.5 percent

Train length: 20 feet

Appalachian Ry.

HO scale (1:87.1)

Room size: 35'-2" x 41'-1"

Scale of plan: $\frac{3}{16}$ " = 1'-0", 24" grid

Illustration by Rick Johnson

Find more plans online in the
ModelRailroader.com Track Plan Database.

name-train passenger service, and a seemingly endless parade of coal trains. The Maumee's linear, single-track design with ample passing tracks will accommodate interesting operation of this type. Its gentle eastbound grades are another matter.

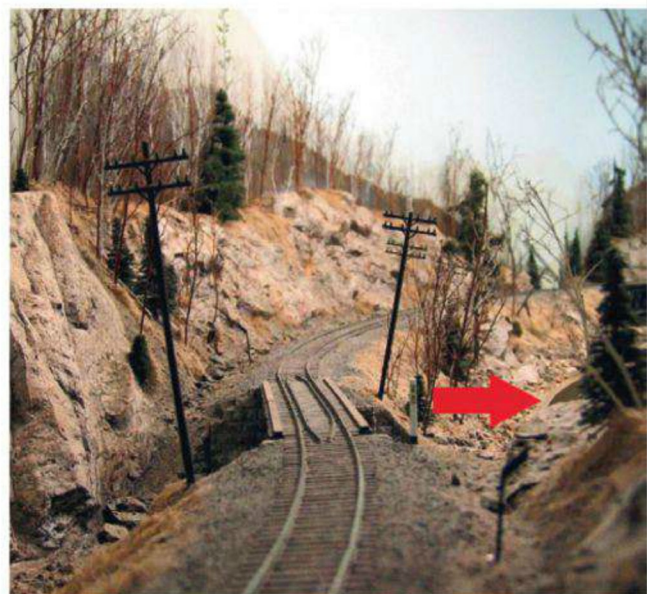
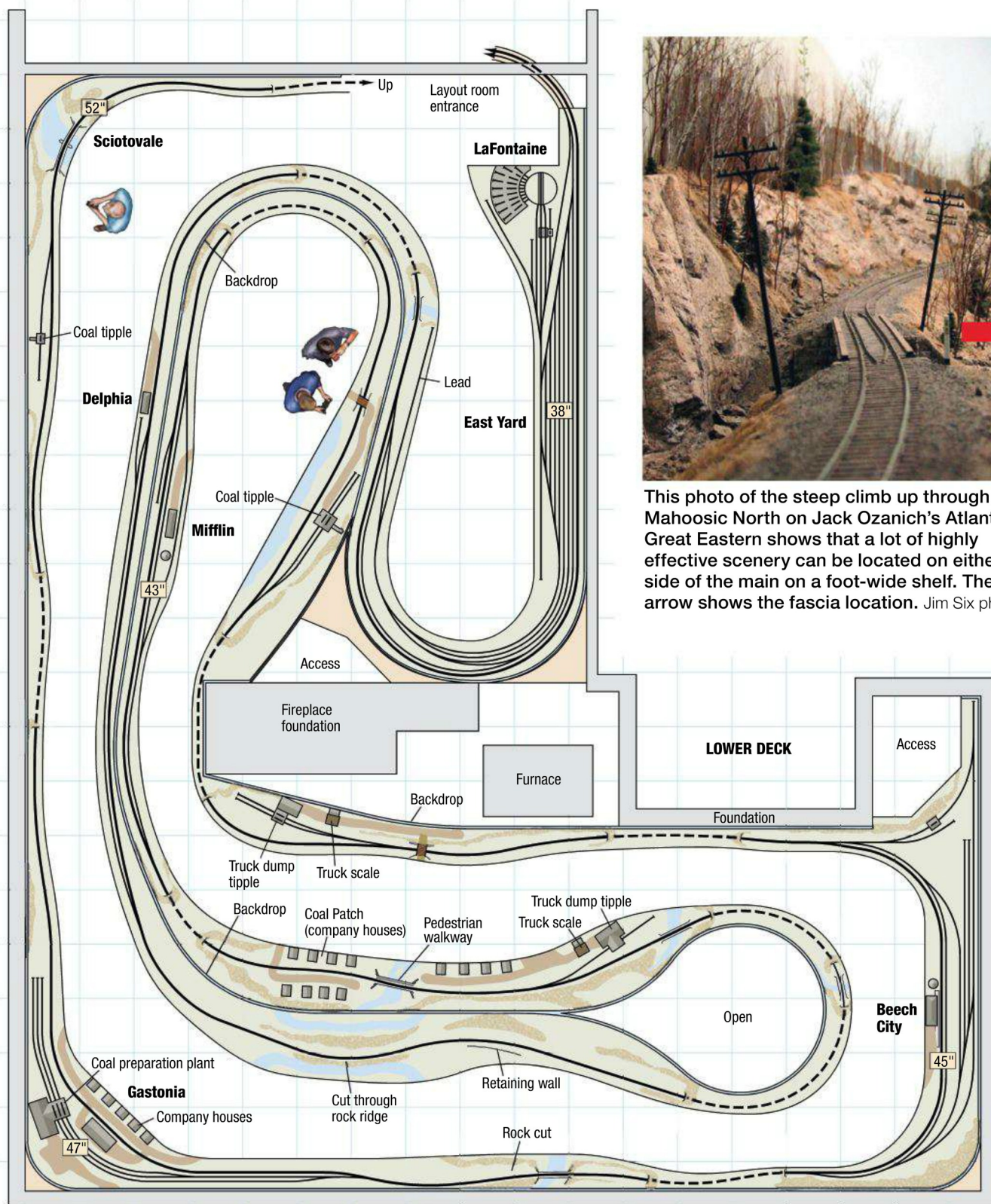
For this exercise, I'm going to assume the mountain line is a freelanced Eastern railroad. It could just as

easily be Western or depict a specific prototype. Freelancing lets me avoid choosing a favorite. Moreover, getting up to speed on a particular prototype would require a lot of research.

The track plan above illustrates the concept of a mountain railroad in the same space as the Maumee. The basic plan remains the same, as do the basement constraints. The run still

starts at one division-point yard on the lowest deck and ends at another yard on the upper deck. Staging remains stub-ended in the same locations.

The basement constraints dictate that the yards remain in their present locations as well as the minimum and maximum layout elevations, as I described in MRP 1995. To make comparing the old and new plans



This photo of the steep climb up through Mahoosic North on Jack Ozanich's Atlantic Great Eastern shows that a lot of highly effective scenery can be located on either side of the main on a foot-wide shelf. The red arrow shows the fascia location. Jim Six photo

easier, existing Maumee place names have been retained whether or not they make sense in the new concept.

Adapting to mountain grades

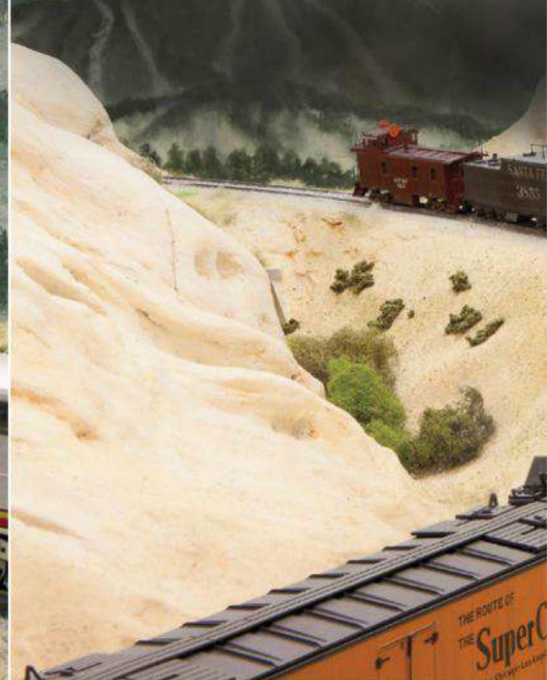
Elevation constraints bring us to the first concern: grades. For the Maumee, I wanted to minimize grades to avoid detracting from the flatlands concept. I therefore held grades to 1 percent or

less between towns and a maximum of 1.6 percent in the transition between lower and upper decks.

The grades on a mountain railroad need to be accentuated to impart the look of railroading amid mountains, and for realistic operations such as tonnage restrictions and helpers.

The obvious approach is to climb continuously to the top, but this may

not be as interesting as modeling both sides of a climb to a summit. The latter presents opportunities for more varied helper operations and train tonnage adjustments. The length of mainline run available with this design, 600 actual feet (about 10 scale miles), affords the opportunity to simulate operations on both sides of a summit. More on this later.



These photos of Ted York's HO Santa Fe Cajon Pass illustrate the operating potential of mountain railroading: a helper coupled to the front of the road power; a pusher cut

in ahead of the caboose; and a helper drifting back down the mountain to assist the next train. Dealing with helpers takes time, which extends the run. Ted York photos

Locating the summit

Modeling both sides of the mountain requires locating the crest somewhere between the division-point yards. As the transition between the Maumee's relatively level lower and upper decks is naturally the steepest grade in the original plan, it makes sense to incorporate this transition into the final assault on the summit in the new plan.

The highest point on the layout is limited by ceiling height, which fixed the elevation of Dacron Yard at 66". I allowed sufficient height for tall structures like a coaling tower, but this

won't be a concern for locating the crest of the grade.

If I located the crest of the grade in a tunnel, the track could be just low enough for equipment to clear the ceiling joists, with the mountain built up into the ceiling or even between the joists. However, let's assume that track level is 6" below the joists, allowing the main to negotiate either a tunnel, cut, gap, or pass.

On the original plan, the station immediately after the transition from the lower to upper level is Avoca. Its 56" elevation is limited by a furnace duct immediately above. As at Dacron,

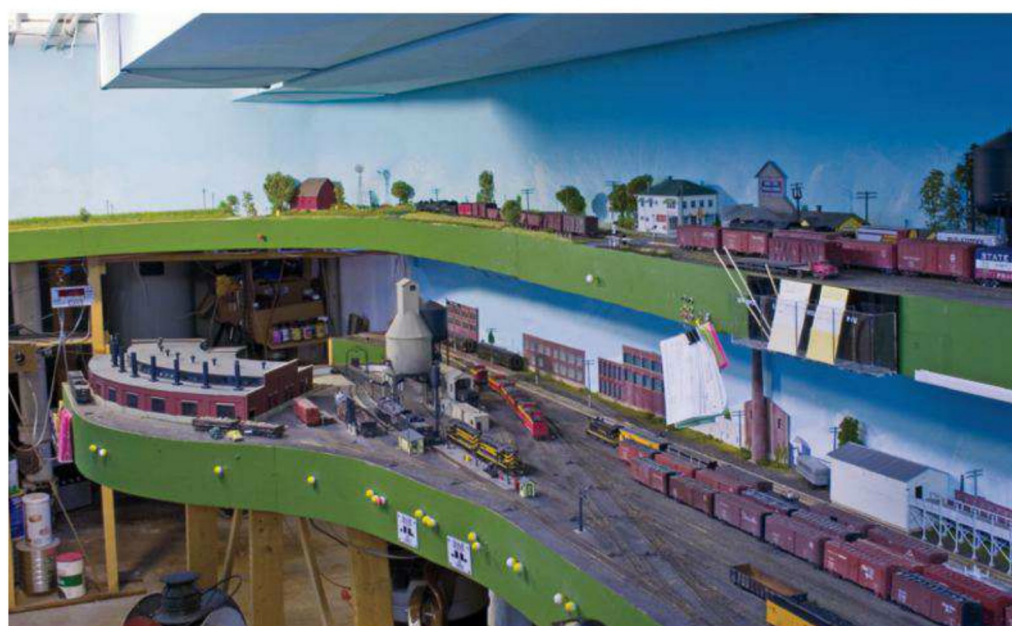
Avoca's elevation was set to allow the installation of a water tower and coal dock at the midway point of the division, and that's still desirable.

Therefore, starting from Avoca and climbing at 2.5 percent until track level is within 6" of the ceiling joists positions the crest of the grade near the east end of Edison. This is labeled as Summit on the new plan with an elevation of 75". That's 3" above 6 feet and should ensure that the summit really looks the part!

The profile chart of the new plan on the bottom of the next page shows how the grade peaks relative to the rest of the railroad. The crest of the grade is now 9" above the upper-deck yard at Dacron. This isn't much of a grade going down, as a third of the railroad lies ahead. However, the chart shows that a lot of vertical separation between decks now exists.

Note that the crest is 37" above the deck below it. This presents the opportunity to create a downgrade from the crest until the decks become too close together for lighting and scenic purposes. At this point, the grade would rise again to the upper yard, creating an undulating profile this side of the crest. This feature could create a requirement for helper operation on both sides of the crest.

The new profile has a nominal grade of 1 percent or less ascending from the lower yard to about Gastonia. From there, the grade stiffens to around 1.5 to 1.6 percent to Avoca, from which the 2.5-percent grade starts for the final ascent to the crest. From the summit, the grade now descends at 2 percent to



The track elevation at the top of the climb may be restricted by overhead obstacles such as ceiling joists or a heating duct, as on the author's basement model railroad above East Yard at LaFontaine and Avoca, Ohio. Bill Darnaby photo



the west end of Fairmont siding. The gradients resume the profile of the original plan to the upper yard.

Turning wye at Fairmont

Having the 2-percent grade from the summit end near Fairmont presents an opportunity. On the Maumee plan, this area has sufficient depth for a working interchange. This would also be ideal for a wye track and helper facility. From an operational standpoint, this could be very interesting as helpers work from Fairmont over the summit down to as far as Gastonia or Beech City, pushing trains up either side of the mountain.

The new plan shows wyes for turning engines, small engine-servicing terminals, and small yards at both Fairmont and Beech City. Tonnage is added or subtracted at the small yards as required to get trains over the hill in either direction, and extra trains could be operated between these two points to handle excess tonnage. These extras and light helper movements create the

possibility for very interesting timetable and train-order operation.

Note that these facilities are only suggested on the plan without concern for detail. They will require development to suit the operation.

This type of gradient is perfectly prototypical. The relatively easy climb out of the lower yard could be justified by having the railroad follow a river or stream through a valley. This water-level part of the route could be reinforced by numerous river crossings or hints of the river along the track. Then, to get over the top of the ridge, the railroad would leave the river and start climbing the side of the mountain to the summit. Once on the other side, the railroad would drop to a lower ridge or plateau and climb slightly to the upper yard.

A different context

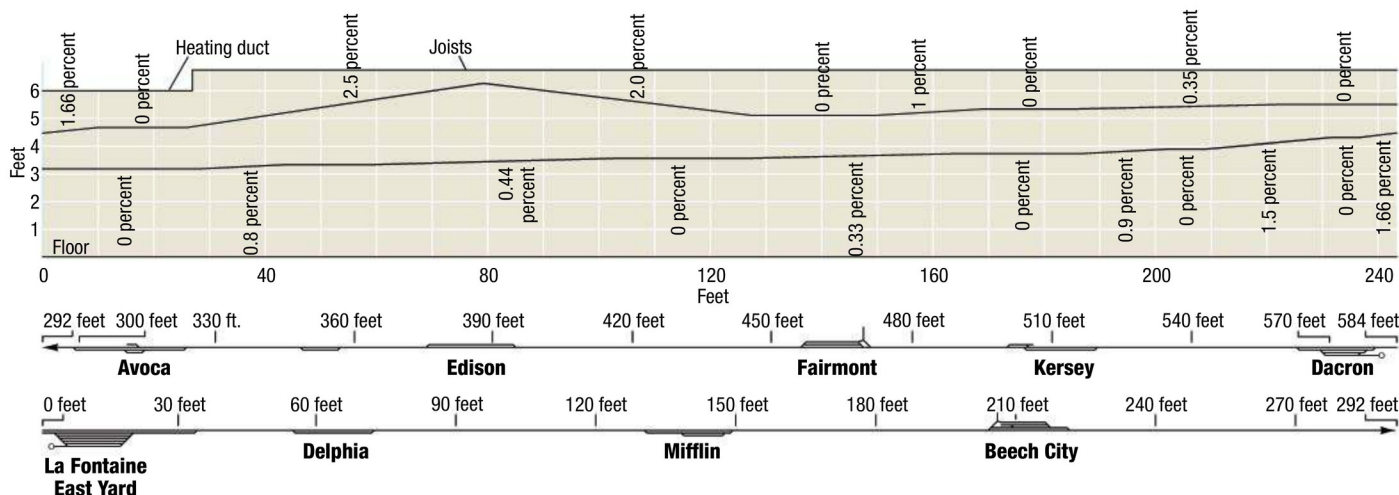
Naturally, the physical characteristics of the main line would have to change. The Maumee was designed to have the long tangents typical of the

Midwestern plains. For a mountain railroad, the main line should curve back and forth between the backdrop and fascia on the new plan to support the scenic theme.

The fascia should follow these curves and undulations to reinforce the sense of difficult terrain. For the Maumee, the goal was to keep the aisles straight to reinforce the feel of Midwestern tangents, but here the aisles should curve around to accent the mountainous country. The inherent curves and turn-backs in the original plan that are detrimental to the flatlands theme are now beneficial to the new mountain setting.

Scenic vistas?

Unless you're enamored with stunning vistas, I maintain that narrow-shelf construction is ideal for a mountain railroad. In my professional life, I logged thousands of miles in Electro-Motive Division locomotives on some of the best-known grades in the country. I observed that most of the





Editor Tony Koester built a deep ravine on an upper deck of his HO railroad, impinging on scenery on the lower deck. The combined fascia and valance and tall structures on the lower deck help separate the scenes. Tony Koester photo

time the railroad hugs the side of the hill in cuts and on fills.

This is well suited for narrow scenes, as demonstrated by Jack Ozanich's Atlantic Great Eastern. [See *Great Model Railroads 2005 – Ed.*] In many places, Jack's benchwork is only 12" deep, yet it very effectively conveys the feel of mountain railroading, thanks to careful attention to prototype engineering practices and good backdrops. His cuts and fills interplay with the terrain, and the profile of the fascia leaves no possible conclusion other than this being a railroad that hugs the side of a mountain. I would use the same approach for a mountain version of the Maumee.

Learning points

- Designing a mountain railroad differs in both obvious and subtle ways from planning a flatlands railroad.
- Crossings at grade and interchanges with other railroads every few miles, key aspects of flatlands railroading, aren't part of mountain railroading.
- Using helpers and pushers and a slower pace enhances mountain railroad operations.
- Challenging timetable and train-order operation is practical on a single-track mountain railroad.
- Choosing industries typical of the modeled area reinforces plausibility.

The open interior of the peninsula near the turnback of the original Maumee plan is missing. This area, reserved for live interchange staging, isn't needed in the new plan and is now devoted to scenery depth. However, the areas used on the Maumee for live interchange staging could now be used for staged branches.

Deep scenes on upper decks

If you need vertical depth in the scene for crossing ravines and such, you'll have to do some planning based on the separation between decks. If you have lots of separation between decks, there's no problem, since the depth of the ravine or gorge will not intrude on the scene below. However, if there is insufficient separation, you'll have to plan where such ravines and gorges are placed or resort to ploys.

For example, if a ravine on the upper deck forces the upper-deck benchwork to dip down to within a few inches of the lower grade level, you could arrange to have the lower grade go through a tunnel at that point. If this isn't appropriate, another ploy would be for the lower grade to pass behind structures or through a narrow foliage-lined cut to create a tunnel effect until the upper deck again rises away from the lower.

Appropriate industries

Since I assumed that it would be an Eastern railroad, coal mining would be appropriate. For those who prefer a Western theme, remember that a lot of coal is also mined in the Rockies. In fact, the Walther's New River Coal Co.

"Appalachian-style" preparation plant kit is based on a prototype on the Denver & Rio Grande Western.

I eliminated nearly all of the many industry tracks of the original plan, which is consistent with isolated mountainous terrain. However, there are plenty of locations around the layout with benchwork wide enough for good-size mines with plenty of load-generating capacity, and I've suggested a few of these on the plan.

One industry found in the mountain foothills is a paper mill such as the Westvaco mill at Luke, Md., which was jointly served by the Baltimore & Ohio and Western Maryland (CSX today). One mill would provide numerous switching opportunities.

What towns there are would support the usual team track and fuel industries, particularly in the lower elevations of the layout where towns are appropriate. There should be no difficulty in generating online traffic.

The new plan has all the same passing sidings in the same locations as the original plan, and train-order offices are suggested by depot symbols. Their locations may not be entirely appropriate and need to be thought through when the true nature of how you intend to operate the railroad is brought into focus. However, the lesson to be taken away is that the length of the railroad provides ample siding capacity for interesting timetable and train-order operation.

Lots of potential after all!

Quite frankly, this exercise turned out much better than I thought it would. There is plenty of operating interest in the helper movements and mine traffic and, of course, plenty of timetable and train-order operation.

That said, it's still hard to beat the diversity and intensity of TT&TO operations typical of the 1950s Midwest. So I don't think I'll be replacing grain elevators with coal tipples on the Maumee any time soon. **MRP**

Bill Darnaby, a frequent contributor to Model Railroad Planning and Model Railroader, is a retired General Motors Electro-Motive Division mechanical engineer. He lives with wife Mary Ann and dog Beau near Chicago.

On the Web

You can download a copy of Bill's Maumee Route track plan at ModelRailroader.com. Follow the MRP link under Special Issues.

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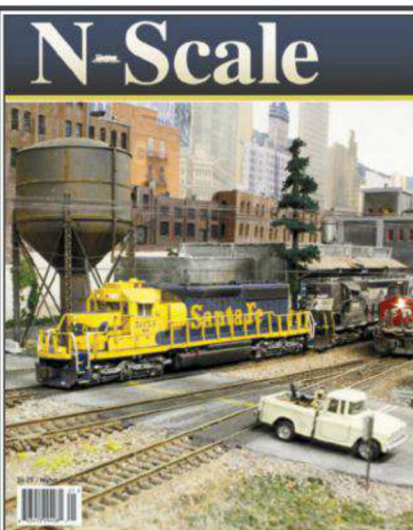
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An inside perspective



Establishing a dramatically different view point

By Paul J. Dolkos

Photos by the author unless noted

We think of railroads and trains as being “outside,” so our layouts feature outdoor scenes with cities and towns, rolling countryside, or mountains. But occasionally we encounter trains and tracks occupying interior spaces that are just as impressive as those that are outdoors.

What I’m thinking of are big arched passenger train sheds or smoky, grease-encrusted confines of roundhouses, or even the more tidy modern diesel shops. Also inspiring are the concourses of major passenger terminals like New York’s Grand Central Terminal or Cincinnati’s Union Terminal, even if the trains are downstairs or out back. Most of the time, the visual impact of being inside such facilities doesn’t get captured in our modeling – and for good reason.



Cliff Powers truncated one side of his roundhouse not only to save space and move the turntable closer to the aisle, but also to allow viewers to look through the interior out onto the turntable. Cliff Powers photos

Acres of roof

If we model a large passenger station, we end up looking at a roof expanse that’s not all that interesting, and the only interior view is a peek through the windows, which may be great but hard to see. Some modelers have built easily removable or hinged roofs to reveal interiors. However, this

doesn’t capture the awe that one experiences when standing in these interior spaces. We’re still on the outside looking in.

Because of this, locomotives tend to disappear inside roundhouses. If you’re told to pull out number 2601, you may have to ask what stall it’s in, assuming anyone remembers.

Arched passenger trainsheds were seldom more than 100 feet tall at the peak. Roundhouse ceilings are typically 17 to 24 feet high, and in diesel shops, the ceilings are usually higher. Still, in HO scale that means the station shed clearance is at most 15" high, and a roundhouse cross-section is about 3" high.

Modeling in a larger scale such as O (1:48) does open things up a bit, but nevertheless, with these relatively snug dimensions, one has to wonder how the majesty of such interior scenes can be captured.

Selective expansion

We often resort to selective compression to fit a structure into tight quarters. Instead, why not reverse the principle and stretch the interior space, expanding it vertically to better see inside? Set the normal viewing and operating position so the structure ceiling is above you and the trains are slightly below eye level so multiple tracks can be easily viewed and operations performed.

This would be similar to the vertical space required on the lower deck of a multi-deck layout. For passenger operations, perhaps the tracks should run parallel to the operator. For an engine shop, the viewpoint could be down the tracks or from the side, or even both.

Operations in a passenger trainshed would probably require more vertical clearance than that required for running locomotives in and out of a roundhouse or diesel shop. We need to consider how equipment will be uncoupled, so magnetic or electro-magnetic ramps seem mandatory. To determine the proper clearance, it would be critical to mock up the configuration prior to construction.

By now you're asking the obvious question: Wouldn't raising the roof lines of these structures make them look rather odd compared to the rest of your railroad? Solution: Separate the interior scene from the rest of the layout's conventionally scaled scenery by erecting a view block so the structure distortions aren't visible. The separation would also enable us to establish an ambient light level appropriate for the interior scene.

Setting the mood

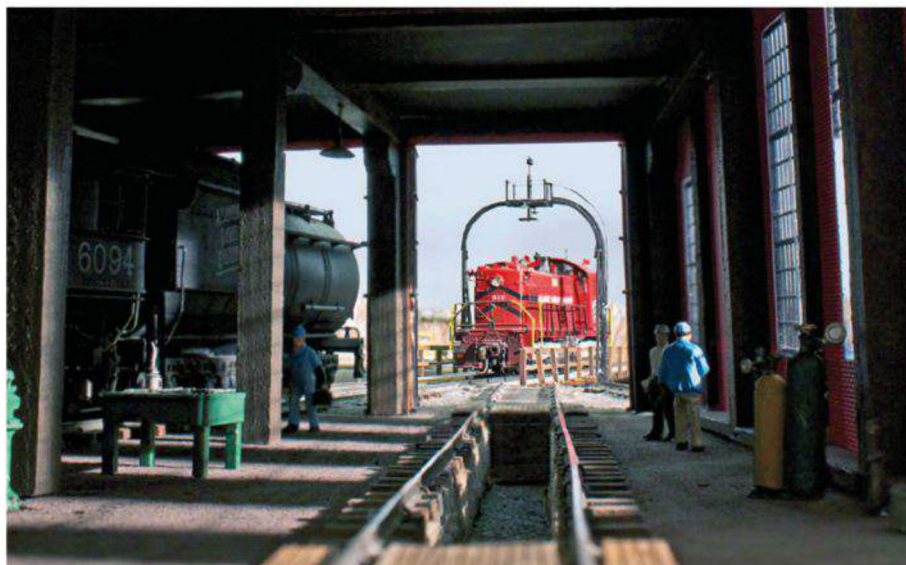
Lighting is critical to creating the proper mood. There should be light coming through the structure windows. A trainshed ceiling has structural elements like metal trusses and skylights that form appealing patterns.



At the Severna Park Model Railroad Club in Maryland, large overhead doors make it easy to get a sense of being inside the diesel shop on their HO railroad.



A gritty interior added a lot of atmosphere to the GG1 electric locomotive shop in Wilmington, Del., in 1972. The aisle could be in the foreground.



Jack Ozanich left off a wall of a roundhouse on his Atlantic Great Eastern layout. The open wall is on the edge of the benchwork so visitors can view the interior.

Looking in – and out again

In the late 1970s, I began planning the construction of a two-story depot located in Merced, Calif., on my HO scale Yosemite Valley RR layout. One of my goals was to make the interior details of the building readily visible without the need for a removable roof. My solution was a pair of periscopes.

Each periscope consisted of a styrene box fitted with two regular mirrors. One periscope looked into the first-floor lobby, and the second provided a view into the second-floor drafting room.

At that time, I didn't have the information needed to build the adjacent freight house. In fact, I drew plans for the depot by estimating dimensions from a few photos. Many years later, I was given a copy of a tracing of the original YV drawing of the station and freight house. I used it and other dimensions I had obtained to develop much more accurate CAD drawings for both buildings.

Several years ago, I built the adjacent freight house. But when I compared my newer CAD drawings to my already-constructed depot, I discovered, to my frustration, that my depot was oversized by around 20 percent!

Knowing this, I just couldn't intentionally build the freight house oversize. After much anguish, I realized that I needed to start over, so I built a new depot plus the freight house, both to scale. Given the visitor response to the periscopes incorporated into my first version of the building, there was no question that I needed to include them in my new station.

The mirrors I used in the first version of the station resulted in "ghost" images when looking through the periscopes due to the reflection from the thickness of the glass over the mirrored surface. For my replacement building, I used front-surface mirrors, which solved the problems with ghost images.

Both periscopes in the new station provide views into the first floor, one looking again into the lobby and the second one looking into the adjacent dispatcher's office. The periscopes allow visitors to have an unobstructed view into the first floor of the station, and they let them watch trains pass by the depot through the trackside windows. This gives the visitors a whole new perspective when viewing my layout. – *Jack Burgess*



The scratchbuilt depot at Merced, Calif., on Jack Burgess's HO Yosemite Valley RR features a pair of periscopes that allow viewing into the dispatcher's office and the first-floor waiting room. Jack Burgess photos

Overhead lighting should be rigged so it shines through the canopy and silhouettes the supporting metalwork. We should install points of light inside shining from signs, fixtures, and interior rooms adjacent to the platforms so the scene sparkles. To keep normal layout lighting from spilling over on to the scene, we may have to set off the area with a door or curtain.

Besides proper lighting, sounds can also change the mood of your layout. Don't overlook different terminal sounds such as train announcements and the din of myriad conversations. You want to clearly establish to your operators that they have moved "indoors" and are now part of this unique ambience and atmosphere.

When operating these sections, consider that one might have to move between the interior and exterior of the building. This would occur when the station switcher pulls a cut of cars from a track out to the coach yard or is simply rearranging the consist, so ease of operator entry in and out of the sequestered area is important. Having a two-person crew, one inside and one outside, may be the best approach.

Locating the scene

A separate area like this might seem hard to incorporate into a track plan. However, if the scene is located at one end of the layout or in a corner, as a large terminal or roundhouse often is, then it shouldn't be disruptive to the

flow of people and trains. Other possible out-of-the-way locations would be under a staircase or at the end of the lower shelf of a multi-deck layout.

One possible aesthetic problem is the exterior view of the structure's facade on the outside of the view block. For instance, with a roundhouse, there would be just the stall doorways, and the view block would extend upward from the roofline. In essence, the front of the roundhouse could be just a structure flat with openings that locomotives enter and exit. The exterior view of a trainshed should include the outline of the roof arch end. I suspect, however, the dramatic inside view would make up for the truncated outside view.

Learning points

- Changing the outside-looking-in viewing location to inside looking out is sure to attract attention and adds visual interest to a model railroad.
- Trainsheds provide an opportunity to take viewers and operators inside a familiar and impressive structure.
- Uncoupling passenger cars inside a trainshed requires advance planning.
- A roundhouse or other lineside structure also provides a chance to create seldom-modeled views of one's railroad.



On his 1:29-scale Miami industrial layout, Bob Springs erected a shallow see-through warehouse along the fascia. This is a relatively easy way to create a view from a structure interior.

Trains? What trains?

So far I've discussed models of interior space where the trains are present. But there are many other prototype situations where trains are in the dank basement and the compelling interior space is upstairs. One example is the magnificent restored main waiting room of Grand Central Terminal in New York City.

A recent newspaper article clip related how a little girl just arriving back from a European tour with her parents and entering Grand Central



The concourse of the 30th Street Station in Philadelphia, photographed in 1975, is an example of a notable interior with the trains underneath the building, so they're out of sight. A sense of the terminal could be established on a layout by putting the terminal tracks in the foreground with a photo backdrop of a grand concourse above and behind them.

looked up and exclaimed, "Oh no, not another cathedral!"

Another impressive concourse was in New York City's Pennsylvania Station prior to its demolition and the property's redevelopment in the 1960s. When these structures were built in the first decade of the 20th century, architecture often followed the dictum that "bigger is better."

Carroll L.V. Meeks, author of *The Railroad Station: An Architectural History* (Yale University Press), wrote that during this time "elephantiasis" took

over every element of railroading. This produced awe-inspiring interiors of "opulent dimensions" in these terminals that "were not functionally necessary."

One could model just the track areas, but not to include the magnificent concourse areas in some way would exclude a vital signature feature. Grand Central or Penn Station may go beyond your modeling objectives, but there are many smaller depots with the tracks and platforms downstairs.

I would again create a darkened, sequestered area with platforms and

Trainsheds



The Reading Terminal trainshed in Philadelphia no longer protects travelers from the elements as it did in 1976 when this photo was taken. It now serves as a convention center and is protected as a National Historic Landmark.

The first large arched trainsheds were built in Europe. Since the continent has always maintained an extensive passenger train network, many are still sheltering passengers. In the United States, fewer trainsheds were constructed, and as the passenger-train network contracted, most were demolished or replaced with umbrella-style platform roofs. But wherever they existed, they created an impressive interior space. Some large American examples that existed until the mid-20th century include the following:

City/station	Year Built	Span across tracks	Height	Length
Boston/North Station/B&M	1896	398*		
Boston/South Station/NYNH&H	1896	570*	63	602
Chicago/Grand Central	1888	119	60	560
Chicago/Dearborn	1883	165	60	600
Chicago/Illinois Central	1892	180*		
Chicago/La Salle Street	1901	207	60	578
Jersey City/Erie	1896	140*	56	600
Louisville	1892	100	50	400
Milwaukee	1885	100		600
New Orleans/Illinois Central	1892	145*	30	
Oakland, Calif./ SP Mole	1892			
Philadelphia/PRR Broad Street	1892	300	108	595
Philadelphia/RDG	1891	256	90	559
Pittsburgh/PRR	1898	240	110	550
St. Louis/Union Station	1891	600	74	630
Worcester, Mass.	1875	228*	67	
Dimensions are in feet * multiple sheds side by side				

This is basic data from *The Railroad Station: An Architectural History* by Carroll L.V. Meeks. The book discusses passenger-station design and has numerous drawings of trainsheds. First published by Yale University Press in 1956 and later reprinted, it's inexpensive and readily available on the used book market. – P.J.D.

tracks for passenger operations in the foreground. The low lighting would be typical of such locations. A mirror might be installed behind them to increase the apparent depth.

Above the platform area, and to the rear of the scene, would be a cut away depiction of the bright interior concourse area upstairs. Rather than model this in 3-D, a photo might suffice.

I envision operators standing in a darkened aisle handling arriving and departing trains. There would be a control panel aglow with switch position lights, not unlike those on an interlocking tower's model board. Anyone working in this setting would surely sense this is a special job.

Alternate views

I've discussed relatively complex approaches to creating an inside view, but there are some more conventional and simpler approaches to create the same effect.

One is a view through the model roundhouse toward the turntable, thanks to a wall eliminated by the aisle edge. Another is of a diesel shop interior that can be viewed through one of the large entry doors. A third approach is to erect a structure along the layout edge and eliminate the wall on the aisle side so one can look through the interior to the scene beyond.

A railroad YMCA hotel or yard office next to the tracks would be a great example. The photo on page 85 shows a view through a warehouse door, but the same technique could be used with a factory, passenger station, or other facility. Interior furnishings could be used to frame the vista.

Jack Burgess built periscopes into the layout fascia of his Yosemite Valley RR at Merced, so viewers could look into the depot interior and out through the front windows to see trains passing by the front of the structure. Read "Looking in – and out again" on page 84 to see how he built them.

Unique and memorable

Modeling such interior spaces doesn't fit every layout design or objective, but it would be a distinctively unique and memorable layout feature. I think most of us would jump at the opportunity to run trains into such a model setting. **MRP**

Paul Dolkos is a veteran layout designer and builder who regularly contributes to Model Railroad Planning and Model Railroader. He described the design for his own HO scale Baltimore Harbor District layout in MRP 2010.

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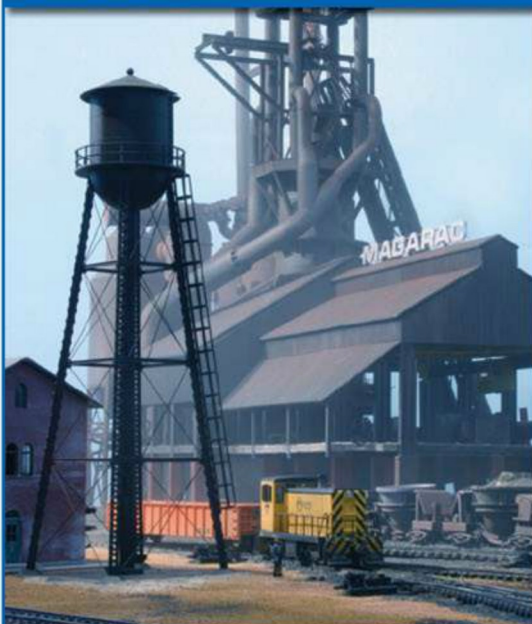
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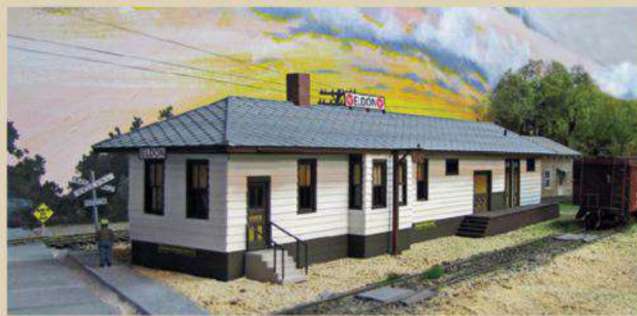
Don Ball, who's modeling a California shortline railroad set in 1895 (*Model Railroad Planning 2011*), scratchbuilt this working interlocking machine to control the plant at Orford Junction. Don Ball photo

A working interlocking

The accompanying photo of a manual interlocking plant that I built *a la* the Paul Larson/Gordon Odegard series in *Model Railroader* back in the early 1960s [February 1961 –Ed.] will serve as a brief update to my *Model Railroad Planning 2011* article on modeling an 1895 railroad. Orford Junction will be interlocked, with my operator working the plant along with his other duties. I have a random-type signal controller made by Logic Rail Technologies that I hope can be adapted, but I haven't experimented with it yet.

I talked to Jeff Wilson about his plastic interlocking plant (*The Model Railroader's Guide to Junctions*, Kalmbach Books, 2006) but wanted the heft and feel of metal. I don't think I'll do another, however – too many holes to drill and tap!

Don Ball
Blue Springs, Mo.



MRP 2010 author Charlie Duckworth has finished the last depot for his HO scale Missouri Pacific Bagnell Branch, a laser kit from Lake Junction Models. Model photo by Charlie Duckworth; prototype photo from Art Johnson

The last depot

As an update on my HO scale version of the Missouri Pacific's Bagnell Branch railroad featured in *Model Railroad Planning 2010*, I'd like

to share with MRP readers a photo of the Missouri Pacific's depot at Eldon, Mo., as well as my nearly finished HO model of it built from a laser kit by Lake Junction Models (LakeJunction

Models.com). This is the last station I needed to finish for the MoPac Bagnell branch.

Charlie Duckworth
Omaha, Neb.

Imaginary branch lines

My layout models a fictional Southern Pacific branch, an idea popular in the United Kingdom. The advantage is that a familiar prototype "look" is present in the railroad components – locomotives, cabooses, structures, signals, etc. – instead of those items having to be freelanced.

The year my family and I lived in England during a sabbatical was entirely eye-opening on the model railroad front. There seemed to be model railway exhibitions almost every weekend, and the standard of exhibition layouts is very high indeed.

But it was the idea of the imaginary branches that intrigued me the most.

And looking through the various British model magazines yielded even more examples than I had seen at the exhibitions. So you can understand that I was surprised and delighted to open my copy of *Model Railroad Planning 2011* and find an article by John Flann about this exact kind of modeling: "British OO scale railway

packs a lot of action into a small space," pages 22-27. It neatly encapsulates most of the ideas I'm talking about. The layout models the typical look of the Great Western Ry., and is set in the 1930s.

My own use of the concept is like that in John's article in that I embed my line firmly in the SP's Coast Division and intend to adhere strictly to a 1953 modeling date. This gives a mixture of steam and diesel motive power, though dominated by steam, and of course incorporates standard depots and other SP structures, along with cabooses and work equipment typical of SP in that era. The intention is to achieve maximum credibility without confinement to a specific place. So far, the idea is working very well for me.

Tony Thompson
Signature Press
Wilton, Calif.



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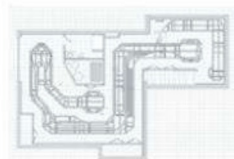
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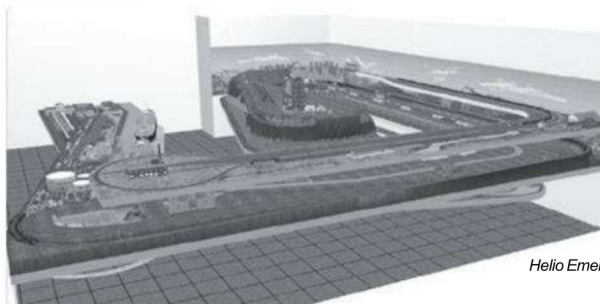


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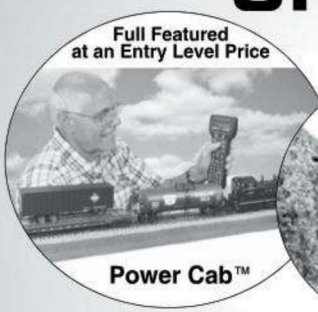
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CP and CN together

Model Railroad Planning 2011 was another very enjoyable edition, with all the usual blend plus some very good new angles on use of rooms in the home smaller than the gargantuan basements or purpose-built rooms we all dream about.

However, I noticed something in Rich Loveman's feature on his Thompson River Canyon layout. The plan shows Canadian National as red and Canadian Pacific as black on the track plan, which I thought was odd given their corporate colors are the opposite. Then I looked at some of the photos again to orient myself on the layout. In pictures 2 and 6, CP appears to be running, according to the plan, on CN trackage (and CN on CP in 2), but in photo 7 CN does appear to be on its designated tracks per the plan. Can you clear this up? Perhaps trackage rights were being utilized?

*Mike Arnold
Hockley, Essex, U.K.*

[Mike's conjecture is exactly right. Starting in 1999, the paired trackage on the prototype gave rise to the opportunity for our running a series of model trains in a "continuous" loop, at least until the staging yards at each end can be completed. The photos of the model railroad in the article were taken on the morning after a gaggle of relatives had visited the night before and wanted "to run some trains." The train consists in the photos were left where visiting firemen had left them on the main lines!

So, although the original track plan and concept was for operation as two individual competing tracks up the canyon, we presently do run the railroad today as paired track. The east end of the prototype paired arrangement ends just west of the Black Canyon and proceeds east through Ashcroft on their individual tracks.
– Rich Loveman]

Concentric curves

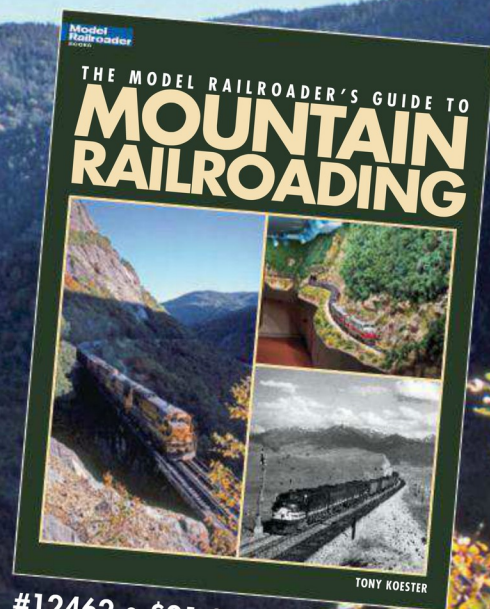
Another fine job on MRP-2011! I appreciate the courage of presenting "Concentric curves with easements" by Van Fehr. In *A Brief History of Time*, page vi, Stephen Hawking wrote, "Someone told me that each equation I included in the book would halve sales."

*Rick Mugele
LaGrange, Calif.*

[Last time I checked, our sales department and publisher were smiling. – Ed.]

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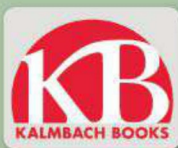
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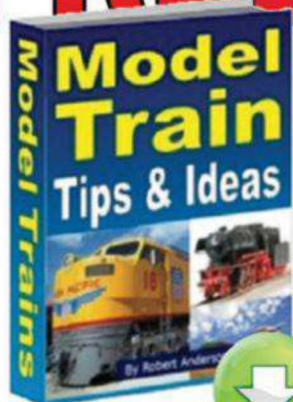
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Planning Tip



Perry Squier widened the aisles at the corners of the peninsula on his HO scale Pittsburg, Shawmut & Northern to make it easier for crew members to pass or meet as their trains do the same. He did this by squaring off the outside corners of the aisle where the main peninsula ends in a turnback curve. Tony Koester photo

Aisles as human passing tracks

People have to meet and pass too

It's nice to have wide aisles, but not at the expense of the operating or even scenic potential of the railroad. And having wide aisles doesn't mean that they have to be wide everywhere.

On my Pittsburg, Shawmut & Northern, I packed a lot of HO railroad into a 29 x 33-foot room. The aisles in front of the two division-point yards at St. Marys, Pa., and Angelica, N.Y., are generous, as they should be – yards attract operators like kitchens attract family members during a holiday dinner. Elsewhere, they pinch down to as narrow as 24", which makes it

difficult for two crew members to squeeze past each other.

But at the turn-back end of the main peninsula, aisle width increases to 40", which is sufficient for crews to meet and pass. I did this by squaring off the fascia along outside corners of the aisle.

Wider aisles everywhere would have been nice, but my first design objective was to have a sufficient main line to support reasonably long runs between several towns. That led to an around-the-wall design plus two peninsulas, and the remaining floor space was devoted to aisles. – Perry Squier

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Affordable Model Railroads 95	Haddon Software 94	ModelRailroader.com 95	Rib Side Cars 94
All Electronics Corp 94	Hornby America 90	Model Train Classics, LLC 94	Rix Products 95
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Barrett David 94	Market Leaders, LTD 92	NKP Layout Services 94	TM Internet Trains, LLC 95
Bill's Trains and Track 95	Megahobby.com 94	Novacon LTD 95	Train Sets Only 94
Blair Line 94	Micro Engineering 90	Panavise Products, Inc. 92	Ulrich Models 95
CVP Products 81	Micro Fasteners 87	Peanut Butter of Trains, The 94	Wm K Walther's, Inc. 93
Digitrax 99	Micro-Mark 81	Peco Products 89	Woodland Scenics 100
El Dorado Software 89	Model Railroader Books 91	Rail-Lynx 87	Xuron 89
Exactrail 3	Model Railroading Planning Back Issues . . 87	Rainy Day Hobbies, LLC 87	



Sharp curves

It depends on how you look at them

CLD Pacific Grain's Trackmobile pulls four covered hoppers around the loop track at CLD's dock on the Willamette River in Portland, Ore. The track in lower right foreground connects the Union Pacific Portland Subdivision to Steel Bridge over the Willamette River.

By Tony Koester // Photo by Scott Lothes

No matter how many times experienced modelers tell us not to do something, the full-size railroads go right ahead and do it anyway. Shame!

A case in point is the photo above, shot by Scott Lothes. It depicts what appears to be an impossibly sharp curve serving a grain-unloading facility in East Portland, Ore.

The photo shows export wheat being transloaded from the railcars to the bulk carrier *Thalassini Kyra*, Scott reports. The loop track is approximately

a 45-degree curve. In HO scale, that would be an 18" radius.

The entire East Portland complex is fascinating. Even the Union Pacific main line, which curves off at the bottom center to cross Steel Bridge over the Willamette River into Portland, is by prototype standards, a very sharp 15 degrees. This is considered quite sharp on the railroad (too sharp for UP 4-8-4 no. 844), but it equates to a very broad 53" radius in HO scale. Conversely, the rather generous 42"

curves I use on my HO railroad are a sharp 19 degrees, and the more typical 30" curve is about 27 degrees.

This may not really matter to the typical model railroader, but it's a little comforting to know that the prototype also has to occasionally look the other way where minimum-radius standards are concerned.

That said, modelers who follow the prototype's example would be wise to build a test curve to make sure the model cars will as well. **MRP**

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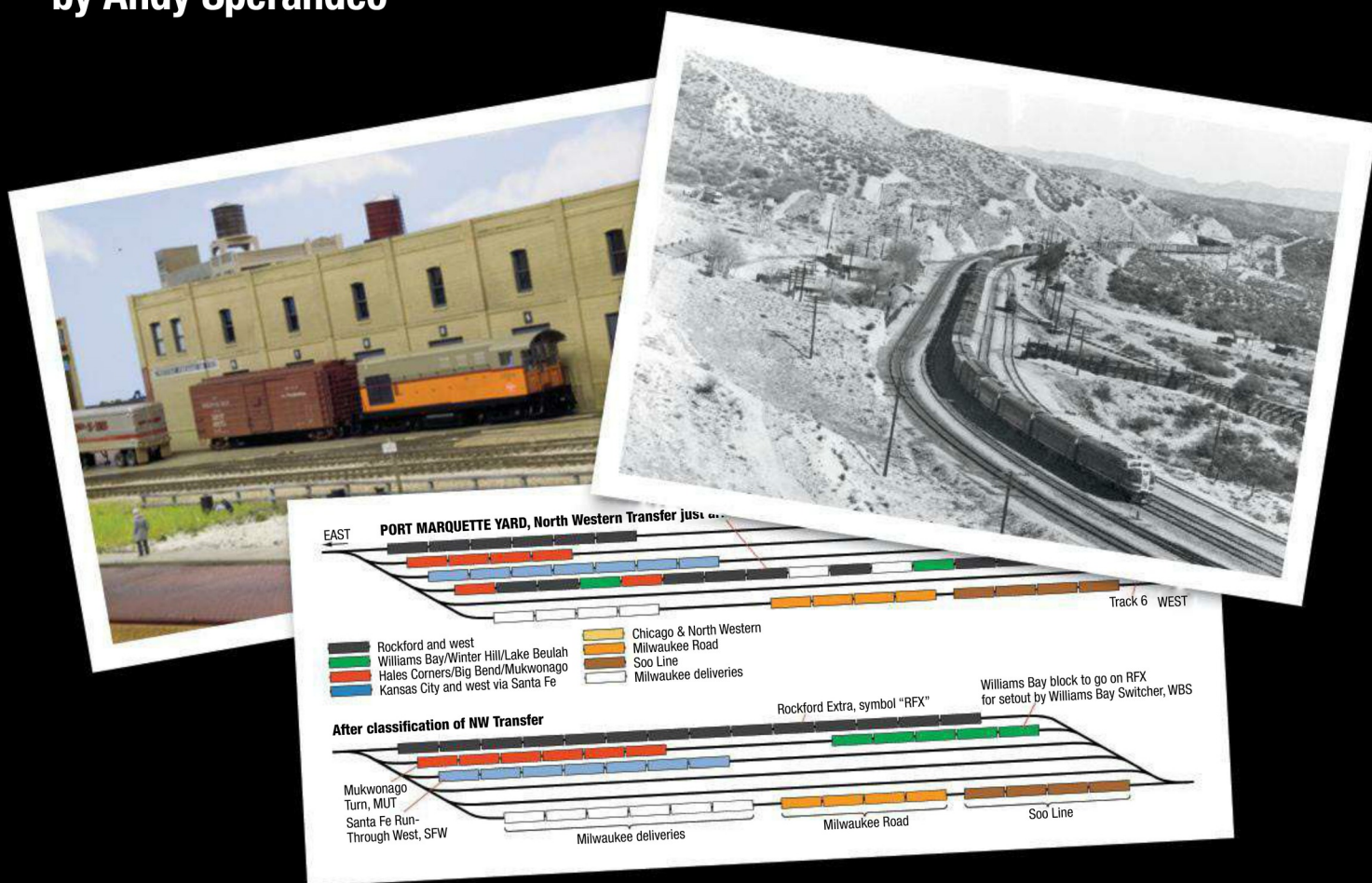


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Workshop tips

Layout design for operation

by Andy Sperandio



- How a busy model railroad freight yard works
- Learn how to reproduce realistic engine terminal and caboose activities
- Types of staging yards and tips on how to use them effectively
- Prototype passenger train servicing activities that you can model



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Layout design for operation

What makes one track plan better for an operating layout than another? Here are some things I look for in published track plans, plans I design myself, and plans my friends show me. Then on the following pages I'll describe operational features both prototype and model that can be planned into our layouts.

Staging. It's a given that any model railroad can represent only part of a major railroad, let alone the continental railroad network. So any operating layout needs offstage tracks to represent the distant places our trains come from and go to when they aren't passing across our too-short main lines.

In general I'm open to any of the three main types of staging – stub-ended, reversing loop, or through. Each has its applications, and my only concern is that the staging is suited to the kind of railroading to be practiced.

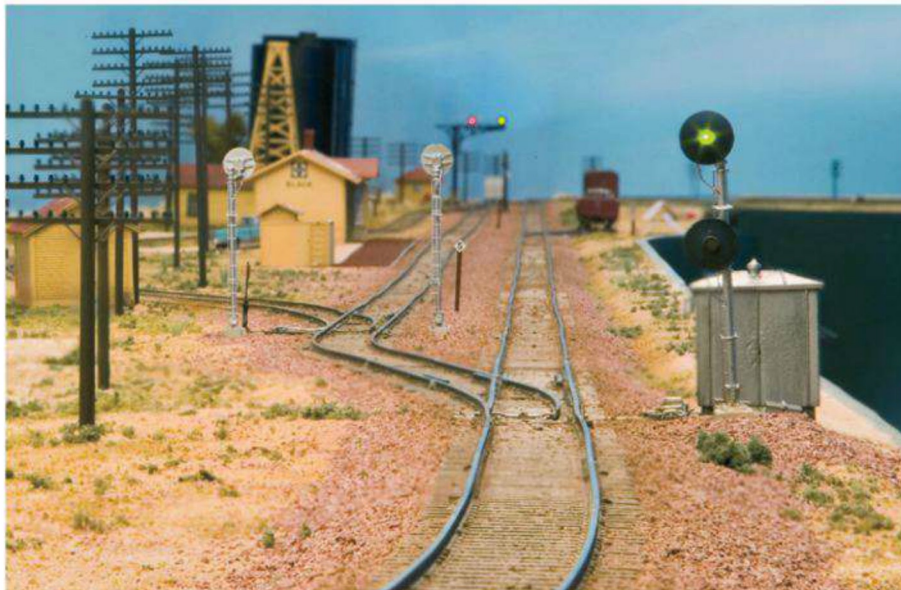
If the plan is for a mainline railroad, I prefer that the staging define the ends of the main route between A and B. Shortline, branchline, and terminal railroads may need only one staging yard to represent “everywhere else.”

The very smallest layouts may make do with on-layout staging – that's been sufficient for our operating sessions on *Model Railroader's* Milwaukee Road Beer Line. Recently I designed an N scale industrial railroad based on a Santa Fe prototype where a car float connecting to a float bridge at one corner of the 4 x 8 layout is the staging beyond the layout.

Access. Walk-in access is a must. Lift-outs or gates to allow walking in are okay, especially if someone else has to build them! I'll accept a limited amount of stooping, but if “duckunder” means crawling, I would prefer not to.

Even better than walk-in is walk-around, meaning the ability to follow a train along every part of its run. Modern command control systems make this practical, and onboard sound effects give us even more reason to want to be up close to the action.

Passing tracks. Most model railroads have single track main lines and so need passing tracks where trains in opposing directions can meet. An operating layout needs enough passing tracks to allow



On a single-track main line, passing sidings determine operating flexibility and train length. We're looking down the main track at Black, Texas, on Jay Miller's HO scale Panhandle & Santa Fe. The passing track is on the left. Jay Miller photo

some flexibility in meeting trains, and the length of these sidings sets the maximum length of most trains. (Yard and staging tracks also need to hold trains of that length.) Ideally I like to see at least 1½ train lengths of main line between passing sidings, to avoid crowding and allow some cross-country running.

While it may seem heresy to some, double track would be a good choice for the traffic density of many model railroads. It also happens to be prototypical for a lot of busy mainline railroads, including the part of the Santa Fe that I model. Usually double-track railroads need passing sidings too, unless Centralized Traffic Control allows running either way on either track (really two main tracks instead of double track).

Yards. I explained most of my criteria for yards in my article “13 tips for freight yard operation and design” in the June 2010 MR. I'll just add a couple of ideas here. I've learned that engine terminals can slow yard operations unless there's adequate track capacity to handle incoming and outgoing locomotives simultaneously. A turntable with only a single lead track, for example, will be a choke point at a busy yard.

For any era when a caboose was still a part of every freight train, a caboose track (or two) is pretty much a must.

One way to think of it is that the yard needs the capacity to store as many cabooses as there are road locomotives in the engine terminal. If it's a crew-change point where cabooses are swapped on through trains, it might need to store even more of them.

I've also learned to appreciate the importance of yard auxiliaries such as RIP (repair-in-place) tracks, scale tracks, icing tracks, and stock resting tracks (adjacent to pens for resting, feeding, and watering livestock in transit). These add interest and realistic action, so the more of them in a track plan the better.

And even as a confirmed “yard guy,” I'll admit that you don't *have* to have a yard. Our managing editor David Popp used to have a yard-less Soo Line layout that was a lot of fun to run. To make it work, you have to be able to set up all the trains you'll need in staging or in a fiddle yard. It can be done, even though I wouldn't necessarily want to.

Looking for more? *Model Railroad Planning* magazine as a rule approaches layout design from an operational perspective. I share the feeling of the late John Armstrong that all model railroads should be designed as if they were going to be operated, at least to some degree. To me this just makes any layout look more like a railroad.

In and out of staging

West Mesa operator's territory

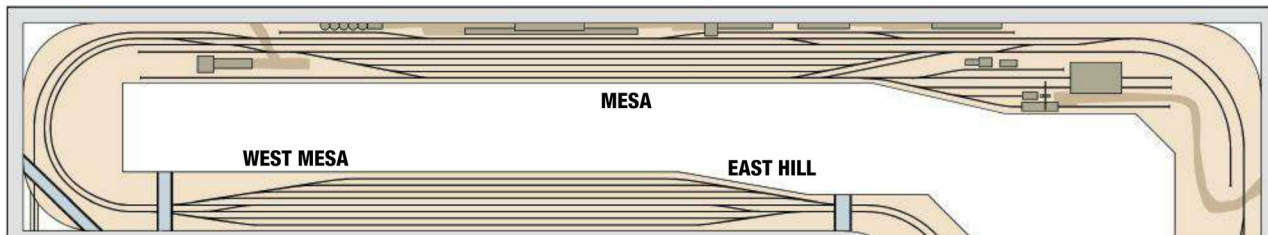


Illustration by Rick Johnson

Many layouts have a major yard connecting to a staging yard at one end. If the on-scene yard is also a crew-change point, a place where engineers start and end their runs over the layout's main line, a question comes up in regard to crew assignments: Who will run the trains between the on-scene yards and off-scene staging?

When you're concerned about providing realistic railroad jobs on your layout, that question isn't trivial. Ideally these movements will be handled by someone other than the road engineers whose job is running trains across your layout. Actually changing operators makes the crew change more significant.

On some layouts the answer to this question is "the yard guy." When I've been in that position, I usually haven't found moving trains in and out of staging to be an objectionable burden. However, this approach fails in terms of a realistic job description for the yardmaster or yard engineer.

Here are some other answers. I wouldn't say any one is best, except to the extent that it fits the circumstances of your layout.

Off-duty road engineers. On our old Milwaukee, Racine & Troy HO club layout in downtown Milwaukee, we needed to move several transfer runs between the west end of our through staging yard, called "Allis," and the on-stage, working Port Marquette Yard. This didn't amount to much of a run even though our "work rules" let inbound transfers from other railroads turn and take a cut of cars back to staging from the MR&T, instead of returning "light," meaning without cars.

People quickly learned not to bid on these lousy jobs when they were posted

on our call board, so we stopped trying to get engineers to sign up for them. Instead, operators picked the mainline runs they wanted, but all of those didn't leave immediately when the session started. That meant we usually had at least one or two engineers with time to kill until their next road job, and they gladly worked the transfers to have something to do.

Fiddle operator. Where there's some form of active staging, such as a fiddle yard restaging trains during the session, the fiddle yard operator may run trains between the offstage tracks and the on-stage yard. On Bill Darnaby's HO Maumee Route, that's usually Bill himself. He runs freights and "pullers" (yard transfers) between the fiddle yards and his on-scene freight yards. And he runs passenger trains to and from the stations at each end of the main line, where the crew change would ordinarily be made on these first-class jobs.

This lets road crews have a realistic trip over the Maumee's First Subdivision, the modeled main line representing one crew district, and get off their trains after doing their day's work. The fiddle operator doesn't have a real-life equivalent anyway, so it's not compromised by moving trains to and from staging.

Yard hostler. David Barrow's former HO Cat Mountain & Santa Fe Ry. had an open through staging yard across the aisle from the western terminal of his main line, Mesa, Texas, as shown above. The staging yard, called East Hill at the east end of the run and West Mesa at the end closest to Mesa Yard, represented both ends of the modeled railroad.

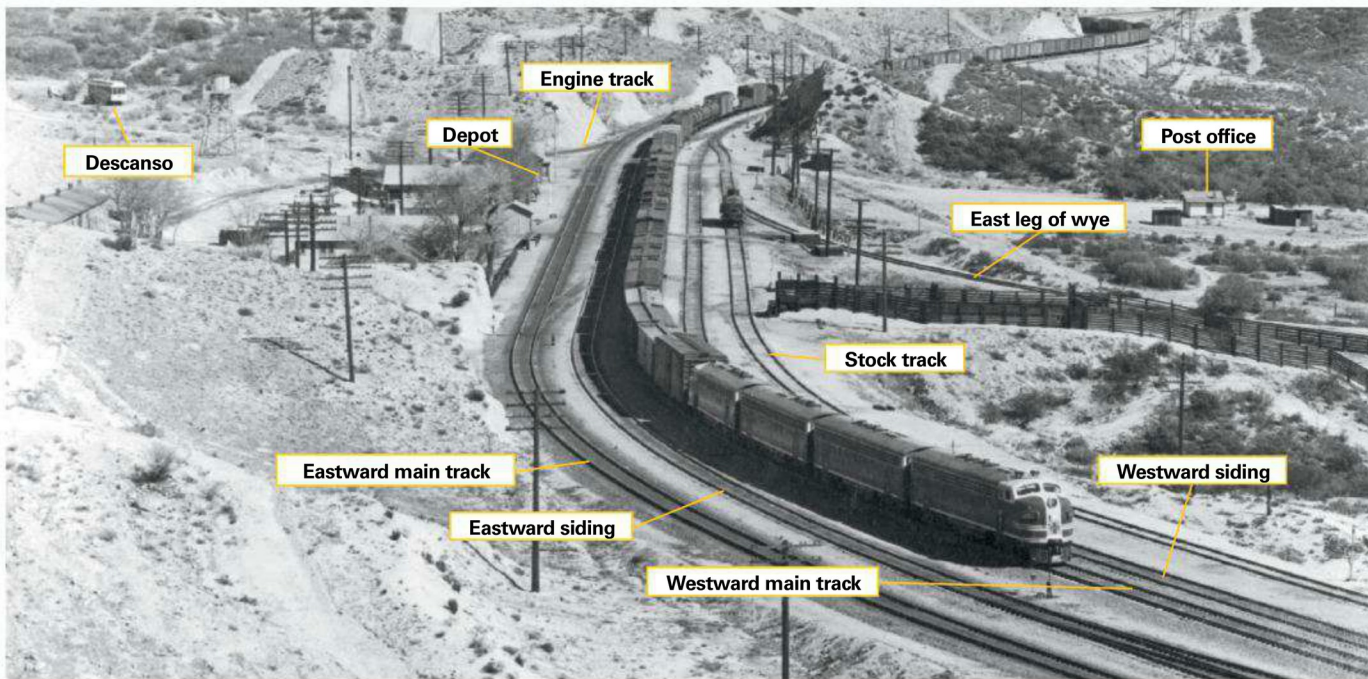
In addition to a Mesa yardmaster, David instituted the job of West Mesa

operator. When needed to move trains between Mesa and West Mesa, this person functioned as a kind of yard hostler, shifting trains between the classification yard and the mainline fueling and inspection sidings, which is how David thought of his open staging yard.

When not shifting eastward or westward trains, the West Mesa operator worked as a second yard engineer at Mesa, helping with classification or industrial switching. It was an interesting job with at least some prototypical basis, and it let road crews work over a realistic district between Mesa and East Hill.

Automation? For some, the ultimate answer might be to automate movements in and out of staging with a combination of command control and a computer interface. This has its own challenges, especially since realism may require the software-driven "crews" to hostle engines between the yard and the roundhouse. Even if that's beyond your interests, there are several good ways for people to do the job.

Name every track



Every track has a name on prototype railroads. Some names may be official and some may be informal monikers. Either way the names allow railroaders to communicate clearly about locations of trains, engines, and cars, and about movements between the various tracks. That's something we'd also like to do in model railroad operation. The names given to tracks can sometimes clarify their purpose, and often they add colorful touches of historical context.

Those of us modeling prototype roads can transfer these benefits to our layouts by learning and using the prototype names. For freelance modelers, naming tracks on their layout like the prototype does will add another layer of realistic detail as well as serving useful operational purposes.

Santa Fe examples. To help get you started, here are a couple of my favorite examples from the Atchison, Topeka & Santa Fe's line over Cajon Pass in southern California.

Officially that line was the First District of the Los Angeles Division, part of the Coast Lines grand division including all of the AT&SF west of Albuquerque, N.M. Every part of the railroad was divided into districts (equivalent to subdivisions on other railroads), divisions, and grand divisions, all named.

At Summit in the photo above, the names of the main lines and sidings explain their function. It's obviously a big help to know how all these parallel tracks were used. The First District was then (and until 1972) a double-track railroad with trains moving with the current of traffic governed by automatic block signals. Eastward trains didn't run on the westward tracks except as directed by written train orders.

Helpers on the eastward main or siding at Summit could cross the westward tracks to reach the wye because this area was within yard limits (see the column "Yard Limits" in the February 2007 *Model Railroader*, page 128).

Historical context. My other example is from the engine terminal at San Bernardino, the west end of the First District. When FT freight diesels began running into this terminal after World War II, there was no diesel house there and no way to get four- or even three-unit consists onto the turntable.

There was, however, a long track with an inspection pit just south of the roundhouse. It had been used to store Mallet articulated steam locomotives that also didn't fit on the turntable. It was known as the "Mally track," from the way railroaders pronounced the French name with a silent "t."

A westbound Santa Fe freight makes a brake test at Summit, at the top of Cajon Pass, before descending the 3 percent grade ahead. There were lots of tracks at this remote station, and every one had a name. Robert Hale photo

By 1945 the Santa Fe hadn't used articulated steamers on the Los Angeles Division in years, but on railroads, names tend to stick. The Mally track, still called by that name, made a handy place to park the FT locomotives.

Function and imagination. Does every track on your railroad have a name? It's hard to think of another way that we can add so much functionality and atmosphere for the cost of just a little time and imagination.



The pit track south of the San Bernardino roundhouse was still the "Mally track" even when it served multi-unit diesels, as in this 1947 view.

Wm. W. Turkington photo

Yard work

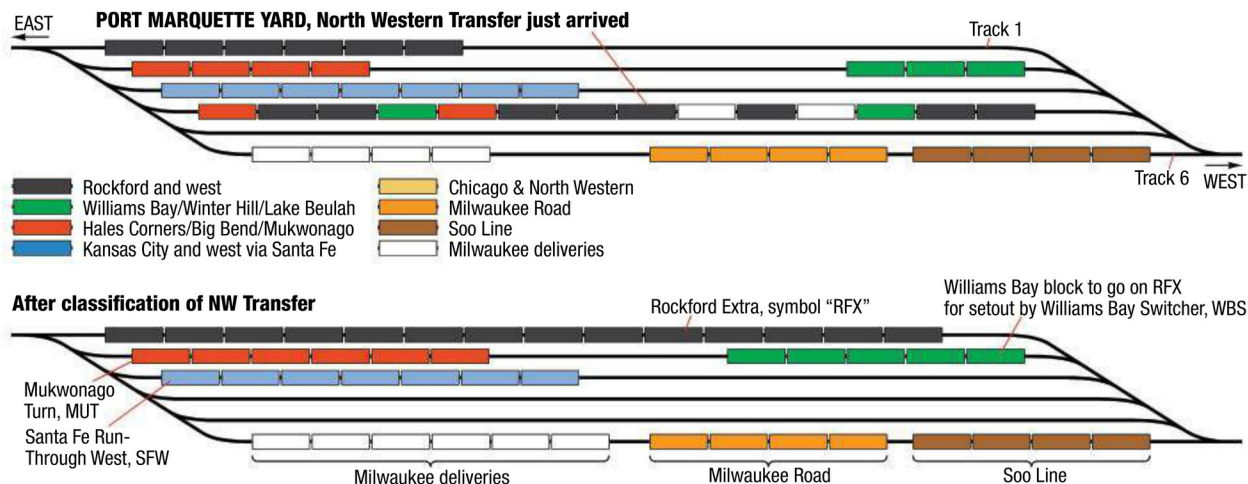


Illustration by Rick Johnson

I'm almost always willing to take on a freight yard job when I'm invited to an operating session. It really doesn't matter if I've even seen the layout before or know anything about its operating patterns – I'm happy to do it. Am I just fool-hardy and overconfident?

Quite possibly. However, I've also learned through experience and observation how yards are supposed to work, and I know they all pretty much work the same way.

The basic function of any freight yard is what the railroads call "classification." That's sorting cars with similar destinations or routings together to build trains, or blocks for trains carrying cars with multiple destinations. Each grouping is a "classification," and you "classify" cars by sorting them.

For efficiency, the classification needs to be done as cars arrive in the yard, so trains are ready before they're scheduled to depart.

Port Marquette Yard. I can illustrate classification switching with an actual example instead of something abstract. The diagrams above show Port Marquette Yard, the Milwaukee freight terminal on our old HO scale Milwaukee, Racine & Troy club layout. The colored blocks represent cars, and the key shows the classifications represented by each color. Notice that we had eight classifications but only six tracks in the yard. Some doubling up was necessary, especially since the yard crew kept at least one track clear for arriving trains. Hav-

ing more classifications than tracks is typical of model railroad yards.

In the upper diagram, track 4 is occupied by cars with a variety of destinations just brought in by a transfer from the Chicago & North Western. The next assignment for the two Port Marquette switchers, one working from either end, is to classify the cars from the North Western and add them to the blocks already standing in the yard.

(There are no cars in Port Marquette for the C&NW because the transfer job took them back to its base in Butler, Wis., represented by a staging track to the east.)

Classification builds trains. The lower diagram shows the yard after the cars from the North Western have been classified. As you can see, they've been assembled directly into blocks being built for outbound trains, as identified in the lower diagram.

The RFX and SFW are both through trains headed west. The WBS and MUT blocks on track two are both for way freights, but they'll be handled differently. The WBS block will go out on the head end of the RFX, and that train will set out those cars at Williams Bay for a road switcher based there. The MUT operates as a turn to its namesake station and back, and it'll be clear to pull to the west out of track two once the RFX departs with the WBS block.

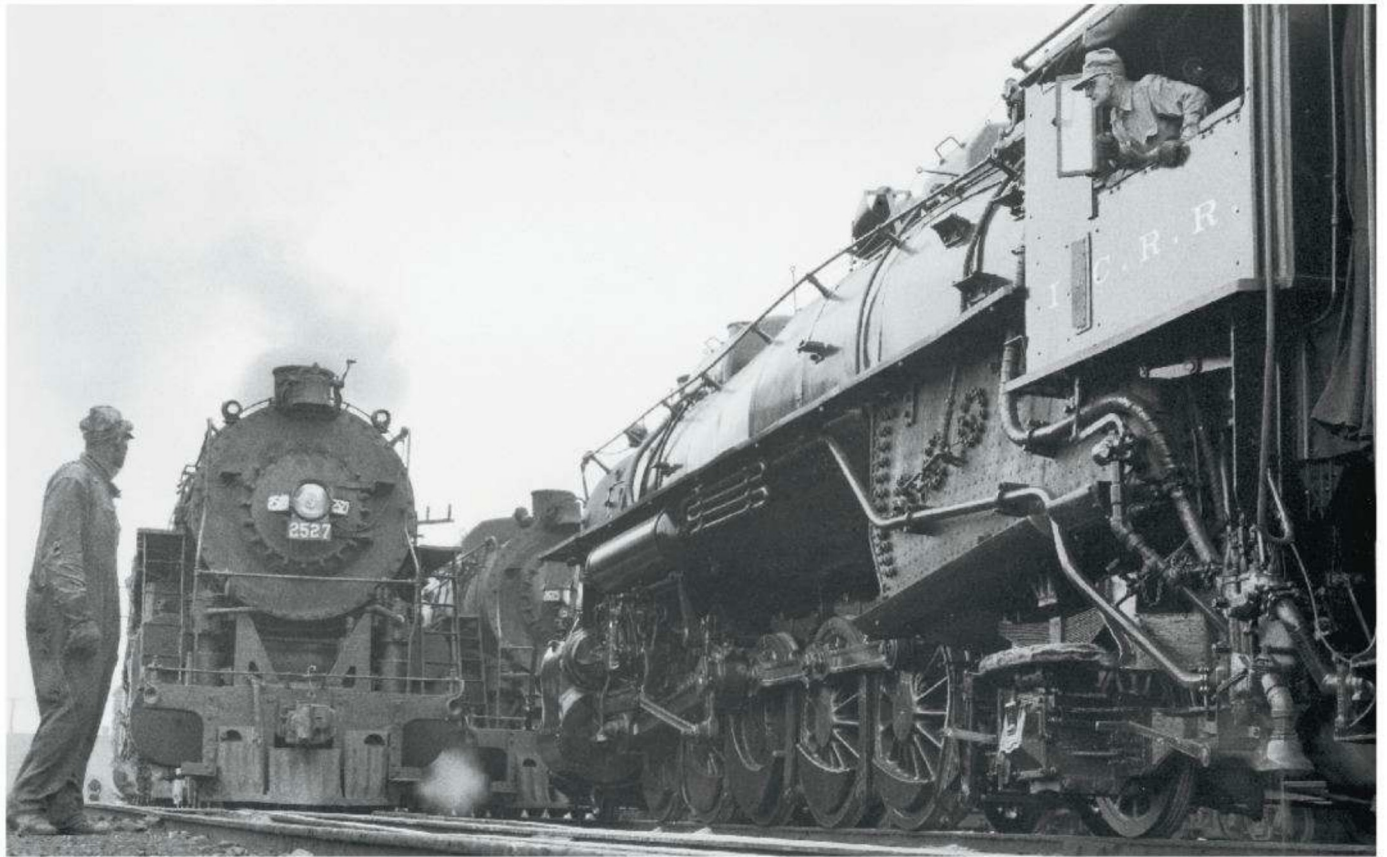
The cars on track 6 are in three blocks. The Soo cars are at the west end for pickup by a westbound Soo train

operating over the MR&T on trackage rights. After a few more Milwaukee Road cars show up in arriving trains, the yard crew will pull the middle block off six and start building a transfer for that connection on track 4 or 5. When there's a lull in the yard switching, the east end switcher will spot the Milwaukee deliveries at local industries, returning to the yard with pickups to be classified.

Where to next? And so it went. The yard was always in a state of flux as trains came and left, but outbound trains were usually ready in plenty of time for departure because we classified the incoming cars upon arrival.

I haven't said anything about our car-routing system. We had one, but its particulars don't matter. As long as the paperwork in your operating system indicates where cars arriving at a yard are going next, you'll have the essential information needed for efficient classification switching.

Engine hostling



Engine hostling, moving and servicing motive power in terminals, is a job deserving more attention on model railroads. It's a chance to enjoy our favorite railroad equipment, the locomotives, up close and without the distractions of mainline operating rules. A hostler can also save time for other operators. Yardmasters and road engineers have other things to do; the hostler's job is taking care of the engines.

Just getting inbound power out of the way, turned if necessary, and lined up for its next job can be time-consuming. For increased realism you can allow time to simulate servicing and inspections.

Different railroads and varied union work rules make for various ways of organizing hostling duties. One common arrangement makes hostlers responsible for all movements within the engine terminal. An arriving road crew leaves their engine on an inbound track, perhaps with the firebox of a coal-burning steamer over an ash pit.

The hostler takes over from there to move the engine through the process of

cleaning, inspection, servicing, and repair. The engine might be stored in a roundhouse stall or outdoor storage track if not immediately required. When the locomotive is assigned to a departing train, the hostler moves it to an outbound engine lead, where the road crew called for that train would take charge.

(For a model railroad example of a typical steam servicing sequence, see "The Maumee turns a Mike" by Bill Darnaby in the July 1996 *Model Railroader*; for diesels see "Diesel locomotive servicing" by Jim Hediger in the June 1982 MR. The 1996 issue can be ordered on ModelRailroader.com.)

In some cases hostlers also move engines beyond the engine terminal, perhaps to handle passenger engines between the roundhouse and a station some distance away. Or they might take engines too long for the turntable to a wye track for turning. The railroad may distinguish between inside hostlers, who handle locomotives only between the lead tracks and the roundhouse or shop, and outside hostlers, who can work anywhere within specified terminal limits.

Hostlers line up 4-8-2s and 2-10-2s on the Illinois Central ready tracks at Paducah, Ky. Robert Hale photo

Model terminals that handle many engine changes or helper engines are good candidates for full-time hostling jobs. The hostler might also wear the roundhouse foreman's hat to make engine assignments, staying in touch with the yardmaster and dispatcher to anticipate power requirements.

If you don't think your engine terminal is that busy, you might still benefit from part-time hostlers. Off-duty crew members awaiting assignments can pitch in as hostlers to keep the engine leads fluid and the locomotives moving through a simulated servicing routine.

If a model engine terminal is reasonably complete, the hostler's job has more appeal than many seem to think. You might find your operators lobbying for full-time hostling assignments.

Caboose operations



The way car (caboose) tracks at the Atchison, Topeka & Santa Fe's Barstow, Calif., yard were busy in 1948. Train crews ran out of this terminal in three directions – north, east, and west – and every freight train that arrived left with a different way car. Donald N. Nesbit photo

Caboosees have been missing from most freight trains since the 1980s, but for many of us they're still a necessity. And all of us who model some period before the caboose's demise can take advantage of the additional movement and interest they add to our operations.

Caboose functions are worth reviewing since they've been gone so long. A caboose was a shelter for the conductor and flagman/brakeman, an observation post so they could keep watch on their consist, and an office for the conductor's paperwork. It had a pressure gauge to monitor the train's air brakes, and a brake valve for emergencies.

Many cabooses had combined air whistles and brake valves on the end platforms for signaling and braking during backup movements. Around 1950 cabooses began to carry two-way radios for conversations with the engine crew and wayside stations and towers.

The caboose could serve as living quarters at the train crew's away-from-home terminal. Usually it had a table with seats, a stove and sink, an icebox, bunks, and a toilet. Living aboard

gradually became less common, but a few crews did so into the 1950s.

Other installments of "The Operators" explained how the caboose was the base for flag protection at the rear of the train (September 2008 *Model Railroader*), and how it carried the markers showing that the train was complete (August 2007 MR).

Switching cabooses at crew terminals was necessary for years. Until fairly late in the game – the mid-1960s on many roads – cabooses were assigned to specific crews. This was generally a part of labor agreements on work rules that railroads were obliged to follow.

Crews worked on districts (or subdivisions) of 100 miles or more, and long-distance trains required several crews to reach their destination. Every time the crew changed, the old crew's assigned caboose was switched off the train and the new crew's caboose put on. Even if all cars in the train were going through, and the locomotive too, there was still some work for a yard engine.

If the yard on your layout is a crew-change point, assign some of your

cabooses to the district to the east and others to the one to the west. Any train passing through gets its caboose changed. If you use a card-order system, the district assignments can be entered on each caboose's car card. Or letter division assignments on the cabooses themselves, as some of the big roads did.

For a higher level of detail, note the time on your fast clock when an arriving caboose is spotted on the caboose track, and use that as an off-duty time for the incoming crew. Then don't use that caboose again until its crew is rested, at least eight fast hours later.

You might find yourself running out of assigned cabooses during an operating session, or at least running short of cars representing rested crews. That's a great excuse to buy or build more cabooses – as if you needed one.

More caboose tricks. If you run more trains in one direction than the other, even occasionally, you might run short of cabooses at one end of the subdivision. Prototype roads tried to anticipate this and balance cabooses just as they did locomotives. In anticipation of a westbound weekend rush, for example, a few eastbound trains at the end of the week could have two or more cabooses, as is shown in a photo in *The Operators* in June 2009.

Only the rear car of a multi-caboose train necessarily carried a working crew, however. The other crews, paid to "dead-head" to the other end of the district, might ride a passenger train.

Regular runs such as a five-day-a-week way freight often attracted high-seniority crews because of the regular hours. Their cabooses in effect became "assigned" to those trains, and were thus subtracted from the pool available for through trains. Oh good, now you need still more cabooses!

These are just a few of the ways that prototypical procedures can let us have more fun with cabooses. Give them a try and it won't be just nostalgia making you glad you still use cabooses on your road.

Servicing passenger trains

A friend asked about a typical servicing sequence for passenger trains. Here's what I saw at New Orleans Union Passenger Terminal in the late 1950s and 1960s. It could easily be applied to operations on a model layout.

Arriving trains. When a train arrived, it backed into its station track after turning on the wye out beyond the coach yard. Once the passengers got off, the road engine was uncoupled and it went out to the enginehouse adjacent to the coach yard.

A switcher coupled on, and a carman uncoupled the head-end cars that were to be set out on the mail and express tracks on the downtown (northeast) side of the station. Checked baggage was usually unloaded onto carts on the platform, and the car carrying it might stay with the train, although there was a baggage track on the downtown side of the station, near the baggage room.

With the switching of the head-end cars out of the way, the switcher returned to pull the consist out to the coach yard. Car inspectors had been going over the cars since the train arrived, noting required repairs.

Coach yard. In the coach yard, the consist would be set out on a cleaning track for the cleaners to work through. Cars needing repair were set out on the RIP (repair-in-place) track. If a car would be out of service for long, a substitute might take its place. This was also when consist adjustments were made for the next trip's loading.

Clean linens from the railroad's and Pullman Co.'s laundry and supply rooms were carted out to the trains on the cleaning tracks. Commissary supplies for the dining and lounge cars were handled similarly, though I also often saw diners and lounges loaded from carts wheeled out on the station platforms just before departures.

When the train was ready, the last coach yard move was to pull the consist through the car washer so it would arrive at the platform fresh and clean.

Ready for departure. A switch engine backed the passenger cars for an outbound train into the assigned station track an hour or more before it was due



In 1954, the arriving Louisville & Nashville *Humming Bird* from Cincinnati backs toward New Orleans Union Passenger Terminal. The coach yard is at the right, and the engine terminal is on the left. James G. La Vake photo

to leave. Meanwhile express, baggage, and mail cars had been loaded on their assigned tracks. After the passenger consist was spotted, a switcher would gather up the head-end component and couple it on.

Then the entire train would be blue-flagged, protected by a blue metal sign reading MEN AT WORK. By rule, a train so marked couldn't be coupled to or moved, allowing carmen to connect it to station air and steam lines. They also made the air and steam connections through to the head-end cars.

About half an hour before departure the road power backed from the enginehouse to the station track. If the blue flag was off, the road engine coupled on. Then the blue flag went back up while the steam and air were made through to the road engine, the station connections were uncoupled, and the terminal air test was done. Passengers were boarding at this time, and last-minute mail and express were being loaded.

Shortly before departure the blue flag came off, and the conductor brought the engineer his copies of the clearance and train orders. The engineer turned on the

headlight and signal light (if any), alerting the Clara Street Tower operator to line the train out if he hadn't already done so.

At departure time the conductor called "All aboard!" the engineer blew the air horn, and away they went.

Variety and consistency. Many head-end cars reached the coach yard only when they needed repairs or to be stored when not required on the next trip. They rarely visited the car washer. A passenger consist might remain together for days or weeks at a time, but the head-end cars – except Railway Post Office cars (RPOs) – could vary from day to day. There were fewer RPOs, so they stayed on their assigned runs longer.

I designed a track plan for modeling NOUPT operations that appeared in the October 2002 *Model Railroader*; it's also included in my book, *The Model Railroader's Guide to Passenger Equipment & Operations* (Kalmbach Books).

Freight station operations



Less-than-carload-lot (LCL) package and merchandise traffic lines a covered freight station dock at the Chicago & North Western's Proviso Yard in December 1942. Note the light-colored refrigerator car on the far track. Office of War Information photo, Library of Congress collection

Many of our model railroads have freight stations, but we don't always make the most of their operational possibilities. Especially for medium to large cities, freight stations can be among the busiest industries on our layouts.

Freight stations provide rail service to businesses that don't have their own rail sidings. You can think of a freight station on your layout as an industry multiplier. In the space you might devote to one small or medium size factory, your railroad can serve many unmodeled customers at a freight station.

Less-than-carload lots. Most of the traffic moving through freight stations was "LCL," varied cargos in less-than-carload lots. The freight station received LCL from a variety of shippers, consolidated it into carloads moving to like destinations, and sent it on its way, primarily in boxcars. It also received carloads of LCL from other stations. Customers could pick up and deliver with their own

trucks, the railroad might have a trucking arm of its own, or it might contract with a private trucker.

Right into the 1950s, the railroads had enough of this traffic to schedule dedicated "merchandise" freights carrying all or mostly LCL. However, this was retail transportation, and railroads are best at wholesale. As early as the 1930s, some railroads leased space in freight stations to forwarding companies that operated pickup and delivery trucks and consolidated their own loads for rail shipment. Ultimately freight stations were sold to freight forwarders, although for our purposes they still worked much as when the railroads owned them.

While LCL disappeared from freight stations by the end of the 1960s, a good share of it is still on the railroads in the form of TOFC (trailer-on-flatcar) traffic.

Opportunities. Here are six ways to take advantage of the operating potential of freight stations.

1. Schedule setouts and pickups.

You can establish cutoff times requiring arriving cars to be spotted in time to make the next morning's scheduled truck deliveries. Also set deadlines to have outbound cars in the yard in time for either a merchandise train's departure or for pickup by a merchandiser passing through.

2. Use parallel tracks for loading and unloading from one dock.

It was common to spot cars so their door openings lined up, allowing bridge plates between cars to connect the outer cars to the dock.

3. Reload "foreign" empties. Cars from other railroads can arrive at your freight station with LCL from across the country. When those cars have been "unloaded," reload them – a paperwork procedure – with outbound LCL (toward their home roads, if possible).

4. Use refrigerator cars for LCL.

Empty "RS"-type reefers (ice-bunker cars without meat rails or other special equipment) often carried clean, dry freight on their way back to perishable-producing areas. Or if your road serves a produce-growing region, your freight station may receive LCL in reefers coming home from distant markets.

5. Load LCL "peddler cars" for way freights.

Pull the peddler boxcar from the freight station and couple it at the head end of the way freight. Besides its other work, the local will stop for five or ten minutes at each station along its run to unload and load LCL. At the end of the way freight's trip, spot the peddler car at that terminal's freight station.

6. Make it a separate switch job.

At large, busy locations, an engine and crew might work for part or all of a shift to spot the freight station tracks and transfer cars to and from the classification yard.

For more on freight station operation, see "From the freight house to everywhere," by Mark Vaughan, in *How To Build Realistic Layouts: Industries you can model*, a *Model Railroader* special issue. Another good reference is "Package and LCL Traffic," Chapter 6 in *The Model Railroader's Guide to Industries Along the Tracks 2* by Jeff Wilson, from Kalmbach Books.

Helper operations



This four-unit set of matched F7s is headed away from us, pushing a Baltimore & Ohio coal train up West Virginia's Cranberry Grade from behind the sturdy steel wagon-top caboose. The flag on the side of the nearest cab unit is a marker indicating the rear of the train. H.W. Pontin photo

Helper operations on model railroads can transform an operating problem – a grade steep enough to limit train length – into an operating highlight. It's perfectly realistic to get long and heavy trains over a steep section of line by adding extra locomotives, whether steam, diesel, or electric. Before today's radio-controlled distributed power units (DPUs), those added locomotives most often had their own crews who worked as a team with the road engine crews to get trains over the railroad's Big Hill.

Digital Command Control makes it easy to independently control two or more locomotives on one train. That makes helper service an opportunity that can add excitement to your railroad's operations.

Double-heading, with the helper in front of the road engine, is the simplest way to add power to a train. This was often done on passenger trains, but was used on freights too. However, too much power applied from the head end might exceed the strength of the cars' draft gear.

Draft gear limitations aren't a problem on model railroads, but our sharp curves can introduce another difficulty, "stringlining." That's when the power up front and the load behind are each great enough to pull cars off the inside of a curve, as if drawing a straight line between points along the arc.

Pushers at the rear of the train reduce the strain on prototype draft gear, since

many drawbars are in compression instead of tension. Having part of the train pushed rather than pulled also makes stringlining less likely on a model railroad. If neither engine can move the train by itself, the pusher can't derail the train by buckling it in the middle. If either engine hesitates, the train stalls.

With cabooses, the question is whether the pusher can be behind the cabin or must be ahead of it. Often the deciding factor was whether the prototype's caboose had a steel underframe to transmit the pusher's power. There were also laws in a few states requiring pushers of a given weight or tractive effort to be ahead of occupied cabooses.

If the pusher is ahead of the caboose, some kind of switching maneuver is needed to cut the pusher out of the train and get the caboose back on. Then the train needs to make a standing set-and-release brake test. This can add interest even to through freight runs.

There's also drama in dropping a pusher on the fly from behind the caboose. The big roads did it with a long valve handle on the caboose platform to close the angle cock in the brake pipe, as well as a chain or extension lever to lift the coupler pin. The pusher's brakes set automatically when the air hoses separated and the train went on its way.

On model railroads we can simulate this maneuver by blocking open the knuckle of the pusher's front coupler. The pusher can stay with the train just

by pushing hard enough to help. When the train starts over the summit, the pusher engineer can back off his throttle and let the train pull ahead.

Mid-train pushers add more complication, both in getting the helpers into the train and out of it again. This was usually done where there were crossovers between parallel tracks.

Operating rules treat helpers as part of the train they're helping. The helper crews receive copies of all the clearances, train orders, or track warrants delivered to the train while they're helping it.

Once cut off from a train, a helper engine needs independent authority to return to its base. Typically it runs as an extra train.

On a road with two or more main tracks and current-of-traffic signalling, such movements were often authorized with a clearance card assigned a number and okayed by the dispatcher. On single track the light (without cars) engine would need a Form G running order.

Under Centralized Traffic Control, a clearance might be issued from an open office, or the crew could get the dispatcher's verbal authority, by telephone or radio, to proceed to the next signal and run on signal indication from there. Under track warrant authority the light helper needs its own warrant.

However it's done, getting the helpers back to their base adds at least one train movement down the grade for every train that needs help going up.

Industrial switching layouts



Lance Mindheim's HO East Rail layout represents a CSX industrial park in Miami. The unloading rack in the foreground is for propane tank cars, and it's a great example of how compact an "industry" can be. Lance Mindheim photo

If you're looking for a layout theme, consider the example of several leading model railroad operators who have built industrial switching railroads. What these workaday lines lack in mainline glamour and drama they make up for with concentrated switching movements. If industrial switching is what you most enjoy, you can make it the focus of your model railroad.

Those who have built and are operating industrial layouts find that they have many advantages. I'll explain some of them here, and highlight some of the opportunities such layouts offer for operating realism and interest.

Simplicity. Many industrial layout owners cite their less-complex operations as an advantage compared to more elaborate mainline systems. Timetable schedules, signals, telephone or radio communication, and complicated controls are largely or completely unnecessary. The operating environment can be more relaxed, with time to think and pay attention to the details of basic switching movements. This may be an easier path to the kind of operating fun you're looking for.

Simplicity can also equate to easier and less-costly construction. Narrow shelf construction and industrial layouts

are a natural match, meaning you have to model only a relatively narrow strip on either side of the railroad, much of which can be taken up by industrial structures and installations. Benchwork can be basic, and a minimum of roadbed structure would probably be most realistic for this kind of railroad.

Manually operated turnouts can be the norm, combining lower expense and prototype authenticity. If you prefer powered turnouts, you can use the simplest controls located in line with the switch points on the layout fascia, where they'll be convenient for walkaround use. That will both minimize wiring and help maintain the working atmosphere of a switchman on the ground.

Structure modeling may be the greatest challenge in building an industrial railroad. However, the operational function of most structures is to give purpose to the placement of cars, and that can be fulfilled by illustration-board or foam-core mock-ups until you have time to complete fully detailed models.

Multiple prototypes. The variety on hobby shop shelves presents a dilemma to many of us: how to model just *one* railroad when there are so many attractive possibilities. Industrial railroads can

offer believable ways to run trains from several prototypes on one layout.

One approach is to model transfer operations. In cities where several railroads have terminals, these inter-yard runs move connecting cars from one to the other. Locomotives and cabooses from any line can thus enter your railroad to deliver interchange cars to a yard. Often work rules dictated transfers could handle cars only from their own lines, so the transfer power and caboose would return home "light," without cars.

A good example of this is Chuck Hitchcock's Argentine Industrial District Ry., featured in the February 2007 *Model Railroader*. Chuck's layout represents a Santa Fe yard in Kansas City and five nearby industrial switching zones. But in addition to the home road switch jobs, transfers from each of the many other lines in Kansas City arrive to bring in connecting cars.

Another angle is to model an industrial area with overlapping or parallel lines. Each railroad would have its own industrial zones to serve, and there could also be some joint service areas to provide competition between carriers. Transfers and interchange connections could be included as well.

Paul Dolkos' Baltimore Harbor District layout, featured in the 2010 edition of our annual *Model Railroad Planning* magazine, demonstrates this approach. The Baltimore & Ohio, Canton RR, and Western Maryland each have their own industrial zones to switch on Paul's layout, and transfers arrive from the Pennsylvania RR too.

A developing trend? Industrial switching railroads have been planned by some leading layout designers since the earliest days of our hobby, but I think more of them have actually been built and operated in the last 20 years than in all the time before. The advantages I've pointed out and more are appealing to growing numbers of model railroad operators.

Innovations continue, and many new ideas are included in the article "Grow your operations, not your layout" by Lance Mindheim in the *Model Railroader* special issue *How To Build More Layout in Less Space*, available from dealers or from ModelRailroader.com.

“Loading zones”

One way to add to the operating interest and realism of a layout is to follow prototype practices for track arrangements and car spots at industries. That gives more meaning to how we place cars when switching those industries, and looks more realistic too.

The photo here is a good example. Tony Koester built the tracks at the Low Gap tippie on his former HO railroad, the Allegheny Midland, to follow a common mining country pattern from the days of “loose car” railroading, back before unit trains or loading on the move.

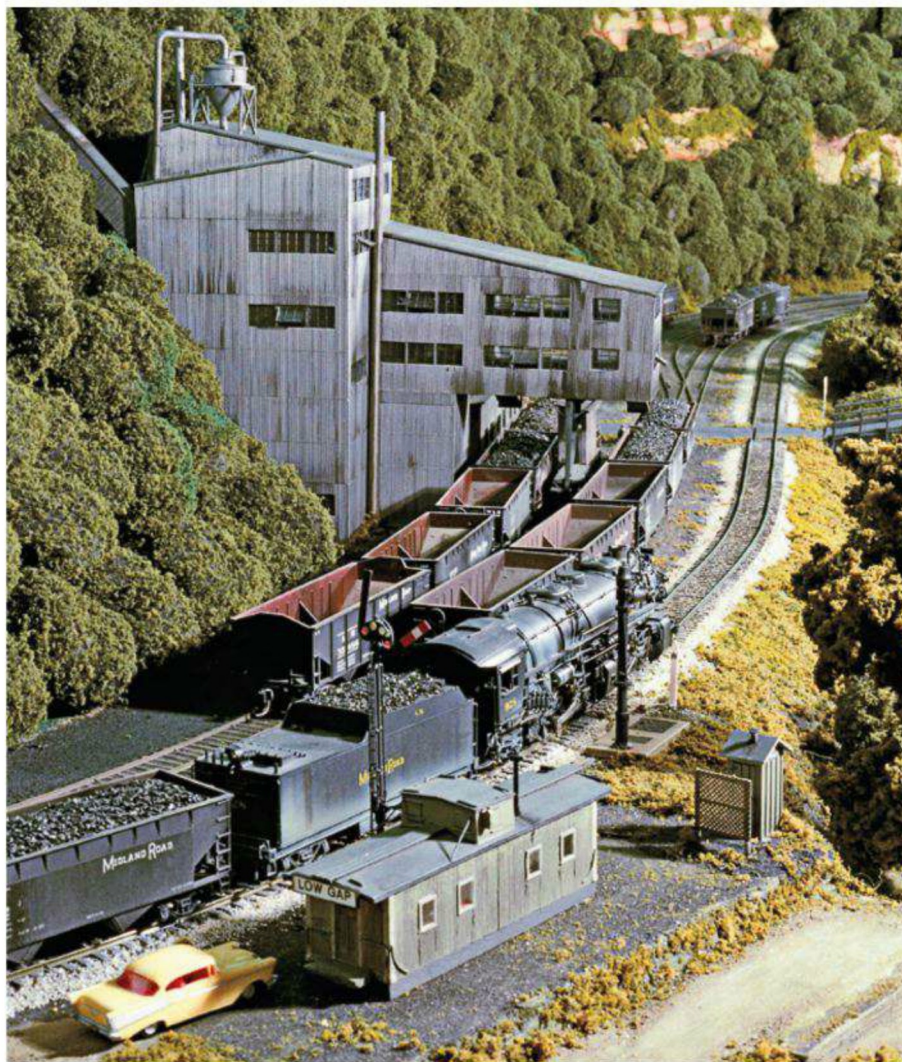
Loading sequence. Empty hoppers are placed on the two tracks passing under the tippie, but either entirely past it (toward the camera) or with the first car on each track under a loading chute. Typically the tracks are built with a slope from the empty car end in the foreground to the loaded car yard in the distance, with the cars held by hand brakes.

To spot a car for loading, a tippie worker releases enough brakes to let the cut roll under the tippie, then applies one brake to stop the first empty under the chute. When the car is filled, the hand brake can be released to roll the next empty into position, and so on. When a short cut of cars has been loaded – short enough to be safely controlled by hand brakes – the loads can be uncoupled and allowed to roll into the loaded car yard.

When the Midland Road’s Coal Fork Shifter arrives to work the tippie, the crew finds the empty tracks vacant and the load tracks full. They pick up the loads to haul to the coal marshalling yard, and spot another set of empties past the tippie.

At smaller tipples and truck dumps there might be just one shorter track holding only a few cars, but the principle is the same. And note that only as many cars as fit on the track upgrade from the tippie can be loaded before the track must be re-spotted, and that there has to be room below for that many loads.

Model subterfuge. Alas, gravity switching controlled by hand brakes is pretty hard to reproduce in HO scale. In reality, the Shifter picked up the loads and spotted the empties on mostly level tracks. The empty hoppers then stood still until the end of the operating session.



The Low Gap tippie on Tony Koester’s old Allegheny Midland layout is a good example of realistically arranged loading tracks. Tony Koester photo

Between sessions, Tony put loads in the cars and rolled them by hand to the load yard, ready for the next visit of the Coal Fork Shifter.

Nevertheless, the tracks were laid out to support a realistic loading sequence, and even those who didn’t know how a coal tippie worked could learn from the model railroad. And Tony could stage a photo like the one here showing the tippie in the midst of loading its daily allotment of hoppers.

Not only mines. Similar patterns applied for other kinds of bulk commodities, including cement and grain. Large grain elevators used long double-ended tracks where 40-foot boxcars were fed into one end and came out the other,

either loaded or unloaded, or both. Rather than gravity, it was more common to have car pullers or privately owned switch engines move the cars through the loading/unloading sheds.

Hand-powered subterfuge works for model elevators, even during a session. See “Switching Santa Fe’s Elevator ‘A,’” by Chuck Hitchcock, in *Model Railroad Planning 2006*. But also see “Working car puller for your soybean plant,” by Bill Darnaby, in our 2007 special issue, *How To Build Realistic Layouts: Industries You Can Model* (for the back issues go to KalmbachBookstore.com).

For any industry, if we model not just the buildings but the prototype’s car handling patterns, we can find greater realism and switching satisfaction.

THE OPERATORS

Sure spots for switching fun

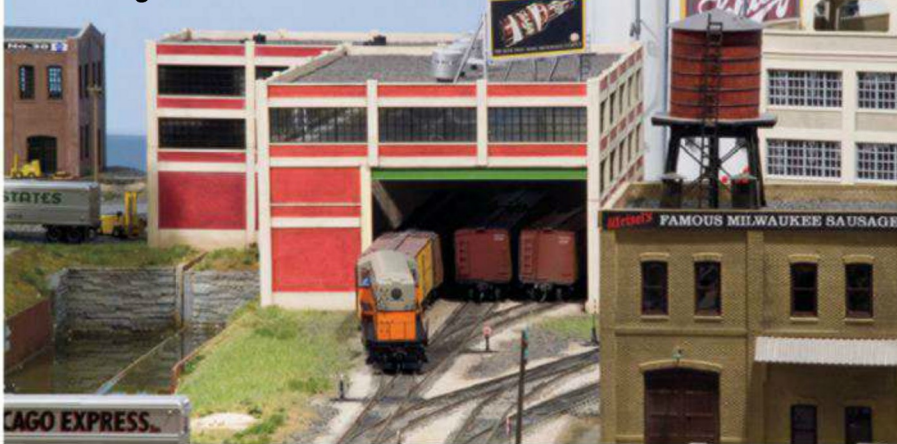
Milwaukee 20451 to door 8



Andy Sperandio photo

"Sure spot" is a term some railroads use for placing cars at specific track locations, not just anywhere near the customer's building. Shippers and receivers usually need cars placed precisely, as at numbered doors, for loading or unloading. For us this can add to the fun by requiring additional switching to line up and spot cars as specified on waybill cards or switch lists. Here on *Model Railroader's* HO scale Beer Line layout, a Milwaukee Road boxcar is being delivered to door 8 at the freight house.

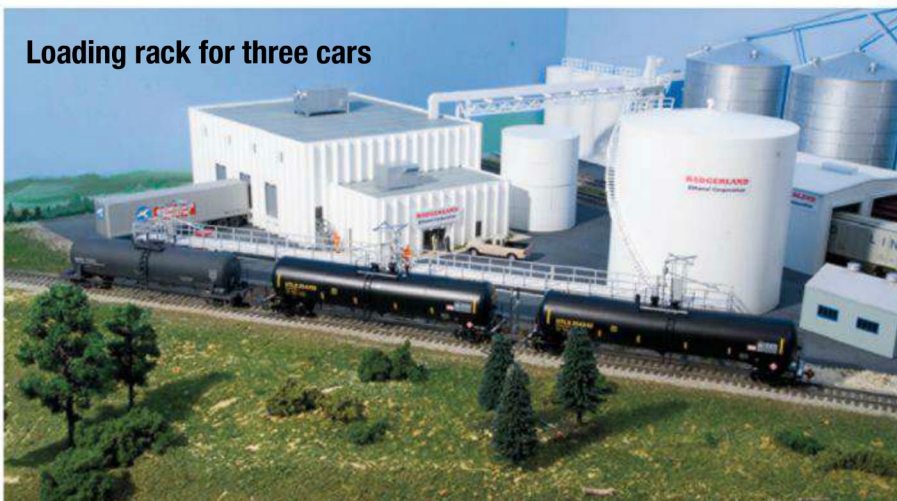
On the right track at Schlitz



Andy Sperandio photo

When industries have multiple tracks, each track usually serves a particular purpose, and the customer wants certain cars placed on certain tracks. At the Beer Line's Schlitz warehouse, the switch list orders cars to be placed on track 1, 2, or 3 (from left to right). The switch crew usually sorts cars for like tracks together so that each track's cars can be spotted with one shove. Making the fewest possible movements inside the building is generally safest for both railroaders and warehouse workers.

Loading rack for three cars



MR staff photo

At the ethanol plant on MR's Wisconsin & Southern layout, each tank car is uncoupled to be spotted at a filler point along the loading rack. Only three cars can be spotted at a time, and any extra empty cars will be left "off spot." That means leaving them on the plant lead off to the right, or on a storage track, to be placed the next "day" (operating session) after the loaded cars are pulled. The left-most spot also serves for unloading the gasoline used to denature the ethanol. When, as in this photo, a gasoline car is spotted for unloading, only two ethanol cars can be loaded at a time.

Modeling livestock traffic

Stockcars have a place in many of our freight car fleets, and stock pens or stockyards are common models on our layouts. But are we making use of the operational opportunities in livestock traffic? Modeling the details of livestock operations could add movements and interest on many model railroads.

Preparation. Before loading, stockcars had to be cleaned, inspected, repaired as needed, and “bedded.” This last meant putting down a layer of sand, and perhaps also straw or hay, on the floors of the cars.

To model these activities we can switch empty stock cars to a designated cleaning or bedding track, or to a repair track in a nearby yard, for a preparation period before moving them to stock pens or stockyards for loading.

Don’t forget that the sand and hay have to come from somewhere. Deliver occasional carloads of these to supply your livestock operation.

Loading. Obviously we’ll spot stockcars with their doors lined up with the loading chutes. Chutes were ordinarily spaced about 40 feet apart, the length of a typical stock car, so more than one car could be spotted in one move.

If you have more cars to load than chutes, you’ll need an engine standing by to re-spot empties. In the photo above, the locomotive is pulling the stockcars up to the single loading chute one at a time to receive sheep. (Sometimes cars could be re-spotted by gravity, or by men with pinch bars if only a few cars had to be moved.)

The ranchers or “drovers” shipping the stock drove the animals into the cars, but railroaders often helped, including the train crew, station agent, and even the local section gang (track workers) for large shipments.

Shipping charges were based on both weight and distance. If there wasn’t a stock scale where the cars were loaded, they would be weighed at the nearest track scale, another operation you can model on your layout.

Transit. Loaded cars were quickly sent on their way. Most railroads placed blocks of loaded stockcars at the head end of trains to reduce the effects of slack action.



Ranchers and railroaders help load sheep at Silverton, Colo., on the Denver & Rio Grande Western narrow gauge. William Moedinger photo

By law, livestock could be kept in the cars for only 28 hours, or 36 with shippers’ waivers. Then the stock had to be unloaded at suitable pens to be fed, watered, and rested for at least five hours.

If your layout is somewhere along a lengthy livestock route, stock-resting pens could be a major industry and a way to keep through freights from getting across your main line too fast.

(The 36-hour waiver let the Union Pacific run fast “DLS” (for *Day Livestock*) trains from Salt Lake City to Los Angeles without rest stops.)

Drovers cars. Shippers could send caretakers (drovers again) along with their stock. When there were only a few, they could ride in the caboose, but several Western roads used special drovers cars for larger groups of riders, which you can add to your stock trains. These included rebuilt or purpose-built open-platform cars on the Santa Fe, long cabooses with extra windows and seats on the Missouri Pacific, and older arched-roof coaches on the UP.

Destinations. Most livestock was shipped to large “union” stockyards in

places like Omaha, Kansas City, and Chicago. These had slaughterhouses and packing plants adjacent, but stock could also be reshipped from union stockyards to other points. Traffic at these yards was generally as steady as our appetite for meat, but stock movements could be seasonal in various ranching regions.

Another kind of seasonality was the fall movement of stock from summer ranges in high country to winter ranges in the lowlands. Some of the last large stock movements were of this kind; the Denver & Rio Grande Western ran its last fall stock extra in October 1980.

Learn more: Jeff Wilson’s article, “Rolling livestock” in our special issue *How to Build Realistic Layouts: Industries You Can Model*, pages 48-53, goes into greater detail. I also recommend “Santa Fe’s Livestock Service, History and Operations,” by Matt Zebrowski, in the Third Quarter 2001 issue of the Santa Fe Ry. Historical & Modeling Society’s *Warbonnet* magazine, on sale at atsfr.net.

Andy Sperandio is a contributing editor for Model Railroader. He writes the monthly column, “The Operators.”

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