

- EXPERT ADVICE ON PLANNING AND BUILDING
- TRACK DIAGRAMS AND DETAILED INFORMATION
- A SUPPLEMENT TO *MODEL RAILROADER* MAGAZINE

Freight yard design and operation



- How to add more operational possibilities to your layout
- Plans for through yards, stub yards, and more
- Loading points for various commodities and cargo
- How to fit classification tracks into almost any space

Lessons from a small yard

Woodsriver Yard is short on space, but big on operation

By Paul J. Dolkos/Photos by author

Most of us want at least one full-service yard on our model railroads where we can classify and sort cars, service locomotives, park cabooses, and represent a number of other support functions.

As I learned in building Woodsriver Yard, shown in **fig. 1**, on my HO scale Boston & Maine layout, a yard doesn't have to be large to be interesting. Let me give you a guided tour and point out some of the features I've included to make my little yard look – and operate – like the real thing.

Classification tracks

Tracks for sorting cars are what makes a yard a yard. Mine includes five parallel tracks where consists for local freights and blocks for through freights are assembled. The distance from the first turnout to the end of the stub tracks is about 10 feet, and the yard capacity is about 70 cars. My longest track can hold 15 or so 40-foot cars. Of course, not much classification is possible when the tracks are filled to capacity. Ideally, I've found the yard operates best if its tracks are less than half full. Then it's easy to sort and move cars around to get blocks in the desired order.

My yard ladder turnouts are hand-built and curved. This enabled me to place the yard ladder snug against the outside of the mainline turn-back curve. I also find the flow of the curved throat and slight curve of the classification tracks attractive.

My classification tracks aren't permanently assigned for cars going to a specific destination. As the yard crew plans their moves, they decide



Fig. 1 Action-packed. Yards don't have to be big to be interesting. The Woodsriver Yard on Paul Dolkos' HO scale layout offers plenty of action in a relatively small space.



Fig. 2 Flexible track assignments.

Since there are a limited number of classification tracks in the yard, track assignments by destination must be flexible. Paul's car-card box has a magnetic strip that allows yard crews to easily change assignment labels.

which trains and blocks will be placed on each of the tracks. If there's a block of cars on a track billed to a single destination, then by default that track will likely be selected for any additional cars bound for that destination.

I've placed magnetic labels, shown in **fig. 2**, for the car-card boxes on the fascia. The labels can be easily moved to identify the current use of any track. Sometimes there can be blocks for multiple destinations on the same track. In either case, not permanently assigning tracks by destination adds a lot of flexibility.

Switching lead

Figure 3 shows a key operating element of the Woodsriver Yard – the yard lead (the track that extends outward from the classification yard ladder parallel to the main line). In my yard the lead is a separate track running parallel to the main line. The lead is an important feature, as it permits the yard switcher to work largely independently of departures and arrivals of other trains. The yard job needs to clear the lead only when a road locomotive needs to leave or run into the engine terminal.

When the lead is shorter than the longest cut being switched, yard work is slowed. My lead can hold about 20 cars, but I seldom use its full length. In yard designs where the main line is

used as the yard lead and there are multiple train arrivals and departures, congestion is sure to result.

Running parallel to my classification yard, but separate from the ladder, are two tracks on which arriving freight trains terminate and outbound consists are parked prior to departure. Trains can arrive and depart on the two arrival/departure (A/D) tracks without interfering with the yard job working the classification yard. This proved to be critical to the smooth operation of the yard.

If I didn't have independently accessed A/D tracks, the work would have to stop in this yard each time a train arrived or departed. Ideally, the A/D tracks would be located along the main line beyond the classification yard so operators aren't elbowing each other for aisle space.

My A/D tracks are a tail of a wye coming off the main line. This arrangement allows either northbound or southbound trains to back in so that the locomotives aren't trapped at the stub ends. This makes it easy for the power to run to the engine terminal or get into the clear so the yard switcher can work the train's consist. There's also a crossover from the yard lead to the A/D tracks.

The nerve center of a prototype yard is the building where clerks sort the waybills and make up the switch lists that tell the switcher crews what to do. The yard office normally would be located near the start of the ladder tracks, which, as **fig. 3** shows, is where I placed my office. When there's a lull in operations, the switcher is probably parked nearby, and its crew is inside the office drinking coffee.



The size of the building would depend on the size of the yard, and typically it may house a break room and crew lockers.

Engine terminal

If space is critical, one could do without an engine terminal. When engines aren't in service they can be parked on any open track. But for most modelers an engine terminal is an opportunity to install interesting structures and a great place to show off their locomotive roster.

If steam power is used it's almost mandatory to have a way to turn locomotives on a turntable, wye, or in rare instances, a balloon track.



Fig. 3 Yard lead. The Woodsriver Yard lead is a separate track that runs parallel to the main line so switching can continue as other trains arrive and depart. The train in the foreground is departing to the south. Over the hood of the 1535 is the crossover connecting the lead and arrival/departure tracks. The yard office is also located along the lead.

Turntables take up quite a chunk of space, but being able to store engines on the radial tracks makes it easy to access them.

My engine terminal lacks a turntable – see **fig. 4** on page 6. Locomotives have to line up on the service and storage tracks, so there may be engines blocking the power that's needed for a specific assignment. On the other hand, my nearby wye offers an easy way to turn not only engines but entire trains. It also happens to fit into my space very well.

You probably won't consider a balloon track or reversing loop for turning locomotives unless this track arrangement is already part of the

layout plan. With diesels, turning usually isn't required, and some modern-era modelers have a filled-in turntable pit as part of their scenery.

There are also car movements in and out of engine terminals, including incoming loads of fuel, sand, parts, and supplies, all usually in home-road cars. Outbound loads include ashes and scrap. The engine terminal is an industrial switching complex that the yard crew can work when they're finished in the classification yard.

Caboose track

If you're modeling an era when cabooses were still in service, you probably should have a track or

specific place in a yard to store cabooses. A string of these cars can be an attention-getter in a sea of drab rolling stock. If there's enough space available, include a shed, hoses, and other equipment and materials required to inspect, clean, and service cabooses for the next run.



Fig. 4 Engine terminal. These facilities aren't only a place to park locomotives between runs; they're also a setting for interesting structures, such as a coal tower. This one is based on the Central Vermont's coal tower at Palmer, Mass.

The caboose track should be located where it's convenient to add a caboose to a train or drop it off when a run terminates. A caboose is usually the last car coupled to a consist. It shouldn't be placed at the end of a yard track where cuts of cars are repeatedly shoved against it as the train is made up. Instead, have a switcher tack the caboose on once the train's consist is complete, or back the entire train up to the caboose.

Car repair

At yards that interchange with connecting railroads (and at other points as well), there's often a track or two set aside for freight-car repair,

usually called the RIP (repair-in-place) tracks. Many are modest, with just enough capability to repair a defect so a car can be forwarded to its home-road shop.

Figure 5 shows my RIP track, which includes a wheel crane and some wheelsets. You can make it more than just a bit of scenery and designate it as a car spot. In your car movements, create a bad-order ticket or two and have the yard job move that car to the repair track.

Yards are often places where you find stored maintenance-of-way equipment. This can include old Pullmans rebuilt as dormitories, flatcars carrying earth-moving

equipment, and ballast hoppers. It's a great opportunity to include equipment that's a little different and from an earlier era. And the cars can contribute to operations if you occasionally dispatch a work train.

Industrial track

Clusters of industries are frequently near yards because the location is convenient for railroads to



switch, and the adjacent real estate, at least originally, was often available.

Behind my yard I've built a long spur serving six different companies, shown in **fig. 6**. The varied structures make a nice backdrop for the scene. But in some places the spur is as much as 30" from the aisle, making it a bit difficult for shorter people to uncouple cars back there. As a result, we've had some operating sessions where the industrial siding didn't get worked, although another reason is that the crew may have had its hands full getting trains in and out of the yard.

You might want to think twice about concentrating too many activity points so close to one another.



Fig. 5 RIP track. Many yards have a designated RIP, or repair-in-place track where freight car wheel replacement and other running repairs are performed. At Woodsriver Yard, this activity is suggested by a crane and some spare wheel-sets. The snowplow waits for winter on an out-of-the-way track.



Spreading it out

You can see that there's a lot more to yard operations than simply sorting cars and making up trains. Variety makes yards interesting.

As you plan your own yard, try to lay out the various pieces to minimize congestion. If possible, spread out the elements in a linear fashion to prevent yard crews and road crews from having to stand in the same few feet of aisle space.

Another solution is to include aisles on both sides of a yard. Rather than locating the yard area up against a wall, some modelers have created an open pit behind their yards exclusively for the yard crews. Other crews use

Fig. 6 A working yard. The five-track yard with dual arrival/departure tracks is center left in this photo. The classification tracks are only partly full, making it easy to sort freight consists. At right is a spur that serves six industries. Their structures form a backdrop for the Woodsriver Yard. Note the access road between the yard and engine terminal.

the aisle in the front of the yard. With proper planning, you'll be able to make your yard the nerve center of your railroad. **MR**

Paul J. Dolkos lives in Alexandria, Va. He's a frequent contributor to Model Railroader magazine.

A baker's dozen yard ideas for design and operation

Advice from a modeler experienced in both

By Byron Henderson

If you're planning a new layout or an expansion, congratulations! A few wise choices now can make your yard free-flowing and fun to run.

Model railroaders like trains, obviously, so most of us like to see lots of them run during a session. The effect that those trains will have on yard operations may not be obvious until the layout is built and it's too late to make track changes.

I've had the chance to design and operate many model railroad yards, and yards are among my favorite parts of any layout. Yards provide engaging operating roles and a "railroady" look that I really enjoy. Designing yards according to "best-practice" design principles and applying thoughtful operating procedures can keep traffic moving smoothly and put smiles on your operators' faces.

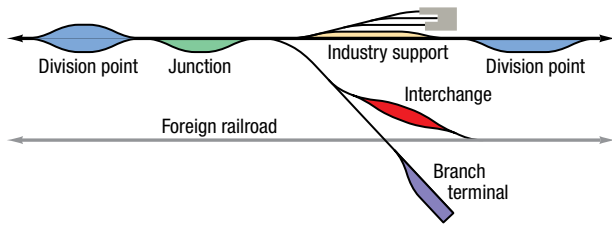
Even if you've already laid all of your track and have no room for expansion, a few operating ideas might make your existing yard(s) work better without rebuilding. Here are a dozen and one ideas you can use when designing a new yard or getting the most fun and efficiency from your existing layout. **MR**

Byron Henderson is a custom layout designer from San Jose, Calif., where he grudgingly lets the family car share the garage with his N scale layout. He's a past editor of the National Model Railroad Association's Layout Design Special Interest Group's Layout Design Journal (www.ldsig.org) and has also written for Model Railroad Planning magazine.

Layout designer and author Byron Henderson shares ideas on planning and operating model railroad yards. Watertown Yard on Jack Gutsch's HO scale Minneapolis & St. Louis layout is a good example of a small but efficient yard layout. Andy Sperandio photo



Yard types and locations



1. Choose the right yard. Many model railroaders I talk with about layout designs focus on “division point” yards, which were often crew-change locations in the steam and transition eras. And with enough space and the right concept, a division point yard can be a rewarding element for a layout.

But most real-life division point yards are huge, and modeling one (or more) is a significant commitment of time and space. I find that many folks who say they need a division point yard actually just want a chance to classify some cars, originate and terminate a few trains, maybe handle some engines and cabooses, and perform a few other yard functions.

As it turns out, there are a wide variety of different types of yards on the big railroads, and many are of a scale and scope that are small enough to be good candidates for modeling. Often one of these other types of yards is a better layout subject than attempting to shoehorn a full representation of a division point into too little space. Instead, the division point yard or yards may be represented by staging.

As the diagram shows, smaller yards can be found at many locations, such as junctions, near interchanges with other railroads, adjacent to large industrial customers, even scattered along or at the end of branches. These smaller yards can offer a lot of operating fun and usefulness without overwhelming other layout elements. So don't automatically decide on a division point terminal, especially when space is tight.

Visibility on yard ladders

A
Cars on front tracks
block view of rear tracks

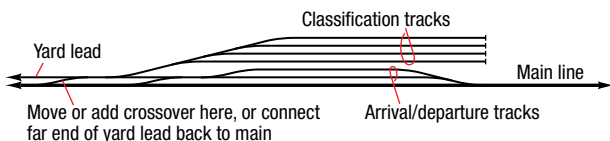
B
Clearance points near
ladder are more visible from aisle

2. Orient ladders for visibility and ease in uncoupling. Curved yards are often necessary in the cramped quarters of a typical model railroad. But when possible, provide some straight track at the clearance points near the ladder, where most coupling and uncoupling takes place. In real life, brakemen on the ground often have to push or pull the couplers to allow coupling, but that becomes tedious in model operation. Whether you use magnets or some type of coupler pick, easy and reliable uncoupling increases the efficiency and enjoyment of a model railroad yard.

Veteran layout designer Don Mitchell has pointed out that it's also a good idea to orient the ladder so cars at the end of each successive track are easy to see. This isn't always possible, especially if you're following a prototype track arrangement, but it's worth early consideration in designing your yard.

The two yard throats shown above are roughly equivalent. If we assume that the operating aisle is below the yard in each diagram, configuration B makes it easier for operators to see and reach the critical areas at the clearance points on each track. That's especially true when most tracks are full of cars. And if you plan to operate your switches with ground throws, they'll also be easier to reach from the aisle.

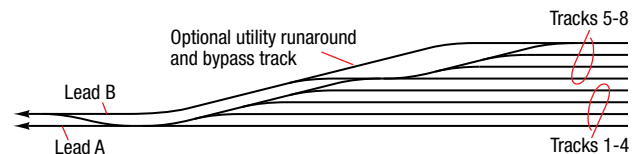
Mainline access



3. Allow departures from classification tracks.

Most layout designers are familiar by now with the concept of a separate switching lead on a model railroad yard. But some ways of connecting a ladder with a yard lead are more flexible than others. When possible, use crossovers that allow trains to depart from (or arrive in) the classification tracks directly as shown in the illustration. This saves at least one back-and-forth pull-and-push for each departure, especially when the yard is double-ended, with ladders at each end.

Ladder for two switchers



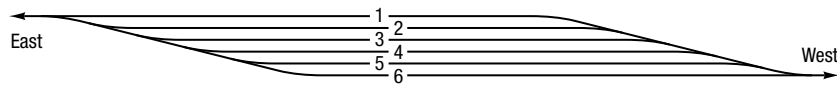
4. Two crews, one ladder. Because of the length occupied by a yard ladder, some designers try to double-up with parallel separate ladders, especially when multiple switch crews will be working. However, the configuration shown in the drawing is favored in many full-size yards and is often more useful. A switch crew on either lead may reach all the tracks easily, but when two crews are working, the crew on lead B can switch tracks 5 through 8 without interruption.

Just as important as providing multiple leads is ensuring that there's enough aisle width along the yard to handle a couple of yard operators as well as the crews of arriving, departing, and passing trains.

Swinging track assignments

“Swinging” track assignments

Milwaukee, Racine & Troy Port Marquette Yard



Lineup at 12:01 p.m., trains on tracks 1 and 2 ready to depart

Track Classification

1	Rockford and west (through)
2	Williams Bay local (west end of track, block ahead of Rockfords for setout by through train) Mukwonago local (east end)
3	Kansas City and west via Santa Fe
4	Chicago & North Western (C&NW) interchange
5	Soo Line interchange
6	“For now” (mixed, but none of the above)

Lineup at 4:15 p.m., earlier trains on tracks 1 through 5 have departed

Track Classification

1	Rockford and west (through)
2	Williams Bay local (west end) Mukwonago local (east end)
3	Open
4	Inbound C&NW interchange (to be classified)
5	Milwaukee Road interchange
6	Port Marquette local deliveries

5. It's better to “swing” yard tracks than build tracks that are too short. In the ideal situation, there will be at least one yard track for each classification (train, block, or destination) to be sorted in the yard. But in the model situation, there isn't always enough room. A number of yard designs have lots of tracks. However, many of those tracks are so short they're unusable, since the yard ladder takes up so much room.

In these situations, it's often better to have fewer, longer yard tracks and change their assignments from one classification to another during a session, as shown here at left. Or, if the eastward local departs early in the session, but the cars for the eastbound through train aren't needed until later, the same track might be used for both. On some railroads this was called “swinging” the yard tracks.

Build in tools for organization



Laying car cards on the layout is unsightly and inefficient. Rick Fortin's HO Santa Fe provides boxes in the fascia for each yard track, and the low-profile Plexiglas rack at left can hold cards for sorting. Byron Henderson photo

6. Build in tools for paperwork and organization. Real railroads burn coal, oil, or diesel, but run on paper. Even computerized operations are notorious paper generators. The same is true for model yards, which require car cards and waybills, switch lists, and other documents to guide the work.

I happen to prefer car cards and waybills because they're easily shuffled to always reflect the order in which the cars stand on the track. But laying the cards out on the yard's surface or leaning them against the cars they represent is unsightly and unrealistic.

Instead, plan places to store cards and tools to make them work better. The photo shows Rick Fortin's HO scale Atchison, Topeka & Santa Fe layout. Rick provided a car card pocket for each yard track, as well as a couple of extras for crews to use as they like.

In addition, simple dividers (sheet styrene tabs with destination and/or block labels) allow crews to keep groups of cars organized. A clear Plexiglas strip purchased from a local plastics house allows crews to occasionally sort out a stack of cards without carpeting the layout with paperwork.

Auxiliary yards



Storage tracks at the White Mountain Paper Co. on Paul Dolkos's HO Boston & Maine railroad serve as an auxiliary yard, relieving the Woodsriver Yard (shown on page 30) of some work. Paul Dolkos photo

7. Call in the auxiliary! Auxiliary yard, that is. If your main yard is too busy, an industrial support yard (see photo), junction yard, or branchline yard might be a good way to share the workload and the fun.

Real-life crews often go on duty and work all day at remote yards serving local industries and interchange tracks without ever seeing the main division point. Instead, these local yard crews organize blocks of outbound cars for through trains to pick up, and deliver inbound cars set out by the passing trains to local industries.

An auxiliary yard can be an interesting new job for another yard crew, add work that lengthens the run for crews on through trains, and relieve the main yard of some burdens – a triple bonus!

Thin the herd



Tommy Holt uses drawers under his staging yards to store extra rolling stock, so his HO scale Western Pacific layout isn't overloaded. Tommy Holt photo

8. Thin the herd. No, not your operators – your rolling stock collection. Some model yards are crowded with cars that rarely or never move during a session.

Some, like maintenance-of-way consists, might be spotted on a little-used spur "out in the country" during operating sessions. Still others of these "yard queens" may be cars that don't operate well or don't really fit the era or theme of your layout. Fix, sell, or trade those cars to clear the decks for active yard operations on all available tracks.

Display cases or storage drawers, as in the photo, are other good ways to deal with surplus rolling stock.

Help for keeping up

9. Help the yard keep up with the road. Pity the poor yard crews. As much fun as they're having making up and breaking down trains, the darn things just keep coming – train frequency being a by-product of our always-too-short main lines. Yard work doesn't scale down like the running length on our compressed layouts, so it can be a struggle for the yard crews to keep up.

One obvious help is providing aisle space and yard leads for multiple crews to work independently. But yards collect kibitzing operators the way kitchens collect guests at a party, so try to keep other operators away from your busy yard crews. If you use radios for communications during operation, using separate road and yard channels minimizes the chatter and lets the yard crews concentrate on the tasks at hand.



When the assigned switch crew finishes their work at Elevator "A" on Chuck Hitchcock's HO scale Argentine Industrial District Ry., they help out with classification switching at the west end of Fifth Street Yard. Paul Dolkos photo

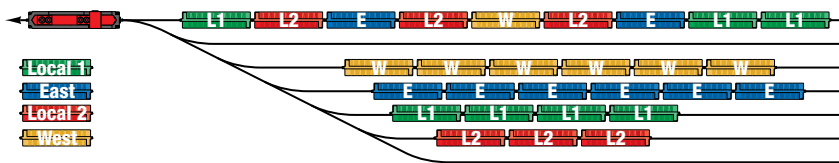
No “cherrypicking” allowed

10. Please don't pick the cherries.

All too often I see model yard crews searching frantically through their paperwork and yard tracks for one last westbound car for a through train that's arriving in five minutes. Finding such a lone car is called cherry-picking and is relatively rare on the real railroads. Railroaders know there will be another train to that destination tomorrow (or in a few hours), so they don't inefficiently dig through the yard to pluck out one more.

In the situation shown in the diagram, the switch crew has been able to keep up with traffic by classifying cars as trains arrive, as recommended in Andy Sperandio's article, "10 tips for freight yard design and operation" in the December 2004 *Model Railroader*. They have just one track of recent arrivals that aren't yet classified, but a westbound through freight is due soon.

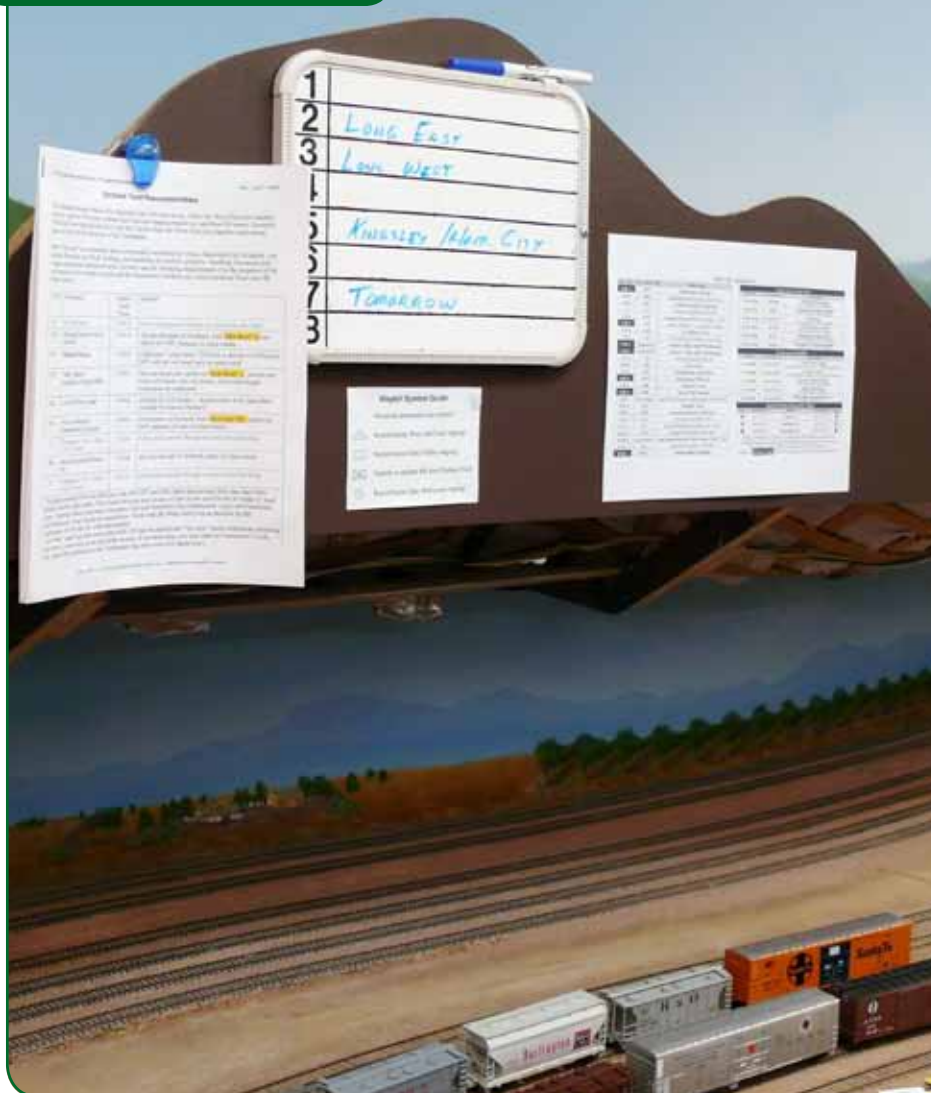
Should the crew try picking that lone westbound car from Track 1? Probably not. When a real-life yard crew couples



onto a string of cars, they'll usually handle them all before grabbing the next track. Jumping from track to track to find one or two cars from each is inefficient. So a professional crew would probably leave that single westbound car for tomorrow. There are posted cut-off times for local and through blocks, so crews know in what order to work the tracks for most efficiency.

Unfortunately, the need to cherry-pick an individual car is sometimes forced on model crews artificially by the limitations of some computer car-routing programs. Better to choose a system that allows the crew some flexibility in handling tracks to meet cut-off times without the panic of a scavenger hunt for an individual car.

Documentation



11. An ounce of documentation is worth a pound of cure.

And speaking of blocks and cut-off times, you do have clear written guides for your yard crews, right? Real-life crews do the same jobs day-in and day-out, so they may know the yard routine by heart. But model yard crews need extra help in the form of procedure guides, timetables or lineup sheets listing expected arrivals and departures, blocking charts, and more.

Whether you write them by hand or on a computer, you can easily create clear, good-looking materials that provide yard crews with the information they need to work efficiently and enjoyably. This yard documentation should be brief, to the point, and posted or placed where yard crews have easy access, hands-free if possible. The photo from Rick Fortin's layout shows printed yard instructions clipped to the upper fascia, with a train lineup and a white board for noting yard track assignments close at hand.

Rick Fortin uses his upper level fascia to post blocking instructions, an erasable track lineup board, and train schedules for the Chico Yard situated below on the layout's lower level.

Byron Henderson photo

Yard limits

12. Know when (and where) to set limits. The big roads use yard limits to allow yard crews to work on designated sections of main track without clearance from the dispatcher. Rule 93 in many rule books says that within yard limits every train except first class (usually passenger) must move at restricted speed, prepared to stop short of other trains, switches lined against their direction of travel, or other obstructions.

Marking yard limits as shown in the photo lets yard crews work more easily and reduces the dispatcher's workload. Yard limits also slow the passage of through trains, often a good thing.

When you set yard limits, take note of crossovers and other tracks that yard crews need to use, and allow room for pulling out long strings of cars.



The engineer of this Denver & Rio Grande Western 2-8-2 knows that passing the “Y”-shaped yard limit sign at left obliges him to run according to the provisions of Rule 93. Doug Tagsold took the photo on his On3 layout.

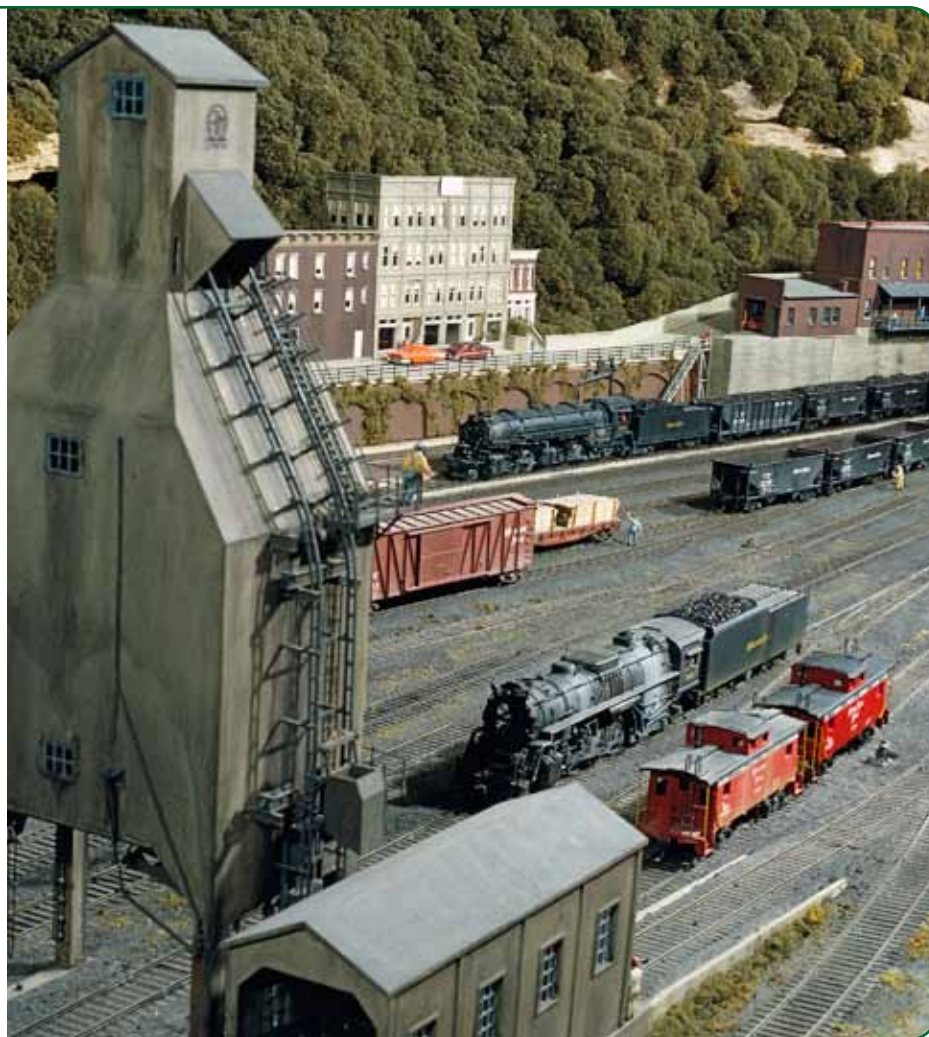
Stage for relief

13. Stage when you can, yard when you must. You can always ease the yard's workload by asking the yard to do less work. As in the photo, some trains can bypass the yard.

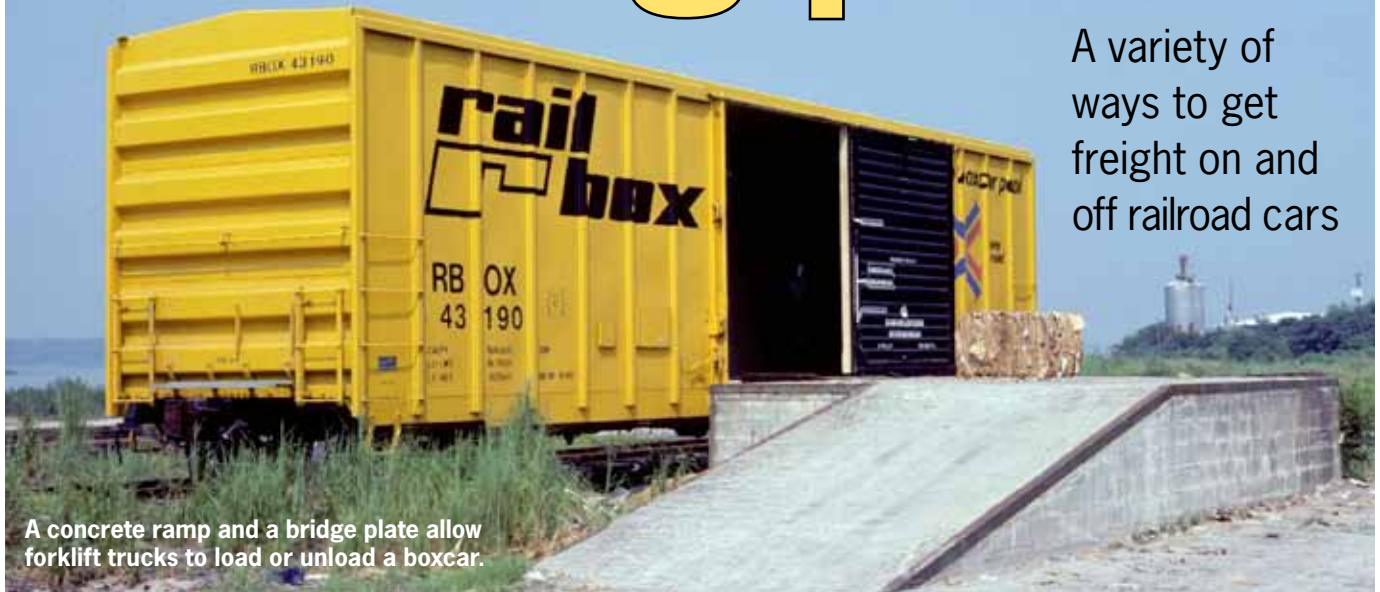
In other situations, look for trains that can be blocked and staged before a session rather than being built in the yard. Railroading is a round-the-clock business, so it's reasonable to have some pre-blocked trains out on the road to start a session.

Or you can preset the first couple of outbound blocks in the yard as if the preceding crew had done the work on an earlier shift. For that matter, simply give “today's” crew the task of leaving the yard lined up for the beginning of the next session. Think of your operations as an ongoing process rather than starting every new session from scratch.

Coal trains on Tony Koester's HO Allegheny Midland bypassed the Sunrise, Va., freight yard, going to and from staging tracks representing a separate coal terminal. Tony Koester photo



Loading points



A variety of ways to get freight on and off railroad cars

A concrete ramp and a bridge plate allow forklift trucks to load or unload a boxcar.

by Paul J. Dolkos
Photos by the author

The point where commodities are loaded or unloaded is the feature we most want to replicate on a model industry. The rest of the structure, no matter how large or attractive, is just part of the supporting scenery. These photos show some of the ways freight cars are loaded and unloaded. **MR**

Now on ModelRailroader.com

Additional photos and descriptions of other freight car loading points are available on the Model Railroader Web site at www.modelrailroader.com.

FREIGHT DOORS



The Robinson Terminal Warehouse in Alexandria, Va., had weather protection around this door where paper rolls were handled in 2006.



In 2000, a single sliding wooden door still serves a farm supply dealer's storage building in Chester, Vt., and it has a short access ladder.

EXTERIOR FREIGHT PLATFORMS



The classic platform of the early 20th century was built of heavy planks supported by joists and timbers resting on concrete piers.



Contemporary freight platforms are often made of concrete. The extended roof provides some weather protection while loading or unloading boxcars.



A curved concrete platform and a matching awning followed the curve in the spur that served this fertilizer plant in Berkley, Va., in 1987.

TEAM TRACKS



The Baltimore & Ohio's public team track in Berkeley Springs, W.Va., had a driveway for public access, but it regularly handled Westvaco Corp. pulpwood. To take care of this regular customer, a truck scale was built nearby to weigh the arriving truckloads of pulpwood.



In Baltimore, Md., CSX offers a modern version of a team track devoted to handling bulk tank car and covered hopper car shipments of food-grade commodities. Note that the various transfer pumps and controls are housed in retired 20- and 40-foot shipping containers.

BULK MATERIAL



Drop pits are commonly employed to unload hopper-bottom cars at coal or gravel yards and feed mills. Steel beams support the track crossing the pit. A conveyor or auger lifts the material out of the pit and transfers it into storage bins. Dump pits may be open or grated, and many have covers to prevent accidents.



At Laurel Sand & Gravel in Annapolis Junction, Md., a steel-sheathed drop pit feeds crushed stone into an extensive conveyor system that moves bulk materials to nearby storage piles. The high platform gives workers a safe vantage point where they can see into the open hoppers and control the unloading process.

LIQUID COMMODITIES



Hose connections and underground pipes transfer the tank car's chemical load into storage tanks inside the wall at the Inland Leidy plant in Baltimore, Md. Many chemical commodities require special handling.



Here's a small rail-to-truck fuel oil transfer system that MacIntyre Fuels built on a spur at Bellows Falls, Vt. Gravity and the small electric pump system, mounted on a concrete pad, did most of the work in 1995.