



DATA SHEET

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Sheet #:	D3h.1
Title:	FREIGHT YARD DESIGN
Updated by:	W. David Doiron
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Originally Compiled by:	Ted Sommers
Page:	1 of 9
References:	Ed Ravenscroft, MMR, Cliff Robinson, Gary Petersen, Tony Steele, Dave Husman, Andy Sperandeo, David Barrow, Don Mitchell, Gil Freitag, MMR

INTRODUCTION

It would be tempting to merely compress the track diagram of an existing prototype yard and try to use it for a model. There are, however, several considerations before resorting to such a simple process.

The prototype occasionally makes mistakes in yard designs; it would be senseless to repeat them.

The prototype can work several engine crews side-by-side because they are contained in the cab. On the model, each operator takes up the entire area of the railroad immediately in front of them (250 feet wide in HO scale) plus more space up and down the line as the operator moves around to do their work.

The prototype can make yards 50 tracks wide. On the model, the operator must be able to reach the track farthest from the aisle (switch stands, coupler whiskers, or at the very least, rerailing). Such reach can be considerable for a basketball player, but experience has shown a practical limit of 32" for the average operator with benchwork 42" high. If the benchwork is 48" high, the reach drops to 24". With the benchwork higher than that, the reach drops off dramatically. We will first present design considerations for the model, then follow with prototype data.

MODEL YARD FUNCTION

Model yard design depends on its function.

1. If a yard is to be used to store complete trains, such as **staging**, then a basic ladder feeding off the main track is appropriate. Back in the days of dummy couplers, all model yards handled complete trains. As a result, yard ladders on old track plans merely fed directly to the main, and vice versa.
2. If it is intended that the railroad be **operated** with a group, then one or more yards will be needed for **classification**.
3. If the layout owner will run the railroad **alone**, then they can use any design they like.

STAGING YARD

A basic ladder can be simple or compound. A compound ladder is more compact than a simple ladder, but a simple ladder is easier to use and has fewer reverse curves.



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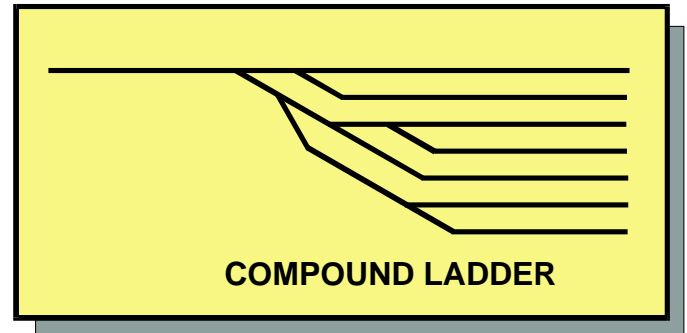
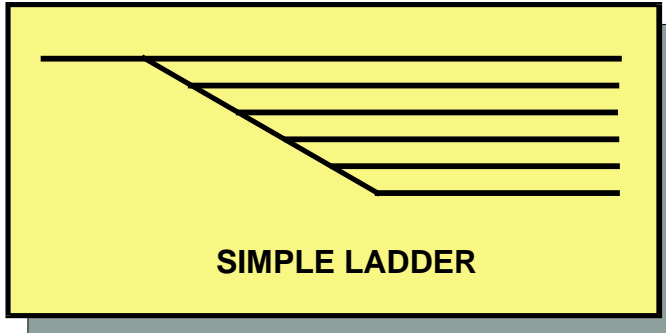
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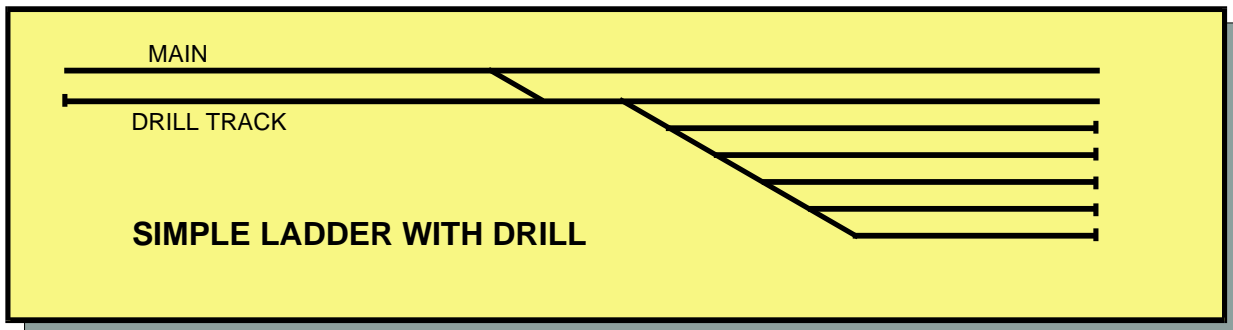
STAGING YARD - continued



CLASSIFICATION YARD

Model mainlines take little relative time to traverse. Model yards, on the other hand, require almost 1 to 1 on the scale time clock to get classification work done! A model yard has a prototype-sized job to do. It can not afford to be paralyzed by every mainline train that wants in or out.

Some years ago, when working couplers improved, and actual work was attempted in model yards, a drill track became standard. **However, the yard is paralyzed when a train enters or leaves this type of yard ladder.**



Experience has shown that the “good jobs” in an operating session are those that keep the crews busy and not bored. So how do you let the yard crews get their work done, and not bore the mainline crews by making them sit and wait until the yard crew is ready for them?

ARRIVAL/DEPARTURE (A/D) TRACKS

Have at least 3 double-ended arrival/departure tracks. These should feed into the main at both ends and be long enough to hold a train.



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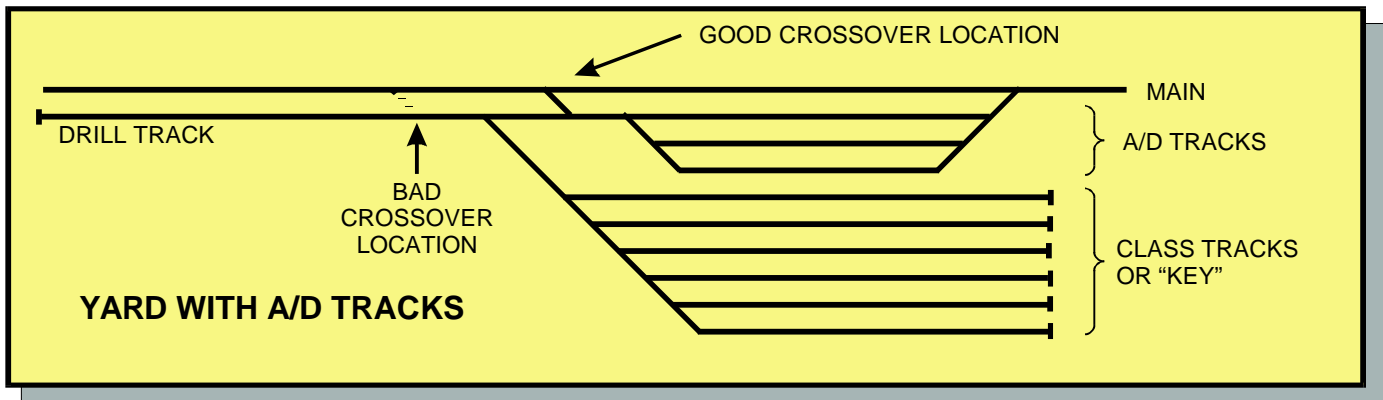
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CLASSIFICATION TRACKS

Class tracks, sometimes called a “key” or “bowl”, can be alongside the arrival/departure tracks, but **must be kept separate** from them. The drill track serves the key, and connects to the arrival/departure tracks.



This design allows the yard crew to keep working while mainline crews can come and go without getting bored waiting.

This configuration should be considered the minimum where there is a yard crew “job” during an operating session. This arrangement will serve as home yard for up to 4 locals and will accommodate 8 through trains that have work at the yard (as long as command control is used, the number will be less with block control). There are at least 6 model yards, frequently operated, that have been using this configuration since 1985. They can comfortably handle more traffic than any other design in the same space.

There is a temptation to make another crossover from the drill track in front of the ladder. Caution: if you make it possible for the mainline crews to paralyze the yard, then they will (if you build it they will come...). The key is that the yard crew must have control of the yard. There is no need for a train to arrive or depart directly from the class tracks; it does not save time. Let the yard crew decide when they want to move cuts between the key and the a/d tracks.

TRACK RATIO

The question arises, “How many tracks should be arrival/departure, etc.?”

The formula that seems to work is 3 or 4, 4 is better if there is room, 5 really is cutting into the classification tracks. Since you can only reach so far, you are limited on total yard width, maybe 12 or 13 tracks. A ratio of 5 arrival/departure to 7 classification tracks is out of balance.



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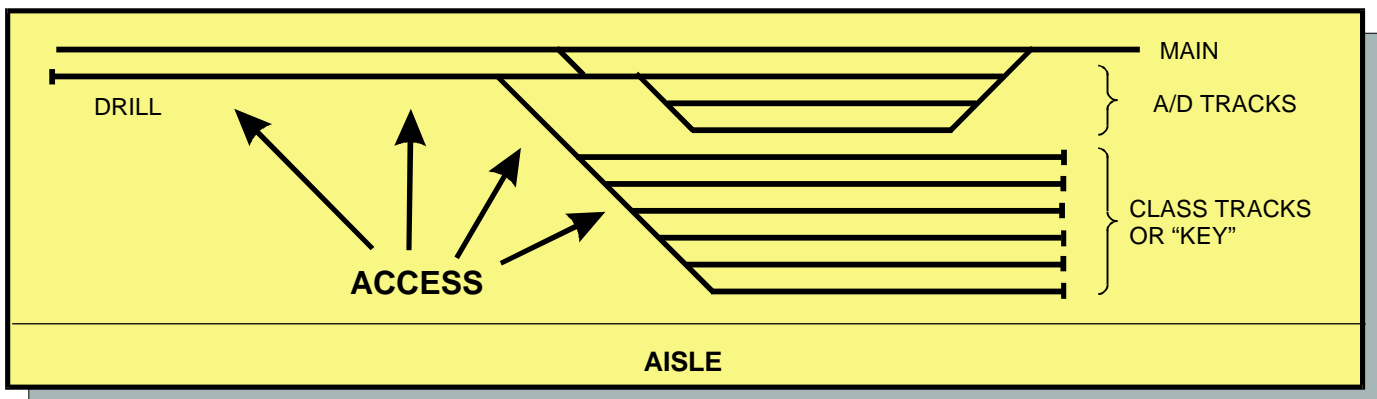
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TRACK RATIO - continued

Keep in mind we are talking about a typical yard with a single crew. They can only process so many arrivals and departures in a given time, and they need the class tracks to do the work. A ratio of 4 or 3 a/d to 8 class tracks is very workable.

ACCESS

Remember that you have to be able to reach your cars to uncouple, rerail, etc. The prototype uncouples by hand and you can too. Be careful what obstructions you may consider placing in the way. The area between the aisle and the ladder may look perfect for engine facilities or other structures, but may cause more problems than they are worth. Since access is required anyway, it is possible to use switchstands rather than switch motors to throw the turnouts. Not only does this save on cost and complexity, it is actually faster because there is no "control panel" to decipher. Besides, the prototype yard crews also use hand throw switchstands! If possible, the ladder should come towards the aisle. This gives the best access.

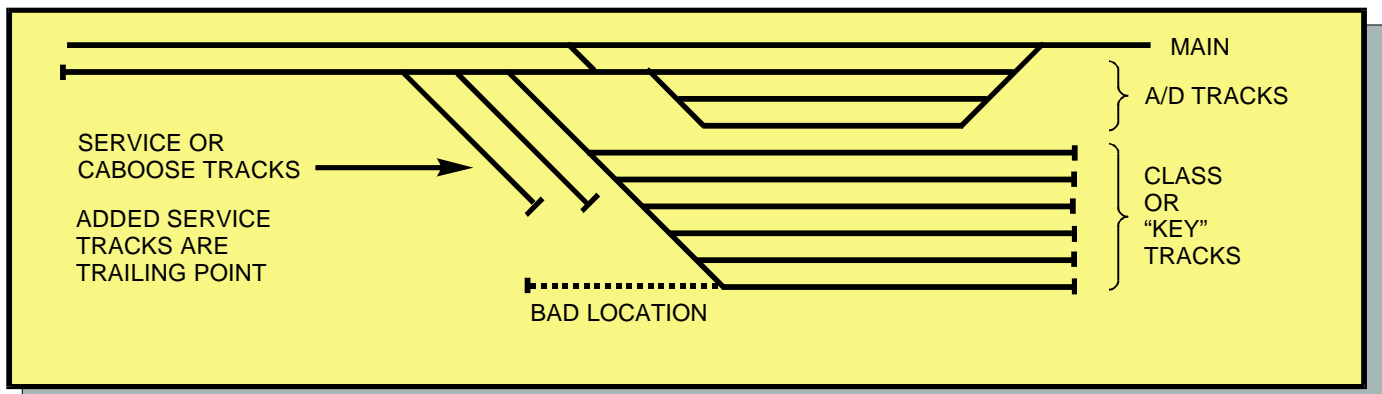


ENGINE FACILITIES

If engine facilities are wanted, try to put them at the end of the yard opposite from the yard lead. This will avoid having the yard die every time a road engine is moved.

AVOIDING RUN-AROUND MOVES

When adding service tracks, such as caboose tracks, avoid pointing them in the direction opposite from the rest of the yard tracks. If you have to do a run-around just to put a caboose away, a lot of time is wasted.





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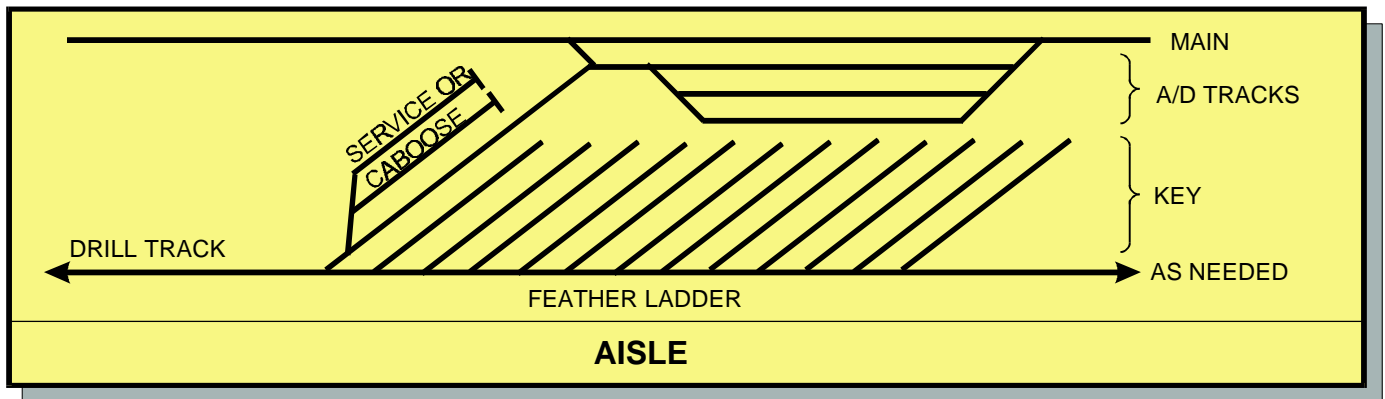
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FREITAG FEATHER

There is a way to get a larger number of tracks into a yard and still keep the important parts within reach. Well known Master Model Railroader, Gil Freitag, has used a yard like this for many years.



Note: Using larger ladder turnouts, such as #6, along with less angle on the key tracks will give longer classification tracks.

SUMMARY

1. A classification yard must be able to keep working and not be interrupted by the arrival or departure of trains. If a yard is intended to operate, then there is no excuse for building a yard that dies with every arrival or departure. **This is the most important rule.**
2. The drill track should be as long as the longest arrival/departure track. This lets the yard crew start work on a train with a single pull.
3. Let the yard crew maintain control of the arrival/departure tracks. When the dispatcher or mainline crews want into the a/d tracks, they should get permission from the yardmaster.
4. A good "busy" yard job would be 12 tracks; 4 a/d and 8 class as home yard to 4 locals.
5. Keep things simple; uncouple by hand, throw turnouts by hand, just like the prototype.
6. Avoid obstructions; let the yard crew have an easy reach into the yard.
7. Keep road engine movements away from the yard ladder; let the yard crew keep on working.
8. Avoid run-arounds; keep the service tracks facing the same way as the yard tracks.



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PROTOTYPE

The primary function of a yard or terminal is to receive, sort and then forward cars, except those to be held to protect peaks in traffic such as seasonal rushes of grain, fruit, vegetables, livestock, etc.

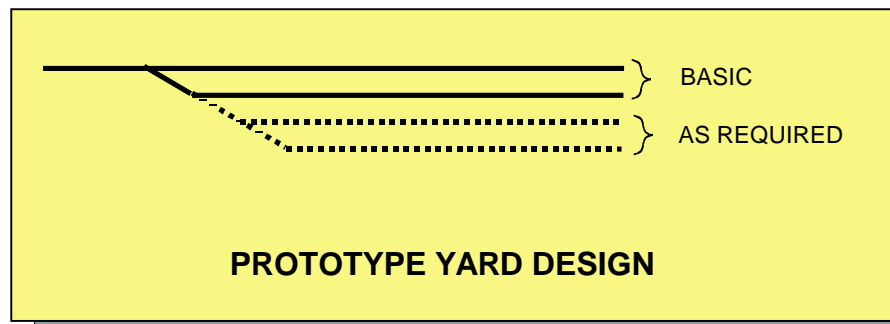
A secondary function of a yard or terminal is to store cars not actually required to move current traffic. Railroads are obliged to return foreign cars promptly, and normally only home ownership cars are stored.

In connection with these functions there is the auxiliary function of providing car repair and such engine service facilities as may be necessary.

Every yard and terminal is designed to provide these functions with the minimum amount of trackage consistent with the nature and density of traffic anticipated at that location. Economical design is mandatory as each foot of track and each structure increases the total amount of taxes, maintenance and insurance.

DESIGN

To receive, sort and forward cars, a yard must have *at least* two tracks connected by a turnout, to permit changing the order or position of cars. When a yard classifies many cars for a number of stations or destinations, it then becomes justifiable to add tracks to reduce the time necessary for classification. It is expensive to handle cars when not absolutely necessary.



If there is to be no yard engine assigned to a given yard or terminal, it is then necessary to provide a runaround track to permit the road engine to pass around cars which arrived with it in the train. A double-ended yard, that is one having tracks connected by turnouts at either end, is preferred by the prototype.



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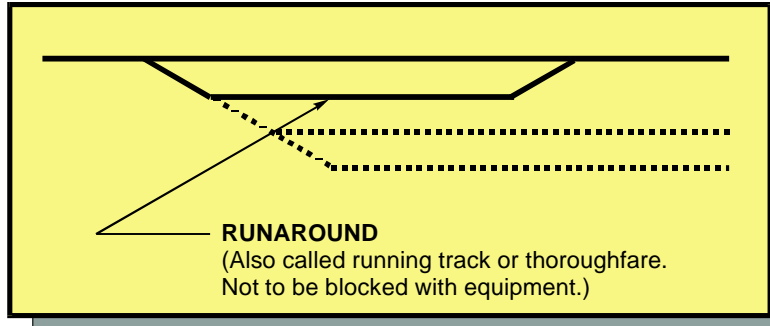
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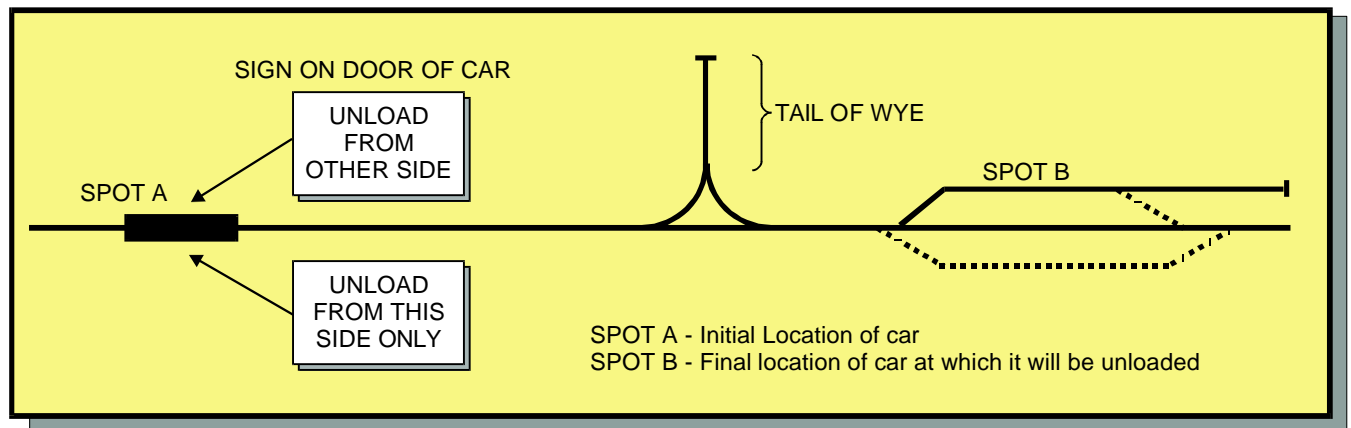
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DESIGN - continued



Sufficient tracks are provided to store cars as shown above. These may be installed in convenient locations, generally where property value is low, inasmuch as there is little or no return on the capital investment.

Quite often, closed cars (auto, box and refrigerator) are loaded so that they may be unloaded from only one side. If the car arrives in the vicinity of or at a yard which will forward the car to a station at which facilities are located such that the car cannot be unloaded without first being turned, means must be provided to turn the car, such as a loop, turntable or wye. When such a facility is part of an engine terminal, its use may also be had for the purpose of turning cars. When a wye is used to turn cars, the tail should be long enough to hold one engine and one car plus about 20 feet braking distance.



Inasmuch as track scales are generally located only at strategic points, cars loaded at stations or yards which do not have track scales must be weighed at the first convenient scale in the direction of their destination and at least before leaving the railroad on which they were loaded, so that the correct freight charges may be computed. This does not apply to LCL (less-than-carload) freight, for it is weighed on platform scales as it is loaded at the originating freight house.



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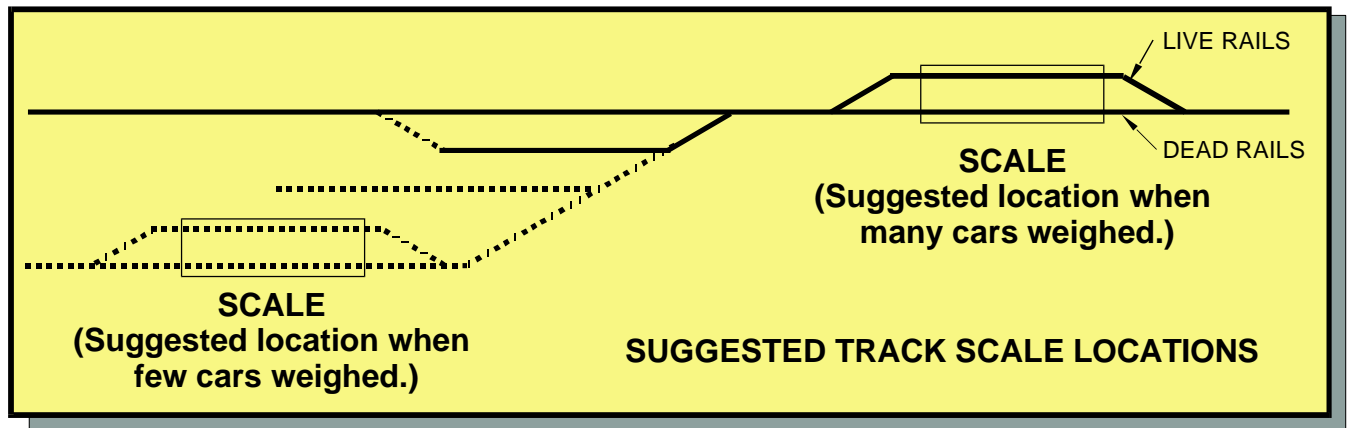
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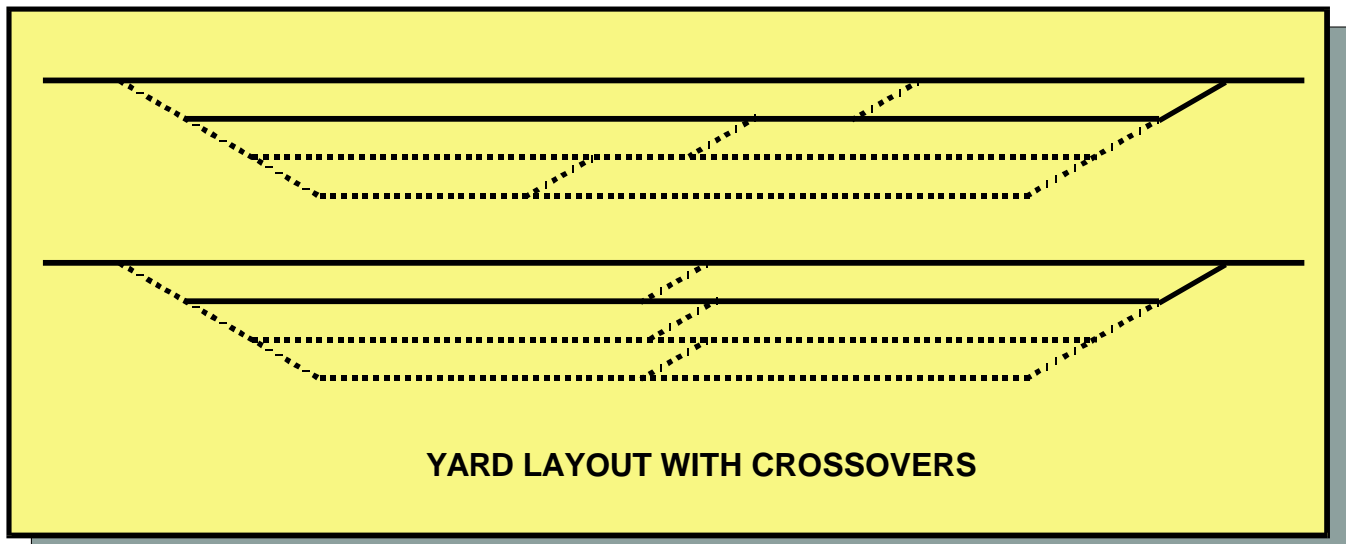
DESIGN - continued

The location of the track scale in a yard depends to a very large extent on the amount of cars to be weighed at that point. If few in percentage, scales would be located so as to interfere as little as possible with routine switching. If many in percentage, scales should be located on the lead track in approach to the ladder(s).

In small yards, one track may have several functions, such as scale track, icing track, rip track, etc. As the volume of traffic increases, it becomes desirable to have separation of these specialized functions on separate tracks.



In a yard where long trains are received and forwarded, and where they are generally switched out and not sent through in original consist, it is economical to have intermediate crossovers between tracks so that yard engines may “reach in” and pull out or cut in cars without first pulling the entire track. In this manner, it becomes unnecessary to have a long lead as shorter “cuts” are handled.





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An ideal yard layout is one where cars move progressively in one direction towards their ultimate destination. This is not always possible, due to shape and size of property, physical obstructions, such as narrow bridges, adjoining streams or water courses, rock cuts, etc. However, as much as possible should be done in this direction.

YARD LIMITS

The existence of a yard does not necessarily require yard limit boards to establish boundaries. Yard limit boards are only established when there is to be one or more regularly assigned yard engines, and/or to relieve trains working at that point from protecting themselves against other than first class trains and thus make the flagman available to assist in switching. Further, where there is a regularly assigned yard engine or engines, no train may switch out cars, only set out and/or pick up cars.

