Why Model Railroad Operations?
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OK, I have now built a model railroad and have trains running on it. I am tired and bored of just watching trains run in a circle all of the time. Now what do I do?

Well, you should consider **Operating** your model railroad. Everyone knows that a railroad takes cars from one place to another. But why? Well, to deliver cars to industries and manufacturing plants. But why? So those industries can have the supplies they need to make the products they make, and also to ship the the finished products to places that need them. That is why we put buildings and industries on our layouts that have sidings next to them. We all know these things, right? But how many of us realize how this is actually done. Sure, we make up trains with cars and take them to our sidings and drop them off, picking up other cars as we go. But so far, we have no real purpose in mind. We are just doing it because we are so-o-o bored with running trains in circles.

True operations are more fun with two or more people. One person runs one train while the other person runs another train. A computer program like RailOp, Pro-Track, Ship-It, or JMRI Ops makes running by yourself more interesting because the computer picks the cars for the train, and picks what cars are to be set out before the train departs. It is no longer a matter of getting the train to the industry and then asking yourself "what cars do I want to set out here". The Manifest tells you, and you have to work the puzzle with your locomotive to get them there. If the tracks are in place for good operations, solving the puzzle is easy. If the tracks are not there, the puzzle becomes harder, but can still be done. If you want to use a manual operating system, then Car Cards can be used. (Car Cards are explained a little more in the next article titled "Operations Set Up".)

So lets take a look at what we can do to make running our model railroad (or running trains) a better experience. First, we need to take a brief look at real railroads.

What does a Railroad do? What is it's purpose?

In its simplest form, the primary purpose of a Railroad is to act as a transportation means for goods, and to move them from one place to another. They do this by loading the goods into special cars (railroad cars) that travel on special routes (train tracks) at special times (schedules) in special convoys (trains).

Trains are limited to serving those factories, industries, and other customers that are located along the Railroad line, and/or to buildings that have Railroad sidings located beside them. These businesses that are served by the Railroads are located all over the country. To move these goods in an efficient manner (Railroads were built to make a profit) some sort of system had to be set up. So in it's simplest form, cars that need to deliver their goods need to be collected in a central location (yard), sorted with other cars (classified) going to the same major destination (a city), and added to a train that is scheduled to make a run (route) to that major destination. Once the cars arrive at the major destination (city), they need to be sorted again (classified), and delivered to their individual destinations (the industries that need the goods).

When we build a Model Railroad and desire to simulate the operation of a real Railroad, we should be aware of these things, and try to see them in the BIG Picture. Not just in the simple form of taking a

boxcar from one place and delivering it to another, although this is also necessary. Also, we want to have fun with our Model Railroad, so we don't want to get into all of the detail in our model operations that a real Railroad does, but we do want to strive to simulate it sort of accurately.

How Do We Simulate Operations on Our Model Railroads?

There are several different operating schemes available to Model Railroaders. The most used seems to be Car Cards (at least prior to the availability of RR operating computer programs). Quite a few modelers using the Rail Op / JMRI Ops program and others have used the Car Card operating scheme before. The drawback from transitioning from Car Cards, or no previous operating scheme at all, to Rail Op / JMRI Ops and others seems to be that operators have been focused on moving cars. The Rail Op / JMRI Ops program provides a TOTAL operating scheme or system. That is, it will deliver cars from one industry to another in the same city or town, and/or even to industries in another city or town. However, in order to set it up correctly to do this, you need to look at the big picture on your own Model Railroad. You need (or should try) to set it up like a real Railroad operates, if possible.

Again, in it's simplest form, cars that need to deliver their goods, need to be collected from the industries by a TRAIN, usually known as a "Local", sent to a central location (yard), sorted with other cars (classified) going to the same major destination (a city), and added to another TRAIN, that could be considered a "Through Freight", that is scheduled to make a run to that major destination. Once the cars arrive at the major destination (city) at a central location (yard), they need to be classified and delivered to their individual destinations or the industries that need the goods by yet another TRAIN, again, the "Local". The Rail Op / JMRI Ops program has been designed and written to operate just this way and it is suggested that this is the way that should be used. Trying to set it up in any other way will lead to problems. The key is to make up TRAINS in the train list that will pick up the cars and take them to a second destination.

A large Model Railroad may use four or more separate trains to deliver cars to their individual destinations in two different towns. A smaller Model Railroad may use fewer trains to do the same thing. You probably already knew that you had to pick up cars at your industries and take them to the yard, and then from the yard to other destinations. Most of the time we didn't think about it. However, Rail Op / JMRI Ops formalizes this process, and even requires it when being set up. The Car Card scheme has done the same thing, however, the focus has been on the movements by Car Card and not so much on the trains, where Rail Op / JMRI Ops operational focus is on the Trains moving the cars. This is the MAJOR consideration that should be kept in mind when configuring the Rail Op / JMRI Ops program or other computer programs for your Model Railroad if you choose to use them.

Thus, by using a system designed for model railroad operations, we can simulate real railroad operations and logical car switching in a simplified form suited to a model railroad or layout. By using these systems, we can operate by ourselves, or with some friends, whether it be one friend or a group of friends.

But first, we should make sure that we have the right tracks in place so we can simulate the same moves and operations that a real railroad does. If we don't have all the tracks and switches (called a turnout in model railroad lingo to distinguish it from an electrical switch) we need, we can still do operations, but they may not be as much fun or as easy.

Setting Up The Railroad (Tracks)

The first step in setting our railroad up for operations is to make sure that we have the tracks necessary that will allow us to switch cars efficiently. That means with few moves as possible. (This then becomes like a puzzle, trying to figure out the least amount of moves to get the cars in the right place. This is actually called **Layout Design**, which will be talked about in the next section.)   So, as an example, we probably have one track that runs around the whole layout that we run our trains on. This would typically be called the Main Track, or simply, The Mainline. This could be a single mainline or a double tracked mainline. Off of this track we may have a turnout that has a section of track that goes up to a building or industry. (A) So now we can put a car up there next to the building.   (Refer to the figure below.)
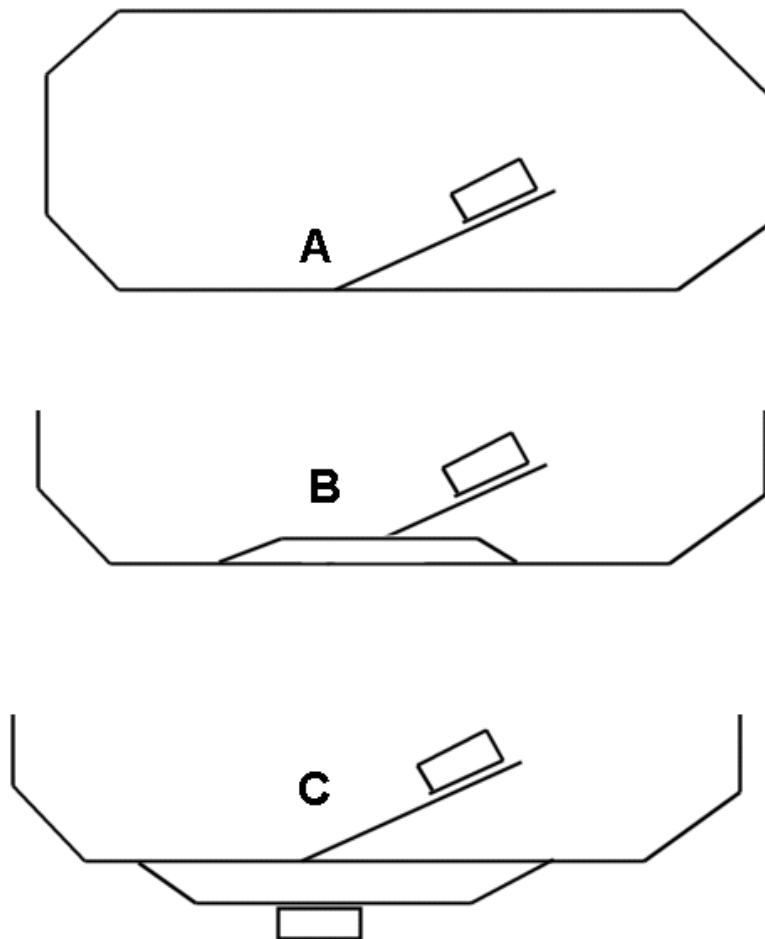
As you can see, it is easier for the train to do the switching when it comes from one direction (trailing point) than the other direction (facing point). In either case, we would be fouling the mainline with our train while switching this siding. BUT, if we add a passing siding on the Mainline there, and then we put the turnout to the industry on the siding, then our train can easily switch the industry when it is running in either direction. (B) Another benefit of the passing track is, if or when another train comes along from either direction, is can pass our train if our train is on the siding and not fouling the Mainline. Now another arrangement may be with the siding still coming off the Mainline, but with the

passing siding on the side away from the industry. (C) However, more "moves" will be required to get the car in place and still be able to get out of the way for another train that may come along. Sometimes, the industry can be right next to the passing siding. But now if a car is at the industry, two trains may not be able to pass each other here. (C)

Now, if your layout has a double track Mainline, passing sidings should still be used as described above. However, if you don't have the room for them, or you have already built your model railroad and left them out for one reason or another, there is a work-around. That involves putting in crossovers from one Mainline track to the other, before and after the industry sidings so that a following train can be switched over to the other track and go around. These must be place in the correct way or they will not work. See the diagram below, which shows the crossover locations for right-hand running.

Double track mainline
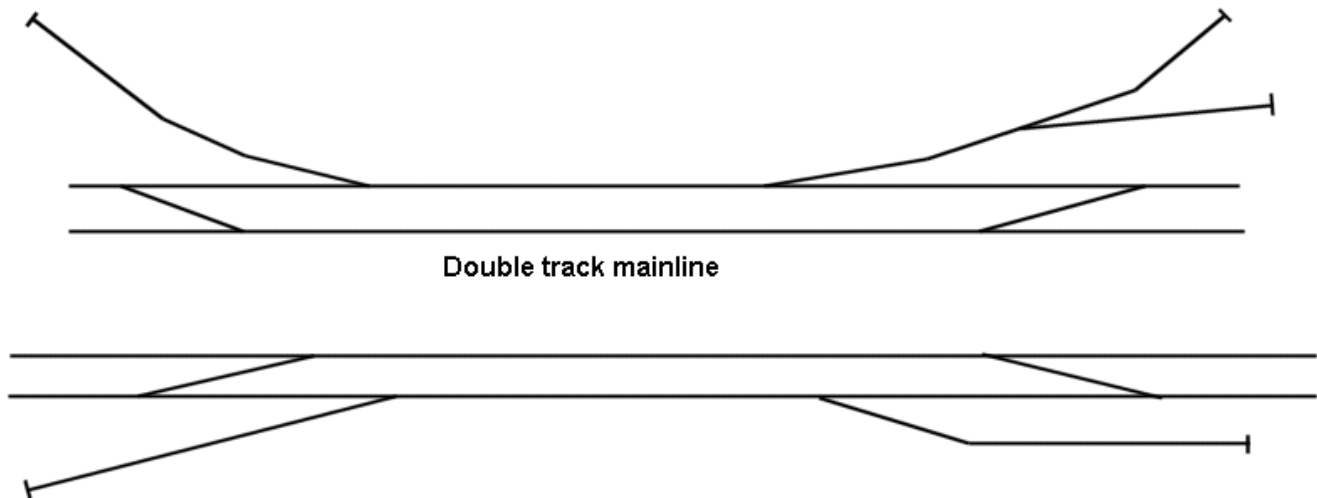
The crossovers should be spaced far enough apart so the train performing the switching has enough room to do its work inside the area between the crossovers. Also, the crossovers used should be number 6's or 8's so trains flow through them in a smooth manner.

Now having shown you how to do this, this is something that the real railroads would not do. They would put actual passing sidings on the Mainline tracks. And from an operational standpoint, we should do that with our model railroads also.

These things are what I mean when I said "Setting Up The Railroad Tracks". And this holds true for every industry on the model railroad, no matter how small or how large it is. The tracks and passing sidings may not be all the same, but you should think about these things at each industry so switching cars becomes as simple as possible.

Layout Design

Now we see that our tracks, or layout design plays an important part in how we can run our railroads. If it is designed well, we can run round and round (if we want to), plus have prototypical switching operations.

The tracks and sidings on a model railroad should have a purpose. By having a purpose, they can be used for operations. Sometimes when we build our first or second model railroad, we include tracks that are usually seen in local areas and on other layout plans in general. Most of the time, these tracks are done correctly and we put them on our layouts, and thus they too can be used for operations, even though we haven't thought of them in that way. Some tracks we choose to put in, are not very efficient for operations, but can be used anyway. So a layout design can affect layout operations.

All Model Railroad magazines publish track plans for model railroad layouts. There are even books with nothing but layout plans in them, also published by the Model Railroad press. These come in all sizes. Plans developed or drawn within the last 10 to 15 years ago were starting to be designed with switching and operations in mind. That is, the design would lend itself to easy operations. Plans designed before that would mostly be designed for toy train use. A couple of the very early books with layout plans in them packed the tracks in so tight that they became known as spaghetti bowl plans.

One of the worst things that you can do for layout design is to copy the track plan of a friend or other modeler that has drawn their own. This is because it is almost like the blind leading the blind. They may not even know as much as you do.

Designing a track plan for operations is like building your very first model kit. The very first kit you built as a child was a new experience, and you probably read and reread the instructions so you could build it right. Designing a track plan for model railroad operations is the same way. You should find a resource that you can read that tells you how certain parts of the layouts tracks should be laid out, or designed. One of the best is a book called "Track Planning for Realistic Operations" by John Armstrong. I would suggest that you get it and read it cover to cover. Don't try to understand everything the first time through, just read it like a novel so you get the general idea of what is going on. Then you can go back through the sections that interest you. Even on a roundy-round layout, if you have the track arrangement correct, you can still run roundy-round, or go for full blown operations. But if you don't get the track arrangements right, you are sort of stuck with roundy-round unless you are willing to make some modifications. Usually these are minor changes.

There are several ways that you can come up with a plan for model railroad operations.
1. You can hire someone to draw a plan for you.
2. You can copy a plan that you like from the many that are published in the Model Railroad magazines and modify it for your own space.
3. You can put several plans together to make one large plan.
4. You can draw one up yourself. If you decide to do this, then this is where you need a good reference book such as the one previously mentioned.

A layout usually has several elements to it. Each should be drawn in a way that replicates the way a real railroad would do it as close as possible. However, because or layouts only have a certain amount of space we can use, we must pick and choose the elements that we want.

Some Things That Affect Track Planning

The size of the layout.
The length of the trains we want to run.
The length of our RR cars.

The length of the passing sidings.
The number of industries we have.
The number of tracks in the yard.
Single track or double track mainline.

Elements That Make Up Our Model Railroads

These items are what we include on our model railroads. They are also the major areas for planning how the track is configured, or planned to run.

The main line.
The branch line.
Yards.*
Engine facilities, steam, diesel, or both.*
Engine repair facilities.*
Passenger stations. (Stations along the line)*
Passenger terminals. (Stations at the end of the line)*
Passenger car service facilities.*
Freight car service and repair facilities.*
Line side industries.*
Industrial areas served by rail.*
Interchanges.*
Staging tracks or yards.*
Towns.
Cities.
Countryside.
Mountains.
Rivers.
Bridges.
And the list can go on and on.

The items on the list that have an asterisk behind them are the ones that we need to be concerned with designing the correct track arrangements for. (Is is not the intent of this document to actually show you how to design a workable track arrangement or plan for these areas, but to point out the major areas that can affect how our model railroad is operated.) It is these items that we need to research real world and model track plans for so that we can get them right on our model railroads.

Industries Defined

There is a difference in Model Railroad Industries and Real World Industries served by the railroads.

A real world industry is one that we think of as a manufacturing plant, power plant, mine, grain elevator, meat packing house, etc. These are industries that the railroads serve in order to make money by charging these customers to transport their goods.

A model railroad industry is also these, but they include many more industries that the real railroads do not consider as money making concerns. Why? Mostly it is because the various Operating Systems

that we use for our model railroads take every facility that can ship or receive a railroad car and lump them all together under the title of "industry". So what are they?

The loco ash pit - Haul the locomotive ashes away.
The loco coal tipple - Deliver coal for locomotives.
The loco sand facility - Deliver sand for locomotive use.
The diesel fueling tanks - Deliver diesel fuel oil.
The loco facility supply room - Deliver miscellaneous supplies.
The car repair facility - Deliver parts and miscellaneous supplies.
The dining car commissary - Deliver food and supplies.
The sleeper car linen service building - Deliver miscellaneous supplies.
And more.

OK, special trains usually serve these areas, but never the less, they are places that receive and ship cars, so they are classified on our model railroads as industries. Another way of putting it would be - They are places that are excuses for taking cars to during our operating sessions.

Staging Tracks and Interchanges

To understand operations and the difference between Staging and Interchanges for our Model Railroads, we need to understand the real life Railroads first.

Now, I am not a modeler who studies railroads and duplicates their every aspect, but a modeler who likes to run trains and operate, so my explanations are going to be simple. Just enough to give you the idea of how things are set up so we can duplicate them in a very basic way on our layouts.

I have also selected some excerpts from some comments Andy Sperandeo made in a post on the MR Forums sometime back, and these are in quotes below.

A large Railroad is divided into divisions. At each Division Point there was usually at least one yard and some loco facilities. (See Figure 1 Below)

Real Life Railroad (black lines)
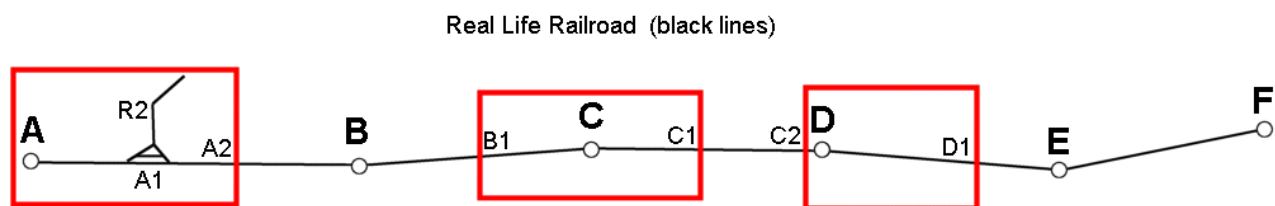
A, B, C, D, E, & F are Division Points.
Division Points usually have yards and locomotive facilities.
The RR between Division Points may be divided into Sub-Divisions.
A1 could be an interchange to another RR or Sub-Division.
What part of the Railroad we usually model is shown in the red blocks.

Figure 1

"A division was a management unit, under a superintendent, consisting of two or more subdivisions. A subdivision was basically the length of line an engine and train crew was expected to cover in one day's work. Nominally that was about 100 miles, but by the 50s and 60s could be longer. In some cases passenger crews, who traveled faster, might work over two subdivisions or districts."

"(As "division point" is often used in model railroad terms, it might be a terminal at the meeting of two subdivisions or districts just as often as between two adjoining divisions.)"

"There were many ways of designating branch lines, but the most common was to make each branch line its own subdivision or district. In that case, a crew might start on on a mainline subdivision and complete their run on a branchline subdivision. After a layover, they might start out the next day on the branchline sub. Or they might work a turn, starting on a mainline sub, running out and back on a branchline sub, and returning to their home terminal on the mainline sub. Almost any permutation of these patterns was possible."

"On the Santa Fe, mainline districts were generally numbered, first, second, and so on, while branchline districts were named for a station on the district, often but not necessarily the district terminal. And there were places where a named district was a mainline route. Other roads might number or name subdivisions. Some large terminals were designated as subdivisions or districts, and again in that case a crew might start out on one subdivision and complete its run on another."

Staging

First, Staging is strictly a Model Railroad term. Staging does not exist on a real Railroad.

Because our Model Railroads take up a defined space, some smaller than others, we tend to model a Division, Sub-Division, or part of a Sub-division. We also tend to model a yard with locomotive facilities. These are shown in the red blocks on Figure 1 above. Block D shows a Railroad with the Division Point & Yard at one end, while C shows the Division Point & Yard in the center. Block A shows the Division Point & Yard at one end and a Branch line or other Railroad connecting to and branching off from the mainline of the main Railroad. If our Railroad is built in a loop, looking at block C, B1 and C1 would be connected. The points at B1 and C1 are where our layouts end, but in actuality, the Railroad in real life continues. It is at these points where we represent staging. (See configuration 1 of Figure 2 below.)
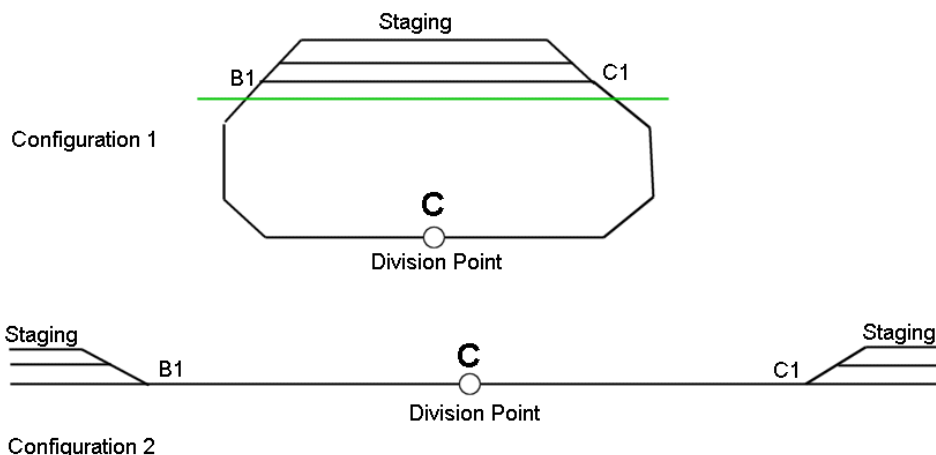

Figure 2

Staging is also know by other names. Staging yard, fiddle yard, staging tracks, and others, BUT NOT interchange tracks. Looking at Figure 2, if our layout is a loop, Configuration 1 can be used with a double ended yard or some passing tracks. If our layout is point to point, then Configuration 2 can be used, with staging at each end. Staging can be just one track, or many. Staging holds COMPLETE TRAINS, including locomotives, cars, and a caboose if we use one. Staging represents where a train leaves our layout to go to the next division point. If Figure 1, this is A2, B1, C1, C2, and D1.

Modeling staging on our Railroads can be done in different ways. Normally, staging tracks are hidden. They can be hidden behind a mountain, a false backdrop, or a row of buildings so as not to be a visible part of the layout. Or it can be on a different level, such as a lower level with just enough room to retrieve a car or locomotive that has derailed. Maybe just a foot of space from the tracks to the bottom of the layout benchwork above it. We also want enough room to be able to work on the track if necessary, but it doesn't have to be sceniced. If you have built your Railroad with no staging, you can designate a siding or two for it if you desire, or add a narrow extension off one end that is wide enough for one or two tracks.

Trains are normally staged (arranged on the staging tracks) so they arrive on our layout with the locomotive in front, pulling the train. If our staging tracks are single ended, the trains that go in them during an operating session are usually turned around (re-staged) after the session is over and before the next one begins. This now represents a train coming in to our territory.

Interchange

When one Railroad (1) meets another Railroad (2), a couple of things can happen. Railroad 1 can have trackage rights over Railroad 2 and the train continues on its route. Or, Railroad 1 can drop it's cars on a siding or small yard (interchange yard) operated by both Railroad's, and then return. Then a train from Railroad 2 comes and picks up the cars just dropped off by Railroad 1 and goes back from where it came. In the process, Railroad 2 may have some cars for Railroad 1 and drops them off there also for later pick up by Railroad 2. So you can say that an interchange is a place where cars are swapped between two or more Railroads. This yard or track is part of the visible Model Railroad. The Interchange can be a single track or multiple tracks. Normally, only CARS are dropped off and picked up at the interchange, not complete trains.

Track arrangements and locations can vary. There can be a wye for turning locomotives or not. It can be located at the end of both Railroads or in the center of one or the other. It can be in a city, or out in the country.

Modeling the interchange can take different forms as well. It can LOOK identical to a staging yard, but IS a visible part of the Layout. It can have an implied connection to the other offline Railroad, or not. If there is room for a wye, that can be modeled as well, if desired.

Rules For Running or Operating Our Model Railroads

Railroads have rules to operate by. A few examples are as follows:

1. A westbound freight should run westbound and not eastbound.

2. If boxcar 146259 should be spotted at industry X, it should not be taken to industry Y.
3. If industry Z takes only covered hoppers, you should not deliver a tank car there.
4. At the end of a run, all cars are taken to the yard and sorted (classified) on the correct tracks for the next train.
5. Passenger trains should back into a terminal station so passengers don't have to walk the length of the train to get inside the station.
6. Head end cars (baggage cars, and express cars, etc.) should be taken to the REA and truck terminal tracks for unloading before being taken to the coach yard.
7. Dining cars and sleepers should be taken to the commissary building and linen service building for cleaning and re-supply before going to the coach yard.
8. Etc., etc.

Thus, if we are going to "operate" our model railroad to simulate a real railroad, we too need some rules. The real railroads have many "exacting rules". Model railroads usually only use the very basic rules, similar to those above. None-the-less, these are "rules" that need to be followed by all operators so the operating session runs smoothly.

These "rules" are usually talked about at a briefing or crew meeting before trains start running on the hosts layout, or they can be printed up on a handout, or some even go as far as making up and printing a Rule Book similar to what the real railroads issued to it's employees. These are called Employee Timetables.   Most of the rules that we operate a model railroad by are self explanatory and don't have to be written down.

The Trains List

This is a list of trains that we can run on our model railroads to simulate operations. The list will depend on the size of your layout and the number of industries you have and where they are at. It will also depend on if you have Staging Tracks or Interchanges. The trains list is built by hand by the layouts owner during the set up of the operating system chosen. The list should be the maximum number of different trains that are run in one day of RR operations or session. After the trains list is built, you do not have to run all of the trains on the list. You can pick and choose.

My trains list consists of all of the trains that my railroad runs in a 16 hour period of simulated real railroad time. This takes 5 real time hours to complete. Some operators have a list of trains that run in a 24 hour period. Thus, an operating session is usually a period of time that the railroad operates during a day. The trains list is usually the same from one session to the next. If all of the trains for one session don't get run, the next session usually picks up where the previous one left off. The length of an operating session is up to you and your operators, and these times vary between layouts and hosts.

A small part of my train list is as follows:
(A Turn is a train that goes out-and-back)

C&A Yard Job (pulls cars for the next train)
C&A B&O Interchange turn*
C&A Yard Class (classifies cars from the above train)
C&A Yard Job (pulls cars for the next train)
C&A Paper Mill turn*

C&A Yard Class (classifies cars from the above train)
Port coal run down (unit train)*
WM Yard Job (pulls cars for the next train)
WM coal turn (unit train)*
Port coal run up (unit train)*
C&A Yard Job (pulls cars for the next train)
C&A Engine facility service turn*
C&A Yard Class (classifies cars from the above train)
C&A Yard Job (pulls cars for the next train)
C&A westbound local, turn*
C&A Yard Class (classifies cars from the above train)

As you can see, for each train run on the layout delivering cars (designated by the *), there is usually a couple of support trains. The Yard Jobs that get it's cars ready before leaving, and a Yard train that classifies the cars when the train returns.

This brings us up to where we look at the different operating positions on the layout.

Operating Positions

If you have a crew of a few people that operate your model railroad, there are usually some assignments that are made so the different positions can be manned. On my Chesapeake & Atlantic RR, the average number of operators is four. The positions are as follows:

Yardmaster - Builds trains and classifies incoming cars.
(I usually take this job myself because it is more hectic.)
C&A Engineer - Operates all of the C&A trains.
WM Engineer - Operates the WM branch line and yard.
Port Operator - Operates all the Port trains and Port movements.

If the layout was larger and more operators were available, I could have an engine Hostler and two yard switching engineers, plus a dispatcher to keep trains moving on the mainline smoothly with as little delay as possible. If the layout had a large passenger terminal, there could be a separate switcher for passenger trains also.

Each operating position would be manned by an operator who took care of the particular job they were assigned to do. They would work with the other operators or the dispatcher to make sure they didn't get in each others way on the railroad.

All Trains are run in sequence. Once the first train leaves, the second is allowed to go. If however, I am short an operator or two, then trains are run in sequence by the operators that are present. These operators take whatever train is next, regardless of what it is.

All trains are run according to the Manifest for that particular train.

Train Manifest or Switch-List

The Manifest or Switch List is just a list of towns on the route, in order, for that particular train. Under each town is a list of cars to be dropped of at the various industries in that town. If the Manifest is computer generated, it will also list the cars that should be picked up at the various industries at each town. The Manifest is the work list of the train, or what it is supposed to do. It can have two towns to work in, or 10 towns to work through depending on the type of train it is. The advantage of a computer program over a Car-Card system is the manifest is one single sheet of paper, usually two at the most. With a Car-Card system, you have a fist full of cards to carry. Each card represents one car in the train. Car-Card operators can also have a switch list. However, it is the responsibility of the train crew to hand write the switch list using the Car-Cards and car destinations. Each system can get "out of whack" if the cars are delivered to the wrong places by mistake, so everyone needs to be paying attention to their trains movements.

Number of Cars For Our Layouts
(How to Determine the Optimum number of Cars on a Layout for Good Operation)

After I started operations on my home layout, I went looking for a way to determine how many cars should be on a layout for good operations. What I found to determine car capacity
for a layout was the following three examples: (There were more, but I chose these three to test.)

ONE:
50% of industry spots full
67% of yard and interchange tracks full
90% of staging tracks full.

TWO:
Since then, the Ops Sig group on yahoo has been discussing it as
well. A couple of the replies have been for 50% full for yard and
industry spots and almost full to all full for staging.

THREE:
One reply gave a link to Joe Fugate's web site where he has a formula of sorts.
http://siskiyou-railfan.net/e107_plugins/content/content.php?content.32.2
This method is rather involved as you have to measure all tracks
etc. Once you have done this, you convert their lengths into the
number of cars they will hold, then perform a not so simple
calculation to determine the total number of cars for the layout.

So to find out how these systems stacked up against each other, I did
the calculations for my home layout. The number of cars on my layout
should be: (based on a 40 foot car length)
System 1- 139 cars
System 2- 116 cars
System 3- 156 cars

Of the three systems, number 3 seemed to be the most accurate due to
the many measurements and calculations required. However, system 1
or 2 would be the simplest, and the percentage numbers for No.1 could
be adjusted so the results were closer to system 3. My layout

currently has 102 freight cars on it and seems to be operating well,
but at certain times there seems to be a car shortage. I have
thought there could be a few more cars, but I think that if I brought
it up to 156, I may get grid-locked. I can see going to 120 cars.

As for the number of cars used in a session, this would/may translate
into the number of cars in a train, and the number of trains run in a session.

So also, under Joe's system, you can calculate the optimum train
length. This is based on the number and length of all passing
sidings on the layout. The two different types of train length are:
Dispatch Train length; and Passing train length. For my layout, the
Dispatch train length should be 8.5 cars, and for Passing train
length average should be 9 cars. These are exactly the size of the
trains that I run +/- 2-3 cars, and they work well for my layout. So
to me, this seems to back up Joe's figures. (Or maybe Joe's figures
back up the way I am operating my layout.)

You can also calculate the number of trains run in a session, but I
have not gone that far.

Conclusion

Now we have a layout that has been designed with a **track plan** for operations, we know what
elements and **industries** we have to work with, have a **train list** of what can be run for a session, know
the **operating positions** that need to be filled, and have a **manifest** that tells us what our train is to do,
and have a basic **set of rules** to follow as we do our jobs. And we also have a layout with the **optimum
number of cars** and locomotives with which to run and operate with.

So what are you waiting for? Start setting up your layout now for operations. You will be pleased and
will be having more fun running your layout than you thought you ever would.

The next article will show you in more detail how to set up Car Movements on your railroad, and how
to set up a Trains List.