Garden State Central
Model Railroad Club

Operations Clinic

2/20/2004

The railroad industry is in business to make money, not to just run trains. To generate this income, traffic is solicited. On most lines, this business was of 2 types, Freight and Passenger. Each of these was handled in different ways, simultaneously. For the moment, let us consider just the freight.

The prototype solicits business from its lineside industries and gets additional revenues by handling cars to and from other lines, via interchanges. On the model we must create a means to artificially simulate these prototype conditions in order to obtain a method of routing our cars that will appear realistic and satisfy our desires by giving our operation a purpose.

It is generally realized that much of the enjoyment of operating a model railroad comes from realistically following the movements of individual cars, based on what the prototype does. A good balance for a model railroad is reached by having your railroad laid out so that the required moves are somewhat complicated, but not overly difficult.

In order to get a good balance and to stimulate many interests at the same time, the GARDEN STATE CENTRAL is patterned after a prototypically correct Trunk Line. Such a railroad would carry a moderate amount of traffic, operating both Local, and Through Freights. By doing so, it is required that the local (or Way Freight, or Drill--whatever it is called), will have to keep out of the way of the higher priority trains, thus adding to the interest.

A prototype way freight starts its work from a terminal, works down the line a certain distance, and usually returns to its initial terminal, most often in the same day. The amount of traffic to be carried depends on the number of industries to be normally served as well as the number of cars each industry may get. Most often, it will run from one Division Point to another, such points being located about a day's work from each other. If there is too much business for a day's work, perhaps there may be a mid-point, with a small yard, for the local to turn back at; another second local then works the 2nd half of the line. Or in our case, a 2nd drill may work only the coal traffic while the first works the higher priority freight (that generating greater revenues).

How should the crew keep track of where a car should go, since another crew may complete a delivery started previously? As with any system, rules and reminders are necessary. Since this is for fun and not for actual business, we should eliminate as much paperwork as possible. The rules should be simple, logical, and easy to remember. The reminders should also be very simple, and kept to a minimum. The system itself should be flexible, so that when someone wishes to "just run trains," he doesn't make the system unworkable for somebody else.

The reminders we chose to use are simple tags placed upon the cars. Since we do not wish to handle the cars any more than absolutely necessary, nor greatly alter the actual cars, we decided to use common magnets. We glued a magnet inside all of our car roofs on the brake wheel end to attach to a painted and numbered magnet on the outside.

We began the system by choosing a different color for each of the locales on the railroad. Thus all of the industries in Wilkes-Barre, for example, are WHITE. Then we practiced switching typical cars into the westbound spurs, to determine the easiest sequence for the cars in a train when it gets to the town. These industries were then numbered, skipping the even numbers. The same was performed for eastbound trains, skipping the odd numbers. Thus it will be seen that westbound trains handle odd numbered tacks; this corresponds to our other prototypical rules, whereby Westbound scheduled trains are assigned odd numbers in the timetable, and use odd numbered mainline tracks.

Train Types

On the GSC, we run 3 types of trains: Yard Jobs, Road Jobs and Locals. Yard jobs take cars from the major yards where originating trains are made up. These jobs never actually leave the yards. They set up cars to be picked up by the Road Jobs.

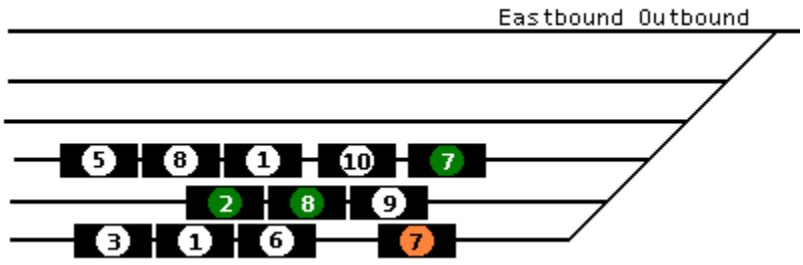
Road Jobs move blocks of cars to the towns that the cars need to be spotted in. These trains usually originate at a major yard, and run between multiple towns on the layout. Some Road Jobs run between interchange yards (off layout) to towns on the layout.

Finally, Local Jobs take cars that have been dropped of in a town by a Road Job and place or "spot" them next to the industries that the car needs to serve. Cars can be either "empty" - awaiting a load, or "full" - awaiting to be unloaded at a site.

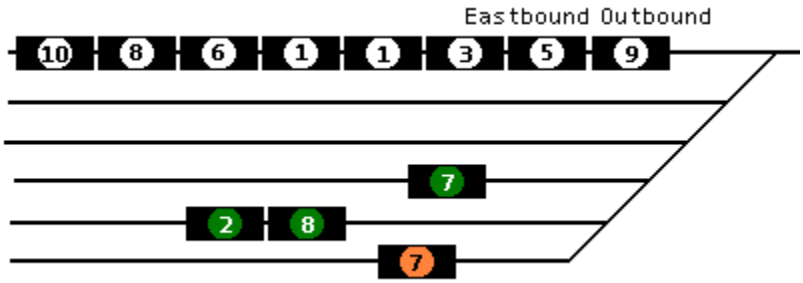
Yard Jobs

Yard jobs originate in Elizabethport, Lehighton Upper Yard and Binghamton/Taylor yard. The purpose of these jobs is to take cars that are sitting in the yard and classify them for outgoing trains. This is where most freight traffic for the railroad starts.

The Yard crew consists of a single operator who acts as conductor and engineer, although two operators can be used. They begin their day by looking over the yard. They'll need to see which cars need to travel westbound from their yard, and which need to go eastbound. The cars need to be grouped by magnet color, then by odd and even numbers of that color.



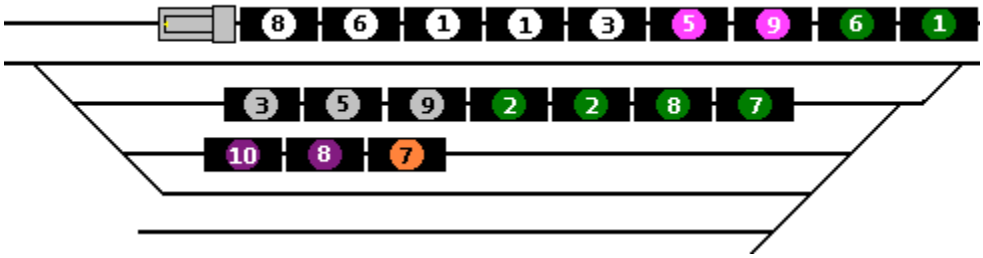
For example: if you were in Binghamton putting together all the cars for Wilkes-Barre (white magnets), you would want to get all the white magnets together and sort them eastbound (even), then westbound (odd) - Wh10, Wh8, Wh6, Wh1, Wh1, Wh3, Wh5, Wh9. These cars would be placed on the Eastbound Outbound track in the yard, because Wilkes-Barre is east of Binghamton.



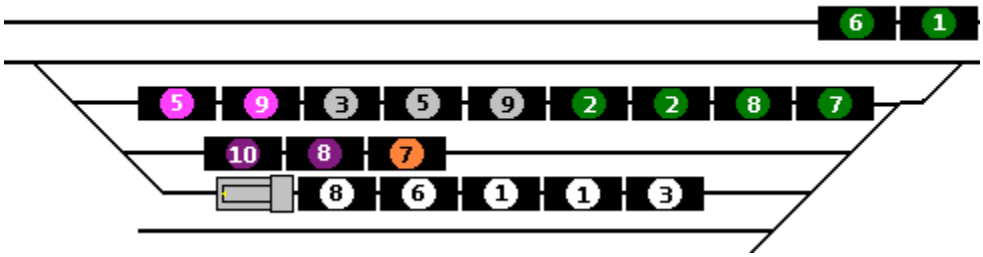
Cars with other eastbound cars would be added to that string to form an eastbound train, or at least be ready for an eastbound train to pick up.

Road Jobs

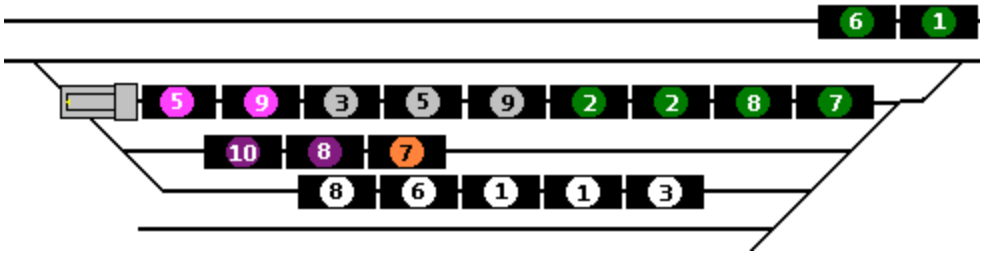
Road Jobs can originate at any location, but usually run between the major yards or interchanges. A Road crew is made up of two people, one engineer to move the train with a remote throttle, and a conductor to work the panel thumbwheels and switches. They drop off cars destined for that town, and pick up any cars in that town that are destined for towns in the direction the train is traveling (for example when our train arrives in Wilkes-Barre, our eastbound train would drop off WB cars, and pick up any cars for towns east of Wilkes-Barre).



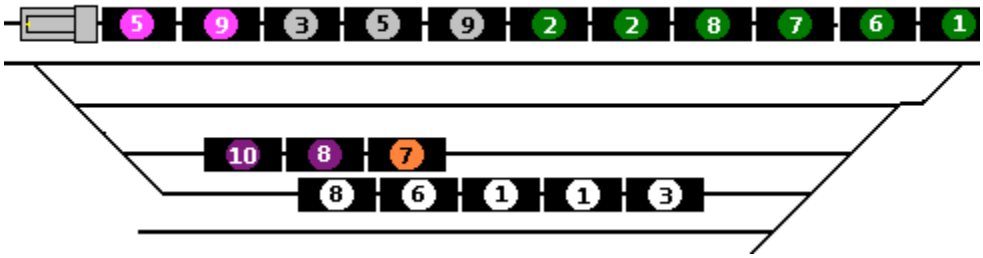
Let's continue with our train that was made up by the Yard Job in Binghamton above. That train has now left Binghamton heading east and pulled into Wilkes-Barre. The first thing we want to do is to drop off the white magnet cars that are destined for Wilkes-Barre. These cars need to be dropped off on the 4th track down. (You would know what track to use by looking on the track plan on the wall above Wilkes-Barre.)



Take the cut of cars that you want to drop off (white magnets), disconnect them from your train, and move them to the Wilkes-Barre drop off track. We'll also take the pink cars from our train and drop them off on the eastbound out track (more about that later).



After leaving the Wilkes-Barre cars, pick-up the outgoing eastbound cars and put them on your train.

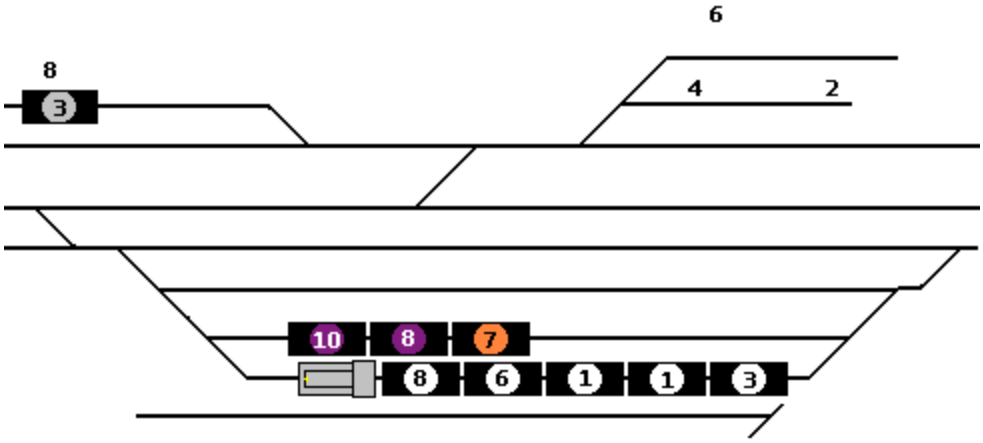


Now, here's why we moved the pink cars when we started this move. If we left those cars on our train, then when we brought out the outbound cars, we would have two groups of Jersey City (green) cars. This would make our job harder when we had to drop off the Lehighton and Bethlehem cars.

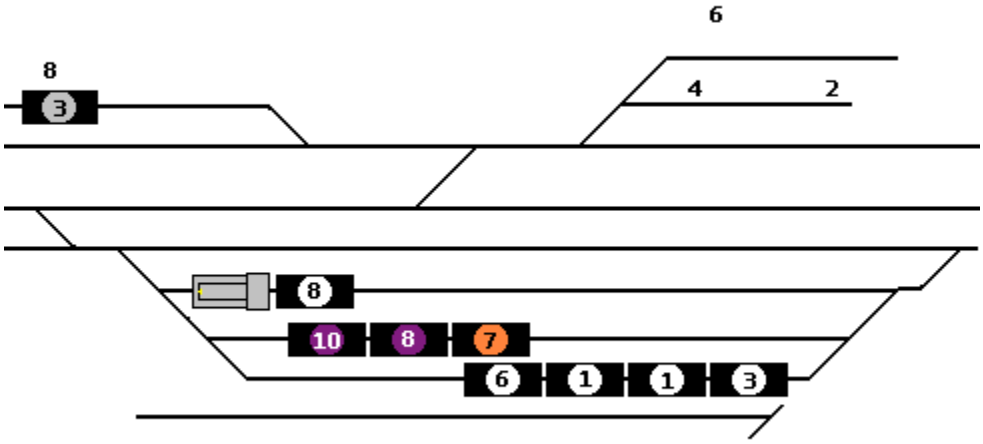
Local Job

Local jobs originate in the yard section of each town, spot cars next to their corresponding tacks and remove cars that are "empty" (no magnet) or do not belong on that siding. This is where most freight traffic for the railroad ends.

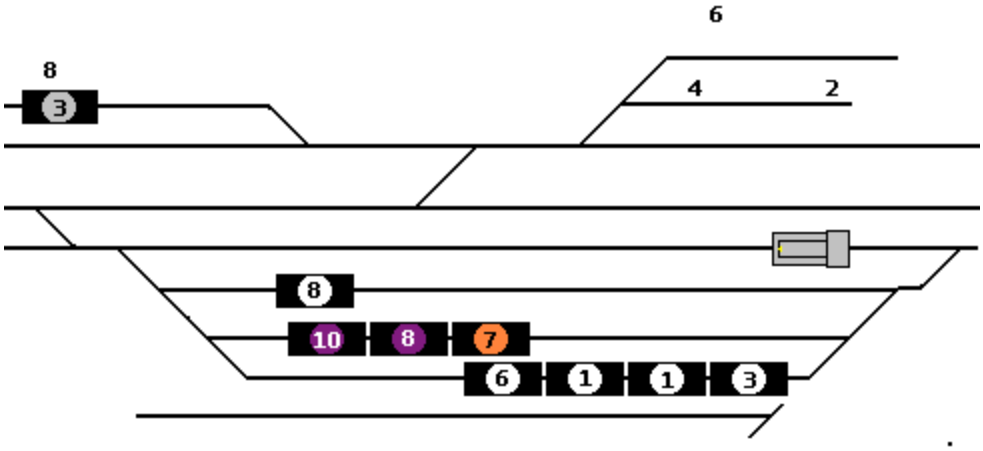
The Local crew consists of a single operator who acts as conductor and engineer, although two operators can be used. He begins his day by looking over the yard. He'll also need to see which cars go on the westbound side of the mainline, and which need to go to the eastbound side. It's usually easier to choose to work one side of the mainline at a time.



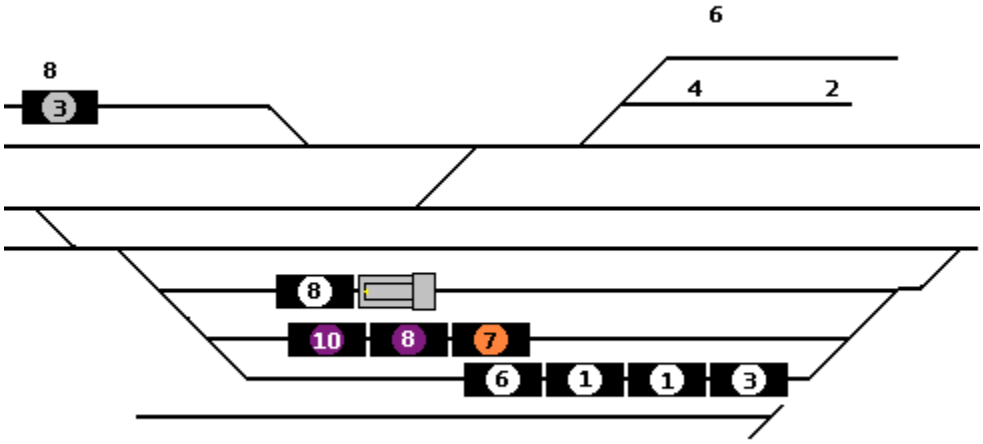
Here are the cars that the Road Job dropped off in Wilkes-Barre. Since the even number magnets (eastbound) are at the front of the string, let's switch them first (cars #8 and #6). Looking at the sidings, we see that we can easily drop off the #6 car, but we must get the engine on the other side of the #8 car in order to drop if off on the correct siding.



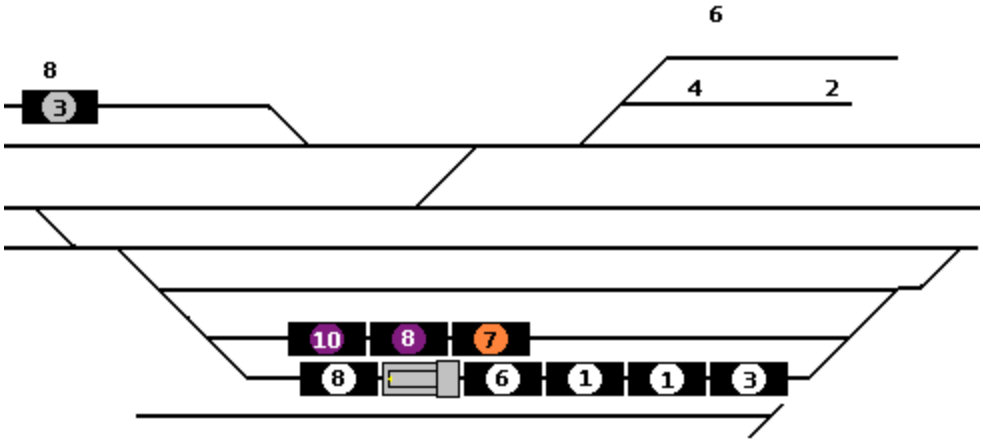
If we "run around" car #8, we can get the engine on the correct side to drop off the car. Pick one of the empty tracks in the yard that you can get to from both ends.



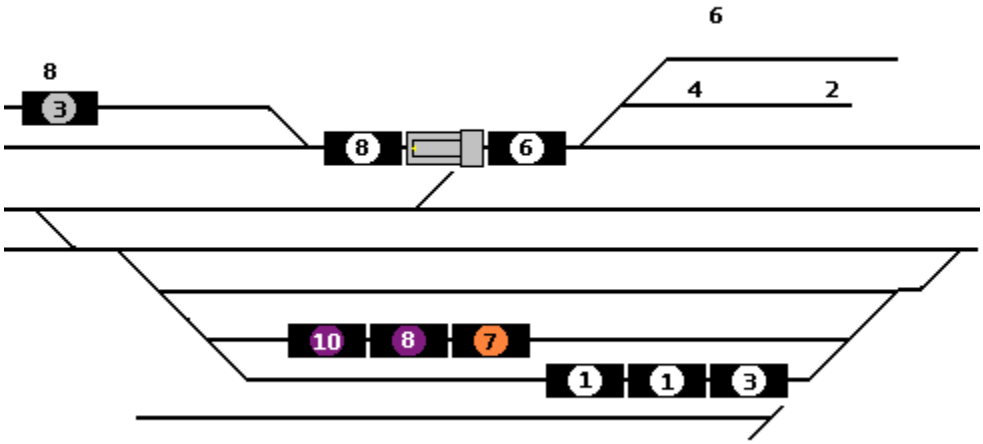
Drop off car #8, run the engine down the track next to the car.



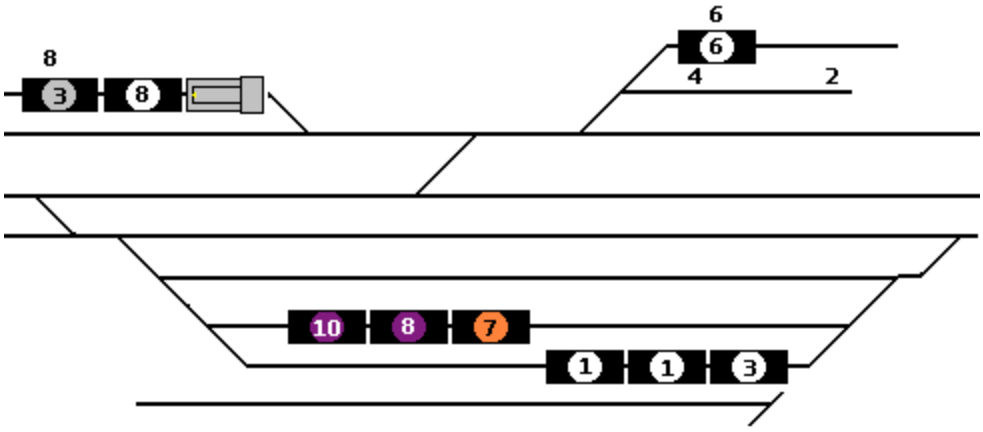
Now come back up the track that the car is on. The engine is now on the correct side of the car to place it on the siding with the tack on it.



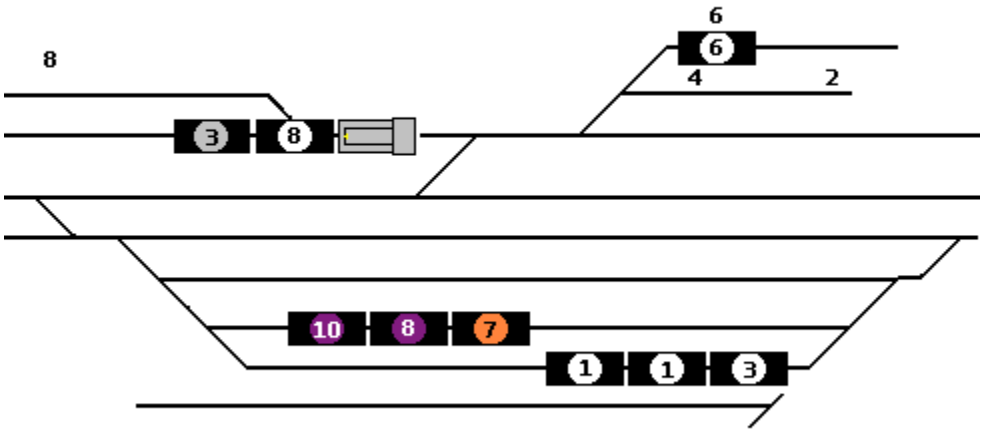
Push the #8 car off the track, then back up and connect to the #6 car. Disconnect it from the #1 car.



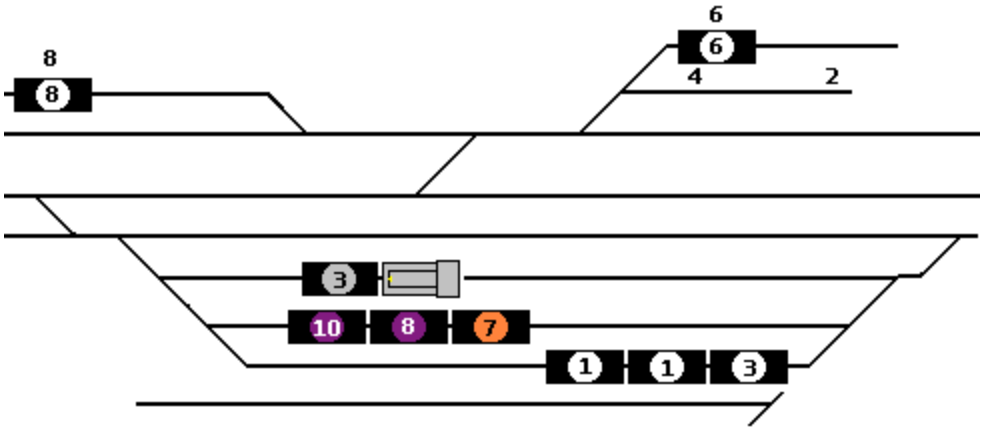
Move the engine and east cars across to the eastbound main. From here you can back up and drop off the #6 car next to the #6 tack.



Almost done. Now we have to remove the gray #3 car from the #8 siding. That car needs to be put on a train heading towards Bethlehem. To do that, we need to move the car onto the eastbound outbound track to be picked up by the next eastbound train.



Pull the #3 car along with the #8 car out of the siding and place the #3 car on the track next to the siding. Uncouple the #8 car, and put it back on the siding next to the #8 tack.



Finally, bring the gray #3 car back into the Wilkes-Barre yard and drop it off on the Eastbound Outbound track. Finished.

Magnets

Here's some quick information about magnets. The color of the tack indicates the town to route the car to, and the number indicates the specific industry or siding in that town that the car is destined for. Odd numbered industries are located on the westbound side of the mainline, while even numbered industries are located on the eastbound side. Blocking the cars in order from low to high behind the engine will aid in making setouts while switching. Refer to the track maps of each town for industry locations.

Passenger cars with tacks are to be set out at the appropriate location. These tacks usually do not have numbers as there is only one logical destination for the car.

Prior to an operating session, the Dispatcher removes magnets from cars that have been correctly spotted at their final destination, or cars on any interchange tracks. Those magnets are placed back in the magnet box, sorted by car type if they have numbers, or sorted by town if they do not. The Dispatcher then goes to the major yards (Lehighton Upper Yard and Taylor / Binghamton) and places magnets on cars that have no magnets. Those cars with new magnets will form the basis for the yard jobs during the next operating session.

The Dispatcher then goes to any interchange tracks (National Docks, Reading branch) and places magnets on the trains stored there.

Color	Destination	Color	Destination
BROWN	National Docks	WHITE	Georgetown
GREEN	Jersey City	WHITE	Wilkes-Barre
GREEN	Elizabethport	WHITE	Dupont
GREEN	Phillipsburg	SILVER	Scranton
GRAY	Bethlehem	PURPLE	Laurel Line
PINK	Allentown	ORANGE	Taylor / D&H
PINK	Lehighton	BLACK	Binghamton
YELLOW	Ashley	RED	End of Train
		LT.BLUE	Bad Order Car

Cars Without Magnets

During an operating session, most cars will have a magnet on top, for those that do not, here are a few rules:

Type	Destination
Coal - Full	Elizabethport (Coal Yard)
Coal - Empty	Ashley
Auto Racks	Elizabethport
High Cubes	Elizabethport
Container Flats (COFC)	Elizabethport (Piggyback Yard)
Piggyback Flats (TOFC)	Elizabethport (Piggyback Yard)
All Others	Lehighton Yard

Schedules

If we allowed any of these trains to run whenever they felt like running, there would be chaos on the layout. You could easily have two or three trains fighting to use a single section of mainline trackage. To avoid this, we came up with a schedule (or timetable) that sets aside blocks of time for trains to use the mainline tracks.

The schedule is set up with town names down the left side and train names / numbers across the top. In this example, reading up the columns, you can see what town a train is scheduled to be in at what time. Example: Train #1 (a passenger train) is scheduled to leave Allentown station at 8:40 pm. It will then depart Wilkes-Barre at 8:46, Scranton at 8:49 and finally arrive in Binghamton at 8:51 pm.

Schedule Sample: Westbound (Read Up ^)

number	**#1**	**LLY-TY-5**	**EP-GT-1**	**#3**	**GT-ASH-1**	**EP-BG-3**
type	pass	mixed frght	coal-empty	pass	coal-empty	mixed frght
speed	60	45	30	60	30	45
Binghamton	**8:51**					**11:02**
Keyser Valley	8:50					11:02
Taylor	|	**9:24**		**9:57**		|
Bridge 60	|	9:23		9:56		|
Scranton	**8:49**	9:23		**9:56**		11:00
Nay Aug	8:47	9:21		9:54		10:58
Ashley	|	|		|	**10:01**	|
Wilkes-Barre	**8:46**	**9:19**		**9:53**	9:56	**10:56**
Georgetown	8:43	9:09	**9:41**	9:50	**9:51**	10:46
East Penn Junction	8:41	9:06	9:36	9:48		10:43
Allentown	**8:40**	9:05	|	**9:47**		10:42
Lehighton Lower Yard	|	**9:03**	|	|		**10:40**

This schedule gives specific trains priority on the main line tracks at specific times. These trains are all Road Jobs. As long as the train is close to schedule (5 mins), it has priority. All other trains must clear the mainline to allow the scheduled train to pass.

The schedule also serves another purpose; scheduling locals and yard jobs. A yard job can use the schedule to see when it needs to get cars together for a departing road job. If you look at train LLY-TY5, you can see that the Lehighton Yard operator needs to have some westbound freight ready to depart at 9:03.

Also, a local switcher can look for a block of time that there is no mainline traffic. That will tell them when the best time to cross over the mainline, or leave a cut of cars fouling the mainline without blocking the mainline. If we look across the schedule for Wilkes-Barre, you can see that there is a 33 minute period between LLY-TY5 (9:19) and #3 (9:53) to cross the main. The better choice may be the 1 hour period between trains GT-ASH1 (9:56) and EP-BG3 (10:56).

When trains are running behind schedule (more than 5-10 minutes), the dispatcher (or person running the operating session) needs to make a judgment call on who has the priority on the section of track in question. The dispatcher may decide to allow the local to tie-up or "foul" the mainline to complete it's move, rather than the road job which is running late.

Our schedule also contains other non-schedule information such as engine assignments, a layout schematic to help people identify locations, train set-ups to start an operating session, and magnet colors and town associations.

Dispatcher

The Dispatcher is king during an operating session. At any time he can annul (cancel) trains for any reason (usually not enough operators or major track problems), mediate disputes and insure that crews are keeping the schedule. Think of the Dispatcher as a traffic cop on the railroad.

When you get a chance to Dispatch you'll need to keep track of a few things. First off, do you have enough operators to run all of the necessary trains on the schedule? If not, you'll have to annul some trains. For example, you may have to stop the coal trains from running. Maybe you just want to set up yard jobs and locals with no road jobs that evening.

Next, you'll need to see that your crews are using the schedule. Are the road crews leaving when the schedule says they should? Are there cars for them to start with or pick-up along the way? Have the locals cleared the mainline for the road jobs to run through?

Nine times out of ten, all of these things take care of themselves. If you can get all of your crews talking when you first start the operating session, it should run like clockwork. But, when things start to go bad for some silly reason, you'll need to step in and try to help get things going again.

I hope that this gives you a good idea what we're trying to achieve with our operating sessions. Remember, it's supposed to be fun not work!