# Pennsylvania
## Railroad
*The Standard Railroad of the World*

## Oak Ridge Branch

# Operations Orientation



By David J. Vinci

(with little pieces copied from all over the place… Thanks to all of you un-named individuals.)

Version 2.02

# Table of Contents

# Why Operate?

Well, after spending years building a model railroad, it is operation that finally brings the model to life.  Ever since I was a little guy and reading Frank Ellison's writings on operations, I've been sold on the idea.  The little book shown at right is one of my prized model railroad possessions as it was published when I was born and it has been with me since at least 1954 when my Dad bought it.

- Operation adds purpose and function to the model railroad.

- Operation is both a stage play and a strategy game.

- Learn about the prototype and how they operate.

- Meet fellow model railroaders.

- It's fun!
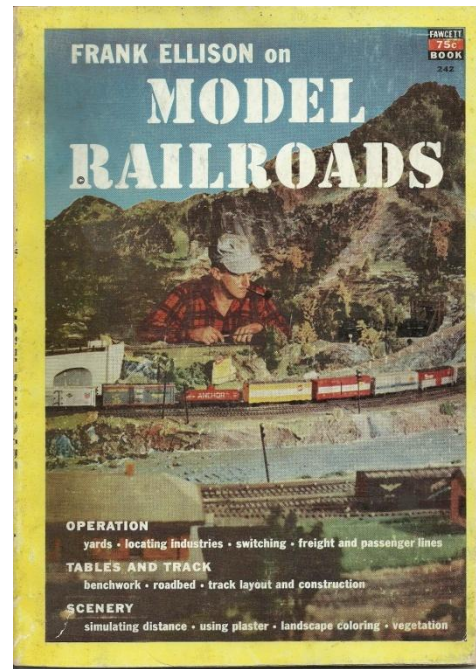
Published by A. C. Kalmbach Publishing Co., 1027 North 7th Street, Milwaukee, WI  © 1949, 1950, 1951.

# The Time Period and Setting of the Oak Ridge Branch

The time period is the 1920s which has a few characteristics that I am fascinated by:

- The 1920s is the end of the transition period from all wood cars to all steel cars. This means that 40 ton wooden cars and 70 ton steel cars are mixed in trains. If trains are handled too roughly, it's more than possible to splinter the wooden cars.

- This is also the period where really big locomotives came into their own, but the smaller power was still around.

- Operation by Timetable and train orders and Tower Operators set the signals and reported the positions of trains to the dispatcher by telephone or telegraph. By the way, our signals are mostly (see page 17), just scenery for now...

- We've built a mythical branch line of the Pennsylvania Railroad located somewhere in western Pennsylvania.

- The Branch thrives on originating freight traffic and some key large customers.

- Steam is king here. What are "Diseasals" anyway?

# Operating Environment

- At some point we will operate via Timetable and Train Order, but for now we're operating with a sequence of trains.

- The layout is a modified dog-bone with a reversing loop at each end.

- The Through Trains operate between Oak Ridge and Franklin with no stops in between.

- The Major Industries modeled are Steel Making, Coal Mining, and heavy Manufacturing.

- Frankfort Iron & Steel – This is the major industry on the Oak Ridge Branch. About 25% of the traffic supports this industry, so as the big money-maker, its trains get priority among the freight trains.

- Franklin Staging yard represents the connection with the rest of the PRR and most of the rest of the world, for that matter.

- The Nickel Plate Road Interchanges with the PRR at Gulph Mills with trackage rights over the branch to Oak Ridge yard. Usually one train every other day.

- The Foggy Mountain & Western Railway is a small coal and lumber hauler that interchanges with the PRR at Union Furnace.

# The TRACKPLAN
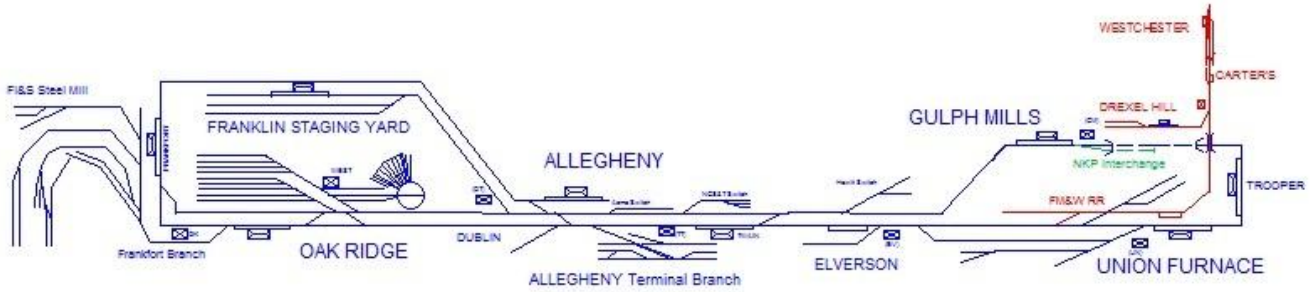


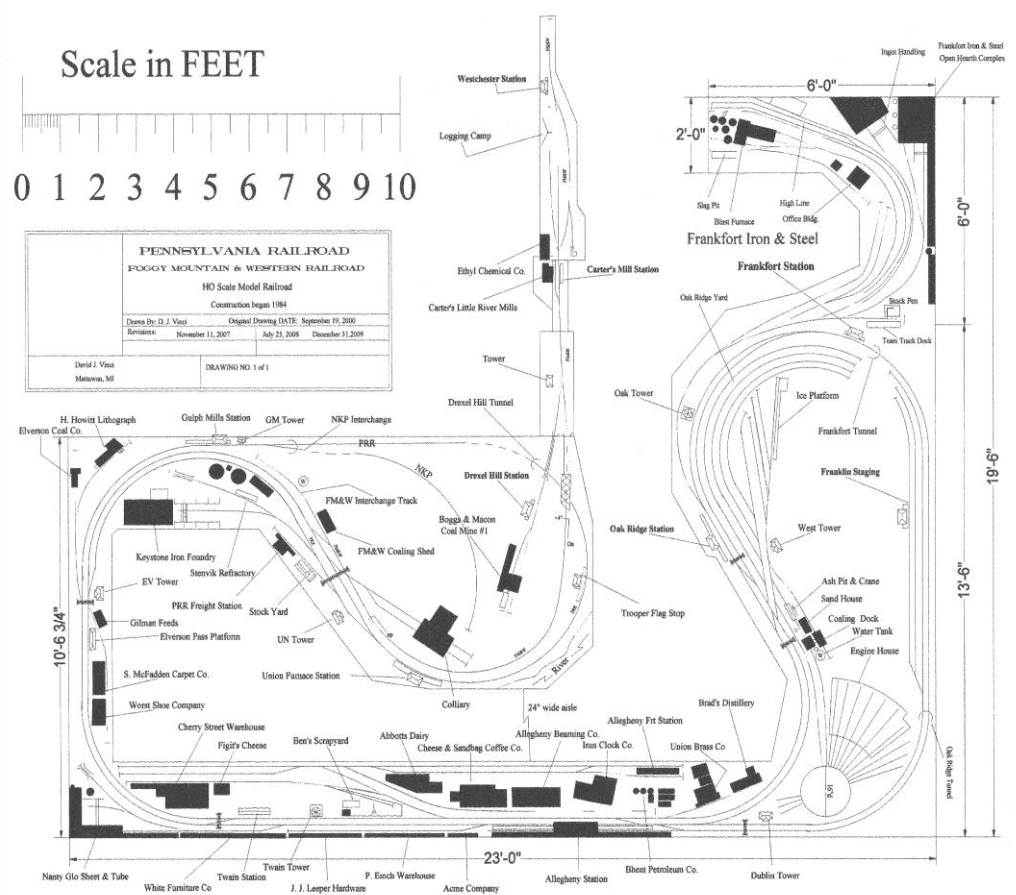It may be easier to think of the layout like this:
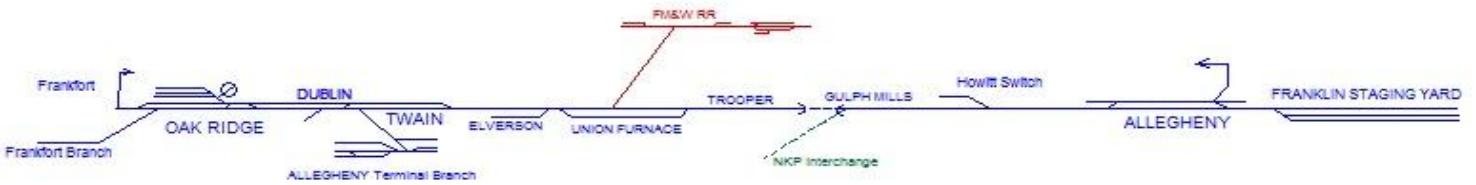


WEST ➔                                                         ⬅EAST

Trains travel **East** from Franklin to Oak Ridge and **West** from Oak Ridge to Franklin.

At right is the actual trackplan drawn to scale.

# Operating Positions

- **Oak Ridge & Franklin Yardmaster** – Handles and oversees all operations in Oak Ridge Yard as well as controls entry/exit from Franklin (Staging).

- **Road Engineer 1** – Handles train movements outside of Oak Ridge Yard.

- **Road Engineer 2** – Handles train movements outside of Oak Ridge Yard.

- **Road Engineer 3** – Handles train movements outside of Oak Ridge Yard.

- **Engineer Frankfort Iron & Steel Industrial Switcher** -- Handles and oversees all operations in the Steel Mill.

- **Road Engineer FM&W** – Handles and oversees all operations on The Foggy Mountain & Western Railway (still working with conventional DC control).

- **Dispatcher** – Responsible for the orderly release and control of trains.
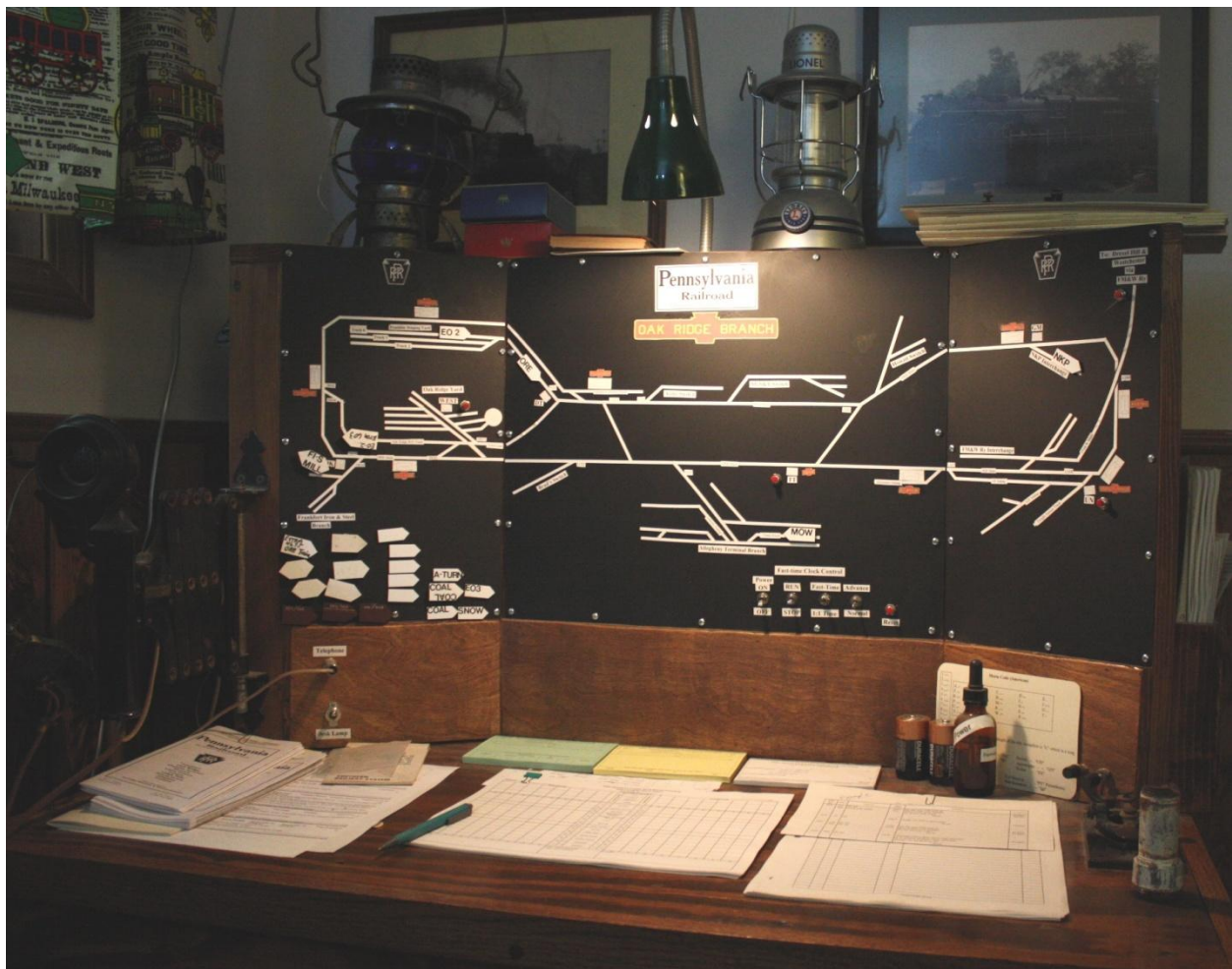
# Car-Cards and Waybills



All Freight Traffic Moves via Car-Card/WayBill.

Each car has its own Car-Card and you will have to match the Reporting Marks and the Car Number on the Car with its Car-Card. See the photo at right.

## How to read Car-Cards

We have two types of Car-Cards on the layout as shown above. I'm trying out the vertical format and I'm not sure which one I like best. Both are 3" x 5" as I think that makes things easier to read. Both cards contain the same information.
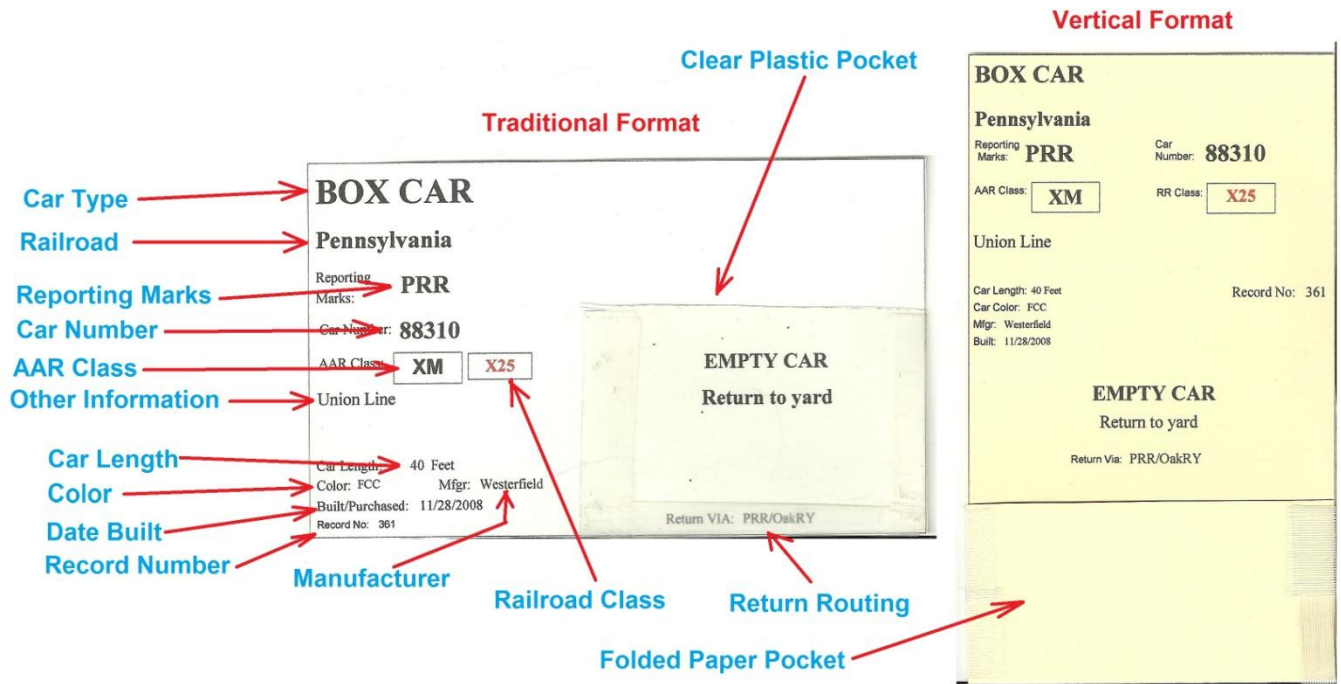


Notice that without a waybill, there is a default car routing instruction (usually to a yard) for this empty car.

Once you have the CAR-CARDs figured out, the WAYBILLs come next

## How To Read A Waybill

### CAR CARD with WAYBILL

**These MUST match**

**BOX CAR**

Pennsylvania

Reporting Marks: **PRR**

Car Number: **88310**

AAR Class: **XM**    X25

Union Line

Car Length: 40 Feet
Color: FCC        Mfgr: Westerfield
Built/Purchased: 11/28/2008
Record No. 381

| 1 | Pennsylvania Railroad | XM |
|---|---|---|

From: Oak Ridge, Pa
Shipper: Freight Yard

To: Union Furnace, Pa
Receiver: Keystone Iron Foundry
KIF Track No 1

VIA PRR        Block: UF
                     Union Furnace, Pa

Load:
Empty Car
Clean prior to delivery

When car has been delivered to destination,
6    Turn Waybill to Destination 2.

### 4 Cycle WAYBILL

**Waybill Cycle #**

| 1 | Pennsylvania Railroad | XM |
|---|---|---|

From: Oak Ridge, Pa
Shipper: Freight Yard

To: Union Furnace, Pa
Receiver: Keystone Iron Foundry
KIF Track No 1

VIA PRR        Block: UF
                     Union Furnace, Pa

Load:
Empty Car
Clean prior to delivery

When car has been delivered to destination,
6    Turn Waybill to Destination 2.

| 2 | Pennsylvania Railroad | XM |
|---|---|---|

From: Union Furnace, Pa
Shipper: Keystone Iron Foundry

To: Wadsworth, Ohio
Receiver: Ohio Match Co.
Dock

VIA PRR-Erie        Block: PRR-Franklin
                            Franklin

Load:
Steel Rollers

When car has been delivered to destination,
6    Turn Waybill to Destination 3.

| 3 | ERIE Railroad | XM |
|---|---|---|

From: Wadsworth, Ohio
Shipper: Ohio Match Co.

To: Allegheny Term. Brch
Receiver: Cherry St Whse
Door 1-3

VIA ERIE-PRR        Block: Alleg Term
                            Allegheny Term. Brch

Load:
Matches

When car has been delivered to destination,
6    Turn Waybill to Destination 4.

| 4 | Pennsylvania Railroad | XM |
|---|---|---|

From: Allegheny Term. Brch
Shipper: Cherry St Whse

To: Oak Ridge, Pa
Receiver: Freight Yard
Yard Tracks

VIA PRR        Block: PRR/OakRY
                     Oak Ridge

Load:
Matches, lamp wicks
See Yardmaster

When car has been delivered to destination,
6    Turn Waybill to Destination 1.

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**Waybill Cycle #**

**AAR Class of Car Required**

**Where the Car came from**

| 1 | Pennsylvania Railroad | XM |
|---|---|---|

From: Oak Ridge, Pa
Shipper: Freight Yard

To: Union Furnace, Pa → **What Town to send the Car TO**

Receiver: Keystone Iron Foundry → **What Customer to deliver the Car TO**

KIF Track No 1

**Railroad Routing** → VIA PRR        Block: UF → **Block Assignment (For making up trains)**
                            Union Furnace, Pa

Load:

**Contents of the Car (the Load)** → Empty Car

Clean prior to delivery → **Special Instructions**

**Waybill Handling Instructions Operators must ignore these. This is the Superintendent's Work** →

When car has been delivered to destination,
6    Turn Waybill to Destination 2.

**Enlarged View of a WAYBILL**

## Handling Car-Cards

● Once a car has been spotted, place its car-card in the "Set-Out" pocket.



● In spite of what is printed on the bottom of the Waybills, **DO NOT** turn, remove or alter them.

● Car-Cards for cars to be picked-up are located in the "Pick-Up" pocket.



● Car-cards in the "HOLD" pocket indicates a car that is in process of being loaded or unloaded. You don't have to do anything to this car. If you have to move this car to spot another car, its waybill will tell you where it belongs so you can put it back.
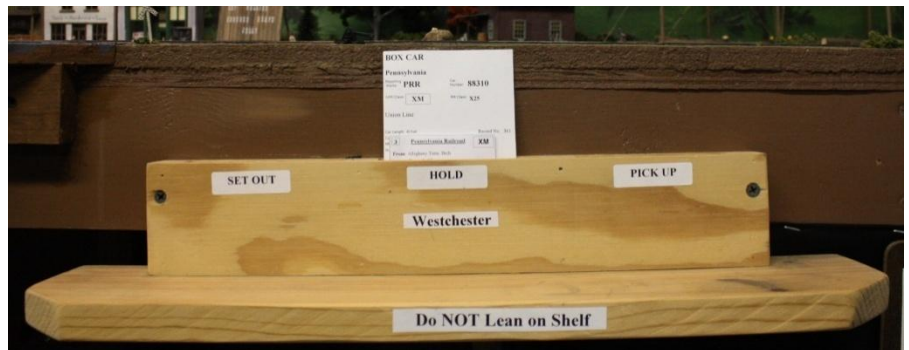


● IF a car cannot be spotted, place car on clear and available track and car-card in the "SET OUT" pocket. Place an orange "Off-spot" tag in the car card pocket. If you arrive in a town with your way-freight, and find a car with an "Off-spot" tag, spot the car correctly if you can and then remove the orange tag. Then put the car-card in the "SET OUT" pocket as usual.



● To repeat, in spite of what is printed on the bottom of the Waybills, **DO NOT** turn, remove or alter them. Alteration of the position of the waybill is done only between operating sessions by the Superintendent.
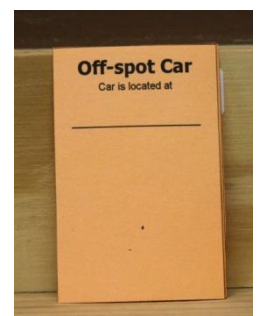
Cabin Cars (Caboose), MOW and other equipment follow same Car-Card format.



The Locomotive Card is the same size as a car card and it has the instructions on it to aquire a locomotive with the NCE throttle. More about this on page 14.

Notice that the paper "Brakemen" are tucked into the pockets on the Cabin Car and the Locomotive cards.

# Making Up Trains

- Cars for a particular destination are collected to form trains.

- Trains are made up and released on a sequence, the Train List.

- Scheduled trains are run on a timetable.

## Keeping Your Train Together

- Car-Cards are collected for a particular destination.

- The collected cards form the basis of a train.

- Cards are placed on a Clip-board to keep all the paperwork together for a train. You could call this a "TRAIN PACK."

- The Clip-board has a clear sleeve at the bottom to hold both the Cabin Car/Locomotive Cards as well as the Train Sheet.

- There are hooks scattered around the layout to hang the clip-boards on.
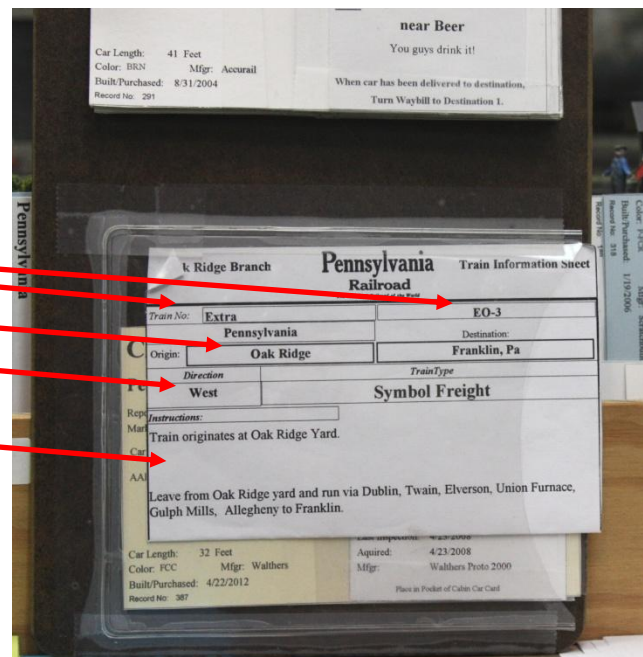
## Train Sheet

Every train has a unique number and schedule. The Train Sheet identifies all relevant information for operating a train:
Train Number and Symbol
Origin & Destination
Train Direction
and
Instructions

# Dispatching and the Movement of Trains

- The 1920s are before the advent of CDC and automatic track detection, so the only way the Dispatcher knew the location of the trains was to rely on the OS reports from Tower Operators and Agents along the line.   Since we are operating in that time period, you must play the role of the tower Operator and report the position of your train as it arrives at each station.

- The Dispatcher doesn't really "control" anything in the physical sense outside of the Fast Clock, a telegraph key, the Dispatcher's Sheet and a phone.

- He does manage the traffic on the branch line by releasing trains and issuing Train Orders.

- Trains from staging bring cars from the outside world onto the Oak Ridge Branch of the PRR.

- Blocks of cars are dropped or picked up by these trains at Oak Ridge Yard.

- Balance of car movements are made by trains that originate and terminate on the layout.

- Only first class trains are scheduled, but all trains are sequenced

- Non-scheduled trains are released as the previous train is at designation point in schedule

- Non-scheduled trains are held to open a window for scheduled trains.

# Train List

(Sequence of Trains)

Version: 1.09

| Train No. | RR | Type | Direction | Name/Symbol | Origin | Destination |
|---|---|---|---|---|---|---|
| Mill Local | FI&S | Mill Switcher | | FI&S Steel Mill Local | Frankfort Branch | Frankfort Branch |
| Extra | PRR | Freight Extra | East | Ore Train/FF1 | Franklin | Frankfort Branch |
| 563/564 | PRR | Local Passenger | West/East | Local Passenger - Miners Morning Commuter Train | Oak Ridge | Franklin & Return |
| 2/3 | FM&W | Local Passenger | West/East | Local Passenger | Westchester (FM&W) | Union Furnace (FM&W) |
| Extra | PRR | Way Freight | West | Allegheny Terminal Turn | Oak Ridge | Allegheny Term. Branch |
| Extra | PRR | Freight Extra | West | Ore Train/ FF2 | Oak Ridge | Franklin |
| Extra | FM&W | Local Freight | West/East | Local Freight | Drexel Hill, Pa (FM&W) | Drexel Hill, Pa (FM&W) |
| Extra | PRR | Symbol Freight | East | EO-2 | Franklin, Pa | Oak Ridge |
| Extra | PRR | Freight Extra | West/East | Coal Drag/ OF3 / OF4 | Oak Ridge | Oak Ridge |
| 565/566 | PRR | Local Passenger | West/East | Local Passenger | Oak Ridge | Franklin |
| Extra 586 | NKP | Transfer Freight Extra | East | NKP Transfer | Gulph Mills - NKP Interchange | Oak Ridge |
| Extra | PRR | Way Freight | West/East | Local Freight | Oak Ridge | Return to Oak Ridge |
| Extra 586 | NKP | Transfer Freight Extra | West | NKP Transfer | Oak Ridge | Gulph Mills - NKP Interchange |
| 567/568 | PRR | Local Passenger | West/East | Local Passenger | Oak Ridge | Franklin |
| 4/5 | FM&W | Local Passenger | West/East | Local Passenger | Westchester (FM&W) | Union Furnace (FM&W) |
| Extra | PRR | Symbol Freight | West | EO-3 | Oak Ridge | Franklin, Pa |

Trains Operated as Needed:

| Train No. | RR | Type | Direction | Name/Symbol | Origin | Destination |
|---|---|---|---|---|---|---|
| Extra 127 E | PRR | Transfer Freight Extra | East/West | FI&S Transfer | Oak Ridge Yard | Frankfort Branch |
| Work Extra __ | PRR | MOW Work Extra | East/West | Snow Plow | Oak Ridge Yard | As needed |

# Timetable

Coming soon to a pamphlet near you!

# Mechanics of Operating Equipment

We have made the leap from the old reliable DC cab control to the new standard of Digital Command Control. Over the winter of 2014-15 we installed an NCE DCC system. At right is a photo of one of the utility throttles we use.

To select a Locomotive, one follows this procedure:
1. Press <SELECT LOCO> (the red LED will light)
2. Enter the 4 digit Loco Address, ie: **0603**
3. Press <ENTER> (The red LED will go out)

At this point you should have control of your locomotive. You will find these instructions printed on the Locomotive Card as a reminder. The "0" button will switch on and off your headlight. If your locomotive is equipped with sound, (only a few are) then the <HORN> button will sound the whistle, and the "1" will operate the "bell".

To de-aquire a loco, just follow the same procedure but enter **0000** for the Loco address.

The photo below shows a typical location where you may plug in your throttle to the

Control net. In this case you can see the black NCE panel with the 2 sockets to accept the plug on the end of your throttle cable. You can only send commands to your locomotive if you are plugged in, but your locomotive will continue to operate if you unplug your throttle. This allows you to move from location to location and follow your train.

At some point, we may purchase radio control throttles but that expense will have to wait for awhile.

Most of the control panels are still there but have been simplified as the Block switched are no longer needed with the exception of the FM&W Branch Line which is still DC block controlled (for the moment at least).

At right is a photo of the panel at Union Furnace, which is where the FM&W and the PRR interchange. You will notice one DPDT toggle switch in the center of the panel. This switch allows this one length of track, with a gap at each end, to be either DCC or DC controlled, but not both at the same time.
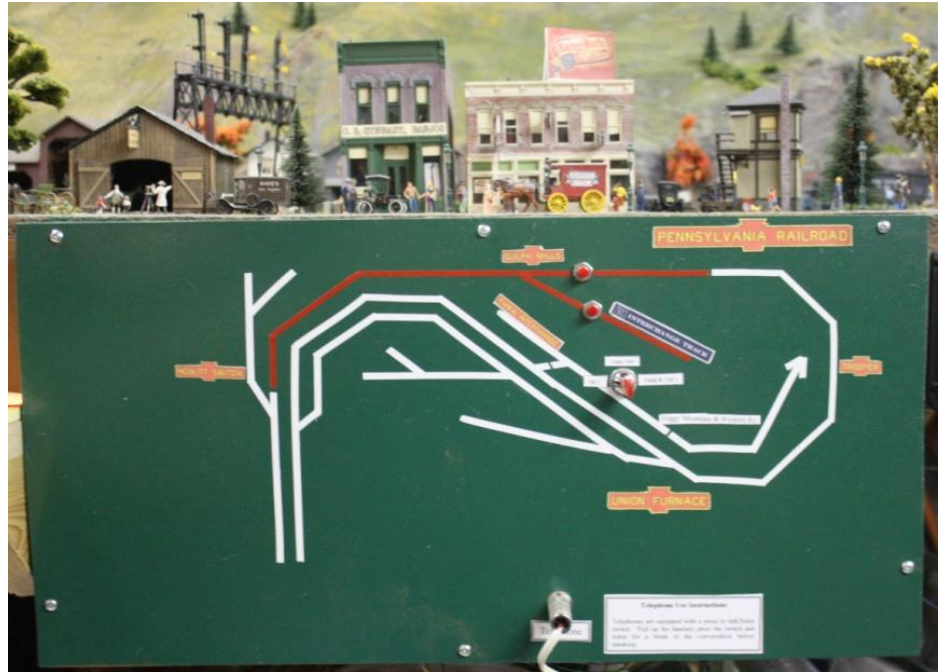
The photo at right shows the old DC panel with all the block switches in place. The reversing track, shown in red, is still necessary and present, but now it is controlled by an AR1 auto-reversing board which handles the polarity changes so operators no longer need concern themselves with that task
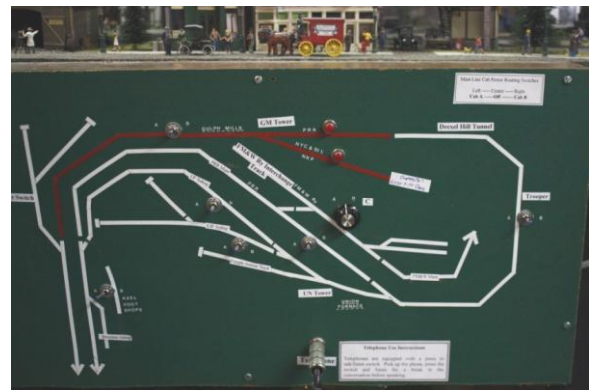
The Oak Ridge Yard Panel shown here still has a number of toggle switches to allow the power to be completely shut off on some of the tracks in the yard if desired. It is the feeling of the Superintendant that there is no good reason for a decoder equipped locomotive to just sit there and cook if no one is operating that locomotive. This is especially true for sound equipped locomotives.

The Tracks that are part of the Franklin Staging Yard also have this shut-down capability. You will notice that there are no switches on the main Line trackage, or on the Reversing trackage (shown in red).



Here is a photo of the panel at Allegheny, which has no switches at all.

# SIGNALS

Experience has shown the need for actual working signals to keep folks from wandering where they should not go.

(What a big surprise!)  So, we have made a few of our "scenery signals" into functional signals. The photo at right shows 3 of the signals we have added.  The 1880s semaphore signal is the signal that allow entry into the yard at Oak Ridge.

The position lights are for the tracks leading to Franklin.  The controls for these signals are located on the Oak Ridge Yard panel as shown at right.  These signals are being set by the local tower operator as we are not operating in a CTC environment.

These signals are intended to be taken as absolute signals, in other words, STOP means STOP!
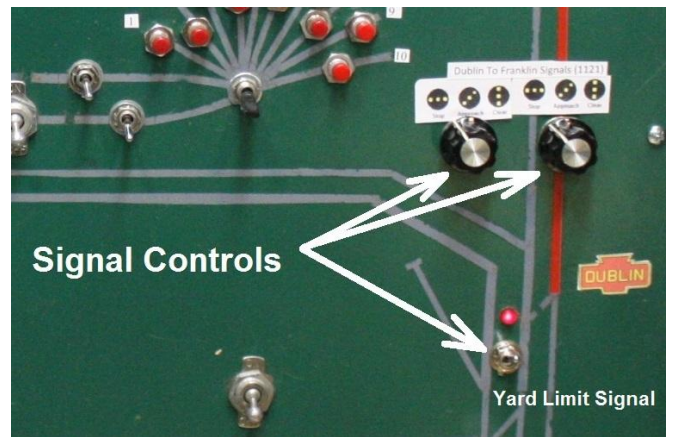
Here is a photo of the signal at the east end of the passing siding at Oak Ridge.  Yeah, I know it's not a working 1880s lower quadrant semaphore but the colors do change with the position of the turnout at the end of the siding.  It seems like a better place to put the turnout indicator lights rather than on the control panel.  Fun with 2 color LEDs.
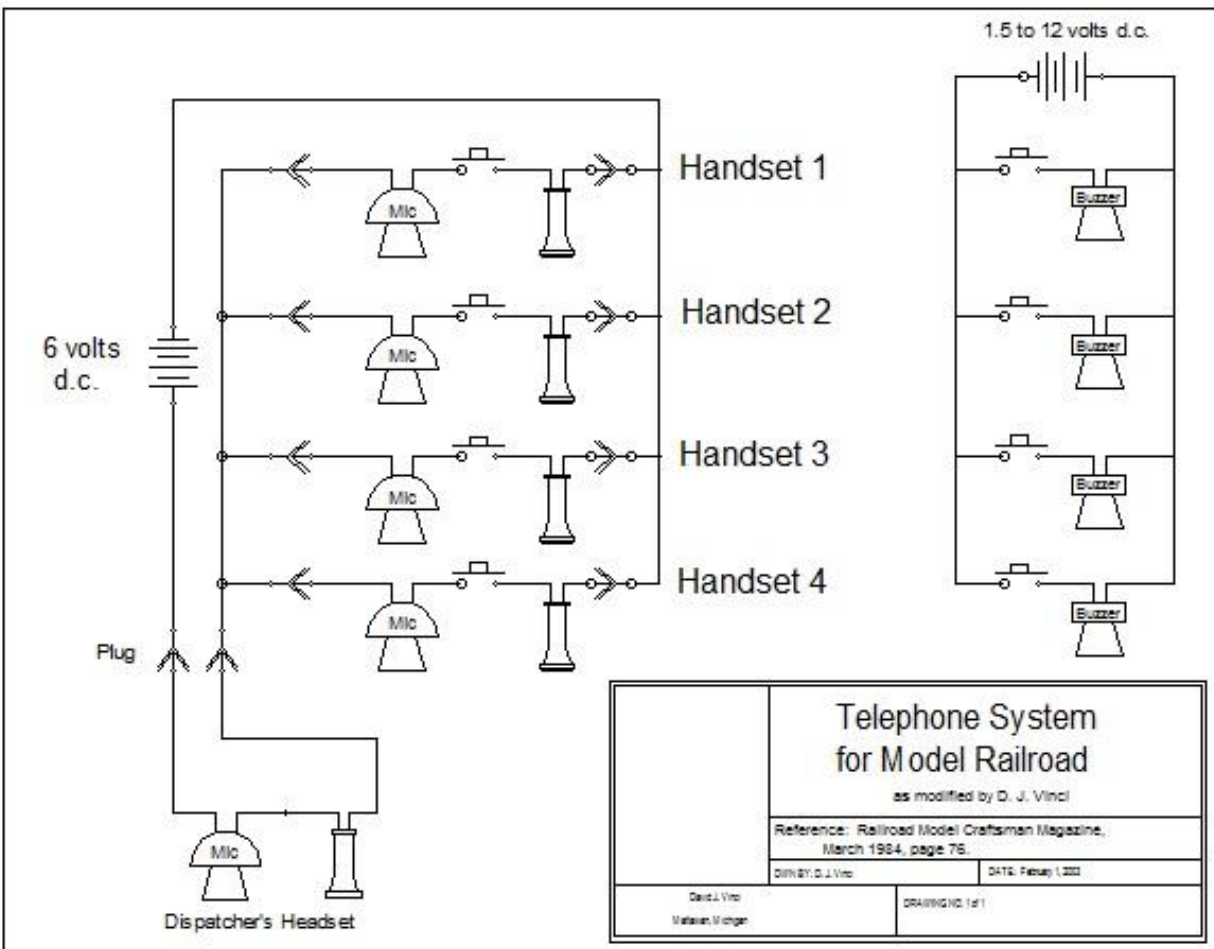
# Calling the Dispatcher

We have a telephone system to contact the dispatcher. The phone line is a party line which means everyone can listen in. Each handset has a push to talk & listen switch. Just pick up a phone, press the button and wait for a break in the conversation to speak to the dispatcher. The Dispatcher's phone is a headset which is "on" all the time unless he hangs the headset on the "hook", in which case the phone system shuts down.

Just for fun, there is a working telegraph with one station at the dispatcher's desk and one located near Howitt Switch.

You can play around with the telegraph as you like. "73" (--.. …-.)  That's American Morse code, please.

Telephone System
for Model Railroad
as modified by D. J. Vinci

Reference: Railroad Model Craftsman Magazine,
March 1984, page 76.

Here is the telephone system electrical diagram for the simple system we've installed.

## How Fast Is Fast Enough?

- 25-35 MPH for Mainline Passenger Trains

- 15-25 MPH for Mainline Freight Trains

- 10 MPH in yards

- 10 MPH for Wreck Trains with Cranes

- 10 MPH for Snow plows on the Mainline and 2-3 MPH through Stations.

| Speed Table | |
|---|---|
| MPH | Seconds per 50' |
| 5 | 6.8s |
| 10 | 3.4s |
| 20 | 2.3s |
| 25 | 1.7s |
| 30 | 1.4s |
| 40 | 0.9s |
| 50 | 0.7s |
| 60 | 0.6s |

# SWITCHING Operations


**Trailing Point Switching**

- Preferably work everything as a trailing point movement whenever possible.

- As facing point movements require many more steps, group all facing point movements and make just one run-around.

- Deliberate moves. Plan before working.

- Group facing/trailing point moves.

- Slower is better.

- If you have a car derailment, carefully re-rail the car.  If the derailment is <u>not</u> due to train crew error, fill out a **BAD ORDER** sheet.

- If you have a locomotive derailment, call the Superintendent.  It's better he should break things than you.

- Should track-work or turnout linkages fail, call the Superintendent.


**Facing Point Turnout**
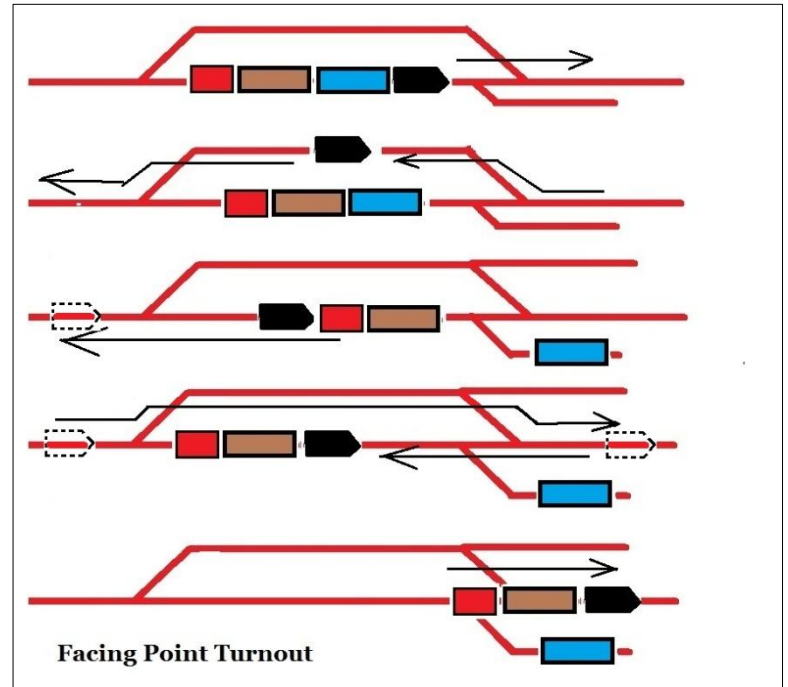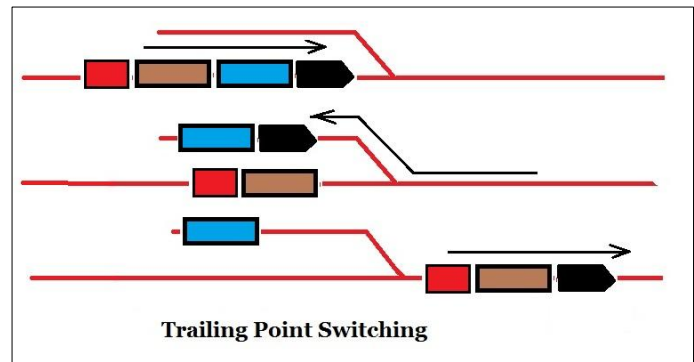
**BAD ORDER** Cars –

- Set out the car at the first convenient location.

- Pick up a **BAD ORDER** sheet, fill it out, use the back if you need more space.

- Place the completed form in the Car-Card pocket.  The **BAD ORDER** sheet must be the document on top in the Car-Card pocket.

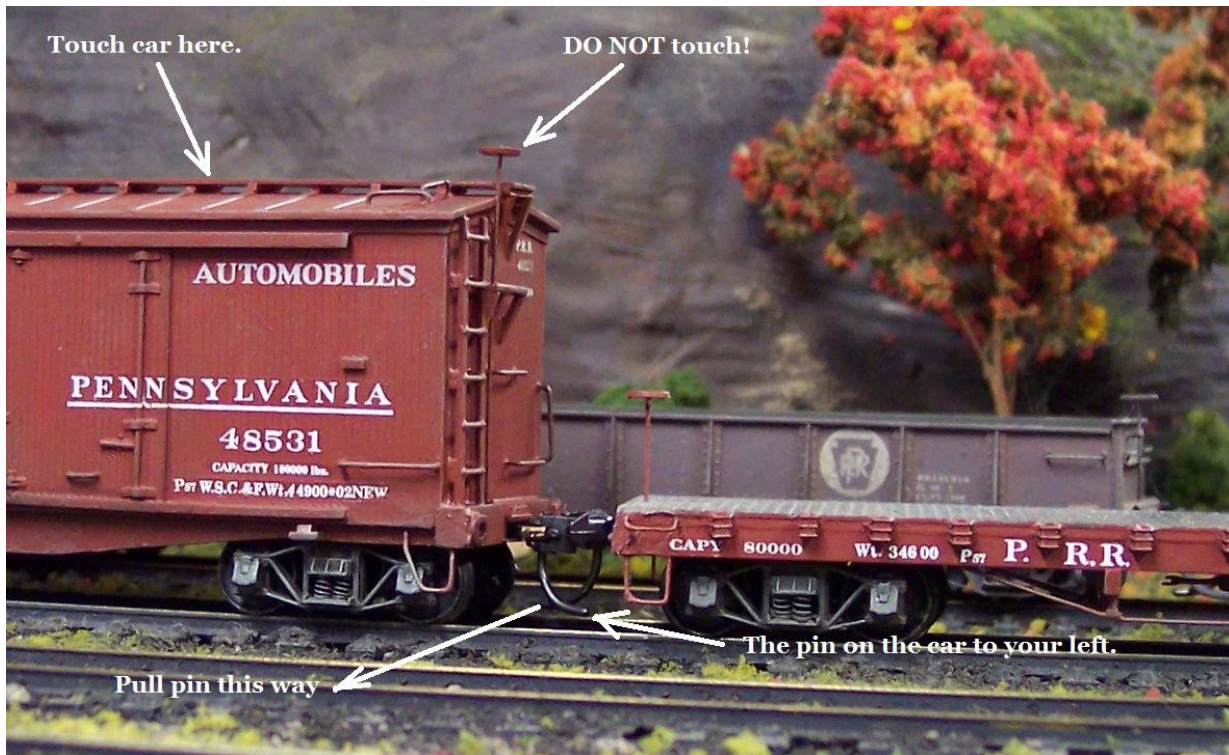- **BAD ORDER** Locomotives – Call the Superintendent.

## Yard Limits

- Cannot move into Yard Limits without Yard Master Authorization.

- The Main Line Is Under Control of the Dispatcher

- However, sidings, yard tracks, etc ARE under the Oak Ridge Yardmaster's control



Yard Entry Semaphore
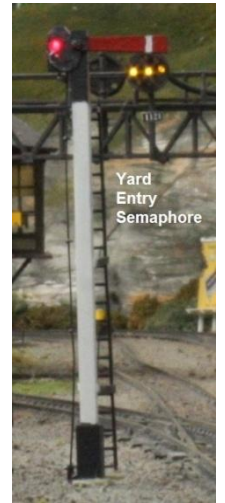
## Uncoupling Cars

To uncouple two cars, gently touch the top of one car to release the tension on the couplers and then, using the pick, pull the curved pin below the coupler toward you to open the knuckle. Then



Touch car here.

DO NOT touch!

AUTOMOBILES

PENNSYLVANIA

48531

CAPACITY 100000 lbs.
P57 W.S.C.&F.Wt.44900#02NEW

CAPY 80000    Wt. 346 00    P57  P.  R.R.

The pin on the car to your left.

Pull pin this way

gently move the cars not connected to a locomotive just enough to keep the couplers from coupling again.

Use the picks (photo at right) provided to manipulate couplers. There is one in each town and they are labeled so if they get misplaced, you will know where to return them.



Don't put them in your pockets, please.

## Added Elements for Realism

● Allow time to pump up the air in the train.  Typically, I understand the prototype takes around 1 min per car.  Just something to consider.☺

● Think about where your brakeman is, and pause to drop him, pick him up, and plan cuts where he is… here is where our little paper brakemen come in handy.



Paper Flagmen

● When switching, don't block grade crossings constantly.  You may get a summons from the local constabulary.  ☺

## Clean up after switching

● Return all Switches to the NORMAL position.  The ground throws are marked as follows:  The straight route through the turnout is **green** and the diverging route is marked in **red**.

● There is a white dot indicating the position the turnout should be set as the "NORMAL" position when you leave town.

● Leave Car-Cards in proper locations.

● Verify that you have the correct cards before you leave town.

● Connected to the Car-Card boxes is a small shelf to use for sorting Car-Cards.  There is also a brass cup-hook to hang your Clip-board on.  Please don't prop the Car-Cards on Cars, Locomotives, Track, Buildings or Scenery.
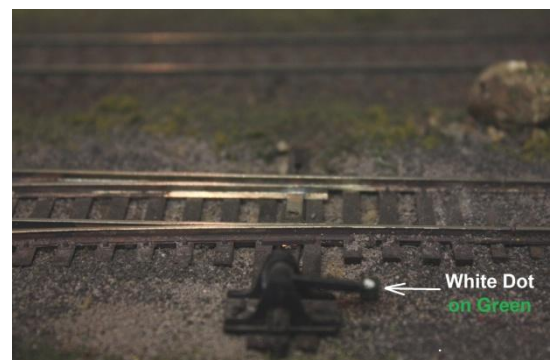
## PRR Oak Ridge Branch Miscellaneous

- No Food or Drinks in the RR Room during the operations session.

- Some of the aisle space is limited, be aware of yourself, watch where your elbows are going, and Make Room for one another.

- Short Sleeved shirts are recommended.

- Also don't lean on the shelf connected to the Car-Card boxes, they are not strong enough for that.  Thanks.

- There are some handrails attached to the layout, you MAY lean on these.

# A Few Final Thoughts…



- The goal is to simulate a rail transportation system in scale.

- Operate realistically: Speed is not as much a factor as deliberate and safe movements.

- Follow prototype practices as much as possible (Including Rule G). ☺

- Relax! This is not intended to be a stress inducing experience. Have fun!

☺ **Rule G:** The use of intoxicants by employees while on duty is prohibited. Their use, or frequenting of places where they are sold, is sufficient cause for dismissal.

    – <u>Pennsylvania Railroad System Operating Department Rules for Conduction Transportation</u>, April 26, 1925, page 6.



The End