

Using Model Railroad Switch List Software

Marshall D. Abrams

Visit the Abrams Railroad Empire at
<http://abrams-railroad.potomac-nmra.org/>

Trains

Cars

Engines

Switchers

Dispatching

Routes

Locations

Setup and Controls

Help On "Help"

Typical Model Railroad Operations

- ◆ 1 to N model railroaders come together to
 - Make up trains in the yards
 - Run trains across the layout – possibly with priority
 - Drop and pick up cars at industries, sidings, yards, service facilities & interchanges along the way
 - Passenger trains with station stops
 - Point to point through freights & passenger
 - Unit trains
 - Optionally use timetables, train orders, signals and control
- ◆ Have fun
 - Engineers run the trains
 - Conductors and switchmen assisting
 - Yardmasters
 - Dispatchers who (try to) control the whole thing



Incorporate More Prototypical Behavior

- ◆ Operating a train layout in a realistic fashion can add hours of enjoyment to our highly creative recreational activity
- ◆ You can give purpose to your model railroad
 - Build industries that depend on shipment from one another
 - Establishing interchanges with other railroads
 - Creating towns that require passenger service
- ◆ Freight Car Forwarding simulates the shipment handling component that gives real railroads their purpose
- ◆ The sense of apparent purpose adds an extra dimension to the experience, every bit as important as scenery or a sound system



Deviations From Prototype

- ◆ **Prototype's motivation is profit — hobby's is fun**
 - **The more traffic and movement, the better**
- ◆ **Prototype must keep records of commodities (loads) moved from source to destination (i.e., freight forwarding): what, when, weight, ...**
 - **Most hobbyists find such record-keeping not fun**
- ◆ **Prototype people much smaller than railroad equipment. Have limited visibility.**
 - **Hobbyists much larger than models. Global (bird's eye) view**
- ◆ **Prototype couplers quite reliable**
 - **Model couplers often erratic and contrary**

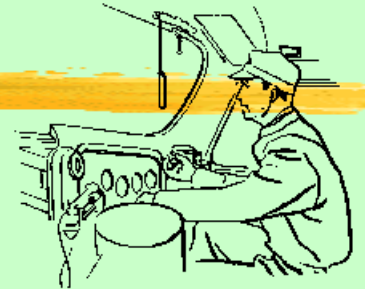


Which Program to Use?

- ◆ I use RailOP — examples in this clinic
 - RailOP has been abandoned by owner
 - Runs on Windows only
 - User group provides assistance
 - Not available for newcomers
- ◆ JMRI-Operations is free and popular
 - Recommended, especially if starting new
 - Runs on many platforms
 - Some folks have moved from RailOP to JMRI-Operations
- ◆ I used several programs before RailOP
 - Eventually had problems that program owner couldn't/wouldn't fix
 - Often the program had an underlying conceptual model that was incompatible with how my railroad operates
- ◆ References and hyperlinks at end of clinic



Clinic Overview



- ◆ Older routing systems: car card and tab-on-car not described or compared
- ◆ This clinic focus on generating switch lists using a home computer
- ◆ Advantages: variety, more prototypical, flexible, can be tuned to layout & crew, can run program & print in real time
- ◆ Getting started
 - A lot of data input
 - Describe your layout towns & industries to the program
 - Define industries and car types used to the program
 - Define trains and/or routes
 - Go slow & incremental



Understand Program Design Opportunities and Limitations



- ◆ Alternatives encountered
 - Automating car cards
 - Realistic freight movement
 - Maximized car movement
- ◆ Trying to force a program to work the way you want may be difficult
 - Better to understand the program design
 - Program limitations often difficult to find
 - May have to un-learn prior experience — options, assumptions, design decision differ among programs
 - Maybe no one has ever tried to do what you want
 - What's easy in one program may be difficult in another
 - Program logic highly influenced by design constraints
 - The less you customize, the better support and lifecycle experience you can expect
- ◆ Example: what happens when program finds destination full
 - RailOP will not schedule any more cars to that destination
 - JMRI has capability to specify an alternate “off spot” track.



Quirks and Tips

- ◆ **Make names unique to program but same to people**
 - **Example: want to set quotas for different types of cars on siding**
 - **Use special characters to make name unique to program: siding_, siding', siding*, siding^**
 - **People will (usually) ignore special characters**
- ◆ **Program may look at limited number of characters for uniqueness**
 - **Put special character first (e.g., 1siding, 2siding, 3siding)**
- ◆ **May need more than one route and/or train in program that corresponds to one train on layout.**
 - **Transfer cars from industries to yard before delivering cars to industries**

City Name	Div Pt?	Max Moves	Max Loc Moves
Marshal		7	0
Yard@Marshal		7	0

City Name	Div Pt?	Max Moves	Max Loc Moves
Babel		7	0
Marshal		19	3



Typical Switch List From My Layout

**** Town: New Rochelle

----- PickUps (2)

Harold's Industry	UO	1524	Box	White	Union RR Oregon
-------------------	----	------	-----	-------	-----------------

Harold's Industry	MCRR	350623	Gondola	Tuscan	
-------------------	------	--------	---------	--------	--

----- SetOuts (3)

Harold's Industry	WELL	6859	Box	Orange	Wells Fargo
-------------------	------	------	-----	--------	-------------

Harold's Industry	ICG	467936	Box	Orange	
-------------------	-----	--------	-----	--------	--

Harold's Industry	SOU	1248	Gondola	Silver	
-------------------	-----	------	---------	--------	--

---- 6 Cars Out, 396 Ft,	670 Tons	Eng	Rating	1750 Tons
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**** Town: Bergen

----- PickUps (2)

Roy's Place	PRR	1256626	Gondola	Tuscan	
-------------	-----	---------	---------	--------	--

Roy's Place	WM	36041	Box	Red	
-------------	----	-------	-----	-----	--

----- SetOuts (1)

Roy's Place	GLDC	749	Box	Orange	Gould Shawmut
-------------	------	-----	-----	--------	---------------

---- 7 Cars Out, 434 Ft,	770 Tons	Eng	Rating	1750 Tons
--------------------------	----------	-----	--------	-----------



Short List of Features



- ◆ Build trains automatically from the data files, but allows manual changes to train consists
- ◆ Handles an unlimited number of cars, engines, trains, and locations (cities and sidings)
- ◆ A "Manifest" on one sheet of paper gives all the information needed from origin to destination
- ◆ Generates working switch lists for yards and towns – user selectable
- ◆ Preview reports on screen before printing
- ◆ Switch lists can be generated before and/or during an operating session
- ◆ Every Operating Session is different
- ◆ Unit trains – freight, passenger, and maintenance of way – can be used
- ◆ Cars are handled individually or in blocks (Kernels)
- ◆ Can assign motive power based on RR grades, car weights, and individual engine power
- ◆ Provides "local moves" between industries in the same city
- ◆ Dynamically updates files as trains are moved
- ◆ Can print lists of all car locations, by city and siding
- ◆ Can provides results at end of session



Computer Switchlists vs Car Cards

- ◆ **“Cherry Picking”** — dislike for switchlists based on operating a layout where the program wasn't set up correctly (GIGO)
- ◆ **“Operatus Interruptis”** — can generate new switchlists based on where trains were left/what work was done last session
- ◆ **Not “self-healing”** compared to car cards
 - If a car is brought to the wrong destination, and the car card is brought with it, we're ok — not so with switchlists
 - With car cards, if the card is misplaced you have a problem
- ◆ **Timing issues: a train arrives at station expecting to pick up a car but that car isn't there yet**
 - Can be avoided by setting up the program correctly
- ◆ **There's stuff you can't do with switchlists**
 - There may be, but why push the envelope
- ◆ **There isn't more data entry needed for switchlists than for car cards**
 - Both require info on each car



Things You Can Do with Switchlists

- ◆ Prototypical use of specific car types (damage free insulated box cars etc.)
- ◆ Cars in dedicated service.
- ◆ Specific delivery sequences
- ◆ Custom loads and hazardous materials
- ◆ Interplant car routing (say within a steel mill)
- ◆ Car blocking and block swaps
- ◆ Classification tracks by train or destination
- ◆ Interchanges
- ◆ "Return when empty"
- ◆ Off-layout load origins-destinations



Setting Up Your Railroad in the Program

- ◆ Illustrates typical features and functions
- ◆ Overview
 - Measure track lengths of spurs and industrial sidings (can be “fudged” by assuming all 50’ cars)
 - Enter cars on layout
 - Create Routes
 - Create Trains
 - Operate!
- ◆ Setup and Controls
 - Set the Gauge
 - Give your railroad a name
 - Choose East-West or North-South
 - Set your maximum train length
 - In scale feet to fit your shortest siding
 - As maximum moves in building train



Set Up Data

Frequent Operations

List Program Values

View Results of Session

Edit Car Types

Edit Train Descriptions

Set Car Rerouting Delay

Car, Engine File Options

Optional Settings

(Not Used)

Dispatcher's Panel

Drawing the Diagram

Printer Control

Printer Properties

Printing Options

Fast Clock

Set Fast Clock Time

Set Clock Multiplier

File Operations

Backup Data Files

Recover Data Files

Re-Link Files

Help on Backup / Recover

"One-Time" Settings

Set Gauge of Layout

Enter Name of Layout

Home Rd Reporting Mark

Set Train Direction

Set Maximum Train Length

Command Control System

Set Weight Units

Tons Per Ounce

Set Kernels/Train

Setting Up Locations and Cars

◆ Entering Locations

- Add towns and staging
- For each town, add the industry, yard, interchange and staging tracks
 - Each track must have a unique name — put number first
 - Enter siding length
 - Set the direction for trailing point moves or “Both Directions.”
 - Select the car types appropriate to the siding, often “all”
- Separate yard from other industries in town to avoid classifying to industries



◆ Entering Cars

- Cars must have unique Road / Number. If duplicates exist, add a letter to end of number.
- After cars are entered, use the “Relocate a Group of Cars” button to quickly place cars at locations



Setting up — RailOP Siding Entry Form

Adding New Siding
(Use Mouse or Tab Key to move around form)

Siding Type
 Yard Ind Svc Stg IntChg

Siding Name

Destination Site?

Road

Car Types

Siding Length

Trailing Points

Car Delay Frequency

Delay

When a car is assigned to a train, it cannot be touched by another train. Once it has left the train it may immediately become available to another train that you may build.

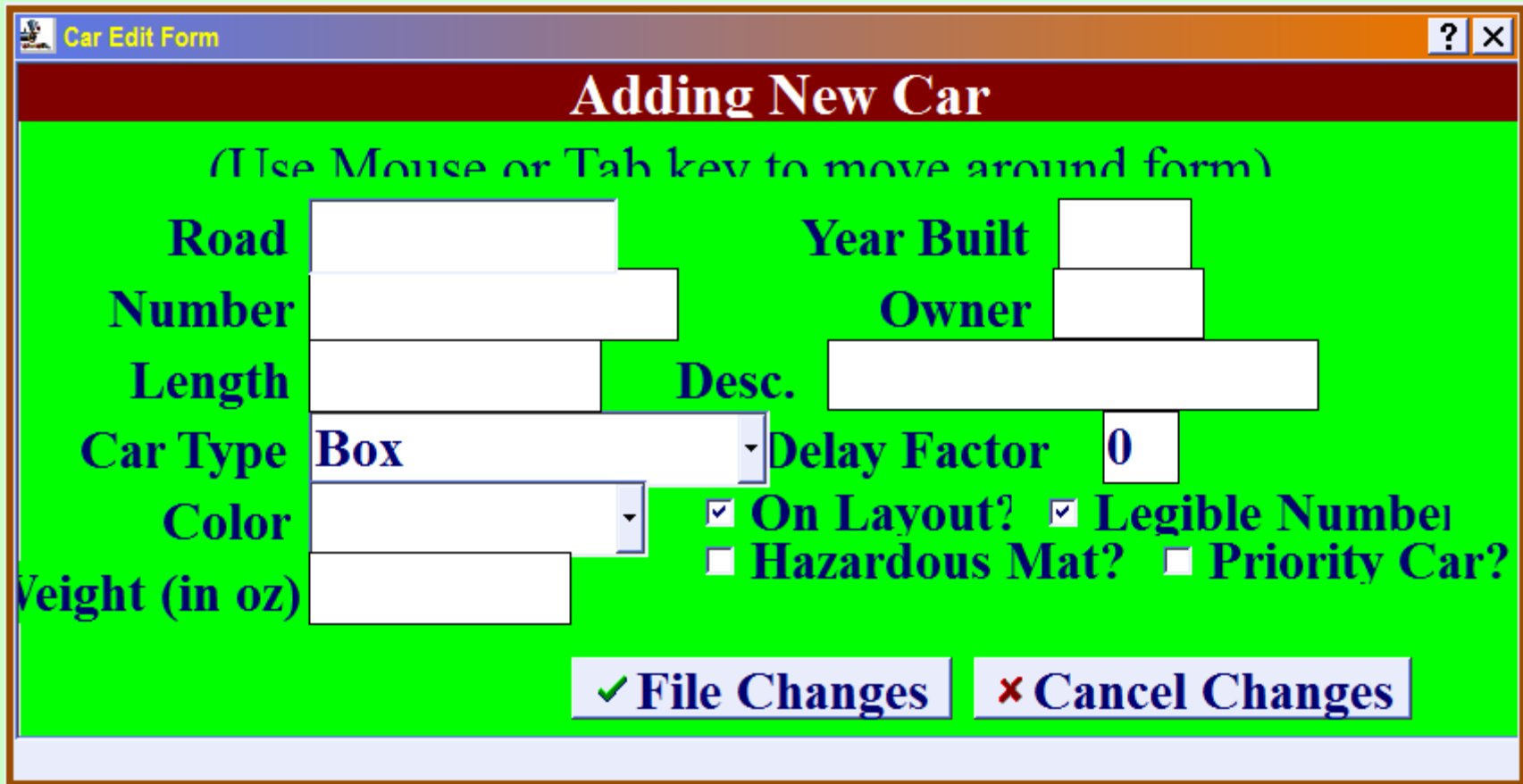
In order to prevent too frequent re-use of the same car, you may wish to set the Delay to some value higher than 0. The delay is decremented by 1 for all cars in file every time ANY train terminates. When it reaches 0, the car is again available to any new train to use.

Delay can be set to apply to all cars, to all cars set out at a specific siding, or only to a particular car. You can also set an individual siding or car to have NO delay factor, by entering a -1 (minus one).

Setting depends on specifics of your railroad.



Setting up — RailOP Car Entry Form



The screenshot shows a software window titled "Car Edit Form" with a dark red header bar containing the text "Adding New Car". Below the header, a green background contains the following fields and controls:

- Road Number**: A text input field.
- Year Built**: A text input field.
- Length**: A text input field.
- Owner**: A text input field.
- Desc.**: A text input field.
- Car Type**: A dropdown menu with "Box" selected.
- Delay Factor**: A text input field with the value "0".
- Color**: A dropdown menu.
- Weight (in oz)**: A text input field.
- On Layout?**: A checked checkbox.
- Legible Number**: A checked checkbox.
- Hazardous Mat?**: An unchecked checkbox.
- Priority Car?**: An unchecked checkbox.

At the bottom of the form are two buttons: "✓ File Changes" and "✗ Cancel Changes".



Setting up — RailOP Route Entry Form

City Name	Div Pt?	Max Moves	Max Loc Moves	Tm Dir	Sym Dir	Grade %	Engine Rating	Max Tm Length	Travel Time(Min)
Babel		7	0	L	L		1.00	493	1.00
New Rochelle		5	0	L	L		1.00	500	1.00
Bergen		6	0	L	L		1.00	500	1.00
New_Rochelle		5	0	L	L		1.00	500	1.00
Babel		7	0	N/A	N/A	N/A	N/A	N/A	N/A

City Name	Div Pt?	Max Moves	Max Loc Moves	Tm Dir	Sym Dir	Grade %	Engine Rating	Max Tm Length	Travel Time(Min)
Babel		7	0	L	L		1.00	500	1.00
Vienna		18	2	L	L		1.00	500	1.00
Babel		7	0	N/A	N/A	N/A	N/A	N/A	N/A



Setting Up Trains

◆ Creating Trains

- **Decide on a numbering scheme.**
- **Assign at least one train to each route. Each train has a unique number.**
- **Set the stops that will be switched**
- **Remove any car types that are not appropriate for the train**
- **Departure times can be used for timetable or sequence operations**
- **Train length can be limited by “Max Tonnage”**
- **“Max Moves in Route Cites” sets the amount of work you will have along the way**



Setting up — RailOP Train Entry Form

Adding New Train

(Use Mouse or Tab Key to move from field to field)

Number	<input type="text"/>		
Description	<input type="text" value="Through freight"/>		
Train Type	<input type="text" value="Freight"/>	Max Total TRAIN moves	<input type="text" value="40"/>
Road	<input type="text"/>	Max Tonnage	<input type="text" value="1750"/>
Route	<input type="text" value="B-R-B"/>	<input checked="" type="checkbox"/> Permanent	<input type="checkbox"/> Trailing Pts Only
Stops	<input type="text" value="(Click to Set Stops)"/>	<input checked="" type="checkbox"/> Use Kernels	<input type="checkbox"/> Stage from any track
Car Types	<input type="text" value="(Click for Car Types)"/>	<input type="checkbox"/> No Thru Cars allowed	<input type="checkbox"/> Equalize Length
Departure Time	<input type="text" value="12"/> Hrs <input type="text" value="0"/> Min	<input type="checkbox"/> Allow Engine Changes	<input type="checkbox"/> Keep Engines Assigned
		<input type="checkbox"/> Loop Train	<input type="checkbox"/> No InterCity Moves
		<input type="checkbox"/> Abbreviate Manifest	
		Groups	<input checked="" type="checkbox"/> All <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D

? Overview

✓ File Changes

✗ Cancel Changes

Building & Running Trains

- ◆ In the “Train” screen, double-click the train you want to build and choose “Autobuild”
 - Review the manifest to see if it is built the way you want
 - If it is acceptable, print it. Exit without printing to make changes.
 - Use the “Manually Build” button and add or remove cars
 - Use “Add/Remove Engines” if you wish
 - If you are running in real time, choose “Move Train”
 - If printing in advance, optionally choose “Run and Save Switchlist”
 - Print Manifests and Switchlists.
- ◆ When all the work is done, Terminate train.
- ◆ When all the trains have been run, perform a master reset.

Train 230		
Autobuild	Crew Instructions	
Manually Build	Move Train	
Add/Remove Engines	Run, Save SwitchLists	
Review Manifest	Run and Terminate	
Print Manifest	Reset Train	
Review Route	Sidings	Sched. Diagram



Train List

Train List, Sorted by Departure time

Settings	Road	Route	Depart	Number	Description	Status
f		MY-Babel	01:03	210	Run & save	
f		CJ-C-CJ	01:05	912	Run & save	
f		Marshal-Yard	01:08	216	Run & save	
f		EB-Marsh	01:09	215	Run & save	
f		SB-Vie-B	01:11	411	Run & save	
f		P-B	03:45	622	Through freight	



Customizing Train Orders

- ◆ Program has default format for operator instructions for running train
 - My experience is that default format is often confusing
 - I figured a “trick” to customize my “Operator Train Orders”
 - Don’t try to change the default — you’ll fail and get frustrated
 - Print default to PDF
 - Copy & paste to your customized “Operator Train Orders”



(My) Employee Timetable and Instructions

Local moves in Marshal:

Zeno Pair O'Doc WP	Box	1953	to 'Westmoreland
Mike Zass ICG	Box	467936	to Marv's Software
Marv's Software MASS	Box	10106	to 'Westmoreland

Setouts at Marshal Industries:

Zeno Pair O'Docks	ARE	57419	Box	Tuscan	
Mike Zass	PRR	357621	Gondola	Black	
Mike Zass	MR	2164	Box	White	McCloud River Railro
.Westmoreland (othe	ARE	405	Hopper	Yellow	
.Westmoreland (othe	SHPX	52102	Hopper	White	W.R.Grace
-Westmoreland (F&G)	GN	42953	Flat	Green	
'Westmoreland (Box)	SC	10108	Box	White	South Carolina State
Caboose Track	ARE	112	Caboose	Red	

Move from Marshal Industries to Marshal Yard (tracks 3-5):

Mike Zass	MNJ	120747	Box	Blue	Middletown & New Jer
Marv's Software	LIRR	1635	Box	Orange	Nedick's
Marv's Software	SOD	177850	Box	White	
-Westmoreland (F&G)	PRR	324096	Gondola	Tuscan	
-Westmoreland (F&G)	ARE	25423	Tank	Black	
'Westmoreland (Box)	NP	15827	Box	Brown	
'Westmoreland (Box)	SBVR	20465	Box	Yellow	
Caboose Track	SCL	183	Caboose		Spirit of 76

Yard Hostler: _____

Time & date: _____



Debugging — When Things Don't Work as Expected

- ◆ Optionally print (to paper or PDF)
 - Lists — cars, locomotives, locations, routes — sorted as you wish
 - Decisions during autobuild

<u>1 Box</u>	<u>BRX 5</u>	<u>at Zeno</u>	<u>11 Available</u>
Marshal Yard		61 Available	
		ADDED TO MANIFEST	
<u>2 Tank</u>	<u>PRFX 4534</u>	<u>at Mike Zass</u>	<u>112 Available</u>
Westmorland		155 Available	
		ADDED TO MANIFEST	
<u>4 Box</u>	<u>ARE 57417</u>	<u>at Babel Yard</u>	<u>612 Available</u>
Westmoreland (flat-gon-tank)		101 Available - Wrong car type	
Westmoreland (box)		0 Available - Not enough room on siding	
Zeno Pair O'Docks		11 Available - Not enough room on siding	
Mike Zass		0 Available - Not enough room on siding	
Marshal Yard		17 Available - Not enough room on siding	
Westmoreland (other)		111 Available - Wrong car type	
Marv's Software		10 Available - Not enough room on siding	

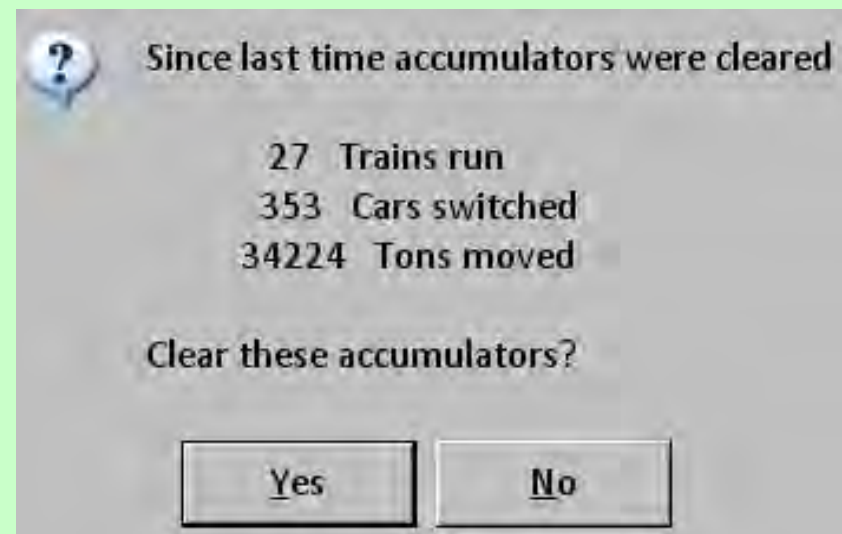
No usable destination found



After the Operating Session

- ◆ Reconcile where cars are actually located & where the program thinks they are*
 - Operators are not perfect; sometimes there isn't space
 - Using printed list of cars in all cities
 - Walk around with laptop
 - Search data by car number
 - Display list by location
- ◆ View Results of Session
 - Quick summary of what has occurred on the railroad *since the last Master Reset* – number of trains
 - For your information (and amusement) only
 - No effect on RailOP's operation

* I like to make program and layout agree, but some people believe that misplaced cars are part of being prototypical



Two Ways of Switching A Town

- ◆ We'll show two different ways of setting up to switch a town
- ◆ Both are used on the same layout for different towns
- ◆ You need to think a lot about how to specify your desires to the program



Example 1: Way Freight Switches Each Industry

- ◆ Train 313 leaves main yard with 5 cars on train
 - 6 moves (pick-up, drop-off, or transfer) allocated for 2 industries in Bergen (other towns not shown)
- ◆ Industries:

Siding	Length	In use	Free	Reserved
Truck terminal	297		243	54
Roy's Place	341	224	9	108

Town	Max moves	Max local moves
Main Yard	5	0
Bergen	6	1
...		
Main Yard	5	5

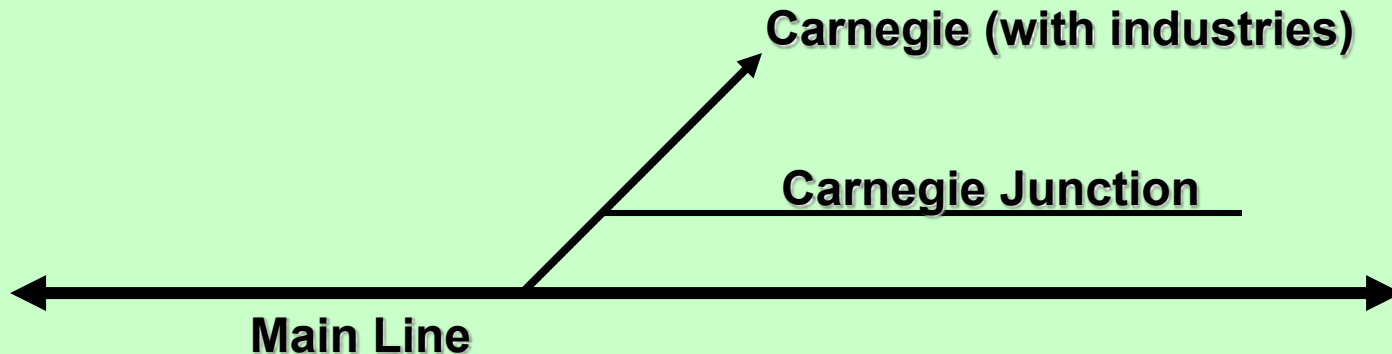


Example 2: Through Freight Services Exchange Track Only and Local Switches Town (1 of 2)

- ◆ Train 911 takes 7 cars from Babel (B) to Carnegie Junction (CJ), picks up cars from CJ, and terminates at Babel (B) with 7 cars

Route B-CJ-B

Town	Max moves	Max local moves
Babel	7	0
Carnegie Junction	16	1
Babel	7	0

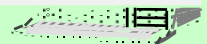


Example 2: Through Freight Services Exchange Track Only and Local Switches Town (2 of 2)

- ◆ Train 928 (local switcher or branch line train) picks up 7 cars at CJ, performs switching in Carnegie, and leaves 7 cars at CJ

Town	Max moves	Max local moves
Carnegie Junction	7	0
Carnegie	16	1
Carnegie Junction	7	0

Siding	Length	In use	Free
Tom's Iron & Steel	210	54	156
Oedipus Wrecks	254	196	68
Smith's Anvils	348	284	64
Dike Straw	370	206	164
Aacham's Razor	99	44	55
Carnot Cycles	140	132	8
Pipeline Processing	145	44	101



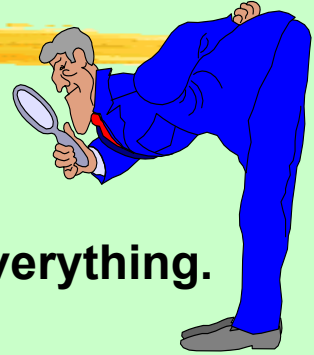
Challenges

- ◆ **The larger and more complex your layout, the more cars, car types, and industries you have, the more you're going to have to tune and tweak the system before you can get satisfying operating sessions**
 - **Too many/few cars – total or of particular type(s) or matched with industries**
 - **Working out meets, passing sidings, interchanges, local switchers, etc. will be experimental**
 - **Understanding how to use the program will also be experimental**
 - **Flexibility, skills, and learning curves for your crew will vary**
 - **Yard and staging capacity are limiting factors**
 - **No right or wrong; program offers tools**
- ◆ **Experience will probably lead to changes in data entry**
 - **Towns, yards, and industries (e.g., add junctions and branch lines)**
 - **Trains run (e.g., staging, congestion avoidance—on track or in aisle)**



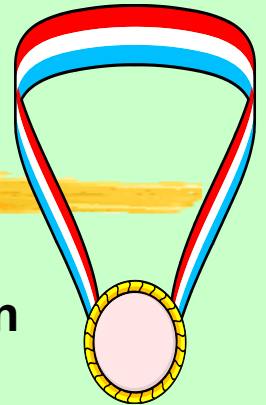
Selecting Switch List Generating Software

- ◆ **Be an intelligent consumer. Research before you buy!**
 - You don't want to discover after a lot of work that the program won't do what you want
 - Read the web page and reviews carefully. Don't believe everything.
- ◆ **Does the program have an on-line forum or news group?**
 - Read a year or two of the history
 - Every program will have "true believers"; discount their enthusiasm. Most people are polite. Problems may be understated.
 - Some key indicators: What is the general tone? Is the owner responsive? How quickly are problems fixed? Are users helpful?
- ◆ **Search on "<program name> problems" (and similar) to get opinions off the products' forum/news group**
- ◆ **Find people currently using the software**
 - Wrangle an invitation to an operating session if practical
 - Phone the owner. Most people will tell you their frank opinion.
 - Look for variety in the layouts supported. You may end up running your layout differently after learning the program.



Sources and References

- ◆ RailOP homepage <http://www.railop.com/> (program abandoned)
- ◆ Support Group for existing RailOP Users and those interested in the software <http://groups.yahoo.com/group/RailOp/>
- ◆ YouTube clinic — basics setting up operations and switchlist system, using RailOp (Last updated on Feb 24, 2019) :
https://www.youtube.com/playlist?list=PLEc1rqTnU7qsP4hoyM_Cff_VN6-RUZ8Js



JMRI-Operations

- ◆ **JMRI-Operations is free and popular** (Copyrighted © 1997 – 2019)
<http://jmri.sourceforge.net/help/en/package/jmri/jmrit/operations/Operations.shtml>
- ◆ **Getting started with JMRI Operations in 4 parts (video 2013)**
<https://www.youtube.com/watch?v=cFLg1OGZgUc>
- ◆ **What does JMTI-Operations do?**
http://jmri.org/manual/3-4_JMRI OPS UsersGuide/Ops_Start.shtml
- ◆ **Clinic, much like this one, using JMRI-Operations**
<http://dopsigmeet.tulsanmra.org/resources/OperateRRwithSwitchlistsforFree.pdf>
- ◆ **From RailOP to JMRI-Operations**
<https://drive.google.com/file/d/0B5wMO3fvfupldEtvWFEtX2tGTjA/view>
- ◆ **“JMRI Operations — Just Do It” presented by John Stewart at NMRA 2014 Cleveland National Convention (video)**
<https://www.nmra.org/clinics/jmri-operations-just-do-it-part-1>
<https://www.nmra.org/clinics/jmri-operations-just-do-it-part-2>
- ◆ **Much more available, just search!**

