Using Model Railroad Switch List Software

Marshall D. Abrams

Visit the Abrams Railroad Empire at http://home.comcast.net/~abrams_railroad/

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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
Clinic Overview

- Operation adds apparent purpose to the movement of cars and locomotives on a layout
  - Simulate a prototypical flow of traffic
  - The sense of apparent purpose adds an extra dimension to the experience, every bit as important as scenery or a sound system
- Older routing systems: car card and tab-on-car (not described or compared)
- This clinic focus on generating switch lists using a home computer
  - Examples from program I’m using now — RailOP [http://railop.com/](http://railop.com/)
- 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
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^*""
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

**** 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
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.
Understand Program Philosophy
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 author’s mind-set
  - Program limitation often difficult to find
  - May have to un-learn prior experience
  - Maybe no one has ever tried to do what you want

- Example: RailOP philosophy
  - Maximize random car movement within constraints
  - Not concerned with freight forwarding
  - Can generate trains in advance or in real time
  - Advanced version adds
    - Car movement sequences (a.k.a. virtual car cards)
    - Graphical Dispatcher Panel
Short List of RailOP Features

- RailOP builds 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 provide results at end of session
Setting up your railroad in RailOP (1/4)

- 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
Setting up

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

"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

File Operations
- Backup Data Files
- Recover Data Files
- Re-Link Files
  Help on Backup / Recover
Setting up your railroad in RailOP (2/4)

◆ 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 — Siding Entry Form

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

Sidings Type
- Yard
- Ind
- Svc
- Stg
- IntChg

Siding Name

Destination Site?

Road

Siding Length

99

Trailing Points
Both Directions

Car Types

Car Delay

Frequency

1

Exclude Car Roads
Include Car Roads

File Changes
Cancel Changes

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 — Car Entry Form

Adding New Car
(Use Mouse or Tab key to move around form)

- Road
- Year Built
- Number
- Owner
- Length
- Desc.
- Delay Factor
- Car Type
- On Layout?
- Box
- Legible Number
- Color
- Hazardous Mat?
- Weight (in oz)
- Priority Car?

File Changes  Cancel Changes
Setting up your railroad in RailOP (3/4)

- Generating Routes
  - Several trains can use a single route.
  - Trains can go through a town on a route without stopping
  - A route can be used for locals from yards
  - Adjust the “Max Train Length” to fit your railroad
  - Start with routes between staging and yard
  - Set “Max Local City Moves”
  - Set “Train Direction” for the route
### Setting up — Route Entry Form

<table>
<thead>
<tr>
<th>City Name</th>
<th>Div Pt?</th>
<th>Max Moves</th>
<th>Max Loc Moves</th>
<th>Trn Dir</th>
<th>Sym Dir</th>
<th>Grade %</th>
<th>Engine Rating</th>
<th>Max Trn Length</th>
<th>Travel Time (Min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Babel</td>
<td>7</td>
<td>0</td>
<td>L</td>
<td>L</td>
<td></td>
<td>1.00</td>
<td>493</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>New Rochelle</td>
<td>5</td>
<td>0</td>
<td>L</td>
<td>L</td>
<td></td>
<td>1.00</td>
<td>500</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Bergen</td>
<td>6</td>
<td>0</td>
<td>L</td>
<td>L</td>
<td></td>
<td>1.00</td>
<td>500</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>New_Rochelle</td>
<td>5</td>
<td>0</td>
<td>L</td>
<td>L</td>
<td></td>
<td>1.00</td>
<td>500</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Babel</td>
<td>7</td>
<td>0</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>City Name</th>
<th>Div Pt?</th>
<th>Max Moves</th>
<th>Max Loc Moves</th>
<th>Trn Dir</th>
<th>Sym Dir</th>
<th>Grade %</th>
<th>Engine Rating</th>
<th>Max Trn Length</th>
<th>Travel Time (Min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Babel</td>
<td>7</td>
<td>0</td>
<td>L</td>
<td>L</td>
<td></td>
<td>1.00</td>
<td>500</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Vienna</td>
<td>18</td>
<td>2</td>
<td>L</td>
<td>L</td>
<td></td>
<td>1.00</td>
<td>500</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Babel</td>
<td>7</td>
<td>0</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>
Setting up your railroad in RailOP (4/4)

◆ 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 — Train Entry Form

Adding New Train

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

- **Number**: 
- **Description**: Through freight
- **Train Type**: Freight
- **Road**: 
- **Route**: B-R-B
- **Stops**: (Click to Set Stops)
- **Car Types**: (Click for Car Types)
- **Departure Time**: 12 Hrs 0 Min

- **Max Total TRAIN moves**: 40
- **Max Tonnage**: 1750

- **Permanente**: ✔
- **Use Kernels**: ✔
- **No Thru Cars allowed**: 
- **Allow Engine Changes**: 
- **Loop Train**: 
- **Abbreviate Manifest**: ✔

- **Groups**: ✔ All ✔ A ✔ B ☐ C ☐ D

- **Overview**
- **File Changes**
- **Cancel Changes**
Building & Running Trains in RailOP

- 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 List

<table>
<thead>
<tr>
<th>Settings</th>
<th>Road</th>
<th>Route</th>
<th>Depart</th>
<th>Number</th>
<th>Description</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>f</td>
<td>MY-Babel</td>
<td></td>
<td>01:03</td>
<td>210</td>
<td>Run &amp; save</td>
<td></td>
</tr>
<tr>
<td>f</td>
<td>CJ-C-CJ</td>
<td></td>
<td>01:05</td>
<td>912</td>
<td>Run &amp; save</td>
<td></td>
</tr>
<tr>
<td>f</td>
<td>Marshal-Yard</td>
<td></td>
<td>01:08</td>
<td>216</td>
<td>Run &amp; save</td>
<td></td>
</tr>
<tr>
<td>f</td>
<td>EB-Marsh</td>
<td></td>
<td>01:09</td>
<td>215</td>
<td>Run &amp; save</td>
<td></td>
</tr>
<tr>
<td>f</td>
<td>SB-Vie-B</td>
<td></td>
<td>01:11</td>
<td>411</td>
<td>Run &amp; save</td>
<td></td>
</tr>
<tr>
<td>f</td>
<td>P-B</td>
<td></td>
<td>03:45</td>
<td>622</td>
<td>Through freight</td>
<td></td>
</tr>
</tbody>
</table>
## 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

<table>
<thead>
<tr>
<th>1 Box</th>
<th>BRX 5</th>
<th>at Zeno</th>
<th>11 Available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marshal Yard</td>
<td>61 Available</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ADDED TO MANIFEST</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2 Tank</th>
<th>PRFX 4534</th>
<th>at Mike Zass</th>
<th>112 Available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Westmorland</td>
<td>155 Available</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ADDED TO MANIFEST</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4 Box</th>
<th>ARE 57417</th>
<th>at Babel Yard</th>
<th>612 Available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Westmoreland (flat-gon-tank)</td>
<td>101 Available - Wrong car type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Westmoreland (box)</td>
<td>0 Available - Not enough room on siding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zeno Pair O'Docks</td>
<td>11 Available - Not enough room on siding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mike Zass</td>
<td>0 Available - Not enough room on siding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marshal Yard</td>
<td>17 Available - Not enough room on siding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Westmoreland (other)</td>
<td>111 Available - Wrong car type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marv's Software</td>
<td>10 Available - Not enough room on siding</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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 313 Switching Bergen

- 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:

<table>
<thead>
<tr>
<th>Siding</th>
<th>Length</th>
<th>In use</th>
<th>Free</th>
<th>Reserved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Truck terminal</td>
<td>297</td>
<td></td>
<td>243</td>
<td>54</td>
</tr>
<tr>
<td>Roy’s Place</td>
<td>341</td>
<td>224</td>
<td>9</td>
<td>108</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Town</th>
<th>Max moves</th>
<th>Max local moves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Yard</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Bergen</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Main Yard</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>
Example 2: Through Freight 911 and Local 928 Switching Carnegie (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

<table>
<thead>
<tr>
<th>Town</th>
<th>Max moves</th>
<th>Max local moves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Babel</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Carnegie Junction</td>
<td>16</td>
<td>1</td>
</tr>
<tr>
<td>Babel</td>
<td>7</td>
<td>0</td>
</tr>
</tbody>
</table>

Route B-CJ-B

Carnegie (with industries)

Carnegie Junction

Main Line
Example 2: Through Freight 911 and Local 928 Switching Carnegie (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

<table>
<thead>
<tr>
<th>Town</th>
<th>Max moves</th>
<th>Max local moves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carnegie Junction</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Carnegie</td>
<td>16</td>
<td>1</td>
</tr>
<tr>
<td>Carnegie Junction</td>
<td>7</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Siding</th>
<th>Length</th>
<th>In use</th>
<th>Free</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tom’s Iron &amp; Steel</td>
<td>210</td>
<td>54</td>
<td>156</td>
</tr>
<tr>
<td>Oedipus Wrecks</td>
<td>254</td>
<td>196</td>
<td>68</td>
</tr>
<tr>
<td>Smith’s Anvils</td>
<td>348</td>
<td>284</td>
<td>64</td>
</tr>
<tr>
<td>Dike Straw</td>
<td>370</td>
<td>206</td>
<td>164</td>
</tr>
<tr>
<td>Aacham’s Razor</td>
<td>99</td>
<td>44</td>
<td>55</td>
</tr>
<tr>
<td>Carnot Cycles</td>
<td>140</td>
<td>132</td>
<td>8</td>
</tr>
<tr>
<td>Pipeline Processing</td>
<td>145</td>
<td>44</td>
<td>101</td>
</tr>
</tbody>
</table>
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)
Sources and References

- Information from *Beginning RailOP Clinic* by Chris Atkins at http://cowcatcherdivision.com/Beginning_RailOp.doc incorporated, with thanks, in this presentation
- RailOP homepage http://www.railop.com/
- Support Group for existing RailOP Users and those interested in the software http://groups.yahoo.com/group/RailOp/

  - Recommended files
    - RailOP Setup Guide (in Other files)
    - Notes for Newbes by a Newbe (in Tips)
    - Review article about RailOP in the 'Ops Sig' newsletter, July 2001 (in Other files, somewhat dated)
## Products

- **Model Railway Software Compendium**
  [http://home.cogeco.ca/~trains/rrsoft.htm](http://home.cogeco.ca/~trains/rrsoft.htm)

### Waybill and Switchlist Generators

<table>
<thead>
<tr>
<th>Free</th>
<th>Commercial Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>JMRI Operations Module</td>
<td>Protrak, RailOp, MiniRail</td>
</tr>
<tr>
<td>Manifests, Waybills and Timetables</td>
<td>ShipIt and ShipIt CarCards Module</td>
</tr>
<tr>
<td>Automatic Waybill Generator</td>
<td>Interchange: Model Railroad Car Dispatch System</td>
</tr>
<tr>
<td>CarCards for Microsoft Access 2000</td>
<td>MiTrains Inventory and WayBills</td>
</tr>
<tr>
<td>Model Operations Processing System</td>
<td>Model RailRoad Manager (MRRM)</td>
</tr>
<tr>
<td>MRRS and Freight Handling Software</td>
<td>Quaker Valley WayBills</td>
</tr>
<tr>
<td>Programmable Traffic Generator</td>
<td>Railroad Management System</td>
</tr>
<tr>
<td>TSL Freight Manager</td>
<td>Decapod Systems offers CarRoute and PRR</td>
</tr>
</tbody>
</table>