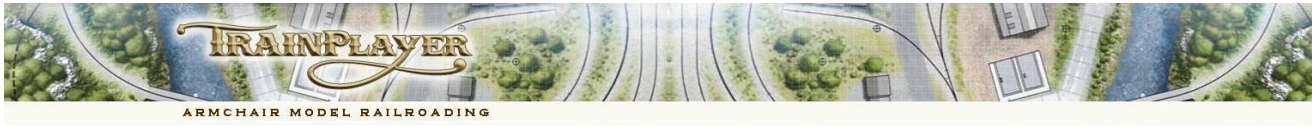

Advanced Ops User Guide

2nd Edition - Updated for TrainPlayer 7.1.

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* REQUIRES TRAINPLAYER 7.1

Advanced Ops (abbreviated to AO) is a sophisticated, customizable, easy-to-use system for conducting both freight and passenger train operations on our TrainPlayer simulated model railroads. The new AO system recognizes that all layouts have different needs regarding operations and incorporates the advantages of the Tag on Car, Card Waybill, Card Order and Computer Generated Switchlist methods of model railroad operation to provide a satisfying operating experience on layouts which may have many different design features. Incorporating these different modes of operation into a single system makes AO suitable for controlling individual car movements between staging and industries, running block trains to and from major industries, routing blocks of cars in fast freights to classification yards for subsequent breakdown and handling by local trains, and the routing of passenger trains from station to station by updating the "Tag on Car" label automatically each time the "Active Train" stops at an intermediate destination.

The system works on the assumption that industries dispatching their loads or returning their unloaded cars to staging will be regularly repeating these actions. Cars located at industries will require pulling and moving to Staging (often via an intermediate Classification Yard) and the industries will then need to receive new loads or replacement empty cars for loading.

The busiest industries will handle the most cars so the designer only has to ensure that he places his cars at the industries in the proportions that reflect the ratio of movement required. If industry A has one car at the start of the first switchlist, industry B has two cars and industry C has four cars; then C will generate four times the traffic of A, and twice the traffic of B.

Double click the Car Monitor button at any time to select and zoom to the Active Engine.

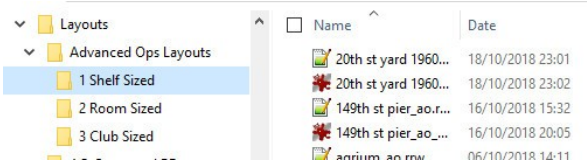
Your switching progress is monitored and the number of cars still to be spotted is displayed on the Train Control Bar. Any cars obstructing other movements can be moved aside temporarily, this will automatically switch on their labels to prompt the user to return the cars to their original spots.

You can save an Advanced Ops layout at any time to enable you to continue working from your current position in a later session. There is no need to constantly refer to the switchlist as all car destinations are shown on the car tops and as coded track labels on the layout plan. All that is needed is to move the cars which are displaying their labels to the tracks which are displaying identical labels. Only cars which need to be moved in the current session will display a label, once a car is correctly spotted its label will no longer be displayed.

Holders of a TrackLayer license have access to a full set of tools for designing their own Advanced Ops scenarios.

THE “READY TO RUN” ADVANCED OPS LAYOUTS

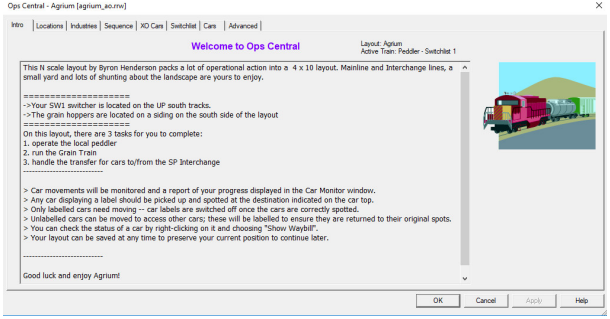
There are more than 240 “ready to run” Advanced Ops layouts from Bruno which are available for downloading by holders of a TrainPlayer 7.1 license. These can all be identified by the _ao filename suffix and they are all located in the Layouts\Advanced Ops Layouts\ folder structure. For convenience these layouts are divided into three subfolders based on the size of the layout.



A Shelf Sized layout would be a good place to learn the basic switching moves while dealing with a smaller more manageable number of cars. Room Sized plans will usually involve more trains operating in a predefined sequence, while Club Sized plans may demand some management skills which will often require cars to travel on more than one train to reach their assigned destinations.

OPS CENTRAL – THE AO USER INTERFACE

The User Interface is in a new modeless dialog called Ops Central (OC) this uses a series of tabbed pages to provide an Introduction to the layout and several spreadsheet type grids for editing the locations, industries, train sequences and car data; plus an Advanced page with the tools needed to help you to develop an Advanced Ops scenario for your own custom layouts.

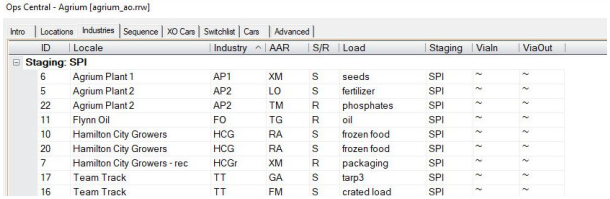


When you first load an AO enabled layout you will see an Introduction on the first page of Ops Central which explains the purpose of the layout and your switchlist will appear in the form of destination labels on the car tops.

If you wish you can also check out the Switchlist tab of Ops Central to see a complete summary of the current task.

By all means take a look at the data on the other tabbed pages but we would suggest this data should not be modified until you have studied the remainder of this document. This includes a full set of instructions for entering and editing the Ops Central grid data should you wish to apply Advanced Ops to your own custom layout.

THE INDUSTRIES TAB

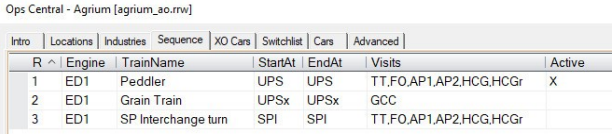


ID	Locale	Industry	AAR	S/R	Load	Staging	ViaIn	ViaOut
Staging: SPI								
6	Agrium Plant 1	AP1	XM	S	seeds	SPI	~	~
5	Agrium Plant 2	AP2	LO	S	fertilizer	SPI	~	~
22	Agrium Plant 2	AP2	TM	R	phosphates	SPI	~	~
11	Flynn Oil	FO	TG	R	oil	SPI	~	~
10	Hamilton City Growers	HCG	RA	S	frozen food	SPI	~	~
20	Hamilton City Growers	HCG	RA	S	frozen food	SPI	~	~
7	Hamilton City Growers - rec	HCGr	XM	R	packaging	SPI	~	~
17	Team Track	TT	GA	S	tarp3	SPI	~	~
16	Team Track	TT	FM	S	crated load	SPI	~	~

The Industries tab displays the data used for Waybill generation.

Each row shows the Locale (Industry Name), Track Label, Car Type, whether for Shipping or Receiving, Loadname, Final Staging destination (~ = any staging) and any ViaIn or ViaOut intermediate destinations used by the cars servicing the industry. (~ = no via dest).

THE SEQUENCE TAB

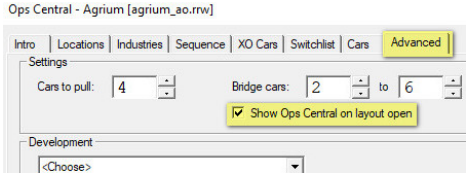


R	Engine	TrainName	StartAt	EndAt	Visits	Active
1	ED1	Peddler	UPS	UPS	TT,FO,AP1,AP2,HCG,HCGr	X
2	ED1	Grain Train	UPSx	UPSx	GCC	
3	ED1	SP Interchange turn	SPI	SPI	TT,FO,AP1,AP2,HCG,HCGr	

The Sequence tab contains a list of scheduled trains which simulate a day's work on the railroad.

Each row in the Sequence includes a Staging location supplying cars to the layout, a Staging location receiving cars pulled from the industries and a comma delimited list of all Industry or Yard locations authorized to be visited by the specified train. An individual car can't be forwarded to its next destination until a train which visits the car's current location is also scheduled to visit that same car destination.

THE ADVANCED TAB

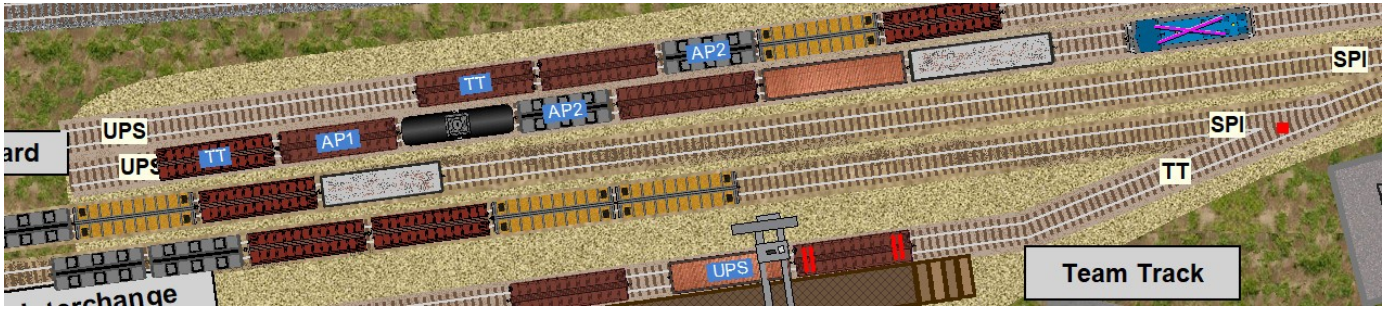


Once you are familiar with the design and purpose of a layout you may want to disable the display of the Introduction page every time the layout opens. You can do this by removing the tick from the checkbox on the Advanced Tab and then saving the layout.

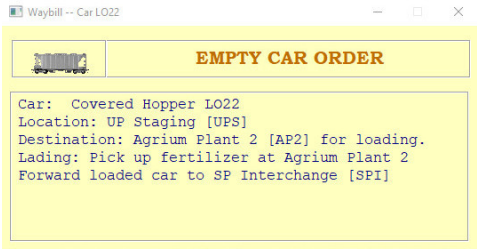
When you are ready to start working your switchlist click the OK button to close the Ops Central interface.

We will refer to the other OC tabs in detail when we discuss setting up a new Advanced Ops scenario.

You can reopen Ops Central at any time by clicking the OC button on your toolbar.
Alternatively you can use the menu option to View > Windows > Ops Central.



Once you have closed the OC Interface you will find the Engine for the "Active Train" already selected. All the cars which need to be moved to new locations will be displaying destination track labels. Each car should be delivered to the industry or yard with the matching track label. Unlabeled cars should only be moved when this is necessary to gain access to labeled cars.

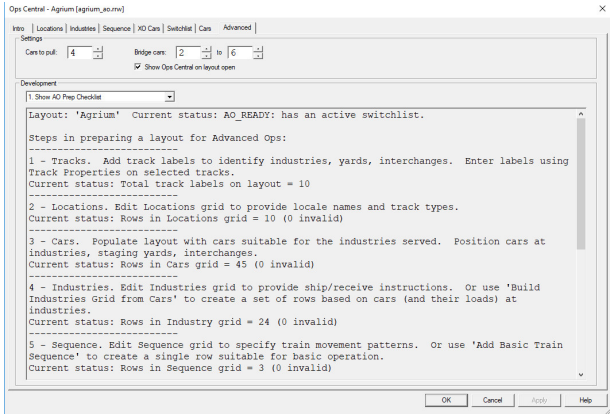


You can view the Waybill (or current Car Order) for any individual car (whether or not it is displaying a label) by selecting the car and clicking the waybill button on your toolbar. Or by choosing "Show Waybill" from the context menu.

The Waybill display is modeless and once it is open you can click on any other car on the layout to check its waybill and identify its next planned move.

You can also view all the outstanding tasks on your current switchlist for the "Active Train" by clicking the Ops Central button and selecting the Switchlist tab.

Your progress will be monitored and you will receive a reward when the task is completed. You will then be able to generate a new switchlist based on the current position of the cars. Cars spotted at the industries will still need to complete their assigned tasks on a later train and additional cars will be selected from staging to deliver incoming loads and service empty car orders.



The Ops Central Interface is a modeless dialog where the layout operator will find all his instructions and work orders. OC is also the Interface used by the layout designer to set up and test the ops data needed to generate the switchlists.

If you want to work with your own layout your job starts with designing your railroad commerce system, placing and labeling your industries, yards and staging tracks, then positioning the required car types at the industries and yards. Ops Central is then used to spell out the details of the required freight and train movements and test out the validity of your data.

Ops Central also includes tools to assist with the task of upgrading earlier style TrainPlayer Ops layouts to the new AO system.

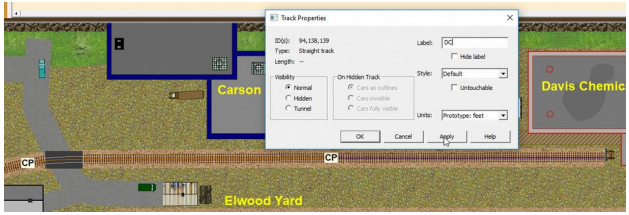
Once you have validated your data in the Ops Central grids with “Test Layout” you can Generate your first Switchlist and save your updated layout. A summary of the process can be found on the Advanced Tab using the “Show AO Prep Checklist” tool and a detailed set of instructions for each of these tasks can be found in the Step by Step Guide below.

When a car is selected to be pulled from an industry the industry ID is added to the end of a queue of industries awaiting cars. This simulates placing an order for an another incoming load, or for another empty car to be loaded with a new shipment. When the industry code reaches the front of the queue, an incoming car from staging is allocated to the task and information is taken from the Industries grid to generate a suitable waybill for the car. If no suitable car exists in staging to service the industry the car order is held over for a later session (the industry remains at the head of the queue awaiting traffic).

Theoretically there is no limit to the number of unique scenarios that AO can generate and no two operating sessions should ever be the same. With AO you can deliver a car from A to C via B using two trains neither of which is authorized to visit both the point of origin (A) and the final destination (C). The first train can move the car from A to B so that in a later session a different train can pick up the car at B and move it on to C.

Step by step guide to setting up your layout for Advanced Ops.

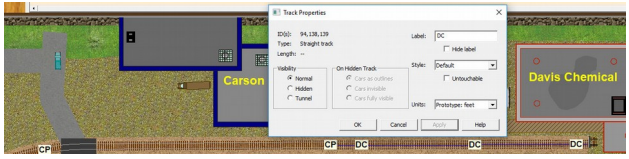
Step 1. TRACKS - Add Track Labels to the Industries, Yards and Staging (using the Track Properties dialog).



Use the track selection tool to highlight one or more tracks to represent a single location, then right click on any one of the highlighted tracks and select Properties from the Context Menu.

Add a simple two or three character alphabetic or alpha numeric code to the 'Label' field in the top right corner of the Track Properties dialog.

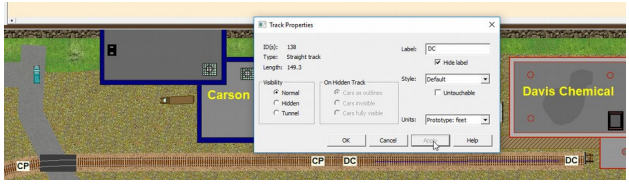
In the example image we have finished drawing and labeling our scenery. The CP tracks for Carson Printing have already been labeled and we have just highlighted the three tracks which will represent Davis Chemical.



The label you entered in the Track Properties dialog will be applied to all the highlighted tracks when you click on the Apply button.

Each track which forms part of the industry (or yard) must have the same code but it is acceptable to tick the “Hide label” box for some tracks to reduce the number of displayed track labels.

To hide the middle label we select only that middle track, then place a check mark in the “Hide Label” box and click Apply.

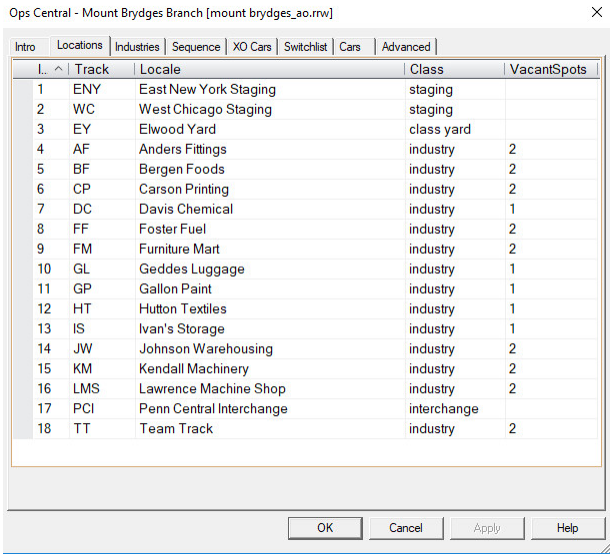


Repeat this same procedure for every industry, yard and staging area on your layout. Each code used should be short enough to also be displayed on the top of a car as a destination label. The code used for individual track labels can be any alphabetical, alpha numeric, or numeric alpha sequence of characters; but it cannot be solely numeric.

In the example only the two outer labels of the three DC tracks are now visible but the middle track still has the same DC label.

Step 2. LOCATIONS - Provide names and types for the labeled tracks.

Open Ops Central and select the Locations Tab to see a list of all Track Labels added to the layout in Step 1.



I..	Track	Locale	Class	VacantSpots
1	ENY	East New York Staging	staging	
2	WC	West Chicago Staging	staging	
3	EY	Elwood Yard	class yard	
4	AF	Anders Fittings	industry	2
5	BF	Bergen Foods	industry	2
6	CP	Carson Printing	industry	2
7	DC	Davis Chemical	industry	1
8	FF	Foster Fuel	industry	2
9	FM	Furniture Mart	industry	2
10	GL	Geddes Luggage	industry	1
11	GP	Gallon Paint	industry	1
12	HT	Hutton Textiles	industry	1
13	IS	Ivan's Storage	industry	1
14	JW	Johnson Warehousing	industry	2
15	KM	Kendall Machinery	industry	2
16	LMS	Lawrence Machine Shop	industry	2
17	PCI	Penn Central Interchange	interchange	
18	TT	Team Track	industry	2

To function properly a layout must have at least one Staging area and several industries. All car movements start and end in the Staging areas

Initially we recommend you start by using only the Staging and Industry classes until you are more familiar with the AO system.

LOCALE COLUMN You should edit this column to give meaningful names to all your industries, yards and staging. The names you provide will be used whenever a name is needed to match a specific track label; for example on the Industries tab or on a Waybill

If you are converting a TP Ops plan then AO will attempt to find a Locale name for each Track from any adjacent text labels. If a name can't be found then a duplicate of the Track Label will be used. There may often be occasions when this Locale name will need editing.

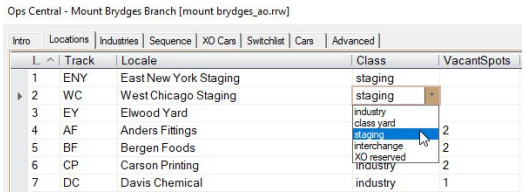
CLASS COLUMN Each Locale name must be assigned one of five possible classes (or track types); Staging, Industry, Class Yard, Interchange or XOreserved. Initially the Class Column will treat every Locale as an Industry so you will need to identify which of these Locales should be reclassified.

VACANTSPOTS The vacant spots value only applies to Track Labels which are defined as Industries. This will always default to a value of 1 and you will only need to change this in special circumstances. The default value of 1 assumes that when you placed your cars at the various industries you left sufficient space at the location to enable it to accept at least one more car. If you did not leave extra space for another car you will need to edit this VacantSpots value to 0.

Occasionally you may need to increase the VacantSpots value for some of your industries to 2 or more. This should only be necessary if the layout has fewer industries than the number of "Cars to pull" as shown on the Advanced Tab. This extra adjustment could also be needed if one of your Staging areas is defined as an Interchange.

Step 2. LOCATIONS continued:

<u>To modify the Class of any track label:</u> click in the Class cell, click again to display the drop down combo menu, then select the class of the track type you require.



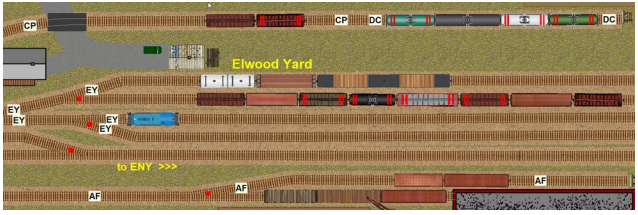
Interchanges can be substituted for Staging but the number of cars placed in an Interchange must not exceed the "Cars to Pull" value. This ensures the Interchange can't receive more outbound cars than it supplied to the Industries and avoids overloading the Interchange.

Additional Staging or Interchanges can be added to allow trains to run between the staging areas and generate Bridge traffic across the layout. Class Yards can be added for sorting cars or for use as Via destinations (see step 4 - Industries). XOreserved tracks for dedicated service traffic such as block trains and passenger trains are optional.

Step 3. CARS - Populate the layout with cars suitable for the industries.

The needs of the Industries generate the traffic flow for the layout. So the Switchlist Generator works on the assumption that industries dispatching their loads or returning their unloaded cars to Staging will be repeating these actions on a regular basis. The assumption is that all cars standing an industry will require pulling and moving on. After a car has been pulled then at some point that same industry will require a replacement load from Staging (or another empty car for loading).

The busiest industries will handle the most cars so the designer only has to ensure that he places his cars at the industries in the proportions that reflect the ratio of movement required. If industry A has one car at the start of the first switchlist, industry B has two cars and industry C has four cars; then C will generate four times the traffic of A, and twice the traffic of B.



Start by working through all your industries, placing appropriate car types for receiving and shipping the goods handled by the industry.

Once you have populated all your industries with cars you can place additional cars in your Classification Yards, and in the Staging and Interchange areas. Cars in Staging and Interchanges are considered to be elsewhere on the Railroad and available for inbound traffic.

In this example Elwood Yard (EY) is a Class Yard, the other labels are all Industries.

Don't forget to provide at least one engine.

Step 3. CARS continued:

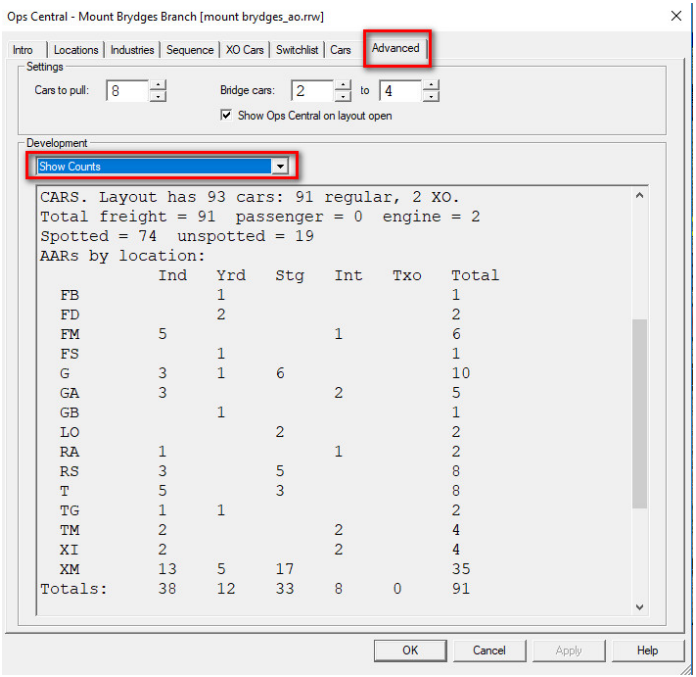
Cars at Industries will be allocated valid waybills or empty car orders when you generate the first switchlist (Step 8). You should only place cars at each industry of the AAR types that are appropriate for the anticipated traffic.

Cars in Staging should be a mix of the AAR types used by all your Industries, we would recommend the total number of cars for a Staging area should be around one and a half times the defined "Cars to pull" value but this is not a hard and fast rule. If the first train to visit a Staging area terminates there it is OK to place no cars because the tracks will be populated by cars from the inbound train.

Cars in Classification Yards are initially considered to be on the homeward leg of their journey. These cars will be pulled and returned to staging. On a layout with only one staging yard the number of cars should be kept low, but where a layout has several staging areas these cars will be shared evenly between them over a sequence of several trains.

Cars in Interchanges should be a mix of the same types used by your industries. The number of cars placed in an Interchange should not exceed the "Cars to pull" value.

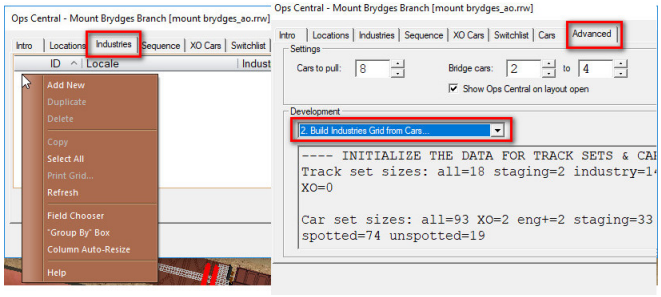
Cars on XOreserved tracks are considered to be Dedicated Service cars and must have the XO (Exclude Ops) flag set. These cars move under the "Card Order" system and don't reference the Waybill Database. XO cars are used for engines, block trains, passenger services etc. – See Step 6.



You may find the "Show Counts" Advanced Tab option useful to help you to identify the AAR types at your industries so you can select cars of the same types for your Staging and Interchanges.

Staging yards can also be thought of as Divisional Yards or as Interchanges with other railroads. An "on stage" yard with TrainPlayer scenery can also be defined as Staging if you wish.

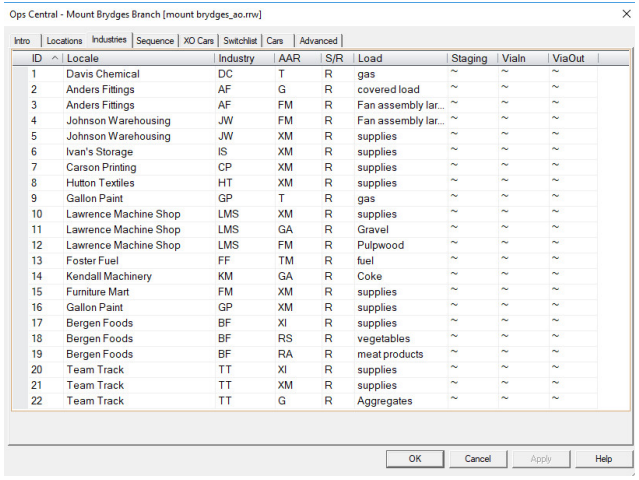
Step 4. INDUSTRIES - Set up and Edit the Industries Database Tab to provide Car Type and Shipment data for Waybill generation.



Open Ops Central and select the Industries Tab.

The first time you view the Industries Tab it is likely to be a blank page. This is where you will build a database to identify the car types used by each industry for receiving and shipping their goods.

Rows can be added to the database from the context menu. If you wish the whole database can be built up from scratch by inserting, typing, duplicating and editing the rows individually but we would suggest that you start by using Option 2 from the Development Tools on the Advanced Tab to "Build Industries Grid from Cars".



ID	Locale	Industry	AAR	S/R	Load	Staging	ViaIn	ViaOut
1	Davis Chemical	DC	T	R	gas	~	~	~
2	Anders Fittings	AF	G	R	covered load	~	~	~
3	Anders Fittings	AF	FM	R	Fan assembly lar...	~	~	~
4	Johnson Warehousing	JW	FM	R	Fan assembly lar...	~	~	~
5	Johnson Warehousing	JW	XM	R	supplies	~	~	~
6	Ivan's Storage	IS	XM	R	supplies	~	~	~
7	Carson Printing	CP	XM	R	supplies	~	~	~
8	Hutton Textiles	HT	XM	R	supplies	~	~	~
9	Gallon Paint	GP	T	R	gas	~	~	~
10	Lawrence Machine Shop	LMS	XM	R	supplies	~	~	~
11	Lawrence Machine Shop	LMS	GA	R	Gravel	~	~	~
12	Lawrence Machine Shop	LMS	FM	R	Pulpwood	~	~	~
13	Foster Fuel	FF	TM	R	fuel	~	~	~
14	Kendall Machinery	KM	GA	R	Coke	~	~	~
15	Furniture Mart	FM	XM	R	supplies	~	~	~
16	Gallon Paint	GP	XM	R	supplies	~	~	~
17	Bergen Foods	BF	XI	R	supplies	~	~	~
18	Bergen Foods	BF	RS	R	vegetables	~	~	~
19	Bergen Foods	BF	RA	R	meat products	~	~	~
20	Team Track	TT	XI	R	supplies	~	~	~
21	Team Track	TT	XM	R	supplies	~	~	~
22	Team Track	TT	G	R	Aggregates	~	~	~

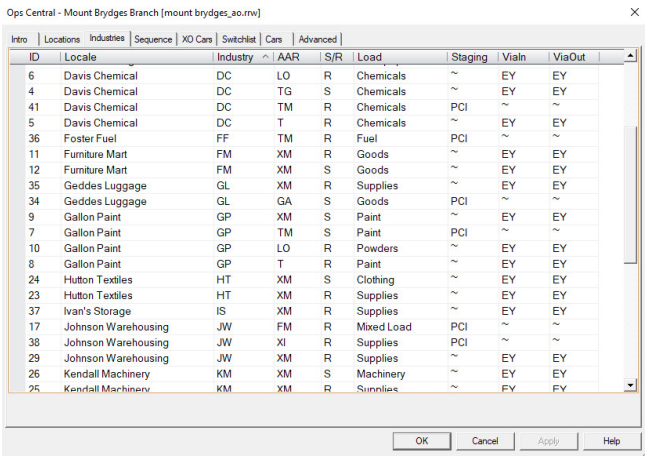
"Build Industries Grid from Cars" will populate the Industries Tab with a set of rows based on the cars you placed at the industries.

The Industries tab now contains one row for each Industry and AAR car type combination. This data has all been set up as though the car is delivering goods to the industry and is sufficient to operate the layout if you complete the remaining set up steps without further editing.

For a realistic operating experience we would recommend that you now edit this new data. The grid contains one row for each AAR car type placed at a particular industry, together with an R to signify that the Industry receives the specified load. You can change R to S to modify the instruction so that the industry uses the specified car type for shipping out the named load, and you can change the existing loadname to anything you wish so as to match your vision for this particular industry.

Right click in any cell to add a new blank row, duplicate a row for additional editing, or to delete any unwanted rows.

Step 4. INDUSTRIES continued:



ID	Locale	Industry	AAR	S/R	Load	Staging	ViaIn	ViaOut
6	Davis Chemical	DC	LO	R	Chemicals	~	EY	EY
4	Davis Chemical	DC	TG	S	Chemicals	~	EY	EY
41	Davis Chemical	DC	TM	R	Chemicals	PCI	~	~
5	Davis Chemical	DC	T	R	Chemicals	~	EY	EY
36	Foster Fuel	FF	TM	R	Fuel	PCI	~	~
11	Furniture Mart	FM	XM	R	Goods	~	EY	EY
12	Furniture Mart	FM	XM	S	Goods	~	EY	EY
35	Geddes Luggage	GL	XM	R	Supplies	~	EY	EY
34	Geddes Luggage	GL	GA	S	Goods	PCI	~	~
9	Gallon Paint	GP	XM	S	Paint	~	EY	EY
7	Gallon Paint	GP	TM	S	Paint	PCI	~	~
10	Gallon Paint	GP	LO	R	Powders	~	EY	EY
8	Gallon Paint	GP	T	R	Paint	~	EY	EY
24	Hutton Textiles	HT	XM	S	Clothing	~	EY	EY
23	Hutton Textiles	HT	XM	R	Supplies	~	EY	EY
37	Ivan's Storage	IS	XM	R	Supplies	~	EY	EY
17	Johnson Warehousing	JW	FM	R	Mixed Load	PCI	~	~
38	Johnson Warehousing	JW	XI	R	Supplies	PCI	~	~
29	Johnson Warehousing	JW	XM	R	Supplies	~	EY	EY
26	Kendall Machinery	KM	XM	S	Machinery	~	EY	EY
25	Kendall Machinery	KM	XM	R	Supplies	~	EY	EY

Editing the Industries grid ensures that it contains all the data needed to generate the Waybills for cars on your layout. You will likely need to add new rows (or duplicate and edit rows) so that industries can ship outbound goods as well as receive inbound supplies. Most of the loadnames will need to be changed to reflect the actual functions of the various industries on your layout.

Locale column is filled automatically to match the label in the Industry column and can't be edited except on the Locations tab.

Industry column must be a valid industry label from the layout.

AAR column can contain a two character code, in which case only the specified car type can be used to carry the load. If the AAR column is edited to show a single character AAR code then any available car with a matching first character can carry the load.

S/R column
S = industry ships the named load in this car type
R = industry receives the named load in this car type.

Load column Any loadname is acceptable for a closed car, open cars will also accept loadnames that are not in the TrainPlayer loads database. If a loadname is used on an open car for which no TrainPlayer load image exists then the load will be displayed as a tarpaulin covered load.

Staging column shows where the car starts and ends its journey. *Tilde (~) means that any staging area is valid.* **Cars terminating at an Interchange must use the actual code for the Interchange, the tilde (~) must not be used**.

ViaIn is an optional Class Yard where the inbound car is sorted. *Tilde (~) means the car travels direct to Industry with no Via yard.*

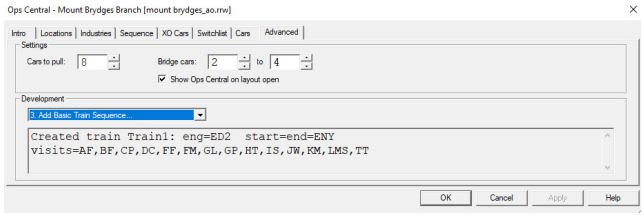
ViaOut is an optional Class Yard where the outbound car is sorted. *Tilde (~) means car travels direct to Staging with no Via yard.*

Notes: *A Via destination must be a Class Yard it cannot be Staging, Interchange or Industry.*

In the grid image (top left) the two Staging yards WC and ENY (shown as a tilde) don't ship direct between staging and Industries. Cars swap between hot shot and local train at the EY class yard.

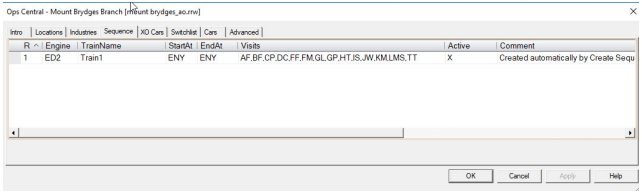
Traffic to and from the PCI Interchange travels direct to and from the industries and is handled separately by a local train from EY.

Step 5. SEQUENCE - Set up the Sequence Tab for the planned Train Movements



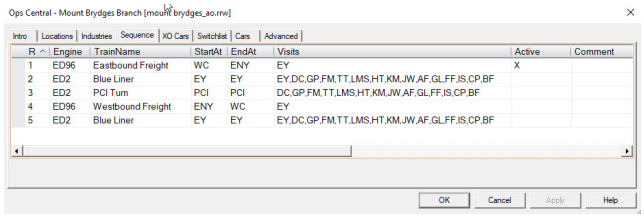
Open Ops Central and select the Sequence Tab.

The first time you view the Sequence Tab it is likely to be a blank page. You can generate an automatic sequence to provide data for one single train by changing to the Advanced Tab and using Option 3 from the Development Menu to “Add Basic Train Sequence”. Then return to the Sequence tab to view the train data.



The Basic Train Sequence includes an engine, a train name and one of your staging labels in both the StartAt and EndAt columns.

StartAt is the staging area supplying inbound cars to the layout and EndAt is the staging area receiving cars pulled from the industries. The Visits column will be a comma delimited list of all the industries on the layout. The Active Train is marked with an X.



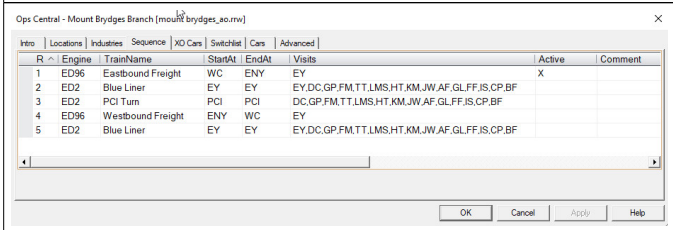
The Sequence Grid can be edited to include as many trains as you wish, right click in the grid to Add, Move, Delete or Duplicate then Edit a row. The Active column is “read only” and can’t be edited.

In the example on the left we have edited the basic grid to show a sequence of five trains. Row 1 will be the first train to run and the others will follow in sequence each time a Switchlist is generated. After the last train has run the sequence will start again at Row 1.

StartAt can be any track classification except for Industry. If it is Staging or Interchange it will supply all the inbound cars for the Industries. If StartAt is a Class Yard there will be no inbound cars, if it is XOreserved then only specified XO dedicated service cars can move onto the layout.

EndAt must not be an Industry. If it is Staging or Interchange cars with a matching destination will be pulled from the Industries. If it is a Class Yard only cars with a matching ViaOut code will be pulled from the Industries. If it is XO reserved only XO dedicated service cars with matching destinations can be moved from Industries.

Step 5. SEQUENCE continued:



1. The Eastbound Freight picks up any inbound cars for the Industries at WC Staging which are routed ViaIn through the EY Class Yard and also carries Bridge Traffic from WC through to ENY Staging. It sets down the inbound cars at EY for transfer and pulls any cars waiting at EY for transfer to ENY.

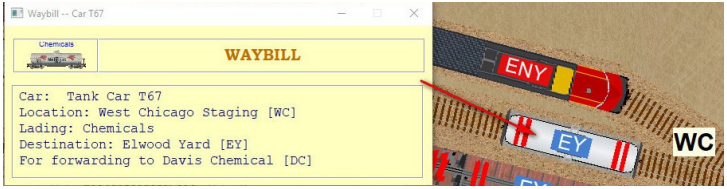
2. The Blue Liner delivers the cars which were set out at EY to the industries and pulls cars from the Industries to wait for an outbound connection in the EY Class Yard.

3. The PCI Turn operates out of the EY yard running light and exchanges cars directly between all the local Industries and the PCI Interchange.

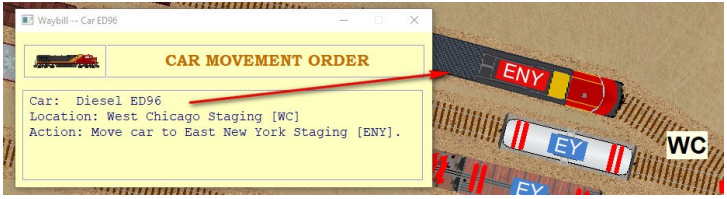
4. The Westbound Freight picks up inbound cars for the Industries at ENY Staging which are routed ViaIn through the EY Class Yard and also carries Bridge Traffic from ENY to WC Staging. It sets down the inbound cars at EY for transfer and pulls any cars waiting at EY for transfer to WC Staging.

5. The Blue Liner makes a second run to deliver cars which were set out at EY to the industries and pulls cars from the Industries to wait for an outbound connection at EY.

The Visits Column contains a comma delimited list of Industry, Class Yard and XO reserved locations which will be visited by the specified train. Only the cars standing at these locations which also have a destination matching the EndAt location will be highlighted for pulling by the specified train. Cars in the StartAt Staging location can only be selected for a train if their destination matches a location which is included on the Visits list.

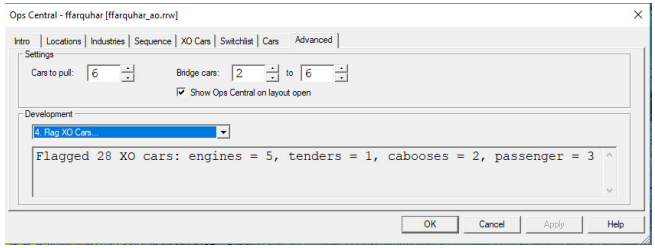


Standard Inbound Cars (blue labels) will only be selected if their current location matches the StartAt location and their destination is included in the Visits list (or the EndAt column). Outbound cars will only be selected to move if their current location is in the Visits column and their destination matches the EndAt location.



XO Dedicated Service cars (red labels) will only be selected if their current location and their next destination are both included in this Visits column (or in the StartAt and EndAt columns).

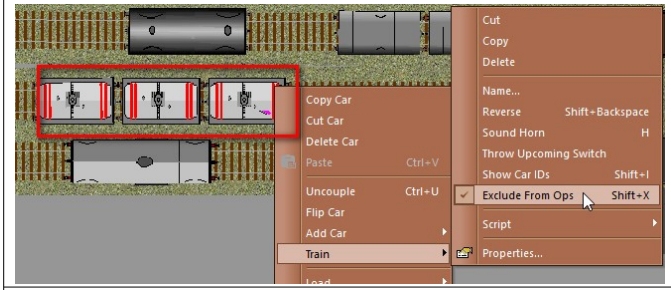
Step 6. XO CARS - Flag the Dedicated Service Cars and edit the XO cars grid.



Open Ops Central and select the Advanced Tab.

Select option 4 on the Development menu to “Flag XO Cars”.

This will automatically apply an XO (Excluded from Ops) flag to all engines, tenders, cabooses and passenger service cars on your layout. This flag prevents these cars from accessing the Industries database, instead of “Card Waybill” these cars will be controlled by the “Card Order” system using data from the XO cars tab.

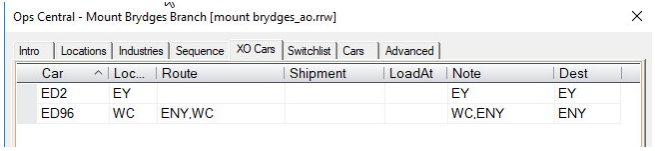


You may also need to control some freight cars independently of the Card Waybill system to run MOW cars, block trains, idler cars for loading a ferry, and routed cars that change destination during the progress of the switchlist.

To flag a single freight car for “Dedicated Service” right click on the car and select “Exclude from Ops” from the context menu.

To apply the flag to a cut of several cars, right click on the cut, highlight “Train” and select “Exclude from Ops” on the submenu.

Select the XOcars tab to set up route data.
Mount Brydges only has two engines, both flagged as XO.



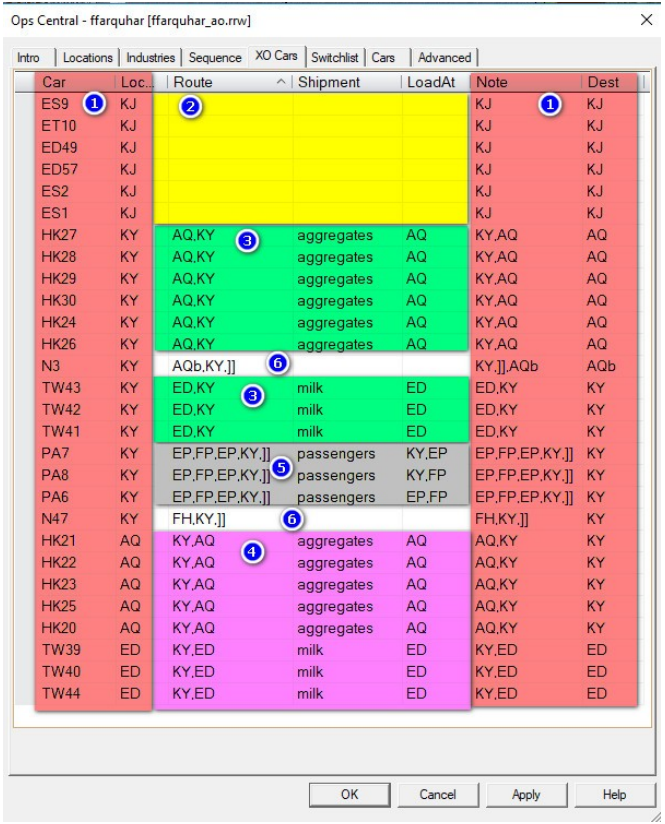
The XO cars grid has seven columns, most may be blank but the ID and current location of the cars will be shown in the first two columns, these two columns can’t be edited.

Note and Dest don’t need editing as they will be reset in Step 9 when we “Generate First Switchlist”. For these two cars we can also ignore Shipment and LoadAt which does not apply to engines.

ED2 at EY doesn’t need Route data as it will always be returned to EY when its task is done. The EY label will appear on the engine as soon as it is moved from EY to ensure it is returned after use.

ED96 does need a route to ensure it can be moved from WC to ENY by the first train, and moved back from ENY to WC when called up for the fourth train. XO car routes must always start with their first destination and end with their current location.

Step 6. XO CARS continued:



Car	Loc...	Route	Shipment	LoadAt	Note	Dest
ES9	KJ				KJ	KJ
ET10	KJ				KJ	KJ
ED49	KJ				KJ	KJ
ED57	KJ				KJ	KJ
ES2	KJ				KJ	KJ
ES1	KJ				KJ	KJ
HK27	KY	AQ,KY	aggregates	AQ	KY,AQ	AQ
HK28	KY	AQ,KY	aggregates	AQ	KY,AQ	AQ
HK29	KY	AQ,KY	aggregates	AQ	KY,AQ	AQ
HK30	KY	AQ,KY	aggregates	AQ	KY,AQ	AQ
HK24	KY	AQ,KY	aggregates	AQ	KY,AQ	AQ
HK26	KY	AQ,KY	aggregates	AQ	KY,AQ	AQ
N3	KY	AQb,KY,]]			KY,]],AQb	AQb
TW43	KY	ED,KY	milk	ED	ED,KY	KY
TW42	KY	ED,KY	milk	ED	ED,KY	KY
TW41	KY	ED,KY	milk	ED	ED,KY	KY
PA7	KY	EP,FP,EP,KY,]]	passengers	KY,EP	EP,FP,EP,KY,]]	KY
PA8	KY	EP,FP,EP,KY,]]	passengers	KY,FP	EP,FP,EP,KY,]]	KY
PA6	KY	EP,FP,EP,KY,]]	passengers	EP,FP	EP,FP,EP,KY,]]	KY
N47	KY	FH,KY,]]			FH,KY,]]	KY
HK21	AQ	KY,AQ	aggregates	AQ	AQ,KY	KY
HK22	AQ	KY,AQ	aggregates	AQ	AQ,KY	KY
HK23	AQ	KY,AQ	aggregates	AQ	AQ,KY	KY
HK25	AQ	KY,AQ	aggregates	AQ	AQ,KY	KY
HK20	AQ	KY,AQ	aggregates	AQ	AQ,KY	KY
TW39	ED	KY,ED	milk	ED	KY,ED	ED
TW40	ED	KY,ED	milk	ED	KY,ED	ED
TW44	ED	KY,ED	milk	ED	KY,ED	ED

<u>Editing the XO Cars Grid to set up your Dedicated Service Cars.</u>

1. The first two columns of the XO Cars grid are “Read Only” and can’t be edited. The last two columns are controlled by the AO operating system and should not be edited by the user as they will be adjusted automatically and differ from switchlist to switchlist.

2. If an Engine (and Tender) operates from and returns back to a fixed location each time it is used there is no need to enter any data here. If the engine operates from one location to another without returning until a later switchlist it will need a route allocating as shown for the ED96 engine on the previous page.

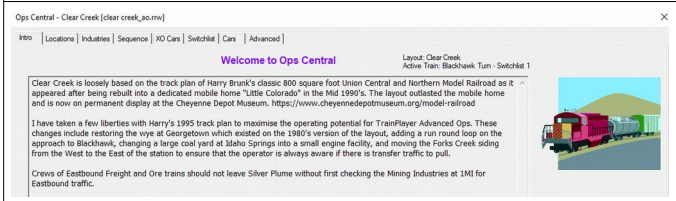
3 & 4. Cars (and blocks of cars) that shuttle between locations or have fixed routes via intermediate yards should be allocated a route which starts with their next destination and ends with their current location (as shown in the Location column).

These cars should be allocated a loadname in the Shipment column and the location(s) at which they are to be loaded should be placed in the LoadAt column. LoadAt can be a single location or a comma separated list of locations from the Route column. The XO car will display its load at these locations and will be unloaded at any other industry or XOreserved location listed in its route.

5 & 6. Routed cars which advance their routes automatically each time they stop should have the]] marker inserted into, or appended to, their route data after any stop at which they are intended to layover and wait to be added to a later train.

Note: All routes when first entered into the Route column must end with the track label for the current location of the car.

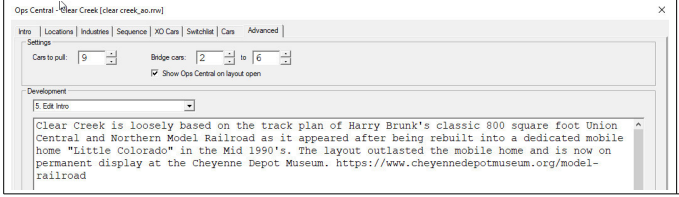
Step 7. DOCUMENTATION - Edit the Layout Introduction and Information page.



When you open an Advanced Ops layout you are greeted with a Welcome Screen which explains the background story behind the layout and provides any special instructions needed to operate it.

This welcome page is "Read Only" and can't be edited directly.

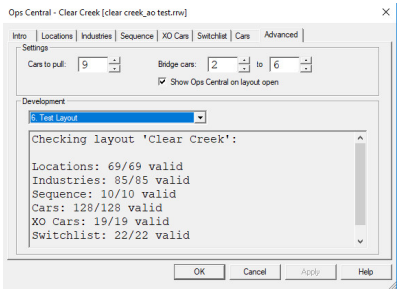
To create or edit this information go to the Advanced Tab and select Option 5 on the Development Menu to "Edit Intro"



Once you have finished editing your text just click OK to commit the information to the Welcome Screen on the Intro Tab.

Retain the check mark in the "Show Ops Central on layout open" box to ensure that the Welcome Screen is displayed each time the layout is opened.

Step 8. TEST LAYOUT - Use "Test Layout" to check for Data Errors in the Ops plan. Report on any missing or corrupt data.



Hint: The **FixOps** subroutine can now provide a more detailed set of instructions for fixing any identified grid data errors (See page 30).

"Test Layout" is Option 6 on the Development Menu of Ops Central.

Use this option to validate the data entered into the grids in Steps 2 to 7 above.

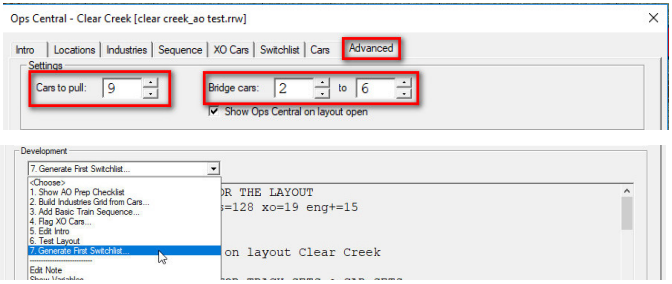
Any error messages reported by "Test Layout" should be investigated and fixed before moving on to Step 9 to "Generate First Switchlist".

Test Layout may also issue Warning messages to highlight other issues, these may not necessarily be errors. It is your decision whether or not a Warning message needs to be rectified, these issues will not prevent the layout from functioning.

The topic of errors and warnings from "Test Layout" will be covered in more detail in the Advanced section of this Guide.

If all is well with your data you will receive a clear report similar to the image on the left and you are ready to generate your first switchlist.

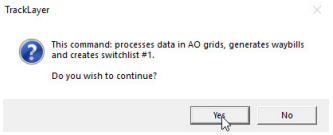
Step 9. GENERATE - Run 'Generate First Switchlist' to process the grid data and create switchlist #1.



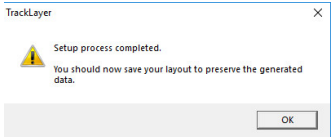
Open the Advanced Tab and adjust the Cars to Pull value to suit your vision for the Ops plan. The default value is 10 cars and signifies how many cars will be pulled from the industries and how many will be dispatched to the industries. The values will be randomized plus or minus one car for each switchlist generated.

You can also set the max and min values for Bridge Traffic, this only affects trains with different StartAt and EndAt locations.

Select "Generate First Switchlist" from the Development Menu.



Click "Yes" for a Switchlist.

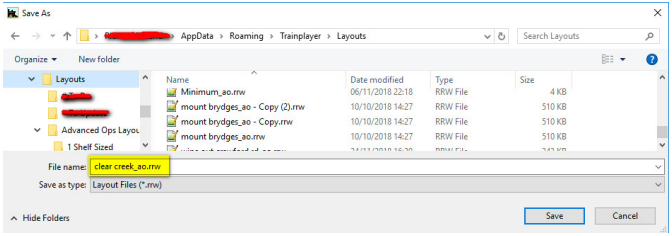


Click "OK" to Save the Layout.

The development window will be populated with information about the layout during the Switchlist Generation process but you needn't immediately concern yourself with this as we can read through the information after we have saved the layout.

When you click the "OK" button the "Save As" dialog is launched.

Step 10. SAVE - Save the layout.

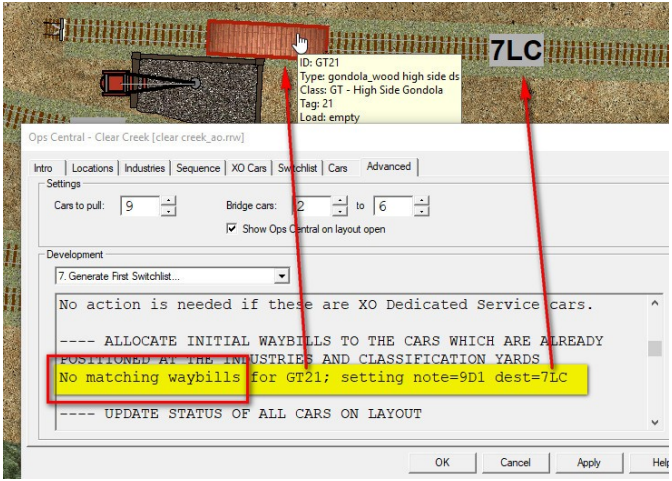


The "Save As" dialog will be launched automatically when you click the "OK" button in the previous step.

As this is now an Advanced Ops layout we recommend giving your chosen filename the **_ao** suffix but this is just a convention we have adopted to identify an AO layout, it is not essential.

On completing the Save your layout is ready to operate but we recommend you first take a look at the data displayed in the Advanced Tab that was produced by the Switchlist Generator.

Step 11. REVIEW - Examine the initial report produced by the Switchlist Generator



The report from the Switchlist Generator is a summary of the data used to control all the car movements on your layout.

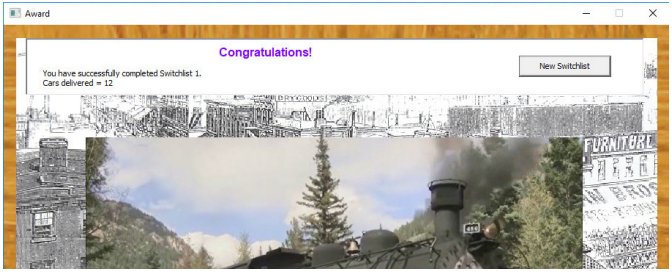
We recommend you read through this data and search for any messages relating to “No matching waybills” as shown in the example on the left. Hopefully there will be none.

This rather cryptic message is explaining that a GT Gondola has been placed at Industry 7LC but the AO system can’t allocate a waybill because the Industries grid doesn’t include the Waybill data to justify a GT Gondola at this location.

This will not prevent your layout from working but it is better to change the car for a type that is allowed by the Industries grid to be at this location, or to add an extra line to the grid to authorize the use of a GT Gondola at this industry.

After making the corrections you should go back to Step 9 and regenerate your first Switchlist.

Step 12. ENJOY - Deliver the cars and win the award!

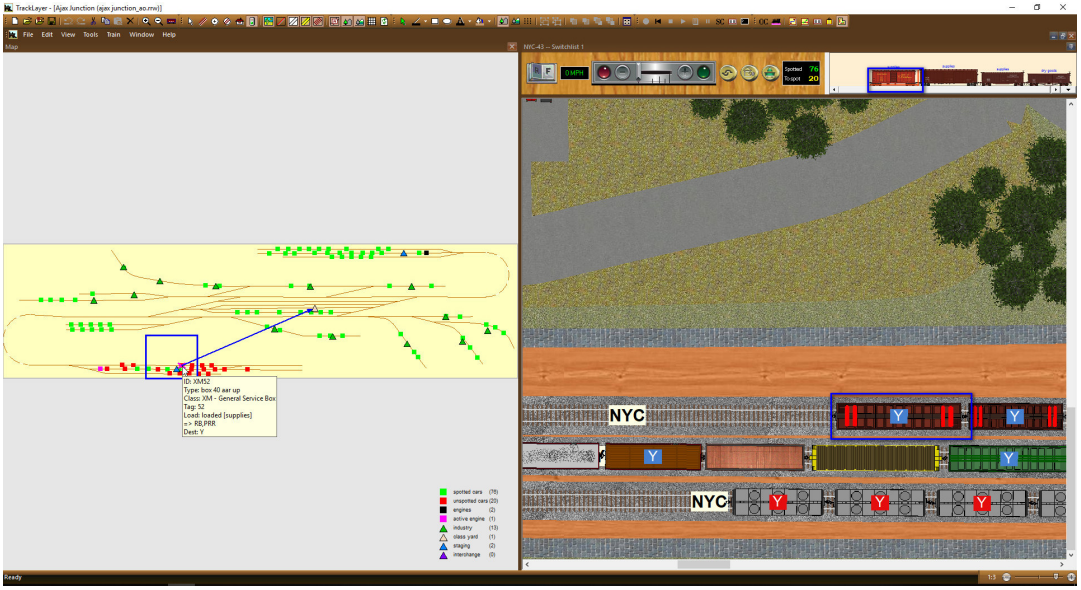


Your layout is ready to run Switchlist 1 with Advanced Ops. The full instructions for Working a Switchlist are included on Page 5 of this Guide so they are not repeated here.

Deliver your cars and win your award, click the button to generate a “New Switchlist” and keep your cars moving just like the real Railroad, then keep on going.

Save and quit at any time, then next time you reopen the layout you can pick up exactly where you left off.

INTRODUCING THE "MAP VIEW" WINDOW



Click the Map View button on the Advanced Ops toolbar to display a diagram of all the tracks and all the cars on your layout.

The first time you open the Map View it appears in a floating window which can be docked alongside the main top down display.

Cars are represented by squares, labeled tracks by triangles. A color coded key of the car types and AO track classes is provided

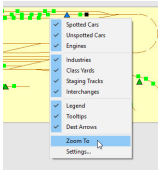
The blue rectangle represents the area currently displayed in the adjacent top down view.

To explore the layout just drag this rectangle to another part of the map to quickly change the area and location displayed in the adjacent view.

Hovering over any rectangle or triangle will display a tooltip.

Hovering over an unspotted car on the map will also display an arrow pointing to the location of the car's destination.

The selected car is highlighted on the map with a Magenta **X**.



Right click on the Map View to see a context menu which enables you to select which of the map objects you want to display.

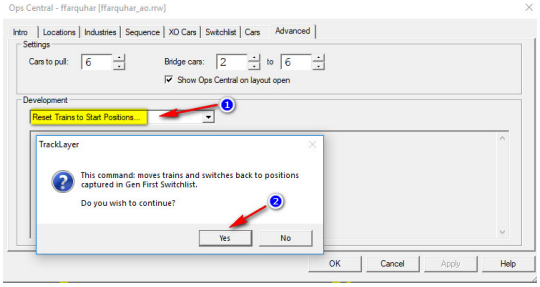
"Zoom To" immediately moves the blue rectangle to the current mouse position and adjusts the main view to cover the same area.

"Settings" is used to adjust the line thicknesses and the colors of the rectangle, arrow and map background.

Advanced Topics

RESETTING YOUR LAYOUT BACK TO THE FIRST SWITCHLIST

Each time you work with an AO layout you will be prompted to save the current situation at the end of every operating session. This enables you to continue working the switchlists from the saved position the next time you load the layout.



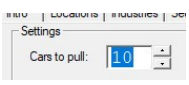
There may be times when you want to completely reset your layout back to the default Switchist 1 scenario, perhaps you just want to start over again, or maybe you want to adjust the track layout, change the mix of cars on the layout or adjust the data in one or more of the Ops Central data grids.

To reset the layout go to Advanced Tab Development Menu and select "**Reset Trains to Start Positions**", then click "Yes" to confirm. Don't forget to Save the layout before closing it.

Once the trains have been reset you can make changes to your tracks, cars and/or grids (Steps 1 to 8 above) and then use the **"Generate First Switchlist"** option (Steps 9 and 10) to produce a new revised first switchlist which incorporates all your changes.

TWEAKING THE "CARS TO PULL" VALUE

Cars to Pull on the Advanced Tab is set to a default of 10 cars.



This denotes the number of cars to be pulled from and delivered to the industries in each session (plus or minus one car.)

Cars are pulled if the train EndAt = Staging or Interchange.
Cars are delivered if the train StartAt = Staging or Interchange.

On a small layout with only a few industries you may need to modify this value to a figure less than or equal to the number of industries. Alternatively you could increase the number of Vacant Spots at the Industries on the Locations tab.

Where the Sequence includes individual trains which deliver cars to more than one Class Yard for transfer onto local trains the number of inbound and outbound cars is multiplied by the number of Class Yards used as Via destinations.

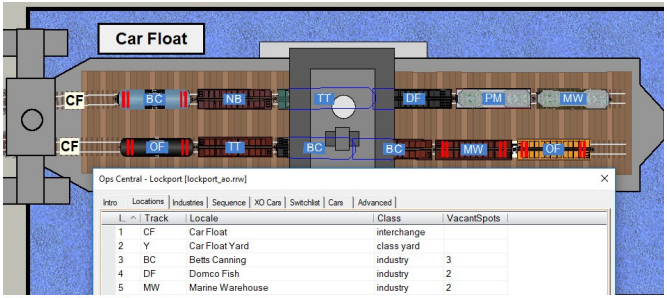
This can result in very long trains unless you reduce the Cars to Pull value a little to counter this effect.

Modifying this value should change the number of cars to move by around twice as much as the increase or decrease.

Changes you make to the **Cars to Pull** value will not take effect until the next switchlist is generated.

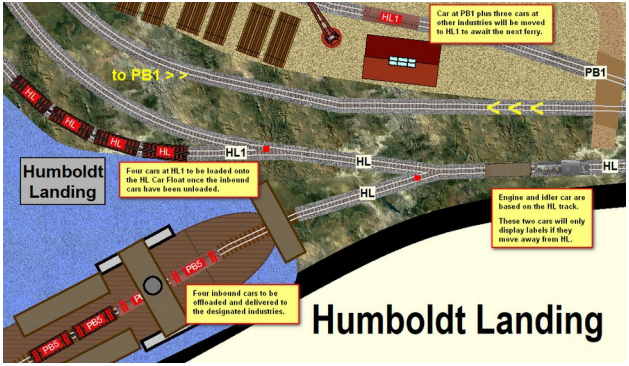
MANAGING CAR FLOATS & INTERCHANGES

The Car Float on the Lockport layout



Lockport only supports eight industries yet the Car Float delivers 12 cars, so extra vacant spots are essential.

The Car Float at Humboldt Landing on the Pelican Bay layout



When a train collects its inbound cars from an Interchange AO attempts to find a destination for <u>all</u> the incoming cars. This is based on the theory that all cars left in an Interchange will be heading for industries on the layout.

It is recommended that the initial number of cars placed at an Interchange does not exceed the "Cars to pull" value.

To increase the chance of finding enough vacant spots for the inbound cars, we recommend that the industries include some extra free space and that this is shown in the Locations tab as additional Vacant Spots.

When the Interchange is a Car Float it is also important that the number of outbound cars to be pulled from the Industries does not exceed the capacity of the float. This requires some extra care in the setting up process.

If the inbound cars are from a Car Float the "Cars to pull" value must **exactly match** the capacity of the Car Float to ensure that the correct number of cars are pulled in every round.

<u>Pelican Bay</u> uses a different approach based on the Card Order system. Here the car float delivers four XO cars in each round.

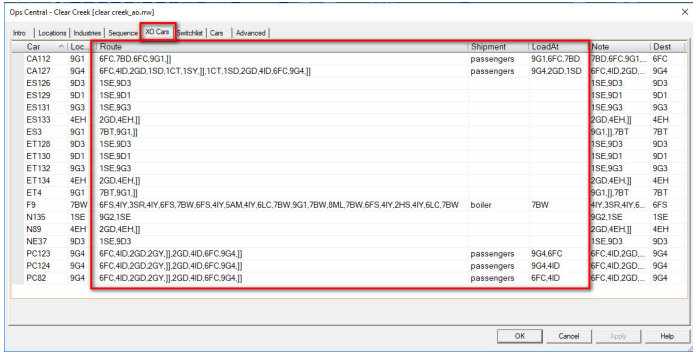
A total of 12 XO Dedicated Service cars are needed to operate this car ferry, these are split into three blocks of four cars and the routes are set up in the XO cars grid as follows:

4 cars at HL (on the ferry). Route = IndID,HL1,HL
4 cars at various industries. Route = HL1,HL,IndID
4 cars at HL1 waiting to board ferry. Route = HL,IndID,HL1

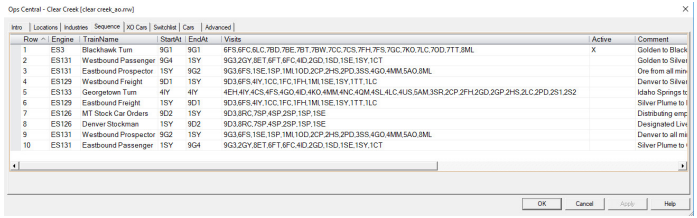
Note: HL and HL1 are both classified as XO reserved tracks.

XOCARS TAB - SETTING UP INDIVIDUAL ROUTES FOR XO CARS

We saw in Step 6 (Pages 15 and 16) that we only need to edit the Route, Shipment and LoadAt columns in the XOcars grid.



The route for an XO car will always end with the current position of the car to ensure it is back in place to repeat its journey when the Sequence restarts after the last train has run.



Engines which operate out of fixed locations (sheds or yards) require no route, shipment or loadat data if they always finish a switchlist task in the same location they started from.

Idler/Spacer cars which operate from fixed locations require no route or loadat data but can be given a shipment name of "mt".

Engines whose trains terminate in different yard or staging area require a route. ES129 at 9D1 has route 1SE,9D1, it travels to 1SE with Train 4 and returns to 9D1 with Train 6.

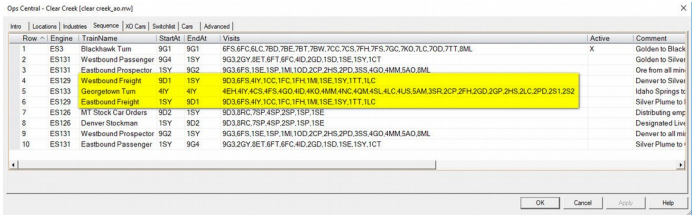
Engines allocated to Turns can be optionally given a route to help with navigation. ES3 at 9G1 has the route 7BT,9G1,]] The 7BT ensures the engine is turned at Blackhawk turntable before returning to 9G1. The]] suffix ensures the route automatically advances at each designated spot and that it doesn't stop doing so until the train reaches the location that precedes the]] marker. ES3 operates Train 1.

Roving Cars such as F9 at 7BW are in dedicated service to a particular industry. This car has a route which delivers to many industries. 6FS,4IY,3SR,4IY,6FS,7BW,6FS,4IY,5AM,4IY,6LC,7BW,9G1,7BW,8ML,7BW, 6FS,4IY,2HS,4IY,6LC,7BW the car keeps returning to 7BW (Blackhawk Boiler Works) for a new load. This car requires a loadname in the Shipment column and 7BW in the LoadAt column to show where it should be loaded. By only using one car for 7BW we restrict its output.

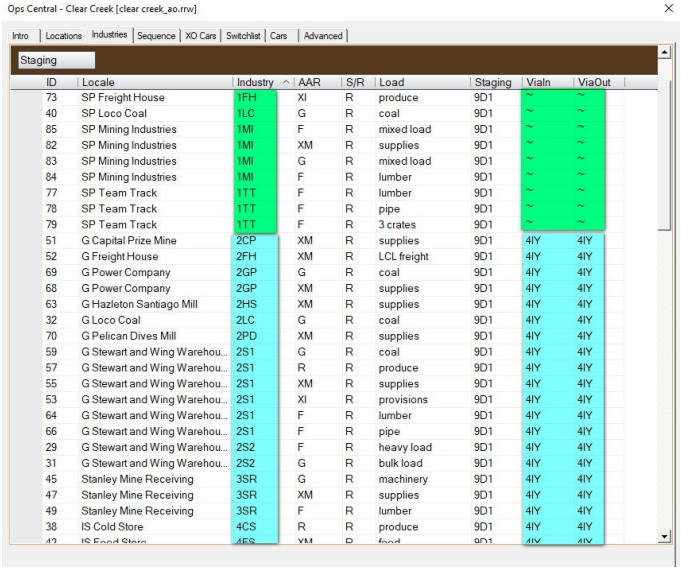
Block Trains (none at Clear Creek) usually use two blocks of cars each operating in opposing directions. So Ffarqhuar has two cuts of hoppers to work the quarry. The cut standing in the quarry (AQ) all have the route KY,AQ, and the cut in staging has AQ,KY. Both cuts have a Shipment of Aggregates and both have LoadAt set to AQ (the quarry).

Routed Passenger Cars have a route through a string of XO reserved stations. PC123 at 9G4 has a route which involves a layover at 2GY; Route=6FC,4ID,2GD,2GY,]],2GD,4ID,6FC,9G4,]] The car will travel on train 2 which starts at 9G4, the]] marker tells the program to advance the route at each stop, and to stop advancing it after spotting the car at 2GY. This car will then layover at 2GY until it is picked up by Train 9 to work the return route to 9G4 (where it will layover until train 2 runs again). The Shipment name is Passengers and the LoadAt is 9G4,6FC. At other stops this car will be unloaded and different cars loaded.

The Sequence grid for Clear Creek



Part of the Industries Grid for Clear Creek



Example: The Clear Creek Freight Operations

To explain the routing system at Clear Creek we will focus on the Westbound Freight which operates from 9D1 in Denver. The Georgetown Turn which operates from 4IY in Idaho Springs and the Eastbound Freight which operates from 1SY in Silver Plume back to 9D1 in Denver.

The Sequence data for the Westbound Freight (Train 4) shows that the inbound cars StartAt 9D1 and there are no outgoing cars because 1SY is a Class Yard (not Staging). The train is authorized to visit all the industries at Silver Plume (1) but not the industries at the intermediate locations (2, 3, 4 and 5). It is however authorised to visit the Class Yard at Idaho Springs (4IY) so we need to arrange our Industries grid to route all the cars for the 2, 3, 4 and 5 located industries via the 4IY Class Yard so that they can be set out to be distributed by the Georgetown Turn (Train 5), a local train operating out of Idaho Springs.

The Industries grid shows that all the Silver Plume (1) industries to be serviced by the Westbound Freight have a Tilde in the ViaIn and ViaOut columns so the cars can travel direct from 9D1 to the industries. The cars for Georgetown and Idaho Springs (Locations 2, 3, 4 and 5) all have the 4IY Class Yard listed as a via destination for both inbound and outbound traffic.

This enables the Westbound Freight (Train 4) to move the cars to 4IY to await the Georgetown Turn (Train 5). This train visits all these industries and will distribute the cars. It will also pull Denver (9D1) bound cars back to 4IY for picking up by the Eastbound Freight (Train 6) as it passes 4IY heading for Denver.

SEQUENCE TAB - EXAMPLES OF TRAIN ROUTING

Codes required in Sequence Grid (Substitute your own custom codes)	**Details of how the train configuration will operate**
Train Name = A Train **StartAt = SY1** (Must be Staging) **EndAt = SY2** (Must be Staging) **Visits = CY1,IN1,IN2,IN3,IN4,IN5,IN6,IN7,IN8,IN9** > Layout must have more than one Staging Yard and at least one Class Yard. > Visits list can contain any track type except Staging or Interchange. > CY1 (Class Yard) can appear in any position in the Visits list. > Engine requires a route SY2,SY1 as it terminates in a different location. > To return the engine to SY1 operate a similar train in the other direction.	**Runs from SY1 to SY2 in a single direction only.** > Train cannot be returned to SY1 in this switchlist cycle. > SY1 will supply inbound cars for the listed industries. > SY2 will receive the outbound cars pulled from the listed Industries. > Train will also service CY1 for both inbound and outbound traffic. > Train will also carry Bridge Traffic from SY1 to SY2. > Cars routed on the Industries tab ViaIn and ViaOut CY1 yard will be moved. > XO cars will be moved if their current spot and destination are both listed.
Train Name = B Train **StartAt = SY1** (Must be Staging) **EndAt = SY2** (Must be Staging) **Visits = IN1,IN2,IN3,IN4,IN5,IN6,IN7,IN8,IN9** > Layout must have more than one Staging Yard. > Visits list must not contain Staging, Interchange or Class Yard codes. > Engine requires a route SY2,SY1 as it terminates in a different location.	**Runs from SY1 to SY2 in a single direction only.** > Train cannot be returned to SY1 in this switchlist cycle. > SY1 will supply inbound cars for the listed industries. > SY2 will receive the outbound cars pulled from the listed Industries. > Train will not service any Classification Yards (if there are any). > Train will also carry Bridge Traffic from SY1 to SY2. > Cars routed via a Class Yard on the Industries tab will not be selected. > XO cars will be moved if their current spot and destination are both listed.
Train Name = C Train **StartAt = SY1** (Must be Staging or Interchange) **EndAt = SY1** (Must be Staging or Interchange) **Visits = CY1,IN1,IN2,IN3,IN4,IN5,IN6,IN7,IN8,IN9** > Layout must have one or more staging yards and at least one Class Yard. > Visits list can contain any track type except Staging or Interchange.	**Operates as a Turn from SY1 to CY1 returning to SY1.** **Or operates as a Turn CY1 to SY1 returning to CY1.** > SY1 will supply inbound cars for the listed industries. > SY1 will also receive outbound cars pulled from the listed industries. > Train will also service CY1 for both inbound and outbound traffic. > There will be no Bridge Traffic. > XO cars will be moved if their current spot and destination are both listed.
Train Name = D Train **StartAt = SY1** (Must be Staging or Interchange) **EndAt = SY1** (Must be Staging or Interchange) **Visits = IN1,IN2,IN3,IN4,IN5,IN6,IN7,IN8,IN9** > Layout must have one or more staging yards (this train type uses only one). > Visits list must not contain Staging, Interchange or Class Yard codes.	**Operates as a Turn from SY1 to the listed industries returning to SY1.** **Or can operate as a Turn from an industry to SY1 returning to the industry.** > SY1 will supply inbound cars for the listed industries. > SY1 will also receive outbound cars pulled from the listed industries. > Train will not service any Classification Yards (if there are any). > There will be no Bridge Traffic. > XO cars will be moved if their current spot and destination are both listed.

Table continues >>

SEQUENCE TAB - EXAMPLES OF TRAIN ROUTING continued:

Codes required in Sequence Grid (Substitute your own custom codes)	**Details of how the train configuration will operate**
Train Name = E Train **StartAt = SY1** (Must be Staging) **EndAt = SY2** (Must be Staging) **Visits = CY1** (Must be a Class Yard) > Layout must have more than one Staging Yard and at least one Class Yard. > Visits list can only contain one or more Class Yards (no industries). > There should be no industries included in the visits list. > If (Class_Yards > 1) cars to pull becomes (Cars_to_pull times No_of_yards). > Engine requires a route SY2,SY1 as it terminates in a different location. Requires a later local train to distribute the cars from CY1 yard – see 'I-Train'.	**Operates as a through train from SY1 to SY2 in a single direction only.** > Trains run through as Hot Shots, stopping only to service the Class Yard(s). > Train cannot be returned to SY1 in this switchlist cycle. > Train will not service any Industries. > Train calls at CY1 to set down cars from SY1 and pick up cars for SY2. > SY1 will supply inbound cars only if routed ViaIn CY1 in the Industries tab. > SY2 will receive cars from CY1 only if routed ViaOut CY1 in the Industries tab. > Cars that are not routed ViaIn CY1 in the Industries tab will not be selected. > Train will also carry Bridge Traffic from SY1 to SY2. > XO cars will be moved if their current spot and destination are both listed.
Train Name = F Train **StartAt = SY1** (Must be Staging or Interchange) **EndAt = SY1** (Must be Staging or Interchange) **Visits = CY1** (Must be a Class Yard) > Layout must have more than one Staging Yard and at least one Class Yard. > Visits list can only contain one or more Class Yards (no Industries). Requires a later local train to distribute the cars from CY1 yard – see 'I-Train'.	**Operates as a Turn between SY1 and CY1, returning to SY1.** **Or can operate as a Turn between CY1 and SY1, returning to CY1.** > Train will not service any Industries. > Cars that are not routed ViaIn CY1 in the Industries tab will not be selected. > There will be no Bridge Traffic. > XO cars will be moved if their current spot and destination are both listed.
Train Name = G Train **StartAt = SY1** (Must be Staging) **EndAt = SY2** (Must be Staging) **Visits = CY1,IN1,IN2** > Layout must have more than one Staging Yard and at least one Class Yard. > Visits list can only contain Class Yards, Industries and XO reserved tracks. Requires a later local train to distribute the cars from CY1 yard – see 'I-Train'.	**Operates as a through train from SY1 to SY2 in a single direction only.** > Trains stop only to service the Class Yard and any other listed industries. > Stops at CY1 to set down cars from SY1 and pick up cars for SY2. > SY1 will supply inbound cars to listed industries without via destinations. > SY1 will supply inbound cars to CY1 if the Industries tab routes them that way. > SY2 will receive cars pulled from listed industries if they have no ViaOut dest. > SY2 will receive cars destined to SY2 which are laying over in CY1. > Train cannot return to SY1 in this switchlist cycle. > Train will also carry Bridge Traffic between SY1 and SY2. > XO cars will be moved if their current spot and destination are both listed.

Table continues >>

SEQUENCE TAB - EXAMPLES OF TRAIN ROUTING continued:

Codes required in Sequence Grid (Substitute your own custom codes)	**Details of how the train configuration will operate**
Train Name = H Train **StartAt = SY1** (Must be Staging or Interchange) **EndAt = SY1** (Must be Staging or Interchange) **Visits = CY1,IN3,IN4** > Layout must have one or more staging yards and at least one Class Yard. > Visits list can only contain Class Yards, Industries and XO reserved tracks. Requires a later local train to distribute the cars from CY1 yard – see 'I-Train'.	**Operates as a Turn between SY1 and CY1, returning to SY1.** **Or can operate as a Turn between CY1 and SY1, returning to CY1.** > SY1 will supply inbound cars to listed industries without via destinations. > SY1 will supply inbound cars to CY1 if the Industries tab routes them that way. > SY1 will receive cars pulled from listed industries if they have no via dest. > SY2 will receive cars destined to SY2 which are laying over in CY1. > There will be no Bridge Traffic. > XO cars will be moved if their current spot and destination are both listed.
Train Name = I Train **StartAt = CY1** **EndAt = CY1** **Visits = IN1,IN2,IN3,IN4,IN5,IN6,IN7,IN8,IN9** > Layout must have at least one Class Yard which receives cars from Staging. > Visits list can only contain Industries or XO reserved tracks. >Visits list must not contain Staging, Interchanges or Class Yards. > Using more than one of this train type lets you divide up the workload. > One train can service industries to the West of your Class Yard. > While another train can service industries to the East of the Yard. > You will need at least one of these trains if your incoming cars have been set down in a Class Yard by any E, F, G-or H type train listed above.	**Operates as a Local Pedlar between CY1 and the listed Industries.** > Does not generate any inbound traffic from staging. > Does not generate any outbound traffic to staging. > Pulls cars from industries which are destined for the stipulated yard CY1. > Delivers cars from the yard CY1 to the stipulated Industries. > XO cars will be moved if their current spot and destination are both listed.
Train Name = J Train **StartAt = SY1** (Must be Staging) **EndAt = CY1** (Must be a Class Yard) **Visits = IN1,IN2,IN3,IN4,IN5,IN6,IN7,IN8,IN9** > Layout must have one or more staging yards and at least one Class Yard. > Visits list can only contain Industries and/or XO reserved tracks. > Should be used with care, this can upset the inbound/outbound car balance. > A matching train of type K (below) should be used to restore the balance.	**Operates as a local train traveling between SY1 and CY1.** **Or can operate as a Turn from CY1 to SY1 and back to CY1.** > SY1 will supply inbound cars for the listed industries. > Train will pull cars from the listed industries that are routed ViaOut CY1. > No outbound traffic will be generated for staging in this switchlist. > XO cars will be moved if their current spot and destination are both listed.

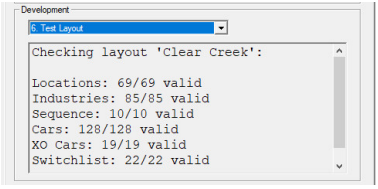
Table continues >>

SEQUENCE TAB - EXAMPLES OF TRAIN ROUTING continued:

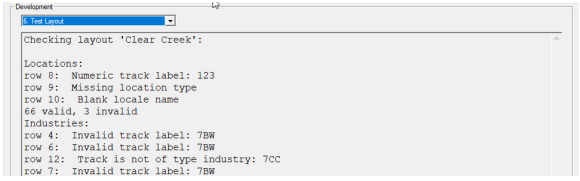
Codes required in Sequence Grid (Substitute your own custom codes)	**Details of how the train configuration will operate**
Train Name = K Train **StartAt = CY1** (Must be a Class Yard) **EndAt = SY1** (Must be Staging) **Visits = IN1,IN2,IN3,IN4,IN5,IN6,IN7,IN8,IN9** > Layout must have one or more staging yards and at least one Class Yard. > Visits list can only contain Industries and/or XO reserved tracks. > Should be used with care, can upset the inbound/outbound car balance. > A matching train of type J (above) should be used to restore the balance.	**Operates as a local train traveling between CY1 and SY1.** **Or can operate as a Turn from SY1 to CY1 and back to SY1.** > No inbound cars will be supplied to the layout. > Outbound cars will be pulled from the listed industries for SY1 Staging. > XO cars will be moved if their current spot and destination are both listed.
Train Name = LXO Train **StartAt = XO1** (Must be XO Reserved or Staging) **EndAt = XO2** (Must be XO Reserved or Staging) **Visits = XO3,XO4,XO5,XO6,XO7** > Visits list can contain Industries but XO reserved tracks are preferred. > Visits list can include Class Yards but XO reserved tracks are preferred. > Visits list can be in any order, it does not need to be in the route sequence. > The sequence of the labels is not critical but all stops should be included. > XO Routed Trains such as Passenger Trains will also use this sequence. > XO blocks will move only if their current spot and next dest are both listed.	**Runs a Block Train of XO cars between any two industries on the list.** **Runs a "Routed" XO passenger service train between any stations on the list.** > Does not service any Staging Yards or Classification Yards. > Selects all XO cars which have their current spot and next destination listed. > Any XO car spotted on and destined to a location on the list will move. >]] routed cars will update their label at each stop until the run is ended. > Does not move any normal cars even if their location or dest are listed.

"TEST LAYOUT" ERROR MESSAGES

On page 17 we explained how to check the validity of your data from the Advanced Tab (Step 8), using option 6 of the Development Menu.

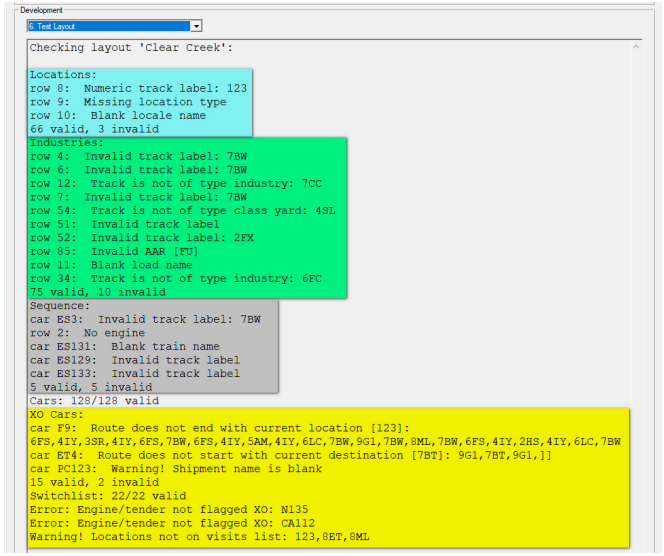


If all went well you will have seen a clean report like the one on the left but we also need to explain what you should do if you were not quite so lucky (see image on right).



Some suggestons for fixing these errors are given on the following page but we highly recommend that you use the **FixOps** subroutine to obtain a detailed report of all problems identified within the data stored in the various Ops Central Grids of your layout. (See page 30 for FixOps)

RESOLVING ERRORS IDENTIFIED BY "TEST LAYOUT"



Entries with row numbers and car numbers, and those flagged as "**Error:**" do all need to be rectified. Instructions for fixing many of these Errors are shown in the righthand column.

Entries marked as "**Warning!**" could be design mistakes but they could also be deliberate. These observations will not stop your AO layout from functioning.

The above list is not exclusive and you may encounter other error messages. The procedures for resolving these remain the same as the methods described in the adjoining column.

LOCATIONS TAB

8	123	BH Boiler Works & Machine Shop	industry	1
9	7CC	BH Coal Company		
10	7FS		industry	0

Go to the Locations tab and make the appropriate corrections. Change the numeric label to numeric-alpha, apply the industry class to row 9, and apply a Locale name to row 10.

Go back to the Advanced Tab and run Test Layout again and you may find this has also fixed several errors on the Industries tab automatically giving you a shorter list to investigate. In our example the errors on rows 4, 6, 7 and 12 no longer exist.

INDUSTRIES TAB

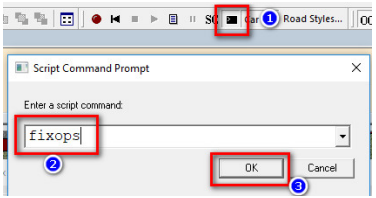
51			XM	R	supplies	9D1	4IY	4IY
52		2FX	XM	R	LCL freight	4KO	4IY	4IY
53	G Stewart and Wing Warehou...	2S1	XI	R	provisions	9D1	4IY	4IY
54	IS Kester Oil Company	4KO	T	R	fuel	9D1	4SL	4SL

On the Industries tab, enter the missing label, correct the 2FX invalid label, change the 4KO industry label for a Staging label, and change the two 4SL via labels to the 4IY class yard label.

In the example this leaves us with three rows to fix. The invalid AAR code FU on row 85 is changed to F (any flat car), the blank loadname on row 11 is corrected, and the industry label on row 34 is changed from 6FC (XO reserved) to 6LC (industry).

A quick double check of "Test Layout" on the Advanced Tab shows us that the Locations and Industries tabs now pass muster. So we can move on to correcting any remaining errors on the Sequence tab and in the XO cars grid. The explanations are clear and the procedures are the same as above. When we eventually get a clean report we can Generate our Switchlist.

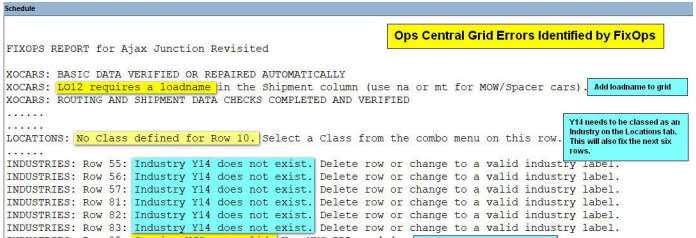
USE THE "FIXOPS" SUBROUTINE TO SCAN FOR DATA ERRORS



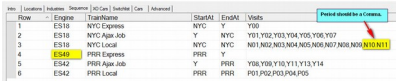
The **Test Layout** feature (previous page) gives a good indication of any data errors in the Ops Central grid but you will find that the **FixOps** subroutine can identify even more problems and point you to the exact rows in your grids to find them.

To launch **FixOps** open the Script Command Prompt (1), type **fixops** into the text box (2) and click OK (3). Read the Intro and click OK to analyze the data for your Ops Scenario.

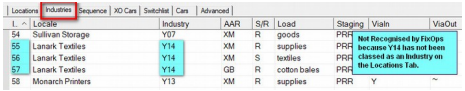
FixOps will test the data in the Ops Central grids and produce a report in the Schedule Window to advise if any data needs to be adjusted.



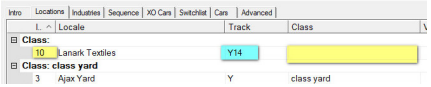
Open **Ops Central** alongside the Schedule Window and make the required adjustments to the data in your grids.

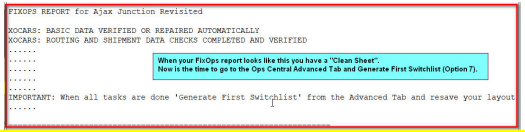


Where possible FixOps will refer directly to the Grid Title and the Row Number of the entry that needs to be amended.



As you work through the list you can rerun FixOps repeatedly to update and reduce your list of outstanding items.





A Clean Sheet should always be followed by Generate first Switchlist.

Note:

If your Ops Scenario is not operating as expected and **FixOps** fails to find your issue then please send a copy of your layout with a brief explanation of the problem to support@trainplayer.com and we will endeavor to identify the cause of your problem.

BALANCING AND WEIGHTING TRAFFIC PATTERNS

With TrainPlayer Advanced Ops the number of cars needing to be held available in Staging is relatively low. Whenever a car returns to Staging it is considered to be elsewhere on the railroad system and is immediately available for reuse as a new (different) arriving car.

We recommend that the number of cars to be made available in staging to enable a Switchlist to be generated should be around one and half times the number of cars you set as the “Cars to Pull” value.

Often this may need to be a little higher to ensure the correct mix of car types is available but there is nothing to be gained from cramming full a staging yard with excessive numbers of every car type.

This can have a detrimental effect on car selection. If the “Cars to Pull” value is 10 (the default) and there are 86 box cars within a pool of 250 cars in staging it will require 25 switchlists to cycle through them all. Theoretically (but unlikely) you could get eight successive switchlists of boxcars before any other car type can move onto the layout.

Adding rows to the Industries grid does not increase the traffic to the named Industry. It is the number of cars preplaced at the industry that manages the quantity and flow of traffic as they are pulled.

Pulling a car from an industry helps to restock the Staging Yard and adds the industry to a list of vacant spots requiring another car. No matter how many rows are listed in the Industries grid for an industry it will not receive another car until an existing car has been pulled for return to staging, nor will a new car be dispatched until each of the other queuing industries with vacant spots have been serviced.

If the number of vacant spots lists fewer industries than the “Cars to Pull” value a new car will be dispatched immediately. However if the vacant spots list is longer than the “Cars to Pull” value it could require several Switchlist sessions before a replacement car is dispatched.

When a waiting industry reaches the front of the queue, and the Active Train will Visit the location, the Switchlist Generator will find a suitable car from those in staging and collect a list of all the loadtypes (inbound or outbound) that the selected vacant spot can accept.

So if industry A only ever handles one car type and a single commodity but is set up to handle four cars (3 preplaced and 1 on the vacantspots list). And if industry B is also set up for 4 cars, perhaps 2 at the industry and 2 on the vacantspots list, but this industry handles a choice of 10 different commodities (rows in the industries grid). Then these two industries would handle exactly the same amount of traffic, but you would see each of Industry B's loads much less frequently.

We rely on a random throw of the dice to select which of the valid loads is added to the car; ensuring that the selected load matches both the industry and the car type. The laws of probability ensure that all the valid loadnames will be used in the fullness of time.

A freight house set to accept 24 different commodities will not receive any more loads than an industry that only handles a single product if both of the industries are seeded with the same number of cars.

If you have an industry that ships two commodities, nuts and bolts, you want the industry to ship twice as many nuts as it does bolts. Then placing two rows in the Industries grid for nuts and only one for bolts will achieve this. It will not increase the traffic pattern, only the loads being used within that pattern. This is because if a car is sent to the industry to collect a load, it will first identify all the available products that can be handled and select one at random. If there are nuts, nuts and bolts available then the chance of selecting nuts is twice that of selecting bolts. However the number and frequency of cars visiting the industry for loading is still constrained by the number of cars that were initially placed at the industry in relation to those placed elsewhere.

CUSTOMIZING CAR OPERATIONS WITH AAR OVERRIDE CODES

AAR Override codes (AAR/o) were introduced with TrainPlayer 7.1 to provide increased flexibility in car movement control. This feature permits you to modify the "factory default" AAR code on any car for a code of your own choosing.

To demonstrate the power of **AAR/o** we can look at the Industries grid on the "Mount Brydges" Layout from a couple of years ago. This layout has three Industries that handle Tank Cars in various forms.


Intro | Locations | Industries | Sequence | XO Cars | Switchlist | Cars | Advanced

ID	Locale	Industry	AAR	S/R	Load	Staging	ViaIn	ViaOut
40	Bergen Foods	BF	RA	R	Food	PCI	~	~
3	Bergen Foods	BF	RS	R	Food	~	EY	EY
8	Gallon Paint	GP	T	R	Paint	~	EY	EY
5	Davis Chemical	DC	T	R	Chemicals	~	EY	EY
4	Davis Chemical	DC	TG	S	Chemicals	~	EY	EY
7	Gallon Paint	GP	TM	S	Paint	PCI	~	~
36	Foster Fuel	FF	TM	R	Fuel	PCI	~	~
41	Davis Chemical	DC	TM	R	Chemicals	PCI	~	~
47	Bergen Foods	BF	XI	R	Food	PCI	~	~
38	Johnson Warehousing	JW	XI	R	Supplies	PCI	~	~

Gallon Paint accepts cars of type T and TM, Davis Chemical uses types T and TG, while Foster Fuel uses type TM only. The use of any car with a single character AAR code (and there are a lot of them) causes problems for AO because if a matching car with the identical code is not found then AO will seek to substitute any car starting with the stipulated character. You will also find that many of the TP collections which have been built up over many years often use the same code for cars which are painted to carry widely different commodities. This can lead to situations such as Milk Tanks carrying Oil or Fuel, or a fuel tanker at at Mount Brydges delivering Chemicals.

We can fix this with a customized AAR Override Code.

First we need to decide which AAR codes to use for each industry and apply these new custom codes to the Industries grid AAR column. Lets say Gallon Paint will use TP, Davis Chemical will use TC and Foster Fuel will use TF. So we make these adjustments to rows 4, 5, 7, 8, 36 and 41 of the Industries grid (image in left column is shown prior to editing).

Then we apply a new AAR Override code to each of the Tank Cars shown in the Cars Grid based on what the car image suggests it would be carrying. Entering an AAR Override code automatically replaces the code in the AAR column. The image below shows the Mount Brydges Cars Grid with some changes made and some as they were originally.


Ops/Builder - Mount Brydges Branch [mount brydges_ao.mrw]

Intro | Locations | Industries | Sequence | XO Cars | Switchlist | Cars | Advanced

Car	Image	Type	AAR	AarOverride
T67		tank 36 ft 1	TF	TF
T53		tank 36 ft 1	TW	TF to do
T68		tank 36 ft 3	TM	
T55		tank 36 ft 3	TM	
T36		tank 36 ft 4	TC	TC
T66		tank 36 ft 4	TA	TC to do
T54		tank 36 ft 4	TA	
T28		tank 36 ft 5	TM	
TM8		tank 50 ft 2	TM	
TG34		tank 50 ft 3	TG	
TM89		tank 50 ft 4	TP	TP
TM16		tank 50 ft 4	TM	TP to do
TM82		tank acf 11 mobil	TM	
TG81		tankcar	TG	

Note how the AAR/o code is applied by TrainPlayer to the AAR column.

Here we will also need to apply one of our new codes TF, TC or TP to each of the remaining blank white boxes as the T, TM, TG and TW codes are no longer listed in the Industries grid.

These override adjustments can also be applied in the Car Data Properties dialog but where several changes are needed then using the Cars Grid is preferable.

Another good use for the AAR/o code would be if you had an industry that only shipped a box car load very infrequently. You could apply a special AAR/o code to the commodity in the Industries tab and only supply one car of the specified AAR/o type on the layout. This would prevent any other box cars from being selected to complete this task.

THE CAR SWAP FEATURE

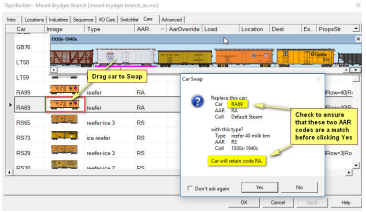
Changing a car by deleting the original car and selecting an alternative from the Car Chooser is not useful with Advanced Ops because the new car will not retain the Ops Properties of the deleted car.

The Car Swap feature resolves this by permitting you to Swap any car on your layout for a different car from any Car Collection. This Swap retains all the Ops Data that had been applied to the original car.

The car AAR types don't need to be identical but we recommend that you restrict Swaps to cars of the same basic type to avoid unforseen complications (such as Fuel Oil being loaded into a Stock Car).

First ensure that the car you want to 'swap out' is visible, either in Layout view, in the Train Window or in one of the Ops Central grids (The Cars Grid is recommended if you want to swap multiple cars).

Next bring up a car source, either the Car Inventory Bar or the Car Chooser and navigate to the image of the car you want to 'swap in'.

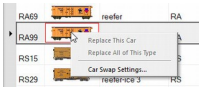


Drag from your car source to the target. If the target car is eligible to swap it will be highlighted with a red frame and [+] cursor.

Release the drag and check the confirmation alert to ensure that the original car's AAR code will be retained after the swap (here the new car is an RS but the RA code is retained.) Click 'Yes' to complete the Swap (this step is undoable).

As all Properties from the original car are retained on the new car it will remain fully compatible with the Operations plan for the layout.

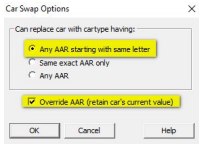
The AAR code from the original RA car has been applied to the AAR override column and is also retained in the AAR column demonstrating that RA is now overriding the AAR code of the replacement RS car.



If the Alert differs from our example in the left column you should answer No to the prompt and repeat the drag using the **Right** mouse button.

Release the right mouse button when you see the red box and [+] cursor, and select 'Car Swap Settings ...' from the context menu.

Ensure your Car Swap Options match the image on the right and click OK. These settings are saved in the Registry and will be used for future Swaps.



No changes have yet been made to the Cars Grid, but you can now revert to using the **left** mouse button to Swap your cars and retain all the relevant Ops data.

Note that dragging with the right mouse button (instead of the left) often provides an additional option to use the newly sourced car image as a swap for all occurrences of the target car's AAR type.

TrackLayer users with the **Pedersen Car Sets** can use the Swap Cars feature to modify local copies of their favorite AO layouts to use Pedersen cars without jeopardizing the existing Ops scenario on the layout.

To add new Car Sets to the Car Inventory Bar you need to use the drop down selection arrow and first pick Car Chooser. Then select the Car Set required from the Chooser, click "Choose" to copy it into the Car Inventory Bar and add it to the list of available Car Sets.

The oldest entry in the list will be removed as there is a registry setting to dictate how many car sets can be listed – CarBarMRUListSize.

USING MULTIPLE VIA DESTINATIONS IN THE INDUSTRIES GRID

We made a brief reference to using Class Yards as Via destinations on Page 11. Usually this involves placing a single Class Yard code in the ViaIn column of the Industries Grid, and the same (or a different) Class Yard code in the ViaOut column. With this arrangement it takes two trains to move the car from Staging to Industry via the Class Yard and another two trains to return the car from the Industry to Staging with a change of train occurring in the Class Yard.

Advanced Ops also permits a second Via destination to be used for situations where there is no direct route between the ViaIn Class Yard and Destination without transferring to a further train in another Yard.

This is demonstrated in our depiction of the Saddlestring layout. Here the logging industry at O5 is serviced only by a log camp engine which Interchanges with the main line in the Pronghorn (PY) Class Yard. As the train servicing PY starts from Saddlestring Mill (SM1) and calls at SYP any Pulpwood car from N1 Staging will need to change trains twice to reach its destination at the O5 camp.

The Industries grid coding needed to enable these Waybills to be created is shown on Row 77 below. This uses a comma delimited pair of two Class Yard codes in both the ViaIn and ViaOut columns.

Ops/Builder - Saddlestring [saddlestring_ao.rrw]

Intro | Locations | Industries | Sequence | XO Cars | Switchlist | Cars | Advanced

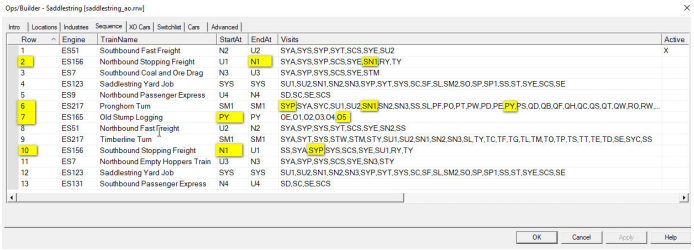
ID	Locale	Industry	AAR	S/R	Load	Staging	ViaIn	ViaOut
45	Pronghorn Team Track	PT	GB	S	mixed load	U1	SYP	SU1
18	Quirky Hardware & Tool Store	QH	XM	R	supplies	U2	SYP	SU2
40	Quirky Team Track	QT	GA	R	gravel	U2	SYP	SU2
77	Old Stump Camp 5	O5	GP	S	pulpwood	N1	SYP,PY	PY,SN1
38	Saddlestring Loco Coal	SL	HC	R	coal	N3	SYS	SN3
34	Saddlestring Power Station	SP	HC	R	coal	N3	SYS	SN3
42	Saddlestring Sawmill receive/disp...	SM2	XM	S	milled timber	U2	SYS	SU2
83	Saddlestring Power Workshop	SP1	XM	R	supplies	N2	SYS	SN2
44	Saddlestring Power Workshop	SP1	FM	R	transformer	U1	SYS	SU1

We can see from the Industries grid that the empty cars are supplied from N1 staging, the cars need to move first to SYP, then on to PY and finally move to Industry O5 for loading. This will require three trains

A further three trains will be needed to take the loaded cars from O5 and return them to N1 Staging, Via the PY and SN1 Class Yards.

Via entries must be Class Yards not Staging, Interchange or Industry.

The Train Sequence grid for Saddlestring looks like this, the trains which will move the pulpwood cars are highlighted in yellow.



Train Sequence analysis for Industry O5

> Train 2 moves loaded cars from SN1 Class Yard to N1 Staging.
> Train 6 moves empty cars from SYP Class Yard to PY Class Yard. *
> Train 6 moves loaded cars from PY Class Yard to SN1 Class Yard.
> Train 7 moves loaded cars from O5 Industry to PY Class Yard.
> Train 7 moves empty cars from PY Class Yard to O5 Industry. *
> Train 10 moves empty cars from N1 Staging to SYP Class Yard.

* *Note: Trains 6 &7 will not move any empty cars until the second cycle as there will be no inbound empties until we get to Train 10.*

If any of these codes are omitted from the Industries Tab or the Sequence Tab the cars will not be selected and the Ops plan will stall.

When designing your own Ops plans it is essential to arrange your Train Sequence to ensure that cars are not left for unduly long periods in the Class Yards before another train is available to take them on the next leg of their journey.

PLANNING FOR INDUSTRY TO INDUSTRY TRAFFIC

Low volume Industry to Industry traffic can easily be set up using XO Dedicated Service Roving Cars, this process was described on Page 23.

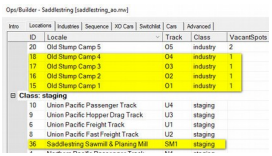
Higher volume Industry to Industry traffic needs a different approach. There are no hard and fast rules as to which tracks can be defined as Staging and which as Industries. The key thing is that Staging is the place where our cars originate and Industries are the points they serve. For example we often use the Staging classification for a set of yard tracks on a Quayside or at a change of gauge Interchange

Tracks located at a busy Industry which serves other Industries on a layout can therefore be defined as Staging to enable them to supply and receive loads to and from some of other Industries on the layout.

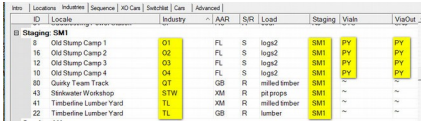
There is an example of this on the **Saddlestring** layout where some of tracks in a Sawmill complex are defined as Staging while another track at the same industry retains the Industry classification. The Staging tracks permit the Sawmill to dispatch empty log cars to several industries and to receive return loads. The Staging tracks can also dispatch lumber loads to other industries, while the Industry class track can exchange outgoing loads with the two main Staging yards.

At the Saddlestring Sawmill the two SM1 tracks are defined as Staging to enable them to service several other industries on the layout, while the SM2 track is defined as an Industry to enable the Sawmill to dispatch and receive cars from the main UP and NP Staging Yards.

The key to making this arrangement work is in the setting up of the Locations grid and the Industries grid and coordinating these with the Train Sequence.

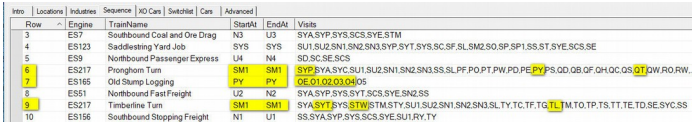


The SM1 track is defined as Staging, the SM2 track is an Industry, as are the logging camps and several other industries which receive lumber loads from the Sawmill.



The industries grid shows that four logging camps ship to SM1 via PY and receive back empty cars.

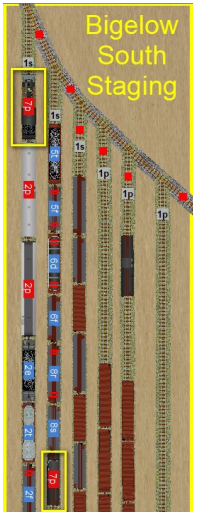
The Sawmill ships goods to four other industries on the layout and also receives empty cars for dispatching further loads.



Train 6 takes northbound cars originating from NP and UP Staging which were set out on the SYP Class Yard track, including to all points north. This train will pull loaded Gondolas from SM1 for QT and also pull empty log cars from SM1 to exchange for loads waiting in PY Class Yard. If QT has any empty Gondolas for SM1 they will return on this train. Train 7 swaps the empty log cars at PY for any loads waiting at the camps. These loads will hold over at PY until the cycle repeats.

Train 9 delivers any southbound cars (originating from NP and UP) which are waiting in the SYT Class Yard. It will also pull any loads originating in SM1 for the SWT and TL industries, and return any empty cars from those locations to the SM1 Sawmill track.

USING ROUTEFINDER WITH THE MAP WINDOW

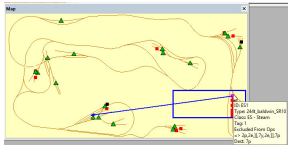


When you open an unfamiliar layout it can be difficult to get your bearings, usually the view is zoomed in to one of the Yards and the car destinations are displayed on the car tops. We saw on Page 20 how the map view can help to show where a car is to go but on a tricky layout this view doesn't show you how to navigate to the destination.

In this example a train has been assembled in the Staging Yard. The cars need spotting at several destinations but it is not clear what route to follow even with the help of the Map View.

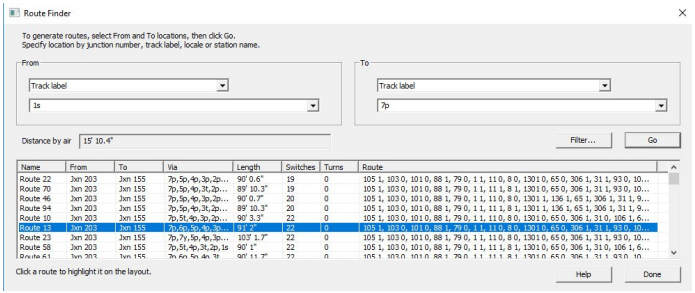
The destination of the engine and the caboose give us a good indication of how far the train needs to travel and we can use these coordinates to plan a suitable route for our train and identify the initial direction of travel.

First we need to open the Map Window using the icon on the Ops toolbar. Here we can check the destination for any of the cars by hovering the mouse over the rectangles which represent them. This shows us where the cars need to be delivered to, but not how to get there.



To resolve this dilemma we need the Route Finder which can also be opened from the Ops toolbar.

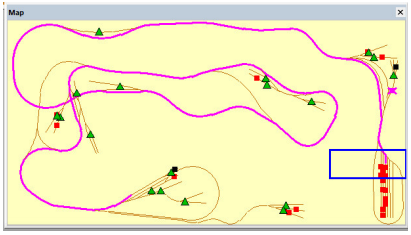
Set both the 'From' and 'To' boxes to Track Label.
Enter the current location of your train (1S) in the 'From' combo box.
Enter the engine destination (7P) in the 'To' combo box and click 'Go'.



In this example the RouteFinder found 288 different routes to the target location. The shortest routes are not always the best as they may cut through loop sidings but if you sort the data on the Switches column the optimum route should be found close to the top of the list.

Here Route 13 has been selected and a plan of this route appears on your the track in the top down display AND in the Map View window.

The Filter button on the RouteFinder allows the search criteria to be adjusted. In this example we excluded routes with more than 0 turns, and routes longer than 1.5 times the shortest route.



Note 1: You will need to memorize your route as it will disappear when you close the RouteFinder window.

Note 2: Script savvy users may wish to copy the data from the Route column of the selected row and use it as a parameter for the SetRoute subroutine which will set all the switches needed for the journey.

Frequently Asked Questions

FAQ – OPS CENTRAL GRIDS

How do I add or delete rows in the Industries and Sequence grids?
Right click on the row number.
Select 'Add New', 'Duplicate' or 'Delete' from the context menu.

How do I rearrange the order of my trains in the Sequence grid?
Right click on the row number.
Select 'Move row up' or 'Move row down' from the context menu.

Clicking Add Row in the Industries grid adds a row at the top of the grid (not where I clicked). I can't move the new row.
Where the row is displayed is entirely dependent on the Sort Order of the grid. You can't reorder the Industry rows but you can sort the grid on any column. New rows are always allocated the lowest unused row number (replacing any deleted rows). Each row relies on having a fixed row number as this needs to be continuously referenced by the program in order to find and select data from any cell on the row.

Why does the Industries grid offer 'Copy' and not 'Paste'?
You can't paste a complete row into this grid and must use either the Add Row or Duplicate options to insert a completely new row (see previous answer). The Copy function is provided to enable you to highlight and copy any rows or cells to an external program such as Excel or Notepad for analysis.

Why can't I minimize the Switchlist to free up screen space?
This is not necessary, you can quickly close the Switchlist (or any grid) by clicking OK or clicking the OC grid toolbar icon. When you click the OC icon again the Switchlist will reopen exactly where you left it, or it will be updated if the situation has changed while it was closed.

"Zoom-to-Industry" would be nice (at least on the Switchlist) since who can remember all of those codes?
Right click on any track reference label in the Switchlist grid and select 'Zoom to Track'. This works in most of the grids as does 'Zoom to Car'.

Why does a track label reference remain in the Industries grid after I remove the label by editing Track Properties? Why is it then reported as an error by the FixOps subroutine? It seems that these "tracks" must by manually removed from the Industries grid.
Correct, removing a track label doesn't always apply to a single track, segment, or you might be deleting the label with the intention of placing it elsewhere. You would feel pretty sick if TrainPlayer deleted all the information you had painstakingly entered. Note that you can relabel tracks by changing the label in the Locations tab but the data on the Industries tab must then be edited separately because you might want to retain it for modifying to a different industry.

It would be helpful if the Visits column (Sequence tab) had a dropdown selection box (easier add/delete) -- who can remember all these codes? Having it list the user defined names and then plugging in the codes would be even nicer!
Not sure I can agree this would be helpful, it is much quicker to type a comma delimited list than it would be to keep adding codes to a list individually from a drop down combo menu. In the visits tab you are planning a route for the train (not the car). These locations in the Visits lists on the Sequence tab are used to decide where cars are picked up and set out. If you design the layout and choose your names and labels carefully it is straightforward to think of the names (labels) when planning a route from **DE**nver to **GO**lden to **BL**ackhawk.

FAQ – OPS CENTRAL GRIDS

Clicking on the Load column in the Cars grid opens a combo of loads, why is this too narrow to see a full description of available loads?
The combo menus open at the same width as the column which contains them. So if you extend the width of the Cars>Loads column the combo will be wider. However the cars menu plays no part in load selection for AO, loads for AO Waybills are sourced from the Shipment column of the Industries tab.

My Industries grid has Viain and Viaout Class Yards for each car type and product but only a Tilde in the Staging column. Does it increase the probability of a car being pulled from Staging for the Industry if I indicate a specific Staging area?
Yes, because it will be less likely that the vacant spots at your specified Industries will have already been reserved for a car traveling from one of the other Staging areas. The tilde (~) says the Industry can accept cars from any Staging Yard but often you will want a commodity to come onto the layout from a specific direction.

If you add a row to the Sequence Tab, clicking the 'Move Row Up' function, doesn't work on the bottom row. It will only move a row down. Gray-out is also reversed for what Move Up should be.
You will only see the 'Move Row Up' option grayed out on the bottom row if the grid has been sorted on one of the other columns leaving Row #1 at the bottom. It is the grid row numbers (not the display order) which dictates the order in which the trains are run.

So if a two row grid is sorted in reverse order only row number 2 can be moved up to take on the new number 1, but it will appear to move down because you have the grid sorted in reverse order. Row #1 will always be the first train to run even if it is at the bottom because you sorted on another column (or reverse sorted the left column).

On the Industries tab, does "Staging" have a meaning for received (R) cars?. Is this where cars come from? Is it where the car goes after it's been loaded/unloaded? Or should it be left blank (~) for R cars and the next train will just pick it up.? In the distributed _ao layouts some have Staging set for all industry rows, some have none at all.
Yes, waybills are only applied to cars in the staging yard they start from, the waybill includes includes the route used to dispose of the car following its unloading. We still need Staging in the grid to tell the waybill generator how to dispose of the car. Tilde (~) does not mean blank, it means use any staging yard as the source for the car.

I am still not clear about the Staging field for an "R" designation. Is it where the car comes from or where it goes when it is pulled?
It is both. There is no difference in the handling of an R row and an S row. For an R row the car leaves staging loaded and after the industry returns to staging empty. For an S row the car leaves staging empty and after the industry returns to staging loaded. There is no difference to the logic other than where the car is loaded and unloaded For an 'R' row the Staging column represents the Staging yard which supplied the load and this is also the RET (Return Empty To) staging yard.

Have there been any discussions about adding a "frequency" column (and related functionality) to Industries?
Yes and No. The concept of "frequency" has very little meaning in an environment where the Train Sequence can be relating to the trains that run in a single day OR to trains that run over a full week.

The frequency of traffic to and from an industry is largely controlled by the number of cars originally placed for pulling and the number of cars which you choose to make available in staging to serve the industry. The Pull Value and number of other industries waiting for cars also have an effect on how long it takes to locate a replacement car.

FAQ – CAR PROPERTIES DATA

Your User Guide says "Only the cars standing at these locations which also have a destination matching the EndAt location will be highlighted for pulling by the specified train." What is meant by "cars having a destination"? Is that the car's Staging column entry in the Industries grid?

NO. All cars have a destination property (Dest) on the Car Data tab, this changes as the car progresses along its individual route. The car may also have a list of subsequent destinations in the Car Note field. When a new Switchlist is generated all cars on the layout are checked, if the new Active Train visits the location of a particular car, AND visits the next destination the car is routed to, then the waybill of the car is advanced, its next destination is added to the Car Dest field, the label is switched on and the car is added to the current switchlist.

For cars in Staging a new Waybill is created if the Active Train starts from that location AND visits the first destination on the car's route.

When placing cars on a layout is there a way to search for available Cartypes by AAR code so as to avoid mixing different Tank car types?

The easiest way to populate your layout with "specific" AAR codes is to select them from the car chooser. Use the context menu to set List View in the center pane and sort the list on the AAR code column. This puts all your tank cars together already sorted into sub types.

Alternatively you could just select a suitable image from the Car Inventory bar and then use an AAR Override code to change the mixed classes of Tank Cars to a common type. This feature permits you to place a TA car with a suitable image onto the track and give it a TM alias applicable only to the current layout. You can also use your own custom codes in this override box to allocate certain images to specific Industries and use this code in the Industries grid (see page 32).

It would be great if TrainPlayer could know the reporting mark and car number for a given car. Keeping in mind that car number is alphanumeric as in the case of MOW cars (AV-69035, for example).

You can already put reporting marks onto a TrainPlayer car. The car label field is editable in the props dialog and can be anything you wish.

So you could edit the label for a box car from say XM82 to AX-69035. Then it would always appear on the tooltips and AO waybills as your customized label for that car. You would need to regenerate the first switchlist on an AO layout after adding the reporting marks to the car label field. The original number is retained elsewhere as the unique car ID (or tag) and the AAR code is also retained in a separate AAR field which remains with the car and will still be used by AO for allocating appropriate loads.

Alternatively you can add a custom car property by adding to the string in the props box of the Car Data tab. Mark=AX-69035 these props are delineated with the vertical bar or pipe character |. Then you could set up Junction Actions triggered by any car to read and report the data in any format you wish.

Previously I could apply a closed car load to a covered hopper or box car by clicking the choose by name option on the load menu but that option is greyed out now. There is a selection of loads but they are not as plentiful. I load a lot of covered hoppers with different commodities, any help would be appreciated.

In TP7 you can use any loadname of your choice on a closed car. Just right click the car, select Load, then New and type in the name of your choice. This will appear on the recent menu the next time you want to load a closed car. The original closed car loads file is no longer needed.

FAQ – TRAFFIC PATTERN PROBLEMS

How do I deal with an industry like a Team Track that handles more car types or loads than it has capacity for?
If a team track only takes a half dozen cars and you need it to handle additional car types you only have to add additional rows for the types that won't fit on the track to your Industries grid. The system will not send cars to your Team Track unless a vacant spot has been created by a pulled car. This is why a pulled box car is not automatically replaced with another box car. The car which is selected to fill the vacant spot will be of a type that the industry is authorized to handle but not necessarily of the type that was placed in the industry to start with. So if you have an Industry which only has a spot for one car but takes three different car types, you place one car on the spot, set the vacant spots field on the Locations grid to 0, and ensure you have matching rows for all three types in the Industries grid.

There is a feeble attempt to differentiate the levels of traffic to and from the industries. For example; a propane dealer which should receive one car load per week versus a grain elevator that may ship three car loads a day. Each location is apt to see a similar level of traffic as AO attempts to keep the sidings full but not over full.
If your Propane Dealer uses a specific car type then you only need to ensure the industry uses a car with a customized AAR override code and only a single car is placed at the Propane Dealer prior to generating the first switchlist. If there are no other cars of this same custom type on the layout the Propane Dealer will be unable to receive any further traffic until after the initial car has been pulled and returned to Staging.

The Grain Elevator which had perhaps three cars placed prior to set up and several more cars of the same type available in Staging will be able to receive replacements for each car pulled from the Industry.

Why is there is there no provision for traffic between Industries on a layout? It states in the manual that AO is only designed for traffic between Industry and Staging. Unfortunate. It is possible to achieve something close by using the XO function but that's not what XO was intended for and it provides a less than satisfactory result.
The handling of XO Dedicated Service cars was designed for light Industry to Industry traffic. This is explained briefly on page 23 under the heading "Roving Cars".

There are no hard and fast rules as to which tracks can be defined as Staging and which as Industries. The Staging classification can just as easily be applied to a Quayside transfer yard as to an off stage yard, and in the right circumstances it can also be applied to selected tracks within an Industry to feed other Industries (See page 35).

Why is there is no way to balance loads to and from each industry? As an example; a sawmill. It is unreasonable to think a sawmill will receive the same number of carloads of logs as it ships lumber or wood chips but AO will not make that distinction.
AO is unable to read English, so it can’t interpret what type of industry the traffic is being generated from, only the layout designer can do that. This is why the initial placement of cars in the right proportions is so important to balancing the traffic patterns.

In the case of your sawmill example, if the log loads are running as XO block trains they will be delivered according to your settings in XO cars grid so that part of the process is totally under your control.

If the cars are not XO and are relying on the waybill generator then the number of outgoing lumber loads depends entirely on the number of appropriate cars preplaced at the sawmill, the number of cars set as the pull value, and the number of replacement cars available on the staging yard track that feeds the sawmill.

FAQ – TRAFFIC PATTERN PROBLEMS

My AO settings are for 5 cars and 2 to 5 bridge cars, But I just got a switchlist with way more than that, about 30 cars! In one sense I understand because I created an industry that is pulling most cars on the layout towards it, but I thought AO would manage it in bits.

The Pull Value doesn't relate to the number of cars on a switchlist, it is a reference to the number of cars that will be "pulled from the industries" listed in the visits column for a single sequenced train. It isn't a reference to the total number of cars to be hauled by your train.

If your sequenced train starts and ends in Staging then a similar number of inbound cars will also be selected for delivery to your industries. So that at the very least a pull value of 5 will mean 10 cars to move on even the simplest of layouts.

Bridge traffic is extra to the pull value as are XO car movements. So if you are in the steam age you can also add engine, tender and caboose to the Switchlist.

Any cars laying over in Class Yards which are added to your train are also additional to the calculations because these cars were already counted during the round that delivered them to the Via yard. This figure can also be high on an early switchlist. If you preplaced a lot of cars in the yard most of these will be pulled for return to Staging.

A further factor that can increase the loading for a single train beyond the default 2x pullvalue relates to trains carrying cars to more than one Class Yard on the first leg of a journey that uses Via destinations. Here the algorithm sends in cars from staging equal to the value of "Cars to pull" multiplied by the number of class yards to be visited. This is to ensure that when the local trains distribute these cars to their designated industries the number of cars to be delivered will still approximate the number of cars to be pulled for return to Staging via the appropriate class yard.

My staging yards are just that. The terminus towns each have a Staging and their own Class Yard in town. Why do I have difficulty generating traffic from terminus Class Yards to their local Industries?

With AO you can't generate new traffic from Class Yards, these are solely for classification and passing on cars to other trains. All waybills are generated in Staging when the particular Staging yard is the StartAt position for the active train. A train can still StartAt at a Class Yard but will only pull the cars with existing waybills that have already been deposited there by a previous train from Staging.

I get the point about Class Yards but I still don't understand why so much traffic goes to Staging and not to local Industries.

When you preplace cars at an Industry the 'First Switchlist' algorithm seeks out a suitable waybill that could legitimately have brought them to the current location and modifies the route to show that the next leg is to start out back towards Staging. When you preplace cars in a Class Yard the algorithm can't detect whether you intended the cars to be travelling inbound to the Industry, or outbound to Staging. There would be several technical problems regarding keeping track of vacant spots and the queue of cars to pull if we were to assume that some, but not all, of these cars were heading inbound for the Industries.

It is therefore assumed that ALL cars preplaced in a Class Yard (loaded or empty) are on the return leg of their journey towards Staging. This will only ever affect the first train to pull cars from the Class Yard, subsequent trains will find inbound cars in the Class Yard which have been delivered from Staging. To overcome this limitation it is only necessary for the designer to ensure that the Train Sequence has an inbound train from Staging to the Class Yard which precedes any train operating between the Class Yard and the Industries it serves.

Attached is a file where Locomotive ES129 just needs to get moved into its engine house (LE) for sequence 5 to terminate and a new switchlist be generated. My problem is that I would like ES69 and its Passenger car P306 on track LY to get selected, and they do. But ES83 and cars P374 and P154 are also selected and I don't want that!

Your XO car selection is working properly. Any engine stored at LE will be selected if the Active Train Visits or StartsAt LE and also Visits or EndsAt a location mentioned on the car route. Here both engines meet this criteria hence both are selected. That is both ES69 and ES83 are routed to StartAt LE and both Visit LP1 as part of their routing, so both engines are selected.

The best way to prevent this would be to relabel the LE storage tracks with individual labels, LE1, LE2, LE3 etc. and only use the appropriate code in the Sequence list for the train they are intended for. Once the engine tracks are relabeled the appropriate track label should be included in the Visits list for the train it must run on. So if ES69 and its tender were stored in LE2 instead of LE. The Train 6 Visits list would also use LE2 instead of LE making this track exclusive to this train. The route for ES83 and its tender would use LE3 instead of LE and the Visits list for Train 10 would also use LE3, again making this exclusive.

The same principle applies to the three coaches sharing a track at LY. Any XO coach standing at LY will be selected if the Active Train uses LY and the train Visits or StartsAt LY and also Visits one of the other locations on the car's route. So these coaches also need storing on separately labeled tracks within the yard, or separate segments of the same track, each using a different label to the yard itself. These new storage locations should be XO reserved tracks with unique labels to enable the appropriate degree of control in the Sequence Visits list.

I have a team track or freight house for instance. Unless I want that location to ship or receive only a single commodity or two, that's going to make for an inordinate number of waybills for that location. The only way to balance the traffic for other locations would require increasing the number of waybills at all the other locations. Correct?

No this is not correct, the large number of grid entries (not waybills) for the freighthouse will not increase the traffic to this industry. It does not need balancing out by increasing the grid entries for industries which only handle a single commodity.

The number of cars preplaced at the industry manages the volume and flow of traffic. So if industry A only ever handles one car type and a single commodity but is set up to handle four cars; while industry B is also set up for 4 cars but handles 10 different commodities (entries in the industries grid). Then these two industries would handle exactly the same amount of car traffic, but you would see a lot of A's loads while the individual loads for B would be much less frequent.

I want the yard switcher to take the cars deposited at ARR and sort them as required to LZ, PZ, GZ or OZ. Would I set that up as those cars "Visiting" ARR rather than making it a Via location?

NO, The Via location refers to the movements of an individual car, whereas the Visits list refers to the places a particular Sequenced Train is authorized to call at. For a car to be selected to move it must be located at a place the train is authorized to StartAt or Visit, and (if at StartAt) its destination must be in the train Visits list (otherwise the car stays where it is). Similarly if the car is situated at an industry included in the Visits list then its destination must also appear as a Class Yard in the Visits list (or as the EndAt position). Cars follow routes on their Waybill, whereas trains follow routes defined in the Sequence tab. Only when both car and train have compatible routes will the car be selected for moving.

I have done all this on the fly and changed so many things that I would like to reposition all the cars, clear out their AO instructions and start over. It is not clear to me how to do this. Any advice?
The required process is as follows.
> First "Reset Trains to Start Positions" from the Advanced Tab.
> Rearrange, add or delete cars as you wish.
> You can also add, remove or relabel tracks at this stage.
> Update your grids (Locations, Industries, Sequence, XO cars data).
> Use "Test Layout" from the Advanced Tab to identify any problems.
> Run the "**fixops**" subroutine to analyse your data.
> "Generate First Switchlist" from the Advanced tab.
> Save the layout to establish the default start position and Reset data.

Is AO a simulation of model railroading operations, or a simulation of real railroad operations? They are not the same.
AO is intended to be Model Railroad operations. It uses two separate systems because some tasks are more suitable to Card Waybill ops and others such as block trains and passenger service are better fitted to Card Order operations. However as model railroading seeks to replicate real railroading there is an element of both involved.

The main difference to both model railroading and real railroading is that we only run one train at a time which is a restriction placed on us by TrainPlayer. So essentially we have turned up in a RR owners basement and have been allocated a train to run, we are concerned only with completing the task we have been allocated, although all the other cars on the layout are also tasked for subsequent trains and can be checked by peeking at their waybills, or at the columns on the cars tab. Only the cars in staging which have no labels are not yet tasked and these cars will not receive their waybills until the train which is to move them becomes "Active" in the Sequence.

For layouts with more than one train, the Sequence seems to advance upon clicking the "new switchlist" button, rather than advancing upon completion of the current switchlist. To me this feels like forced regimentation.
Railroads operate to timetables, the Sequence is the nearest we can get to that at the moment with the TrainPlayer caveat that we can only drive one train at a time.

As layout designer you are free to decide whether to have one, two, three or twenty trains. If you are interested only in the overall picture then set up the layout for one single train (you can still use as many engines as you wish). Or if you want to see a day or a week's sequence of trains then set it up that way, keep the passenger service separate from the fast freights, keep the pedlers separate from the Class 1 trains, and route your cars through classification yards so they have to transfer to other trains to reach their destinations.

You can easily simulate the operating pattern you are asking for by only setting up one train from and to each staging area. If you authorize the train to visit every industry and class yard on your layout then every car selected to move will display a label and you will be free to complete the job in any way you wish.

When I start an ops session, I want to see the whole layout, to get a feel for the scope of that days work. For me at least zooming up on something when a switchlist is generated is the opposite of that.
I guess some of us like it the other way to concentrate on the task in hand and see what the train crew see. The map window (extreme right Ops toolbar button) gives you a plan view of the whole layout.

To see the whole layout when it opens then View "fit to window" in your Master Script should do the trick.

FAQ – MISCELLANEOUS GENERAL QUESTIONS

What if I want to complete a switchlist, move a few cars around, add and delete a few here and there and generate a switchlist to see how that works?
I'm afraid that would be an absolute anathema to what we have tried to achieve with AO. If you start adding and deleting cars you are deleting cars which are already on route and which contain critical waybill data, you are also adding in cars which do not have any ops data. This would be a recipe for disaster unless you were to reedit your Ops Central grid and generate a new first switchlist every time you make a change.

I'm not completely understanding this, on the Locations tab, does capacity minus cars on spot equal VacantSpots? Why not just use track capacity?
Industries need to be populated with cars in the proportions you want to see them used, more cars means a busier industry.

Vacant Spots refers to the number of additional cars the industry can cope with over and above the number of cars you originally placed (default value 1). If you don't leave at least one Vacant Spot per industry you will need to modify the Vacant Spots value in your Locations grid for the affected industry to 0. Capacity is equal to the number of cars originally placed plus the defined Vacant Spots value.

Calculations involving measuring cars would require considerably more data to be processed, this was trialed during early development but we found it far more efficient to count in terms of available spots.

Bear in mind that the longest siding at a particular industry may be at the industry that needs to handle the fewest cars. By defining how many cars the industry should handle we keep the traffic weighting within the sphere of control of the individual layout designer.

As mentioned previously Re-spotting seems to be left out.
Re-spotting should not be necessary under the AO system because industries don't order cars or loads without first having a spot available to accept them – unless an occupied spot is already scheduled for clearance by the train bringing in the replacement car.

You can temporarily respot a car anywhere on the layout but its label will not be cleared until it reaches its assigned destination.

Staging and class yards and interchange tracks all have a real world capacity, but no entry in AO.
Correct, but if we limit the capacity to fixed amounts at both ends of a run, Staging and Industry, we can very soon find ourselves in a situation where no traffic can move at all. We could be unable to pull a car because the Staging track it needs to go to is full, while also being unable to deliver a car because the relevant industry is full.

In the real world the whole continent is available to accept the cars sent to what we perceive as staging. So we should design our layouts with enough staging capacity to take what is placed there plus the number of cars set as the "Cars to Pull Value", maybe a little more to be comfortable. In practice as inbound and outbound car counts are roughly matched there is unlikely to be a problem if a little extra capacity is available.

We therefore assume that Staging, representing the rest of the national network has infinite capacity and if you put too many cars on your layout for it to cope with then you quickly find out and can usually add capacity in staging more easily than at an industry. It is industries that generate the inbound traffic and empty car orders and we need to be able to ensure that they can accept the cars that we send to them otherwise the switchlists cannot be completed.

FAQ – ERROR RESOLUTION QUESTIONS	
Some errors from 'Test Layout' are not explained, eg: "XO Cars: car ED40: Invalid track label". Does that mean the track where ED40 is standing has a bad label? (this only seems fixable by editing the rrw). An invalid track label on an XO car could be a non existent label entered in a route field but it might be more likely to mean that the car has been placed on a track that has no label at all. Running the FixOps subroutine should give you a better explanation of exactly what needs doing to fix this problem (see page 30). **What does FixOps mean when it says for XOCARS:** **Basic Data Verified or Repaired Automatically.?** FixOps ensures that all engines, tenders, cabooses and passenger cars have been given an XO flag, if not it applies one. It also sets the initial destination for XO cars without a planned route to the current car location, this ensures the car is correctly spotted and the label is not displayed when the layout opens.	**What does FixOps mean when it says for XOCARS:** **Routing and Shipment Data Checks Completed and Verified.?** FixOps also applies some automatic fixes to incorrectly constructed routes in the XO cars grid. For example an XO car with a defined route must not have a route that starts with its current position, and it must end its route (eventually not necessarily in a single cycle) in the spot it is currently occupying. This is necessary to ensure that the car can repeat its tasks when the Sequence has gone full circle. So FixOps is able to juggle the existing route data to ensure that at least those two conditions are both met and the layout can be operated. After running FixOps it is essential to regenerate the First Switchlist if the first Active Train involved any movements of XO cars – this enables the generator to process any revised data.

Richard Fletcher for TrainPlayer 7.0 - January 2019.
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