

Car Movement & Traffic Management System

January 18, 2010

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Revisions: 10/27/09 added ecstrack tag to config.txt string table, Added Local track marker
1/18/10 minor revisions and typo corrections

Introduction

The Car Movement & Traffic Management System (CMTM System) is designed to simulate prototype freight traffic patterns and operations in Trainz by providing each freight car on the route a series of destinations that represent freight car movements in prototype operations. Implementing this system is labor intensive to get up and get running and is not for the faint of heart. Think of it as an automated car-card system on steroids.

I developed this system because the built-in WayBill system in Trainz works nothing like the prototype and I like to operate as close to prototypical as possible. Trainz is a fantastic modeling tool for its price, but it is only a \$40 software package with many limitations. Consequently, there are some limitations to this system. The first is that you can not save a session and come back to it with the same destinations for the same cars. Another problem, but one that can be overcome, is that CMTM relies on certain data in each vehicles config.txt files to be correct.

Be advised that many vehicles on the DLS have errors in their config.txt files. The work around is to use only those cars that have the information correct or to modify the config.txt files to make the data correct. The two primary Tags that require correction are the “category-class” code and the “company”. The category-class code is a standardized system for referring to the various types of assets. A complete listing for freight cars can be found in Appendix C of this document. (I was surprised by the number of vehicles on the DLS that do not have the correct category-class.) The category-class for a freight car begins with an X, followed by one or two letters that determine the type of freight car. The CMTM system relies on these codes for proper identification.

The second problem tag is the “company” tag. The CMTM system relies on this tag to determine if a vehicle is a home road vehicle or a vehicle leased for home road use. This tag must be consistent in all vehicles for each owner company that is used for home road use and must agree with the data entered into the CMTM system. I like to use the call letters of the railroad, but you cannot use the “&” as Trainz does not recognize this as a valid letter. If you enter C&NW or CB&Q, Trainz only sees C or CB because “&” is not recognized as a valid letter and the text is terminated.

Trainz Route Requirements

The CMTM System assumes that your route has at least one portal and at least one industry to service. The portals represent either the continuation of your railroad (home road) or an interchange with another railroad (foreign road). Your Trainz route can be just one town on a railroad with industries and portals to the rest of the world, or a complete railroad with multiple towns and interchanges to foreign roads, or anything in between.

Industries used in this system do not have to be interactive. Any spot on any spur or side track can be an industry or destination for a freight car. It is recommended that some type of structure be placed at the location and given a name so the location can be readily recognized. This will also make all industries visible on the Trainz Mini-map. If you have an industry that uses open top cars, you may want to make it an interactive industry. Just make sure that your production rates are set appropriately so there is always product to load or unload.

This system does not deal with "Commodities" or the built in "Way Bill" system. If you are using the CMTM System, the built-in "Commodities" and "Way Bill" features should be completely ignored.

CMTM System Overview

CMTM stands for Car Movement and Traffic Management. The Car Movement portion of this system is what directs cars to and from industries. The Traffic Management portion determines the over all flow of through traffic. Through traffic is usually portal to portal traffic, but not always straight thru on the same train. If you have three or more portals, through cars that arrive in a train from portal 1 may be destined for portal 2 and portal 3. You can control the flow of this traffic with the Traffic Management portion of this system.

The CMTM System consists of a database of specific car movements and a method to attach an appropriate record to a car on the route. The data for a specific car is displayed in a pop-up window in Driver when a left mouse click is executed on that car. This car movement data is contained in the CMTMSystem config.txt file

string-table. Each line in the string-table is a car movement record. Each record has multiple fields grouped in clusters of four fields. Each four field cluster defines either the originating location or a destination for the car. Each record can have as many destinations for its car as needed.

By definition, those records whose first destination is a portal are called “Traffic Management” records. Those records that have more than one destination are called “Car Movement” records.

When a session starts, a destination is assigned to each of the cars on the route except for cars on an Empty Car Storage (ECS) track or a Local track. You have little control over this assignment process other than each car will be assigned a Traffic Management record (first destination is a portal).

When a train arrives on the route via a CMTM portal, every freight car in the train will be assigned a record. The assignment process is to assign Car Movement records first. This is where the Category-Class is used to make sure the correct type of car is sent to an industry. This is also where the Company tag comes into play. Some of the Car Movement records route empty home road or leased cars to an Empty Car Storage track so it is important to identify the company correctly. You have no direct control over which record gets assigned to which car other than they are used in order listed in the string-table. Each Car Movement (local traffic) record is assigned only once in a session.

Once all the appropriate Car Movement records have been assigned to the available cars in the emitted train, each of the remaining cars are assigned a Traffic Management record. If you have a 20 car train emitted from a portal and 4 of the cars meet the criteria needed to match the Car Movement records for the emitting portal, the remaining cars are assigned Traffic Management records assigned to that portal. These traffic management records are used repeatedly, train after train.

The destination data for any car can be displayed in the CMTM Data pop-up window by a left mouse click on that car. This will focus the camera on that car, which makes it nice for switching moves.

As the session progresses, cars get delivered to their destinations. When a car is delivered to it’s destination, it needs to be noted by clicking on the appropriate box in the CMTM Data window. The Trainz message board will give you a message that the delivery has been noted.

The information in the CMTM Data window is updated only when there is a change in the focus of the camera. So, once you have noted delivery, click on another car, then back to the car you have just noted delivered. You will then see how much time is left before the car can be moved to its next destination. Once this time has elapsed and you click on the car, the new destination will appear in the window.

The CMTM System does not plan your operations. That is up to you. There are many resources for designing and planning operations. In my humble opinion, the best being www.OPSIG.ORG

Planning Tasks

There are several planning tasks that are done independent of Trainz. The first is to create a method or system to identify industries and portals so that locations to which cars will be moved can be quickly and intuitively found by the Driver. Keep in mind that some industries have multiple tracks and multiple spots on those tracks at which a freight car might be placed.

Your method will depend on the size of your route. CMTM has been adapted to a one baseboard route with two thru traffic portals, one interchange portal and 10 industries. On a route this small, only the industry names were used to identify car destinations.

CMTM has also been adapted to the Huron Central, with 20 towns (stations), three through traffic portals, two interchange portals, 65 industries and nearly 100 different places to deliver a freight car. On this route, destinations were identified by a letter-number code and the industry name with a spot location letter if needed. This route has a central station (Huron) as the division point. All other stations are noted E(east), W(west), or N(north) from Huron followed by a number that denotes the order from Huron. Tracy is the 4th station east of Huron thus, the designator for that station is E4. This notation makes it easy to get the cars blocked and in proper order for efficient delivery when making up trains. Example: a car of pig iron destined for Quinn Foundry in Tracy will have a destination of E4 Quinn Foundry A1 (pig iron and scrap metal go on track A, spot 1, coke, sand and other foundry supplies go to track A, spot2, finished goods are shipped from track B).

There is no right or wrong way to identify your destinations, just do what works for you. If you intend to share your route with others, make sure it is easy to understand.

Car Movement

The Car Movement portion of this system directs cars to and from industries. To begin this process, determine the traffic generated by each industry. Analyze one industry at a time. Begin by noting the incoming shipments first. Then identify the outgoing shipments.

NOTE: The CMTM System is designed to accommodate seven sequential days of operations. It is recommended that you plan your operations based on multiple days operations. When the session begins, you are asked to select a day for operations. The day selected determines which movement records will be used by the system for the session.

Here is an example industry analysis for Quinn Foundry.

E4 Quinn Foundry A1 (E4 - destination station, Quinn Foundry - industry, A - track, 1 - spot)

Input - pig-iron - one Gondola every Monday from PortalEast takes 16 hrs to unload then return empty to PortalEast

Input - scrap metal - one Gondola every Wednesday from PortalWest takes 12 hrs to unload - return empty to PortalWest

E4 Quinn Foundry A2

Input - sand - one Boxcar every Tuesday from PortalNorth takes 8 hrs to unload then return empty to PortalNorth

Input - coke - one boxcar every Thursday from PortalSoo takes 8 hrs to unload - return empty to PortalSoo

E4 Quinn Foundry B2

Output - castings - one empty boxcar every Monday and Wednesday from ECS-Huron, 8 hrs to load - PortalWest

Output - castings - one empty boxcar every Tuesday from ECS-Huron, 8 hrs to load - N1 Ideal Mfg Co - ECS-Huron

Output - castings - one empty boxcar every Thursday from ECS-Huron, 8 hrs to load - PortalCMSTP

Output - castings - one empty boxcar every Friday from ECS-Huron, 8 hrs to load - PortalNorth

We also need three records to bring home the cars from the last 4 records that sent loaded cars off route.

one homeroad boxcar every Friday & Sunday from PortalWest to ECS HURON

one homeroad boxcar every Monday from PortalCMSTP to ECS HURON

one homeroad boxcar every Tuesday from PortalNorth to ECS HURON

Notes:

1. This example route has three thru portals (PortalNorth, PortalEast, PortalWest, and two interchange portals, PortalCMSTP and PortalSoo).
2. Empty home road cars are stored on an ECS (empty car storage) track. There is one located in Huron, hence ECS-Huron as the beginning location of the output traffic and the destination of returned empties.
3. The boxcar going out on Tuesday goes to an industry on the route, Ideal Mfg at station N1, and after it is unloaded there, it goes to the empty car storage track in Huron.

Creating the CMTM Database

Once you have this scenario for each industry, you can begin to create the CMTM Database. This database will be stored in the string-table of the CMTMSystem config.txt file. It is recommended that the data be entered into a spreadsheet and later, transfer the data to the string-table. Using a Movements Record Spreadsheet for the database creation allows you enter the data by industry and then sort it as needed. For example, sorting by beginning location will tell you how many empty cars of each type you will need to have on your ECS tracks, or how many of different car types will need to be included in trains emitted by a specific Portal.

The database has a specific structure that must be followed. The first five fields define the record number, days the record is active, the beginning location, car type and company. The remaining fields define the cars movements. Each movement is defined by 4 fields. You can have as many movements as you choose. The last movement should be either to a portal or an ECS track.

The column headers on the spreadsheet are as follows:

- | | |
|---------------------------|---|
| Record Number | Each line represents a data record, the numbering starts with the letters cmtm followed by a sequential number, starting with 0. This field becomes the string tag in the string table. |
| Days Active | This field defines the days that this record will be actively used. There are 7 days available. To be active, numbers 1 - 7 must be included in the field in numerical order. If the record is to be inactive on a specific day, enter an x in place of that day's number. Make sure there are NO COMMAS separating the numbers and x's when entered in the database. Example: 12x45xx represents days 1,2,4 and 5 |
| Beginning Location | This field is the name of the portal from which the car enters the railroad OR the Empty Car Storage track from which it begins its journey. If it is a Portal, the name must begin with "Portal" followed by a unique identifier such as "PortalWest". This must be the EXACT name given to the portal in Surveyor. If it is an Empty Car Storage track, the name must start with the prefix "ECS" followed by a unique identifier such as ECS AUS. This must be the EXACT name given to the ECS track marker in Surveyor. |
| Car Type | This is a two or three letter code in CAPS that specifies the type of car. The first letter is always "X". See Appendix C of this document for a complete listing of freight car types. Most cars available on the Download Station have this field correctly filled in. It can be found in each freight car's config.txt file as "category-class".
(The only problem I have encountered is XB and XBG. XB is for Box Car/covered van while |

XBG is box car/covered van for general service. Most of the box cars I have encountered use XBG but there is an occasional XB, which when targeted for local service, can present a problem. Just make sure all box cars that you use have “category-class” set to whatever you enter into the database.)

Company This field defines the company that owns or leases the car. This is used to get the appropriate cars routed to the Empty Car Storage tracks. All records for cars bound for the Empty Car Storage track must have data in this field. The company name must be exactly that used in the “company” line of the config.txt file of the intended car. If this field is not used, enter an x.

Destination 1 Destination 1 - specific location to which the car is to be delivered. This can be an Empty Car Storage (ECS) track, a Portal or an industry.

Dest 1 Load Status “empty” or “load” to indicate the car’s status on its way to this destination. This is used to change the mass of the vehicle for train dynamics and to make the load visible on open top cars.

Destination 1 Delivered Always enter “x” in this column. The system puts a delivery time there when the car is noted as delivered by the driver.

Destination 1 Time Defines the time in hours that the car takes to be loaded or unloaded. Minimum time is 0 hr.

The following columns are defined as above

Destination 2
Dest 2 load status
Destination 2 Delivered
Destination 2 Time

Destination 3
Dest 3 load status
Destination 3 Delivered
Destination 3 Time

Destination 4
Dest 4 load status
Destination 4 Delivered
Destination 4 Time

Multiple Destinations

While most car moves go from a portal or an ECS to industry to off-route destination, there are other moves that can make operations more interesting. A non-mechanical reefer has to go to the ice-house first, then to the loading industry, then to it’s destination. Some cars may need to be weighed after they are loaded and before they are put into a train to leave town. Do you have a scale track in your yard? How about a RIP Repair In Place) track? Throw in a record or two each day to have a car repaired. It can be a loaded or empty car, in through or local service.

If you have a specific car movement sequence that requires more moves, just add additional sets of four columns as needed. LCL service (less than carload) has been implemented on the Huron Central. Each way-freight has a box car that is set out at the freight depot when it arrives at each town and is picked up before

leaving town. The load/unload time is set to zero for these moves. When it arrives back in Huron, it's destination is the freight depot with a 1 hour load/unload time, then it's destination is PortalEast. This movement record has 9 moves.

Home road and leased train cars

Most industries will use box cars, gons or flats, but some industries require more specialized cars or may have their own. For instance, a packing plant may have its own fleet of reefers. When these come onto the route as empties, they should be placed on an ECS. To make this happen, make sure that the car's config.txt file company name is exactly the same as used in the CMTM Database (the CMTM string table). Many cars have the full name of the railroad spelled out in their config.txt files. I find it more readable to use only the letter abbreviation CNW or CBQ. This means you must change the config.txt file for those cars, but I think it is well worth the effort. (DO NOT USE "&" IN THE COMPANY FIELD).

VERY IMPORTANT - ALL FIELDS THAT HAVE NO DATA MUST BE FILLED IN WITH "x". ALL RECORDS MUST HAVE EITHER DATA OR AN "x" IN THE FIRST 12 FIELDS

See example in Appendix A.

Traffic Management

Now we look at the Traffic Management portion of this system. This involves the through freight traffic. Through traffic arrives on the route via a Portal and leaves via another Portal with no delivery to a local industry. To start this process, a traffic plan needs to be formulated.

Here is an example for a route that has an East-west mainline with a branch line headed south. This route also interchanges traffic with the CNW and the CGW. The following percentages are for through traffic and does not include traffic to local industries.

Trains from the west - 70% of cars go to PortalEast, 20% to the PortalSouth, 5% to CGW and 5% to CNW.

Trains from the east - 75% of cars go to PortalWest, 5% to the PortalSouth, 10% to CGW and 10% to CNW

Trains from the south - 80% of cars go to PortalWest, 15% to CGW and 5% to CNW

Trains from CGW - 40% of cars go to PortalWest, 30% to PortalSouth, 20% to PortalEast and 10% to CNW

Trains from CNW - 50% of cars go to PortalSouth, 40% to PortalWest, 10% to CGW

These traffic patterns are created by entering the appropriate number of records into the Movement Records Spreadsheet that reflect these ratios. To maintain these ratios for 7 days of the week, create the following records with all days selected. For the west portal, make twenty records with the PortalWest as the beginning Location. Of these twenty records, make the Destination 1 field of 14 of these records PortalEast, 4 to PortalSouth, one to PortalCGW and one to PortalCNW. As the day progresses, these records will be used again and again, maintaining the desired traffic ratios. Use this method for creating the records for the other portals. Daily patterns can be changed by making more records specific to days you want to change.

Creating the Data Records String Table

Once you have all the records entered into the Movement Records Spreadsheet and before you do any kind of sort, save it as a .csv or comma delimited file. Next, open this file in a Word Processor with find and replace option. Then remove all quotation marks except as shown below.

Example: (a database with 4 movement records)

```
cmtm0      "1x3x5xx,PortalEast,XBG,x,Aus01,load,x,72,PortalEast,empty,x,x"
cmtm1      "12345xx,ECS AUS,XBG,FDDMS,Aus01,empty,x,8,PortalEast,load,x,x"
cmtm2      "1xxxx67,PortalEast,XBG,FDDMS,ECS AUS,empty,x,x,x,x,x,x"
cmtm3      "xx3xxxx,PortalSouth,XBG,x,PortalWest,load,x,x,x,x,x,x"
```

Now create the complete string table. The opening line is "string-table{". The next line is the number of records in the database. Since the record numbers begin with 0 (zero), add one to the last record number for the total number of records. The next line lists the ECS tracks. Make sure that you have them spelled with all caps and that the spelling matches the track marks on the route. The next lines will be your data records. After the last data record, be sure to include a closing brace "}". Save this as your string table. It will be inserted into the CMTM System file that you create for your route.

Sample of string table

```
string-table {
numrecs      "4"
ecstracks    "ECS AUS, ECS HUX"
cmtm0        "1x3x5xx,PortalEast,XBG,x,Aus01,load,x,72,PortalEast,empty,x,x"
cmtm1        "12345xx,ECS AUS,XBG,FDDMS,Aus01,empty,x,8,PortalEast,load,x,x"
cmtm2        "1xxxx67,PortalEast,XBG,FDDMS,ECS AUS,empty,x,x,x,x,x,x"
cmtm3        "xx3xxxx,PortalSouth,XBG,x,PortalWest,load,x,x,x,x,x,x"
}
```

Installing CMTM System Components

Before you install the CMTM System on your route, specific files must be created for your route as follows:

1. Clone CMTMSystem <kuid:32711:1301> - note new kuid number for use in step 4B.
2. Edit config.txt file for newly cloned CMTMSystem as follows:
 - A. Change username to *****CMTMSystem - where ***** is the name of your route.
(example for Santa Maria Valley Railroad use the letters SMVRR.
File would then have the name SMVRR CMTMSystem)
 - B. Copy and paste the string-table created above over the existing string-table.

C. Commit the newly cloned and renamed System asset.

3. Clone CMTM Portal <kuid:32711:1070>

4. Edit config.txt file for newly cloned CMTMPortal as follows:

A. Change username to *****CMTMPortal - where ***** is the name of your route.

B. In the kuid table, change the kuid number for cmtmlib to the kuid number for *****CMTMSystem.

Sample of Portal kuid-table:

```
kuid-table
{
portal-entry      <kuid:-3:10239>
portal-end       <kuid:-3:10238>
0                <kuid:-3:10164>
1                <kuid:-1:15>
cmtmlib          <kuid: (new number for cloned CMTMSystem)>
}
```

C. Commit the newly cloned and renamed Portal asset.

Set-up in Surveyor

Now you are ready to move to Trainz Surveyor. Two components must be placed; at least one instance of the CMTM Portal you have just cloned for your route and at least one ECS track.

Portal Set-up

All Portals that emit freight cars that will need a destination must be the CMTM Portal you have just created specific to your route. Make sure that each CMTM Portal you place on the route is named exactly as used in the movement records. After the portals have been placed, set their parameters as follows: Do NOT check “Produce New Trains”. DO check “Consume all Trains”. These portals will be controlled by the Portal Timetable Rule.

Thanks to Maggs for his permission to modify and use his Re-Rail Portal. The feature I like with these portals is that they can emit a string of freight cars without an engine. This is perfect for simulating an interchange track with a foreign railroad.

I do not recommend using the re-rail feature. It can mess up your operations; the train that derails will be re-emitted from the portal that is enabled for this feature. So, you may derail a train in Austin, only to have it re-emitted miles away by PortalEast. When this occurs, every car in the train will be given a new destination.

If you are planning to run passenger trains and through freight trains that will not stop on the route for set-offs or pick-ups, it is recommended you use non-CMTM Portals for these trains. That way, the CMTM system does not have to attempt to assign records to the cars in these trains.

Empty Car Storage (ECS) track placement

The CMTM System uses a specific place to store empty cars - the Empty Car Storage (ECS) track. This track is identified in Surveyor with a Track Mark that is named exactly as used in the data base. This name **MUST** have the first three letters to be ECS and the complete name must be spelled in all caps. Make sure the track is long enough to accommodate all your empty car storage needs. This track is usually a single ended track at the edge of the yard but a double ended siding or yard track will also work. You may have more than one ECS on your route. Each one should have a unique name.

The ECS tracks must also be listed in the CMTMSystem config.txt file's string table. See Appendix A for example.

Local Traffic Track

The CMTM System uses a specific track on which to place cars in Surveyor that will be assigned a local destination on start-up. To identify this location, place a track marker on the track and name it "Local". You can have more than one track marked "Local". You can also choose not to use this feature by not placing any "Local" track markers.

Session Set-up

Use the Portal Timetable Rule (kuid2:61392:2002:1) to schedule the arrival of trains on your route.

First create a train in Surveyor and save it as a consist with appropriate names such as PortalWest1, PortalWest2, PortalCNW1, etc. That way you can see the cars you are putting in the train and check to see if they are commodity enabled. And it makes it easy to select trains when setting up the Portal Timetable Rule. Make sure that you include specific cars for local traffic. And try to put them on the front end of the train so they can be easily pulled off by a switcher or set-out by the road engine. Don't forget those empty home road cars or leased cars bound for the ECS track and the gon or flat that is needed by a local industry. Here is where you should consider a schedule for specific types of traffic such as putting livestock cars bound for the local packing plant in the early morning trains or running a late afternoon reefer express.

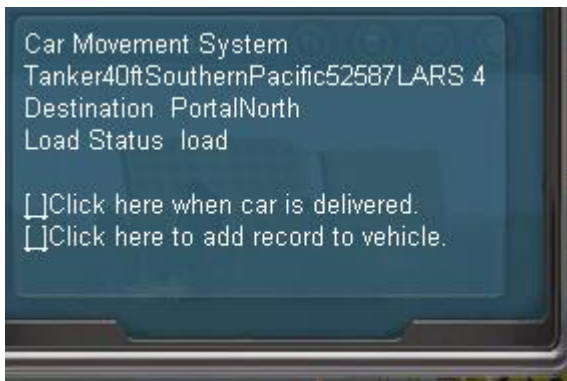
Place cars in yards, industries, ECS Tracks and the Local Track. Cars placed at industries and on yard tracks will be assigned an off route destination at start-up. These destinations will be any portal you have installed. Cars placed on the ECS tracks will not be given any destinations. Cars placed on the Local track will be assigned local destinations at start-up.

This gives you some options when creating sessions. If you want start with running a local way freight or switching local industries, place the appropriate cars on the local track. If you want to start with the arrival of thru freights and do lots of classification switching, do not put cars on the Local track in Surveyor. The cars for local service will arrive on the thru freights.

Using in Driver

When a Session starts in driver, a window is displayed that gives you a choice of 7 different days to run. When you select a day by clicking on it, the CMTM System goes thru a set-up routine and assigns destinations to cars on the route.

When you left-mouse-click on a train car, the camera focuses on that train car. With CMTM installed, this also causes a window to be opened in the upper left corner of the display. This window gives the name of the vehicle and other pertinent data. (Unfortunately, Trainz code does not recognize “&” as a valid text character so if the name of the train car is C&NW only C is shown.) If the train car is not a freight car, it is so noted. If the train car is a freight car, it will state the name of the car as defined in its config.txt file, its destination and whether it is loaded or empty.



At the bottom of the window are two user input choices - “Click here when car is delivered” and “Click here to add record to vehicle”.

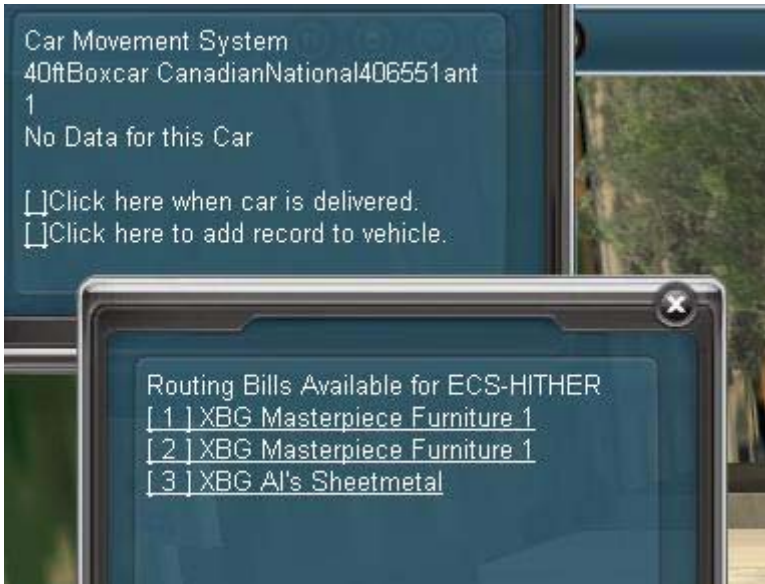
Delivering a Car to an Industry

Although you may click on the first option at any time, it is only appropriate when the car has reached it's destination.

When clicked, it starts a timer to track the loading or unloading time. If you select the car again, the window will tell you how much time is left until the car is loaded or unloaded. If the time has elapsed when you click on the car, the next destination will be displayed.

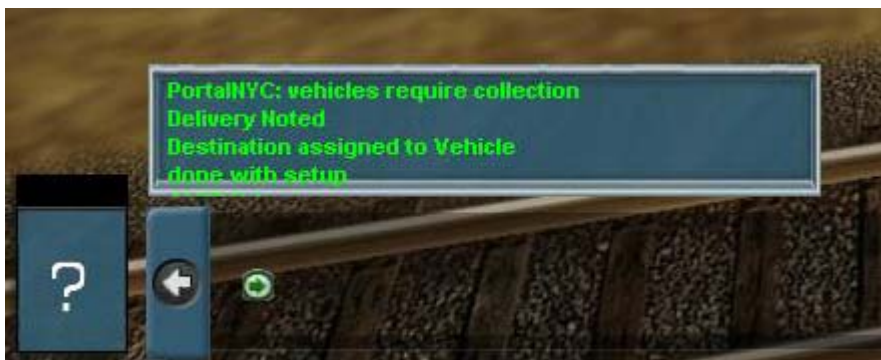
Using Cars from Empty Car Storage

The Empty Car Storage tracks should be checked each day to see which cars are required by the various industries. When you click on an ECS car, no destination will be listed for that car. Clicking on the “add record to vehicle” option is functional only when the car is located on an ECS track. Given that, a new window will pop-up that displays all Car Movement records that are available for that type of freight car at that ECS location. Upon clicking on a displayed record, it is attached to the current freight car.



In Driver Mode - if you press ESC, the CMTM window will close, but will open again when you click on a new train car.

Keep your Trainz message window open and watch for conformation that various selections have been performed or why they have not been performed such as “Selected vehicle is not a freight car” or “Car has off road destination” or “Delivery Noted”, etc.



If you click on a freight car and get the message that it is not a freight car, more than likely, the category-class for that car does not begin with an X. Not every car on the Download Station has all it's data correctly entered.

Remember: Accuracy in data between what you put in the CMTM Database and what is contained in the various config.txt files is most important.

Delivering cars to an interchange portal

When delivering a string of cars to an interchange portal, you must drop kick the string of cars into the portal so you don't lose your locomotive. This switching practice is usually discouraged on most railroads, but here is one time when it is the only way to make it work. I have found that uncoupling the cars from the engine at 20mph and then cutting the throttle works if the interchange track is level. I also recommend placing a fence post or some other scenery item to mark the entrance of the portal (point of no return for the locomotive).

Now, all that work pays off. Every freight car will have a destination and it is up to the Driver to make sure they all get to their destinations in a timely manner. Isn't that what railroading is all about?

Have fun and enjoy.

Definitions

Beginning Location- the place on the map where an in service freight car begins its journey in your railroad. This is either a portal or an Empty Car Storage track.

Database - a listing of records with each record containing the movements of one freight car (See Movement Record Spreadsheet)

Destination - the location on the map to which the train car is to be delivered.

Empty Car Storage - a track identified by a track mark where empty home-road cars or leased cars for local industries are stored. There may be more than one Empty Car Storage (ECS) location on the route.

Foreign road - the name of any railroad that is not the home road.

Home road - the name of the railroad which the Trainz Route represents

Portal - Portals used in CMTM System are CMTM Portals. In addition to acting as a standard portal, they can consume or emit a string of cars without an engine. They also have a built-in interface to the CMTM System so that every freight car emitted has a specific movement record attached,

Movement Records Spreadsheet - this is a listing of all the car movements in a spreadsheet format. Any spreadsheet program that can save the data in a comma delimited text format will work. This is commonly know as a .csv format.

Appendix A - Sample of String table for CMTMSystem config.txt file

This is the string-table database for the route described in Appendix B. Note that the first column of data is not in quotes. The remaining strings of data are each enclosed in a single set of quotation marks. The first line in the string table contains the number of CMTM records that are contained in the string-table. Records begin numbering at zero. In this case the last number is 145 - therefore there are 146 records. as noted in the first line of the table.

```
string-table {
ecstracks      "ECS AUS,ECS HUX"
numrecs        "146"
cmtm1          "1xxxxxx,PortalEast,XBG,x,AUS01,load,x,20,PortalEast,empty,x,x"
cmtm2          "x2xxx6x,ECS AUS,XBG,CBQ,AUS01,empty,x,8,PortalEast,load,x,x"
cmtm3          "xxx4xx7,PortalEast,XBG,CBQ,ECS AUS,empty,x,x,x,x,x,x"
cmtm4          "xx3xxxx,ECS AUS,XBG,CBQ,AUS01,empty,x,8,PortalWest,load,x,x"
cmtm5          "x2xxxxx,PortalWest,XBG,CBQ,ECS AUS,empty,x,x,x,x,x,x"
cmtm6          "xxxx5xx,ECS AUS,XBG,CBQ,AUS01,empty,x,8,PortalSouth,load,x,x"
cmtm7          "x2xxxxx,PortalSouth,XBG,CBQ,ECS AUS,empty,x,x,x,x,x,x"
cmtm8,
cmtm9,         "xxx4xxx,ECS AUS,XBG,CBQ,AUS01,empty,x,8,PortalCNW,load,x,x"
cmtm10,        "1xxxxxx,PortalCNW,XBG,CBQ,ECS AUS,empty,x,x,x,x,x,x"
cmtm11,        "1x3x5xx,PortalSouth,XBG,x,AUS02a,load,x,6,PortalSouth,empty,x,x"
cmtm12,        "x2xxxxx,PortalWest,XRI,x,AUS02a,load,x,22,PortalWest,empty,x,x"
cmtm13,        "xxx4xxx,PortalCNW,XRI,x,AUS02a,load,x,20,PortalCNW,empty,x,x"
cmtm14,        "xxxx5xx,PortalCGW,XBG,x,AUS02b,load,x,20,PortalCGW,empty,x,x"
cmtm15,        "x2xxxxx,ECS AUS,XFM,CBQ,AUS02b,empty,x,48,PortalEast,load,x,x"
cmtm16,        "xxxxx6x,PortalEast,XFM,CBQ,ECS AUS,empty,x,x,x,x,x,x"
cmtm17,        "1xxxxxx,PortalSouth,XBG,x,AUS03,load,x,40,PortalSouth,empty,x,x"
cmtm18,        "xx3xxxx,ECS AUS,XBG,CBQ,AUS03,empty,x,10,PortalCGW,load,x,x"
cmtm19,        "xxxxx7,PortalEast,XBG,CBQ,ECS AUS,empty,x,x,x,x,x,x"
cmtm20,        "xxxx5xx,ECS AUS,XBG,CBQ,AUS03,empty,x,10,PortalCNW,load,x,x"
cmtm21,        "xx3xxxx,PortalCNW,XBG,CBQ,ECS AUS,empty,x,x,x,x,x,x"
cmtm22,        "1x3x5xx,PortalWest,XBG,x,AUS04a,load,x,12,PortalWest,empty,x,x"
cmtm23,        "x2xxxxx,PortalCNW,XBG,x,AUS04a,load,x,20,PortalCNW,empty,x,x"
cmtm24,        "1x3x5xx,PortalSouth,XG,x,AUS04a,load,x,12,PortalSouth,empty,x,x"
cmtm25,        "xx3xxxx,ECS AUS,XBG,CBQ,AUS04b,empty,x,20,HUX03b,load,x,20,ECS AUS,empty,x,x"
cmtm26,        "1xx4xxx,PortalWest,XBG,x,KEL01a,load,x,16,PortalWest,empty,x,x"
cmtm27,        "x2xx5xx,PortalEast,XG,x,KEL01a,load,x,8,PortalEast,empty,x,x"
cmtm28,        "1xx4xxx,PortalCNW,XHB,x,KEL01b,load,x,30,PortalCNW,empty,x,x"
cmtm29,        "1xx4xxx,ECS AUS,XBG,CBQ,KEL02,empty,x,6,PortalWest,load,x,x"
cmtm30,        "xxx4xx7,PortalWest,XBG,CBQ,ECS AUS,empty,x,x,x,x,x,x"
cmtm31,        "x23xxxx,ECS AUS,XBG,CBQ,KEL02,empty,x,6,PortalSouth,load,x,x"
cmtm32,        "1xx4xxx,PortalSouth,XBG,CBQ,ECS AUS,empty,x,x,x,x,x,x"
cmtm33,        "xxxx5xx,ECS AUS,XFM,CBQ,KEL02,empty,x,10,PortalCNW,load,x,x"
cmtm34,        "xx3xxxx,PortalCNW,XFM,CBQ,ECS AUS,empty,x,x,x,x,x,x"
cmtm35,        "1x3xxxx,PortalEast,XBG,x,KEL03,load,x,6,PortalEast,load,x,x"
cmtm36,        "xxxx5xx,PortalSouth,XBG,x,KEL03,load,x,8,PortalSouth,empty,x,x"
cmtm37,        "1xxx5xx,ECS AUS,XBG,CBQ,KEL03,empty,x,12,PortalCNW,load,x,x"
                "x2xxx6x,PortalCNW,XBG,CBQ,ECS AUS,empty,x,x,x,x,x,x"
```

cmtm38 "xx34xxx,ECS AUS,XBG,CBQ,KEL03,empty,x,12,PortalWest,load,x,x,x"
cmtm39 "x2xxx6x,PortalWest,XBG,CBQ,ECS AUS,empty,x,x,x,x,x,x"
cmtm40 "x2xx5xx,PortalCNW,XHB,x,KEL03,load,x,48,PortalCNW,empty,x,x,x"
cmtm41 "x2xxxxx,PortalSouth,XG,x,HUX01,load,x,8,PortalSouth,empty,x,x,x"
cmtm42 "xxxx5xx,PortalSouth,XFM,x,HUX01,load,x,8,PortalSouth,empty,x,x,x"
cmtm43 "1xxxxxx,ECS AUS,XG,CBQ,HUX01,empty,x,8,PortalEast,load,x,x,x"
cmtm44 "xxxxx6x,PortalEast,XG,CBQ,ECS AUS,empty,x,x,x,x,x,x,x"
cmtm45 "xx3xxxx,ECS AUS,XFM,CBQ,HUX01,empty,x,8,PortalSouth,load,x,x,x"
cmtm46 "xxxxxxx7,PortalSouth,XFM,CBQ,ECS AUS,empty,x,x,x,x,x,x,x"
cmtm47 "x2xxxxx,ECS AUS,XBG,CBQ,HUX01,empty,x,8,PortalWest,load,x,x,x"
cmtm48 "1xxxxxx,PortalWest,XBG,CBQ,ECS AUS,empty,x,x,x,x,x,x,x"
cmtm49 "1xxxxxx,PortalSouth,XBG,x,HUX02a,load,x,40,PortalSouth,empty,x,x,x"
cmtm50 "xxx4xxx,PortalCGW,XBG,x,HUX02a,load,x,20,PortalCGW,empty,x,x,x"
cmtm51 "12345xx,ECS HUX,XRI,IBP,HUX02b,empty,x,1,HUX04,load,x,6,PortalCNW,load,x,x,x"
cmtm52 "1x3456x,PortalCNW,XRI,IBP,ECS HUX,empty,x,x,x,x,x,x,x"
cmtm53 "12345xx,ECS HUX,XRI,IBP,HUX02b,empty,x,1,HUX04,load,x,6,PortalCGW,load,x,x,x"
cmtm54 "12x45x7,PortalCGW,XRI,IBP,ECS HUX,empty,x,x,x,x,x,x,x"
cmtm55 "x2x4xxx,ECS HUX,XRI,IBP,HUX02b,empty,x,1,HUX04,load,x,6,PortalSouth,load,x,x,x"
cmtm56 "xxx4x6x,PortalSouth,XRI,IBP,ECS HUX,empty,x,x,x,x,x,x,x"
cmtm57 "12345xx,ECS HUX,XRI,IBP,HUX02b,empty,x,1,HUX04,load,x,6,AUS04,load,x,8,ECS
HUX,empty,x,x,x"
cmtm58 "x2xxxxx,PortalSouth,XBG,x,HUX03a,load,x,12,PortalSouth,empty,x,x,x,x"
cmtm59 "xxxx5xx,PortalCNW,XBG,x,HUX03b,load,x,8,PortalCNW,empty,x,x,x,x"
cmtm60 "xx3xxxx,ECS HUX,GATX,GATX,HUX05,empty,x,99,PortalCGW,load,x,x,x,x"
cmtm61 "x2xxxxx,PortalCGW,XTS,GATX,ECS HUX,empty,x,x,x,x,x,x,x"
cmtm62 "12345xx,PortalSouth,XLA,x,HUX06,load,x,1,PortalSouth,empty,x,x,x,x"
cmtm63 "12345xx,PortalWest,XLA,x,HUX06,load,x,1,PortalWest,empty,x,x,x,x"
cmtm64 "12345xx,PortalEast,XLA,x,HUX06,load,x,1,PortalEast,empty,x,x,x,x"
cmtm65 "12345xx,PortalEast,XLA,x,HUX06,load,x,1,PortalEast,empty,x,x,x,x"
cmtm66 "x23xxxx,PortalEast,XLA,x,HUX06,load,x,1,PortalEast,empty,x,x,x,x"
cmtm67 "12345xx,PortalCGW,XLA,x,HUX06,load,x,1,PortalCGW,empty,x,x,x,x"
cmtm68 "x2xxxxx,ECS HUX,XBG,CBQ,HUX07a,empty,x,8,PortalCGW,load,x,x,x,x"
cmtm69 "xxxxx6x,PortalCGW,XBG,CBQ,ECS HUX,empty,x,x,x,x,x,x,x"
cmtm70 "xx3xxxx,ECS HUX,XBG,CBQ,HUX07b,empty,x,99,PortalSouth,load,x,x,x,x"
cmtm71 "x2xxxxx,PortalSouth,XBG,CBQ,ECS HUX,empty,x,x,x,x,x,x,x"
cmtm72 "x2xx5xx,PortalSouth,XHB,x,HUX08,load,x,46,PortalSouth,empty,x,x,x,x"
cmtm73 "1xxxxxx,PortalEast,XTM,x,MAX01,load,x,8,PortalEast,empty,x,x,x,x"
cmtm74 "xxx4xxx,PortalSouth,XTM,x,MAX01,load,x,8,PortalSouth,empty,x,x,x,x"
cmtm75 "xx3xxxx,PortalWest,XHB,x,MAX02a,load,x,46,PortalWest,empty,x,x,x,x"
cmtm76 "1xx4xxx,PortalCNW,XHB,x,MAX02b,load,x,6,PortalCNW,empty,x,x,x,x"
cmtm77 "x2xx5xx,PortalEast,XHB,x,MAX02b,load,x,6,PortalEast,empty,x,x,x,x"
cmtm78 "x2xx5xx,PortalCNW,XBG,x,MAX03a,load,x,12,PortalCNW,empty,x,x,x,x"
cmtm79 "xx3xxxx,PortalWest,XBG,x,MAX03a,load,x,6,PortalWest,empty,x,x,x,x"
cmtm80 "1x3xxxx,ECS AUS,XBG,CBQ,MAX03a,empty,x,4,PortalEast,load,x,x,x,x"
cmtm81 "1xxxx6x,PortalEast,XBG,CBQ,ECS AUS,empty,x,x,x,x,x,x,x"
cmtm82 "x2x4xxx,ECS AUS,XBG,CBQ,MAX03a,empty,x,4,PortalSouth,load,x,x,x,x"
cmtm83 "x2xxxxx,PortalSouth,XBG,CBQ,ECS AUS,empty,x,x,x,x,x,x,x"
cmtm84 "xxxx5xx,ECS AUS,XBG,CBQ,MAX03a,empty,x,4,AUS02a,load,x,6,ECS AUS,empty,x,x,x"

cmtm85 “xxx4xxx,PortalCNW,XHB,x,MAX03b,load,x,72,PortalCNW,empty,x,x”
cmtm86 “1234567,PortalWest,XBG,x,PortalEast,load,x,x,x,x,x,x”
cmtm87 “1234567,PortalWest,XBG,x,PortalEast,load,x,x,x,x,x,x”
cmtm88 “1234567,PortalWest,XBG,x,PortalEast,load,x,x,x,x,x,x”
cmtm89 “1234567,PortalWest,XBG,x,PortalEast,empty,x,x,x,x,x,x”
cmtm90 “1234567,PortalWest,XBG,x,PortalEast,empty,x,x,x,x,x,x”
cmtm91 “1234567,PortalWest,XBG,x,PortalEast,empty,x,x,x,x,x,x”
cmtm92 “1234567,PortalWest,XBG,x,PortalEast,load,x,x,x,x,x,x”
cmtm93 “1234567,PortalWest,XBG,x,PortalEast,load,x,x,x,x,x,x”
cmtm94 “1234567,PortalWest,XBG,x,PortalEast,load,x,x,x,x,x,x”
cmtm95 “1234567,PortalWest,XBG,x,PortalEast,load,x,x,x,x,x,x”
cmtm96 “1234567,PortalWest,XBG,x,PortalEast,load,x,x,x,x,x,x”
cmtm97 “1234567,PortalWest,XBG,x,PortalEast,empty,x,x,x,x,x,x”
cmtm98 “1234567,PortalWest,XBG,x,PortalEast,empty,x,x,x,x,x,x”
cmtm99 “1234567,PortalWest,XBG,x,PortalEast,empty,x,x,x,x,x,x”
cmtm100 “1234567,PortalWest,XBG,x,PortalSouth,empty,x,x,x,x,x,x”
cmtm101 “1234567,PortalWest,XBG,x,PortalSouth,load,x,x,x,x,x,x”
cmtm102 “1234567,PortalWest,XBG,x,PortalSouth,load,x,x,x,x,x,x”
cmtm103 “1234567,PortalWest,XBG,x,PortalSouth,load,x,x,x,x,x,x”
cmtm104 “1234567,PortalWest,XBG,x,PortalCNW,load,x,x,x,x,x,x”
cmtm105 “1234567,PortalWest,XBG,x,PortalCGW,load,x,x,x,x,x,x”
cmtm106 “1234567,PortalEast,XBG,x,PortalWest,load,x,x,x,x,x,x”
cmtm107 “1234567,PortalEast,XBG,x,PortalWest,load,x,x,x,x,x,x”
cmtm108 “1234567,PortalEast,XBG,x,PortalWest,load,x,x,x,x,x,x”
cmtm109 “1234567,PortalEast,XBG,x,PortalWest,empty,x,x,x,x,x,x”
cmtm110 “1234567,PortalEast,XBG,x,PortalWest,empty,x,x,x,x,x,x”
cmtm111 “1234567,PortalEast,XBG,x,PortalWest,empty,x,x,x,x,x,x”
cmtm112 “1234567,PortalEast,XBG,x,PortalWest,load,x,x,x,x,x,x”
cmtm113 “1234567,PortalEast,XBG,x,PortalWest,load,x,x,x,x,x,x”
cmtm114 “1234567,PortalEast,XBG,x,PortalWest,load,x,x,x,x,x,x”
cmtm115 “1234567,PortalEast,XBG,x,PortalWest,load,x,x,x,x,x,x”
cmtm116 “1234567,PortalEast,XBG,x,PortalWest,empty,x,x,x,x,x,x”
cmtm117 “1234567,PortalEast,XBG,x,PortalWest,empty,x,x,x,x,x,x”
cmtm118 “1234567,PortalEast,XBG,x,PortalWest,empty,x,x,x,x,x,x”
cmtm119 “1234567,PortalEast,XBG,x,PortalWest,load,x,x,x,x,x,x”
cmtm120 “1234567,PortalEast,XBG,x,PortalWest,empty,x,x,x,x,x,x”
cmtm121 “1234567,PortalEast,XBG,x,PortalSouth,empty,x,x,x,x,x,x”
cmtm122 “1234567,PortalEast,XBG,x,PortalCNW,empty,x,x,x,x,x,x”
cmtm123 “1234567,PortalEast,XBG,x,PortalCNW,load,x,x,x,x,x,x”
cmtm124 “1234567,PortalEast,XBG,x,PortalCGW,load,x,x,x,x,x,x”
cmtm125 “1234567,PortalEast,XBG,x,PortalCGW,load,x,x,x,x,x,x”
cmtm126 “1234567,PortalCGW,XBG,x,PortalWest,empty,x,x,x,x,x,x”
cmtm127 “1234567,PortalCGW,XBG,x,PortalWest,empty,x,x,x,x,x,x”
cmtm128 “1234567,PortalCGW,XBG,x,PortalWest,empty,x,x,x,x,x,x”
cmtm129 “1234567,PortalCGW,XBG,x,PortalWest,empty,x,x,x,x,x,x”
cmtm130 “1234567,PortalCGW,XBG,x,PortalEast,empty,x,x,x,x,x,x”
cmtm131 “1234567,PortalCGW,XBG,x,PortalEast,empty,x,x,x,x,x,x”
cmtm132 “1234567,PortalCGW,XBG,x,PortalWest,load,x,x,x,x,x,x”

```

cmtm133      "1234567,PortalCGW,XBG,x,PortalWest,load,x,x,x,x,x,x"
cmtm134      "1234567,PortalCGW,XBG,x,PortalWest,load,x,x,x,x,x,x"
cmtm135      "1234567,PortalCGW,XBG,x,PortalCNW,empty,x,x,x,x,x,x"
cmtm136      "1234567,PortalCNW,XBG,x,PortalSouth,empty,x,x,x,x,x,x"
cmtm137      "1234567,PortalCNW,XBG,x,PortalSouth,empty,x,x,x,x,x,x"
cmtm138      "1234567,PortalCNW,XBG,x,PortalSouth,load,x,x,x,x,x,x"
cmtm139      "1234567,PortalCNW,XBG,x,PortalSouth,load,x,x,x,x,x,x"
cmtm140      "1234567,PortalCNW,XBG,x,PortalSouth,load,x,x,x,x,x,x"
cmtm141      "1234567,PortalCNW,XBG,x,PortalWest,load,x,x,x,x,x,x"
cmtm142      "1234567,PortalCNW,XBG,x,PortalWest,load,x,x,x,x,x,x"
cmtm143      "1234567,PortalCNW,XBG,x,PortalWest,empty,x,x,x,x,x,x"
cmtm144      "1234567,PortalCNW,XBG,x,PortalWest,empty,x,x,x,x,x,x"
cmtm145      "1234567,PortalCNW,XBG,x,PortalCGW,empty,x,x,x,x,x,x"
}

```

Appendix B - Example of System in Use

Our map represents a sub-division of an imaginary railroad, consisting of an east west single track mainline with a portal at each end. Near the center of the sub-division is a branch line that goes south into a portal. These portals represent other divisions of the home road. The western most town is Austin and is where the sub-division yard is located. The map is called the Austin Sub-Division. The yard has six through sidings and a stub siding that is the Empty Car Storage track. Austin has four industries and a teamtrack. On the eastern edge of Austin is an interchange track with the CGW. The next town is Kelley where the main branches south through Maxwell and further south to the PortalSouth which represents the next division. Maxwell has three industries and five car spots. There is also a wye.

Back to the east west main at Kelley. Kelly has two passing sidings and two industries served by three spurs and four spots. Further east we find Huxley. There are six industries with seven sidings or spurs and eleven spots. There is a wye and east of town we cross over the CNW RR double track main where there is a facing point interchange track.

Portals and Empty Car Storage

- PortalWest
- PortalSouth
- PortalEast
- PortalCNW - Interchange Portal
- PortalCGW - Interchange Portal
- ECS AUS - Empty Car Storage Track in Austin Yard
- ECS HUX - Empty Car Storage Track in Huxley yard

Session Operations

Your mission begins with retrieving the cars from the CGW interchange and classify them along with other cars that may be in the yard when the session starts. The first train to arrive is #101 from the west. Pull all the cars from this train and store the engine on the engine track and the caboos on the caboos track. Then classify the cars from this train. The

second train to arrive is #401 from the South. Pull from it the cars for local service and pull half of the westbound cars you may have from the yard, put them in this train and send it on its way West.

Next to arrive is train #201 from the east. Pull from it any local cars, and add to it the remaining westbound cars and send it on its way West. The last train to arrive in the first hour of operations is #301 from the west. Pull from it any local cars and add to it all the southbound cars from the yard and send it south. Then remake train #101 with all the eastbound cars from the yard and send it east.

Your first local train is the Huxley Turn to service the industries in Kelly and Huxley as well as the CNW Interchange in Huxley. Service only trailing point sidings at Kelly - which means some industries on the outbound trip and some on the inbound trip. At Huxley, deliver the livestock to the packing plant first, Then pull refers as needed from the storage track and deliver to the ice house. Then, pull the cars from the CNW interchange. Next work the industry tracks, including any cars from the CNW. then deliver your CNW cars to the interchange track, pull the livestock empties from the packing plant and make up your train for departure to Kelly and Austin. Your last move at Huxley is to transfer the refers from the ice house to the packing plant.

On your trip back to Austin, work the trailing point industries at Kelley.

Back in Austin, switch the Austin industries.

Your last run for the day is the Maxwell Turn which includes delivering the appropriate cars to the CGW Interchange.

Planning tasks for this route

Industries with their traffic requirements:

Austin (AUS)

O'Toole Headlight Mfg Co. (AUS01)

input - one boxcar every Monday from east portal takes 72 hrs to unload
output - one box car every Tuesday and Saturday to east portal take 8 hrs to load
output - one boxcar every Wednesday to west portal takes 8 hrs to load
output - one boxcar every Friday to south portal takes 8 hrs to load
output - one box car every Thursday to CNW takes 8 hrs to load

Austin Grocery Wholesale (AUS02A)

input - one boxcar every Monday, Wednesday & Friday from south portal takes 6 hrs to unload
input - one refer every Tuesday from west portal takes 22 hrs to unload
input - one refer every Thursday from CNW takes 20 hrs to unload

Custom Machine Works (Aus02B)

input - one boxcar every Friday from CGW takes 20 hrs to unload
output - one flatcar every Tuesday to east portal takes 48 hrs to load

Masterpiece Furniture Co. (AUUS03)

input -one boxcar every Monday from south portal takes 48 hrs to unload
output - one boxcar every Wednesday to CGW takes 10 hrs to load
output - one boxcar every Friday to CNW takes 10 hrs to load

Team Track (AUS04A)

- input- one box car every Monday, Wednesday and Friday from west portal takes 12 hrs to load
- input - one boxcar every Tuesday from CNW takes 20 hrs to unload
- input - one Gon every Thursday from south portal takes 48 hrs to unload

Team Track overhead crane (AUS04B)

- output - one boxcar every Saturday to HUX03B, takes 40 hrs to load

Kelley (KEL)

Frank's Valve Co. (KEL01A)

- input - one boxcar every Monday from west portal takes 16 hrs to unload
- input - one Gon every Tuesday and Thursday from east portal takes 8 hrs to unload

Frank's Valve Co. (KEL01B)

- input - one coal hopper every Monday and Thursday from CNW takes 30 hrs to unload

Frank's Valve Co. (KEL02)

- output - one boxcar every Monday and Thursday to west portal takes 6 hrs to load
- output - one boxcar every Tuesday and Wednesday to south portal takes 6 hrs to load
- output - one flatcar every Friday to CNW takes 10 hrs to load

Midwest Paper Bag & Box Co. (KEL03)

- input - one box car every Monday from eastportal takes 6 hrs to unload
- input - one boxcar every Friday from south portal takes 8 hrs to unload
- output - one box car every Monday to CNW takes 12 hrs to load
- output - one box car every Wednesday & Thursday to west portal takes 12 hrs to load

Huxley (HUX)

HUX Steel Fabricator (HUX01)

- input - one gon every Tuesday from south portal takes 8 hrs to unload
- input - one flatcar every Friday from south portal takes 8 hrs to unload
- output - one gon every Monday to east portal takes 8 hrs to load
- output - one flatcar every Wednesday to south portal takes 8 hrs to load
- output - one box car every Tuesday to west portal takes 8 hrs to load

Crawford Plumbing Supply (HUX02A)

- input - one boxcar every Monday from south portal takes 12 hrs to unload
- input - one boxcar every Thursday from CGW takes 12 hrs to unload

Huxley Ice Co.(HUX02B)

- output - one refer every MTWTF, takes 1 hr to load then to HUX04 takes 6 hr to load, then to CNW
- output - one refer every MTWTF, takes 1 hr to load then to HUX04 takes 6 hr to load, then to CGW
- output - one refer every Tuesday & Thursday, takes 1 hr to load then to HUX04 takes 6 hr to load, then to south portal
- output - one refer every Friday, takes 1 hr to load, then to HUX04 takes 6 hrs to load, then to AUS04 takes 8 hrs to unload then to EHUX

See-Thru Glass Warehouse (HUX03A)

input - one boxcar every Tuesday from south portal takes 12 hrs to unload

ABC Appliance Distributors (HUX03B)

input - one boxcar every Friday from CNW takes 8 hrs to unload

Iowa Beef Packing Plant (HUX04)

input - all cars from ice house HUX02B

Iowa Beef Packing Plant (HUX05)

output - one tank car every Wednesday to CGW takes 99 hrs to load

Iowa Beef Packing Plant (HUX06)

input - one livestock car every MTWTF from south portal takes 1 hr to unload

input - one livestock car every MTWTF from west portal takes 1 hr to unload

input - one livestock car every MTWTF from CGW takes 1 hr to unload

input - one livestock car every Monday, Thursday and Friday from CNW takes 1 hr to unload

input - one livestock car every Tuesday and Wednesday from east portal takes 1 hr to unload

Iowa Beef Packing Plant (HUX07A)

output - one boxcar every Tuesday to CGW takes 8 hrs to load

Iowa Beef Packing Plant (HUX07B)

output - one boxcar every Tuesday to south portal takes 36 hrs to load

Iowa Beef Packing Plant (HUX07C)

input - one coal hopper every Tuesday and Friday from south portal takes 48 hrs to unload

Maxwell (MAX)

Jones Gasoline & Oil distributors (MAX01)

input - one tankcar every Monday from east portal takes 8 hrs to unload

input - one tankcar every Thursday from south portal takes 8 hrs to unload

Maxwell Redi-mix Concrete (MAX02A)

input - one covered cement hopper every Wednesday from west portal takes 48 hrs to unload

Maxwell Redi-mix Concrete (MAX02B)

input - one hopper of sand every Monday and Thursday from CNW takes 6 hrs to unload

input - one hopper crushed rock every Tuesday and Friday from east portal takes 6 hrs to unload

Dr Pepper Bottling Works (MAX03A)

input - one boxcar every Tuesday and Friday from CNW takes 12 hrs to unload

input - one boxcar every Wednesday from west portal takes 6hrs to unload

output - one boxcar every Monday and Wednesday to east portal takes 4 hrs to load

output - one boxcar every Tuesday and Thursday to south portal takes 4 hrs to load

output - one boxcar every Friday to AUS02A takes 4 hrs to load

Dr Pepper Bottling Works (MAX03B)

input - one coal hopper every Thursday from CNW takes 72 hrs to unload

Thru-Traffic Flow Patterns

The thru-traffic flow patterns for this map have been arbitrarily set as follows:

Trains from the west - 70% to East Portal, 20% to the south, 5% to CGW and 5% to CNW.

Trains from the east - 75% to West Portal, 5% to the south portal, 10% to CGW and 10% to CNW

Trains from the south - 80% to west portal, 15% to CGW and 5% to CNW
 Trains from CGW - 40% to west portal, 30% to south portal, 20% to east portal and 10% to CNW
 Trains from CNW - 50% to south portal, 40% to west portal, 10% to CGW

These traffic pattern are created by making the appropriate number of records that reflect these ratios. To maintain these ratios for seven days of the week, create the following records with all days selected. For the west portal, make twenty records with the West portal as the beginning Location. Of these twenty records, make the Destination 1 field of 12 of these records the east portal, 4 to the south portal, one to the CGW and one to the CNW. As the game progresses, these records will be used again and again, maintaining the desired traffic ratios. Use this method for creating the records for the other portals. Daily patterns can be change by making more records specific to days you want to change.

The string-table CMTM database that was created from this planning is shown in Appendix A.

Train Schedule

Train#	from	Portal	to	portal time emitted	Description	size train
extra	Austin Yd	Switcher	6:45AM	service thru trains with set-outs and pick-ups, classify cars, make up local freights, service CGW interchange		
101	West	East	7:00AM	make set-outs and pick-ups at Austin Yard	20 - 25 cars inbound	
401	south	West	7:15AM	make set-outs and pick-ups at Austin Yard	15 - 20 cars inbound	
201	East	West	7:30AM	make set-outs and pick-ups at Austin Yard	20 - 25 cars inbound	
301	West	South	7:45Am	make set-outs and pick-ups at Austin Yard	20 - 25 cars inbound	
11	East	West	9:00AM	passenger train		
extra	Maxwell	Turn		Originate in Austin Yd, service all industries in Maxwell	3 - 5 cars outbound	
extra	Huxley	Turn		Originate in Austin Yard, service KEL03 on outbound leg and KEL01&2 on return.		
12	West	East	10:00AM	passenger Train		
402	South	West	11:00AM	make set-outs and pick-ups at Austin Yd Express no empties	15 - 20 cars inbound	
202	East	West	11:15	Drop stock cars in Huxley, make set-outs and pick-ups in Austin	20 - 25 cars inbnd	
302	West	South	11:45	make set-outs and pick-ups at Austin Yard	20 - 25 cars inbound	
102	West	East	12 noon	make set-outs and pick-ups at Austin Yard	20 - 25 cars inbound	

Interchange Portal Schedule

CGW	6:30am	8 cars
	12:15pm	6 cars
CNW	7:20am	10 cars
	1:20pm	8 cars

Appendix C - Trainz Category Class Codes

Freight car designations as listed in the Trains Content Creator's Guide 2006, Chapter 11, Appendix A.

XA Auto transporter
XAA Open sides
XAB auto box car

XB Box car/covered van
XBD Dangerous goods
XBG General service
XBI Insulated

XF Flat
XFA articulated
XFC Intermodal
XFD Depressed center
XFH Heavy duty
XFM General service

XG Gondola/open wagon
XGB Bottom dumping
XGC Combination bottom/end/side dumping
XGE End dumping
XGR Rotary dumping
XGS Side dumping
XGT Covered

XH Hopper
XHB Bottom dumping
XHC Combination bottom/end/side dumping
XHE End dumping
XHR Rotary dumping
XHS Side dumping
XHT Covered

XI Foundry
XIB Bottle/torpedo cars
XIT Tipper/slag cars

XL Livestock
XLA Single deck
XLC Multiple deck and convertible
XLH Horse box

XR Refrigerated
XRI Ice chilled
XRM Mechanically chilled

XS Special
XSN Novelty
XSU Unclassified

XT Tanker
XTA Domeless
XTS Single dome
XTM Multiple dome

XV Ventilated car/louvered van
XVG General service
XVP Produce service