

**Surface Transportation Board**

# **Railroad Cost Program**



**December 2011**

## **Railroad Cost Program Table of Contents**

Chapter 1 – Railroad Cost Program .....	1
Introduction.....	1
User Interface.....	1
Operating System Requirements.....	2
Installing the Railroad Cost Program.....	2
Update Yearly Unit Cost Files.....	5
Chapter 2 – Railroad Cost Basics .....	6
Overview.....	6
Train Mileage (L101-111) .....	6
Calculation of Line Haul Costs.....	6
Car-Mile Costs (Other Than Clerical) (L201-211).....	7
Gross Ton-Mile Costs (L212-225).....	7
Locomotive Unit-Miles (L226-248) .....	7
Carload and Clerical Costs (L250-268) .....	8
Train Mile Costs (L269-290) .....	8
Calculation of Terminal Costs .....	8
Industry, Interchange and Inter-train and Intra-train Switching (L301-320).....	8
Intraterminal and Interterminal Switching (L321-334) .....	9
Calculation of Freight Car Costs.....	9
Private Line Car Rentals (L401-405).....	9
Railroad Owned Cars – Mileage Costs (L406-431) .....	9
Railroad Owned Cars – Time Costs (L432-457) .....	9
Railroad Owned Cars – Accessorial Services (L458-481) .....	10
Railroad Owned Cars – Intraterminal and Interterminal Switching (L482-499D).....	10
Special Service Costs (L501-534) .....	10
Loss and Damage Claim Payments (L535-537) .....	11
Intermodal Special Service Costs (L540-572).....	11
Jurisdictional Add-Ons (L573-587).....	11
Summary of Shipment Costs (L601-704) .....	11
Chapter 3 – Running the Railroad Cost Program .....	13
Inputting Movement Characteristics.....	15
Movement Segments Section.....	15
Freight Car Characteristics Section .....	17
Shipment Characteristics Section .....	18
Program Options .....	19
Update Detailed Parameters Option.....	20
Calculate Costs Option .....	20
Process Results Option .....	21
New Move Option.....	23
Start Screen Option .....	23

Chapter 4 – Detailed Movement Parameters .....	24
General Tab.....	24
Switching Tab.....	25
Train Statistics Tab .....	27
Freight Car Miles Tab.....	28
Freight Car Days Tab.....	29
Freight Car Rental Tab.....	31
Accessorial Services Tab .....	32
Intermodal Tab.....	33
 Chapter 5 – Railroad Costing Program Menu Options.....	 35
File Menu .....	35
Options Menu.....	36
Help Menu .....	37
 Chapter 6 – Batch Processing Program .....	 38
Running the Batch Program.....	38
Batch Control File Statements .....	40
Output Processing Statements.....	40
Move Processing Statements .....	40
List of Active Batch Program Statements.....	44
List of Obsolete Batch Program Statements.....	45
Example of a Batch Control File .....	45
Example of an Output Results File .....	46
Batch Processing Program Menu Options .....	47
 Chapter 7 - Annual Data Files .....	 49
E1P1 Tags .....	49
E1P2 Tags .....	50
E1P3 Tags .....	52
E2P1 Tags .....	52
E2P2 Tags .....	53
E2P3 Tags .....	54
 Chapter 8 - Programming User Interface.....	 55
UnitFactors File Control Class.....	55
Movement Cost Class .....	56
Mandatory Parameters .....	57
Detailed Parameters .....	58
Programming Example of the User Interface .....	60
 Appendix 1 - Commodities.....	 71

# Chapter 1 – Railroad Cost Program

## Introduction

This manual describes the *Railroad Cost Program*, a part of the Surface Transportation Board's Uniform Railroad Costing System (URCS). URCS is a complex set of procedures which transform reported railroad expenses and activity data into estimates of the cost of providing specific railroad services. The Surface Transportation Board (STB or Board) annually assembles the initial railroad database of expenses and activities information, monitors the development of the cause and effect relationships, and calculates the unit cost factors. This program performs the application of those unit costs to user defined railroad shipments. The program allows an analyst to develop variable costs and fully allocated costs for a particular shipment.

URCS uses an accounting based approach to costing, relying on annual operating expenses and traffic data reported by the railroads. This approach provides cost estimates on the average cost structure of individual railroads or regionalized groups of railroads. Average data on average railroad moves may not, in all cases, be appropriate for estimating a cost for a given railroad movement. If appropriate, user generated cost estimates may be substituted for the cost data developed by the Surface Transportation Board. The program produces reasonable estimates of railroad variable cost when all the *Mandatory Parameters* are entered. The user can input specific movement information, when available, and the variable cost estimate for that particular movement may be improved. The user is responsible for ensuring the accuracy and relevance of cost estimates used in each situation.

## User Interface

The program has two operating options, an interactive movement cost option and a batch processing option. The opening screen requires a choice of one of these two options. The operation of the interactive railroad movement cost option is detailed in Chapter 3. The operation of the batch processing option is detailed in Chapter 6. Both modes define a railroad movement using the same data input file.

The costing process uses nine *Mandatory Parameters* to define the characteristics of a railroad movement. All of these parameters must be defined in order for the program to calculate relevant costs. Those parameters are: the railroad(s), the distance(s), the segment type(s) (e.g. OT, OD, RD, RT), the number of freight cars, the type of freight car, the freight car ownership, the tons per car, the commodity, and the movement type (e.g. single-car, multi-car, or unit train).

*Detailed Parameters* can be changed to make estimates more accurate and to reflect the known specifics of a particular shipment. The user does not have to modify these parameters because the program automatically calculates their default value.

There are three program options for defining output from the cost calculations. The first is a standard printout detailing each costing step necessary to compute the cost of rail service. The second is a comma-separated-value (CSV) version of the standard printout. The third is a user-defined batch output file.

## Operating System Requirements

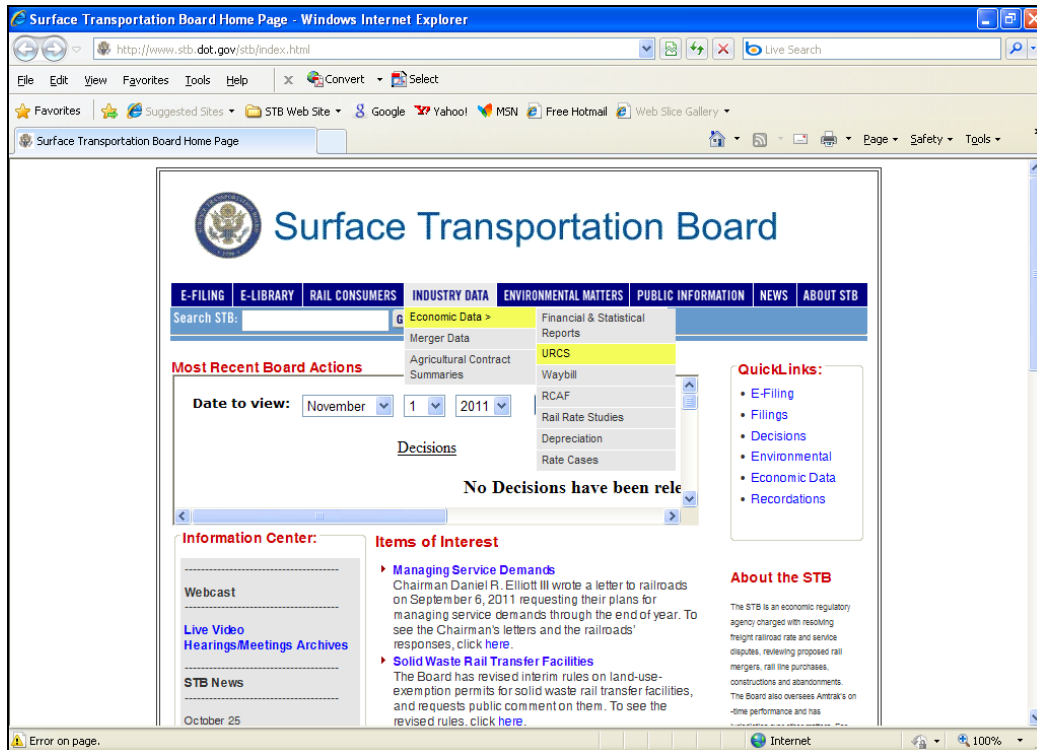
The program cannot be used on Windows 95 or previous operating systems. The program requires one of the following Microsoft operating systems: Windows 98, Windows 98 SE, Windows NT 4.0 (SP 6a required), Windows Me, Windows 2000 (SP2 recommended), Windows XP Home, Windows XP Professional, Windows Vista or Windows 7.

## Installing the Railroad Cost Program

The *Railroad Cost Program* can be downloaded from the STB's website. This program is provided free of charge for use by railroads, shippers, or other parties.

Step 1: Create an "URCS" subfolder in your "My Documents" folder.

Step 2: Go to the STB website at [www.stb.dot.gov](http://www.stb.dot.gov). Click on the links for Industry Data, Economic Data, and URCS.

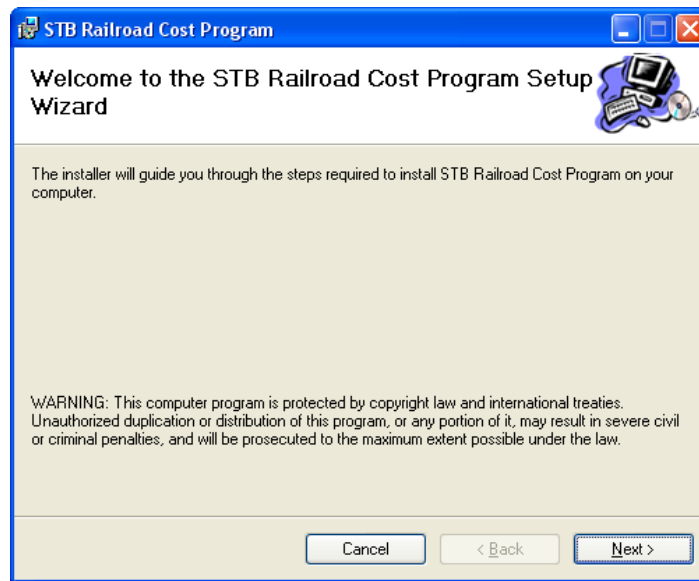


Save the "URCS\_Installer.msi" file to your "My Documents/URCS" subfolder by right-clicking on the "URCS Phase III Movement Costing Program" link. Left-click on "Save

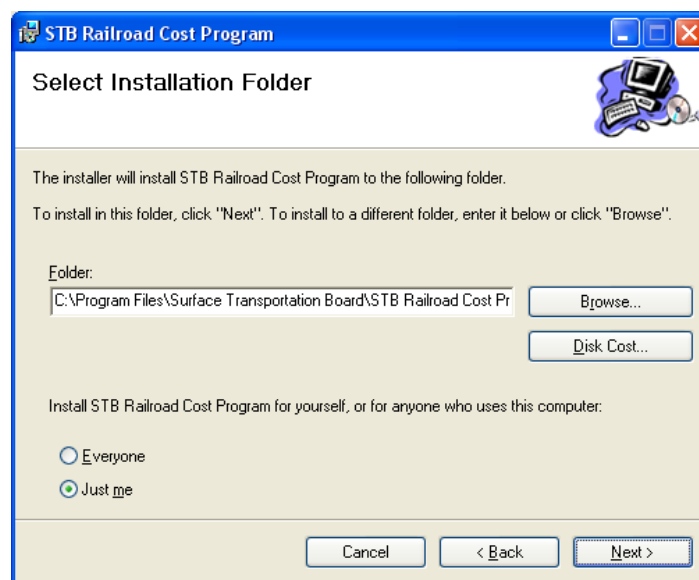
Target As ...” and select your “My Documents/URCS” subfolder using the “Save As” dialog box. Click *Save*.

Step 3: Go to your “My Documents/URCS” subfolder and double-click on the “URCS\_Installer.msi” file.

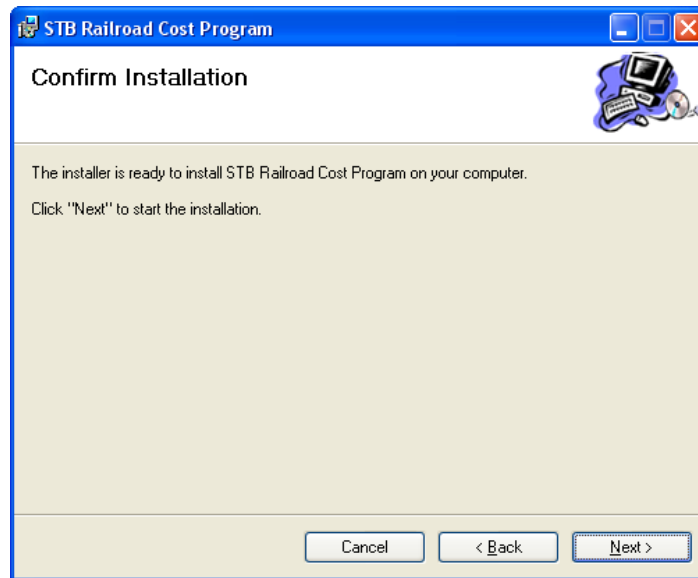
Step 4: The *Welcome* dialog box will appear. Click *Next* to continue, or *Cancel* to stop the installation.



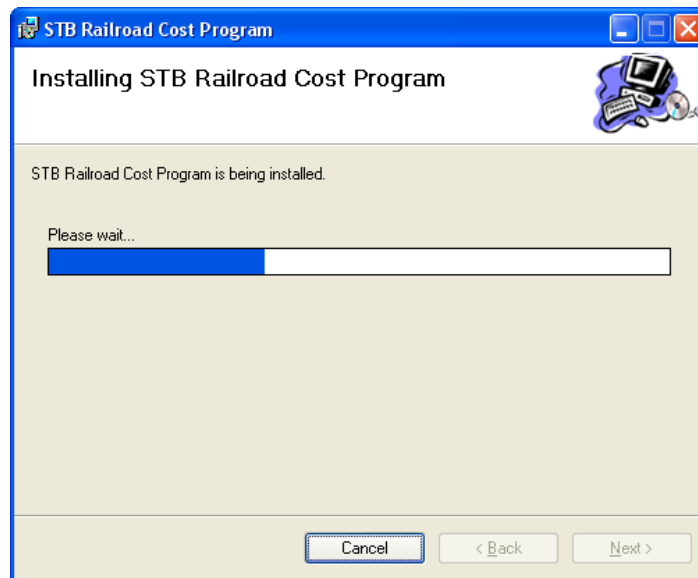
Step 5: The installer will then prompt you to select a folder where to install the program. There is also an option to install this program for any user of a computer, or just the user installing the program. The default is just for the user installing the program. To install the program in the default folder, click *Next*. Click *Browse* to select a different folder.



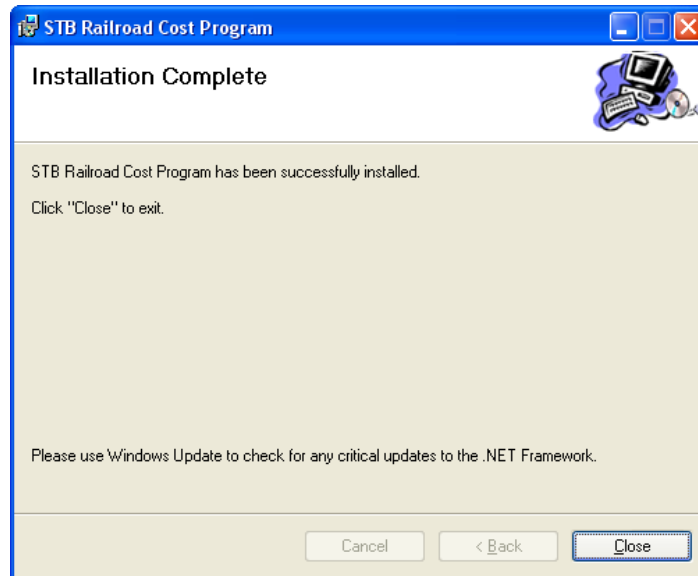
Step 6: The installer will then prompt you to confirm the installation of the program. To install the program, click *Next*. Click *Back* to select a different installation folder, or *Cancel* to stop the installation.



The program will then install the program. During that process, the program displays a status bar indicating how the installation is progressing.



The program will display the following dialog box when the installation is complete. Press *Close* to exit the installation.



Once the installation is completed, the program will be accessible via the Windows Start Menu – All Programs, in a folder called *Railroad Cost*. The installation program will also put a *Railroad Cost Program* icon on your desktop. To start the program, click on either of these two icons.



## Update Yearly Unit Cost Files

During the installation process, a subfolder was created in the *My Documents\URCS* subfolder called *Input Data for Program*. One or more *Railroad Unit Cost* files were saved in this subfolder. When the Board releases its annual URCS cost files, save the new annual file into this same subfolder so that the program can calculate costs using the most recent file. The program does not need to be reinstalled.

To download the most recent *Railroad Unit Cost* file:

Step 1: Go to the STB website at [www.stb.dot.gov](http://www.stb.dot.gov). Click on the links for Industry Data, Economic Data, and URCS.

Step 2: Right-click on the desired unit cost file (e.g. *URCS 2010 Update Data*). Left-click on “Save Target As ...” and select your “My Documents/URCS/Input Data for Program” subfolder using the “Save As” dialog box. Click *Save*.



# Chapter 2 – Railroad Cost Basics

## Overview

Calculating the cost of railroad movements involves a long series of steps comparing railroad operations with unit cost statistics to compute the total variable cost of rail service. The program's internal calculations and results are divided into major sections. Each section performs one related set of cost calculations. Internal calculations and the output are sequential in the sense that the values referenced in subsequent sections will use values computed in previous sections.

The first section in railroad costing computes *train mileage* statistics. These statistics are divided into *through train*, *way train* and, if applicable, *unit train* miles. After computing the basic train mile statistics, the program develops the variable costs for each segment of railroad operations: line haul, terminal, freight car, specialized services, loss and damage, and optionally the jurisdictional add-on. Summing the individual sectional components develops total variable costs per shipment. Finally, the constant cost mark-up ratio is applied to derive the fully allocated cost of service for the whole railroad move.

The mechanics of the methodology used in this program can be obtained by reviewing the detailed print out developed by the program. All the calculations described in the following sections are based on that print out.

## Train Mileage (L101-111)

The initial step in the costing process is the calculation of the number of miles by type of train. These calculations are contained in output report lines 101 through 111. The short line miles provided by the user are first multiplied by a circuitry factor to estimate the number of operating miles. If the user knows the actual miles, that can be entered and the *circuitry factor* set to 1. (See Chapter 4 – Detailed Movement Parameters) In the absence of specific user miles, an average number of way train miles are assigned to the shipment, with the residual miles assumed to be in through train service. If a unit train move is being processed, then there will be no way train miles calculated and all miles are considered actual operating miles in through train service. The total miles by train type are then multiplied by an empty return factor to include an allowance for the empty movement. These calculated miles by type of train are used by the succeeding steps in the costing process.

## Calculation of Line Haul Costs

Having established the total miles by the type of train, the program begins the actual cost calculations. Line haul movement costs are computed first, including the expenses for train crews, train operations, locomotives, roadway maintenance and some clerical operations. The

related unit costs are gathered into five groupings corresponding to the service units used in their calculation. In each of the five cases, the program follows the same basic course. The number of service units applicable to the shipment is determined, and the resulting total is multiplied by the set of related operating (OPR), depreciation and lease rents (DL) and return on investment (ROI) unit costs.

## Car-Mile Costs (Other Than Clerical) (L201-211)

In the case of a single car shipment, the number of car miles is equal to the sum of train miles in both way and through service. For multiple car shipments, car-miles are calculated by multiplying the total train miles by the number of freight cars involved. These calculations are contained in lines 201 through 211 of the output report. The service units used in this section are unit costs per car-mile for OPR, DL, and ROI.

## Gross Ton-Mile Costs (L212-225)

The calculation of variable costs for shipment gross ton-miles is complicated by the need to develop gross ton-miles for the shipment and the train. The total train miles, both empty and loaded, in all train services are multiplied by the tare weight of the car(s), and the result is added to the product of the net tons of the shipment times the total loaded miles. The result of this calculation is the gross ton-mile statistic, which is applied to the gross ton-mile unit cost factors used to derive the variable cost. These calculations are contained in report lines 212 through 225.

For intermodal shipments, the same basic sequence of gross ton-mile costs are the same except that the number of trailers in the shipment, the number of trailers per car and the tare weight of the trailers are used to develop gross ton-miles for the shipment and the train.

## Locomotive Unit-Miles (L226-248)

The number of locomotive unit-miles attributable to the shipment is computed separately for each type of train service and then summed. The total number of unit-miles for way trains is determined by multiplying the average number of locomotive units in a way train times the number of way train miles. This total is allocated to individual shipments based on the ratio of shipment tonnage (tare and lading) to the average gross trailing tons per way train. A parallel calculation is made for through train service, and the sum of these miles represents the number of unit-miles for costing. The separate treatment of train services is necessary because of the substantial difference in both the average number of locomotives and gross trailing tons per train between way and through train service. These calculations are contained in output lines 226 through 248.

## Carload and Clerical Costs (L250-268)

Two carload-type service units are used in the calculation of unit costs. The first is Carloads Originated or Terminated (CLOT). One carload is given for origination and one for termination. The value of CLOT for each carrier depends on the type of shipment. A local, single carrier move would result in a value of two, while a bridge movement would generate no CLOT's. The second carload related service unit is Carloads Originated or Received (CLOR), or the carloads handled by each carrier. The value of CLOR is the same for every carrier in the routing and is equal to the number of cars in the shipment. These calculations are contained in output lines 250 through 268.

## Train Mile Costs (L269-290)

The train-mile costs are in two separate groups: crew wages (output lines 269 to 284) and other expenses (output lines 285 to 290). In both cases the train-miles by train type, computed earlier, are allocated to individual shipments using the same tonnage ratio employed for locomotive unit-mile costs. See output lines 269 to 272.

## Calculation of Terminal Costs

The next major portion of the program computes the terminal costs associated with switching activities. All costs are calculated on a per switch engine minute basis and include the operating, maintenance and ownership items related to yard and way switching activities. They do not include any portion of freight car or specialized service terminal costs.

## Industry, Interchange and Inter-train and Intra-train Switching (L301-320)

The calculations for this class of costs are contained on output lines 301 through 320. To determine the number of switch engine minutes attributable to a shipment, the program first determines the number of switching events for each class of switching event. Each origin or destination switch represents an industry switch. These switches times the spotted to pulled ratio creates a factor that includes switching the empty car into the industry at origin and out of the industry at destination. Interchange switching requirements can usually be inferred from the routing and represent a switch event for both railroads involved. Similarly, intertrain and intratrain switching requirements are derived by a mileage factor, unless the user specifies a specific value. These counts of switching events are multiplied by the average number of switch engine minutes per event, and then the total cost is calculated for all classes of switching. This total becomes the basis for applying the unit costs for switching the shipment.

## Intraterminal and Interterminal Switching (L321-334)

Output lines 321 through 334 are intraterminal switching services, which are generally omitted from an application of the movement cost, since they are not related to inter-city transportation. An intraterminal switch is a complete movement within a terminal area by one railroad. An interterminal switch is still contained within a single terminal area but requires an interchange between railroads. The cost of these switching services is calculated based on the switch engine minutes.

## Calculation of Freight Car Costs

The next major portion of the program computes freight car costs. Freight car costs are a product of mileage and time charges, depending on whether the car is railroad owned or privately owned. Railroad owned cars receive an accessorial service cost.

## Private Line Car Rentals (L401-405)

For privately owned cars, freight car costs are based only on mileage. These shipment costs derive from multiplying the total number of car-miles, both empty and loaded, by the average car-mile rental rate for the specified car type. These calculations are contained in output lines 401 through 405.

## Railroad Owned Cars – Mileage Costs (L406-431)

The mileage costs for railroad owned cars are based on the car-miles running and the car-miles in switching services. Car-miles running include an allowance for circuitry and loaded to empty ratios. Car-miles in the yard are calculated as the summation of all car-miles for all classes of switching service applicable to the shipment. The program permits either the actual costs per mile, excluding switching car-miles, or the use of the railroad or regional average cost per mile, applicable to both the line haul and switching miles. These calculations are made on output lines 406 through 431.

## Railroad Owned Cars – Time Costs (L432-457)

Time costs are based on car-days running and car-days in switching service. The days in switching are based on the total car-days for all classes of switching service required by the shipment. The car-days running are calculated on the basis of the line haul mileage divided by the average miles a car travels in a day. If the user specifies car-day charges, no distinction is

made between the unit cost of car-days in running service versus car-days in yard service. However, if average car-day costs are used, the program uses different car-day costs for yard and running. These calculations are made on output lines 432 through 457.

## Railroad Owned Cars – Accessorial Services (L458-481)

Accessorial services, contained in output lines 458 through 481, measure the cost of providing special equipment within a car. The costs are based on car-miles (running and yard), and car-days (running and yard).

## Railroad Owned Cars – Intraterminal and Interterminal Switching (L482-499D)

The calculations contained in output lines 482 through 499D are included for shipments given intraterminal and interterminal movements, using railroad-owned freight cars. The cost is based on car-miles and car-days in switching service.

## Special Service Costs (L501-534)

Special service costs are based on special services a railroad provides. These services are never added to the variable cost unless directly specified by the user. Special service costs are based on ton-miles or tons multiplied by the service cost. Output lines 501 through 507 include costs for Lake Transfer services, usually invoked by moving carloads on a ship across the Great Lakes. Coal Terminal service is contained in output lines 508 through 514, incurred when a shipment of coal moves through a marine terminal. Ore Terminal services are contained in output lines 515 through 521 and are based on the shipment tons of ore moving through a marine terminal. Other Marine Terminal costs are based on shipment tons, and are computed in lines 522 through 528.

Automobile and intermodal special service costs are included in this group. *Motor Vehicle Unit Loading and Unloading* costs represent the cost for loading and unloading automobiles or trucks on a bi-level or tri-level vehicular flat car. The cost of service is based on the number of vehicles in the shipment. If the user does not specify the number of vehicles, the program estimates them by dividing the shipment weight by two tons. These calculations are contained in output lines 529 through 531.

Refrigerated Car Protective services are computed for refrigerated cars and are based on car-miles. Because of the various methods of providing and billing for protective services in the industry, the cost computed by the program may not reflect the actual cost of this service. The computed cost is intended to recover the net amount of service not paid for by special service revenues. When the total cost for protective service is required, it must be calculated from other

sources available to the user, increased by the general overhead ratio and inserted as a user input. These calculations are contained in output lines 532 through 534.

## Loss and Damage Claim Payments (L535-537)

These calculations are performed for the total shipment, regardless of the number of railroads. The loss and damage costs are computed by multiplying an average cost per ton for the specified commodity by the net shipment weight and the ratio of the segment miles to total miles. See output lines 535 through 537.

## Intermodal Special Service Costs (L540-572)

*Trailer Container Unit TCU – Loading and Unloading (Tie and Untie) Service* costs are calculated for each intermodal plan code. These costs are computed in output lines 540 through 547. *TCU Ownership and Protective Service* is calculated in output lines 548 through 566 and is included for some intermodal service plans. The ownership costs may apply to refrigerated or non-refrigerated TCU's. The protective service costs apply only to refrigerated trailers or containers. Both service costs are based on the days in line haul service plus the days in origination and termination yards. Finally the *TCU Pickup and Delivery Costs* are required by some intermodal plans. These costs are based on the plan number and are estimated based on the cost for the railroad to pick up and or deliver the trailer or container. The number of TCU units defined in the shipment determines the cost. The costs are computed in output lines 570 through 572.

## Jurisdictional Add-Ons (L573-587)

These calculations are optional. The user can choose to include them through the *Defaults* menu option. These unit costs are necessary when developing evidence for rate proceedings before the Surface Transportation Board. They are applied to single and multiple train carloads. The single car movement add-ons are based on industry switching events and on station clerical costs, which is based on carloads originated and terminated. These costs are contained in output lines 573 through 578. The single and multiple car movement add-ons are based on carloads interchanged and freight car miles. These costs are contained in output lines 579 through 586. The total of these add-ons is contained in output line 587.

## Summary of Shipment Costs (L601-704)

Output lines 601 through 703 contain the summary of all variable costs for the shipment. The total variable cost is the sum of output lines 601 through 695. Line 696 is the sum of lines 601 through 695, plus the jurisdictional add-on (line 587). The constant cost markup ratio (line 697) is applied to total variable cost to develop fully allocated cost (line 698). The total variable shipment cost (line 700) is the sum of the total variable cost, jurisdictional add-on, and loss &

damage. The total fully allocated variable shipment cost (line 701) is the sum of the total variable cost and the jurisdictional add-on multiplied by the constant cost markup ratio (line 697), plus loss & damage. Output lines 702 and 703 develop the unit cost per hundredweight for variable costs and fully allocated costs.

If the user entered a freight revenue in the *Shipment Characteristics* section, the revenue to variable cost ratio (line 704) is calculated as that freight revenue divided by the total variable shipment cost (line 700). Otherwise, line 704 will not be displayed.

## Chapter 3 – Running the Railroad Cost Program

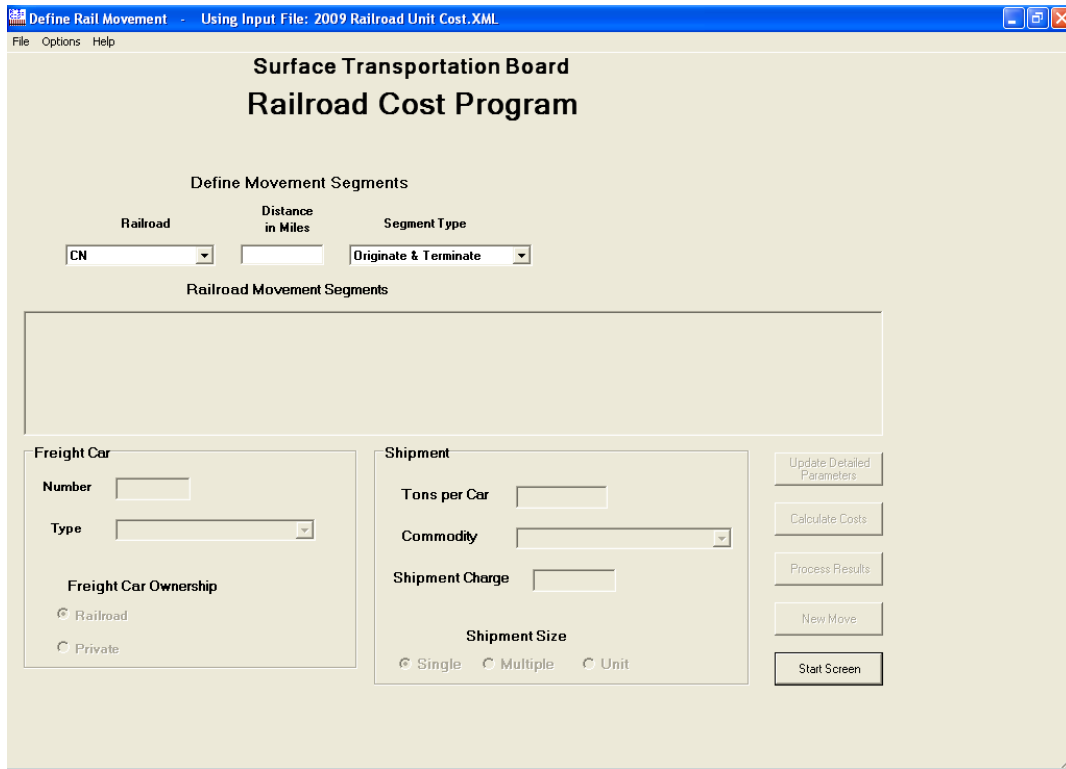
When the program is started, the user first sees the start screen. This is where the user can choose to run the interactive Railroad Cost Program or the Batch Cost Program.



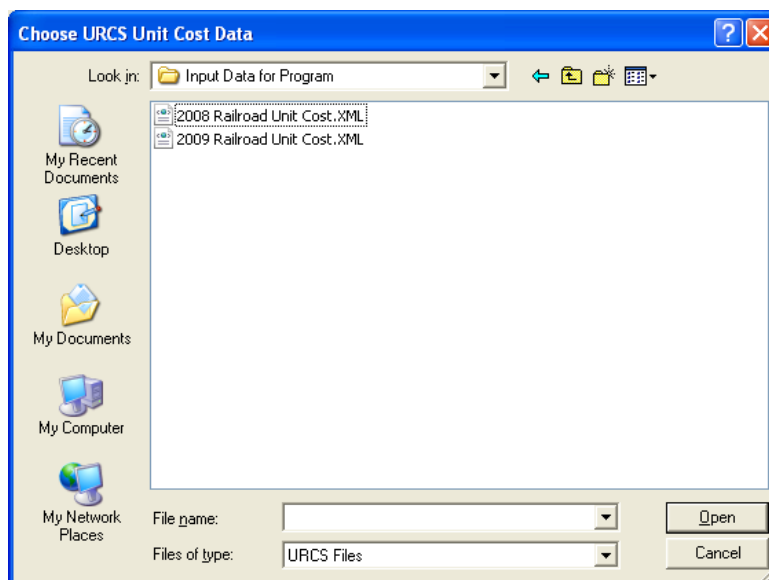
To enter the interactive railroad cost program, click on the *Railroad Cost Program* button. To enter the batch process, click on the *Batch Cost Program* button (see Chapter 6). To exit the program, click the *Exit* button.



After pressing the *Railroad Cost Program* button, the user will see the *Define Railroad Movement* screen.



The first time the program is run, the *Choose URCS Unit Cost Data* dialog box will automatically appear prompting the user to select an annual unit cost data file.



Click on the desired annual file and click *Open*. Once a file is selected, the program will continue to use that unit cost file in subsequent sessions until the user selects a different file. The

name of the selected file will be displayed at the top of the *Define Railroad Movement* dialog box.

Use the *File* menu drop-down box at the top of the screen to open the *Choose URCS Unit Cost Data* dialog box to select a different annual unit cost data file.

## Inputting Movement Characteristics

There are nine basic movement characteristics necessary to estimate the cost of a railroad movement. This *Mandatory Parameter* set is broken down into three sections: the movement segments, the freight car characteristics, and the shipment characteristics. Once this *Mandatory Parameter* set is defined, the program can calculate the cost of a railroad movement.

The *Mandatory Parameter* set can be supplemented with changes to the *Detailed Parameter* set if the user has relevant information to adjust average parameter values. (See Chapter 4) If there is no specific information to modify the *Detailed Parameters*, the program assigns average default values to each parameter, based on the values of the *Mandatory Parameters*.

## Movement Segments Section

In this section, the user enters the first three of the nine mandatory parameters, namely, the railroad(s), the distance(s) traveled on each railroad, and the segment type. These define the railroads and routing between the movement origination and destination. The route must be completely defined before moving onto the freight car characteristics section.



Railroad	Distance in Miles	Segment Type
CN		Originate & Terminate

The first parameter entered is the railroad, which is the originating railroad in a multi-carrier movement. Select the first railroad in the movement by using the drop-down menu. The user can select one of seven Class I railroads (i.e. BNSF, CN, CP, CSXT, KCS, NS, or UP) or one of two regions (i.e. East or West). Use the <Tab> key to move to the next field.

The second parameter entered is the distance. Enter the distance traveled on the railroad selected in the previous parameter. Use the <Tab> key to move to the next field.

The third parameter entered is the segment type. This reflects where this railroad is located in the movement from origination to destination. Select the segment type by using the drop-down menu from the following options:

<b>Segment Type</b>	<b>Description</b>
Originate & Terminate	This indicates this railroad moves the shipment from origin to destination – sometimes referred to as a “local” move.
Originate & Deliver	This indicates this railroad originates the shipment from the origin, but will deliver it to another railroad – sometimes referred to as a “forwarded” move.
Intraterminal	This indicates this railroad moves the shipment within a local terminal area.
Interterminal	This indicates this railroad moves the shipment between local terminal areas by two railroads.
Receive & Deliver	This indicates this railroad receives the shipment from one railroad, and will deliver it to another railroad – sometimes referred to as an “overhead” move.
Receive & Terminate	This indicates this railroad receives the shipment from one railroad, and will move the shipment to the termination – sometimes referred to as a “received” move.

Once selected, use the <Tab> key to move to the next field.

If the selected shipment type is “Originate & Terminate” or “Intraterminal,” the shipment is completely defined and the program automatically moves on to the freight car characteristics section. Otherwise, the user will be prompted to enter the next railroad in the routing along with its distance and segment type. Once a “Receive & Terminate” or a second “Interterminal” segment type is selected, pressing the <Tab> key will prompt the user to begin to enter the freight car characteristics.

While the route segments are being defined, the *Railroad Movement Segments* display area will summarize each segment and how it fits into the total movement.

**Define Movement Segments**

Railroad	Distance in Miles	Segment Type
<input style="width: 100%;" type="text" value="EAST"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text" value="Receive &amp; Terminate"/>

**Railroad Movement Segments**

**Western Region Railroad Originates - takes shipment 500 miles  
Interchange with Eastern Region Railroad - takes shipment 500 miles and Terminates**

# Freight Car Characteristics Section

In this section, the user enters the next three of the nine mandatory parameters, namely, information regarding the freight car used in the movement. These define the number of cars, type of car, and car ownership.

The screenshot shows a form titled "Freight Car" with the following fields:

- Number:** An empty text input box.
- Type:** A dropdown menu currently displaying "Hopper - Open Top General S".
- Freight Car Ownership:** Two radio buttons, with "Railroad" selected and "Private" unselected.

The first parameter entered in this section is the number of freight cars in this movement. As the name implies, enter the number of freight cars that are being moved from origin to termination.

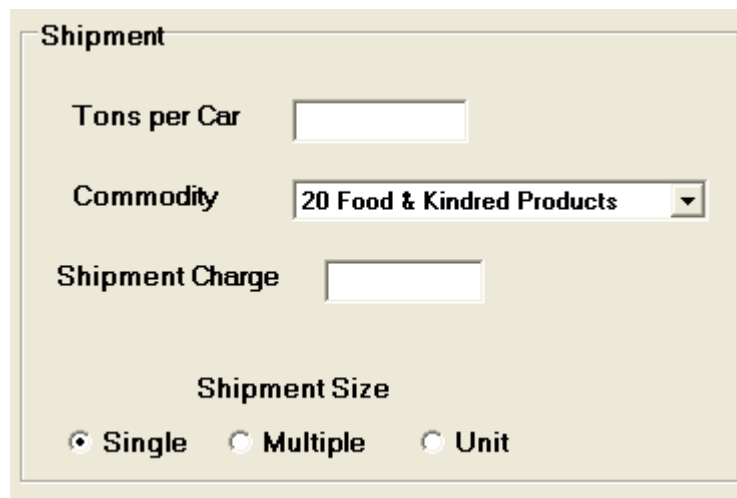
The second parameter entered in this section is the type of freight car used in this movement. There are seventeen different freight car types from which to choose in the drop-down menu.

<b>Freight Car Types</b>
Box Car – 40 ft
Box Car – 50 ft
Box Car – Equipped
Gondola – Plain
Gondola – Equipped
Hopper – Covered
Hopper – Open Top General Service
Hopper – Open Top Special Service
Refrigerated – Mechanical
Refrigerated – Non-Mechanical
Flat Car – TOFC
Flat Car – Multi-Level
Flat Car – General Service
Flat Car – Other
Tank Car (<22,000 Gallons)
Tank Car (>=22,000 Gallons)
All Other Freight Cars

The third parameter entered in this section is the ownership of the freight cars used in this movement. There are two ownerships from which to choose. Click on *Railroad* if the freight cars are owned by the railroad. Click on *Private* if the freight cars are privately owned.

## Shipment Characteristics Section

In this section, the user enters the last three of the nine mandatory parameters, namely, information regarding the weight and commodity of the product being shipped and the shipment size. The shipment charge (or freight charge) of the movement is optional.



The screenshot shows a form titled "Shipment" with the following fields and options:

- Tons per Car**: A text input field.
- Commodity**: A drop-down menu with "20 Food & Kindred Products" selected.
- Shipment Charge**: A text input field.
- Shipment Size**: Three radio button options:  **Single**,  **Multiple**, and  **Unit**.

The first parameter entered in this section is the tons per car. As the name implies, enter the average number of tons within each car that are being moved from origin to termination. The program will calculate the total tons by multiplying the number of cars (entered in the freight car characteristics section) by the tons per car.

The second parameter entered in this section is the commodity. Use the drop-down menu to select the commodity that best describes what is being shipped. This will be used to calculate the loss and damages portion of the costs. There are 82 different commodities from which to choose. They are listed in Appendix 1.

The specific commodities identified represent different groups of commodities. Using farm products as an example, "01 Farm Products" represents the loss and damage for all farm products. There are four other specific commodity groupings within farm products, namely, "0113 Grains," "01195 Potatoes, Other than Sweet," "012 Fresh Fruits/Tree Nuts," and "013 Fresh Vegetables." The "0113 Grains" group actually represents Corn (01132), Oats (01133), Rice (01134), Rye (01135), Sorghum Grains (01136) and Wheat (01137). Therefore, to calculate the cost a shipment of oats, select "0113 Grains." Finally, there is an "all other" group ("01 Other Farm Products") that represents farm products that are not included in the four specific commodity groupings.

The shipment charge (or freight charge) can be entered in this section. It is optional because it is not a mandatory parameter required to estimate the variable costs. If a freight

charge is entered, the program will compute the revenue to variable cost ratio (RVC ratio). This is an estimate of the profitability of this shipment to the railroad. If the freight charge field is left blank, the program will compute the variable cost of rail service, but not the RVC ratio.

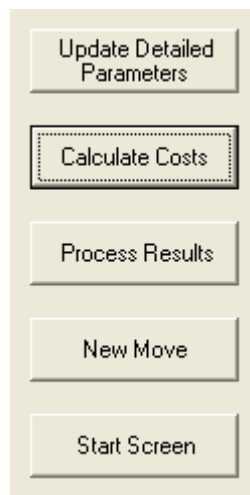
The third mandatory parameter entered in this section is the shipment size. The option selected for this parameter impacts the jurisdictional add-on calculations. (See Chapter 2) There are three options for shipment size: Single, Multiple and Unit.

<b>Shipment Size</b>	<b>Description</b>
Single Car Movement	Select this option when calculating the variable costs for a small number of cars tendered under separate waybills – typically one to five cars.
Multiple Car Movement	Select this option when calculating the variable costs for six to forty-nine cars tendered under one waybill.
Unit Train Movement	Select this option when calculating the variable costs on a trainload basis – typically fifty or more cars.

Pressing the <Tab> key after selecting the desired option will activate the five buttons of the program options.

## Program Options

After all the mandatory parameters are entered, the user has a choice of program options. The five options are as follows: *Update Detailed Parameters*, *Calculate Costs*, *Process Results*, *New Move*, and *Start Screen*. These options become active when the user presses the <Tab> key after selecting the shipment size.

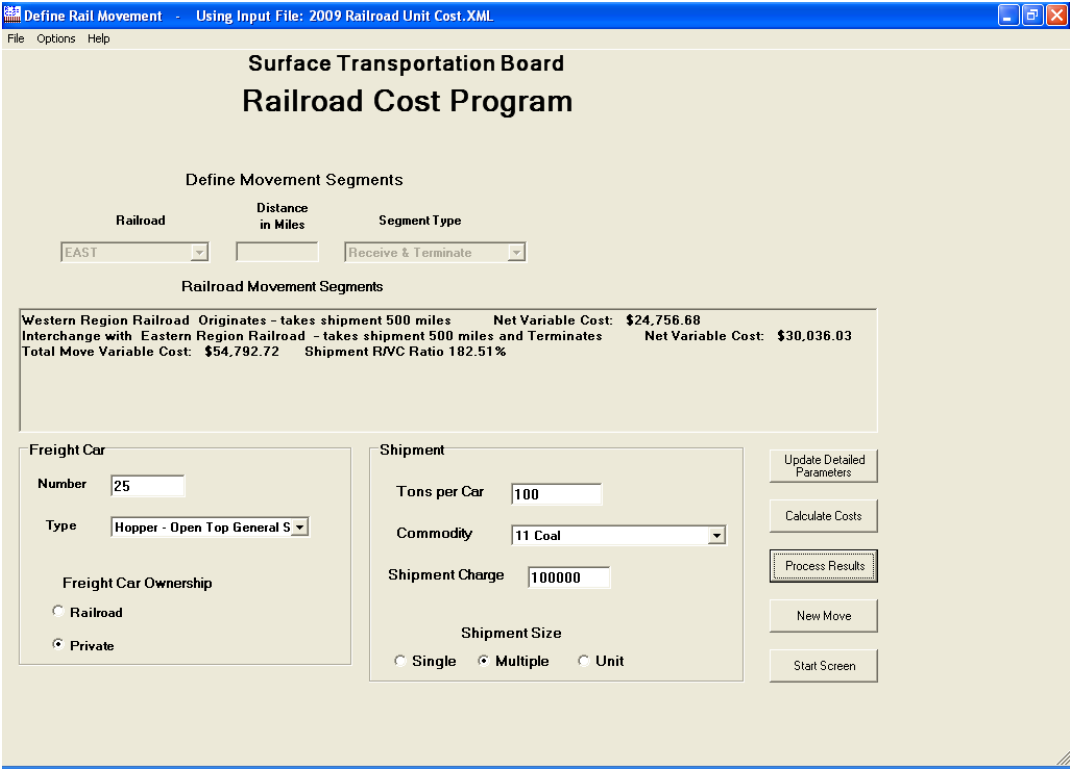


# Update Detailed Parameters Option

This first program option is to update the *Detailed Parameters* set. These parameters are specific cost parameters that may provide increased precision to the estimate of movement variable costs. They are discussed in detail in the next chapter, Chapter 4 – Detailed Movement Parameters.

# Calculate Costs Option

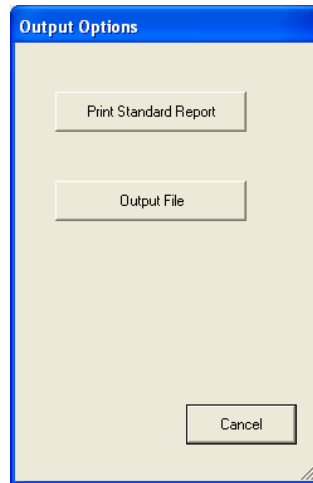
This second option is to calculate the cost of the movement. If this option is chosen, the program will compute the variable cost for each segment and the total variable cost of the move and append the information to the route definition section of the input screen.



Changes can be made to the *Freight Car* parameters, *Shipment Characteristics* parameters, or *Detailed Parameters* – but not to the *Movement Segments*. When the *Calculate Costs* button is pressed again, the variable cost will be recalculated and the resulting figures will reflect the impact of the changes. If changes are made to any of the input parameters, it is recommended to check the resulting cost calculations by costing the movement as a *New Move*.

## Process Results Option

This third option is to output the results of the costing program. There are two choices available for program output. One is to print a standard report and the other is to write out a comma separated value (CSV) version of the standard report.





## Print Standard Report

Choosing the *Print Standard Report* option opens a print preview pane displaying a 19-page report. This is the standard costing report, which displays the calculations used to determine total railroad variable cost.

1

Movement Cost Program 11/8/2011

Railroad	Segment Type	Distance	Circuitry	LE/Ratio
WEST	OD	500	1.137	2.030
EAST	RT	500	1.137	1.986

Freight Car: Hopper - Open Top General Service (OTG)  
 Number of Cars: 25  
 Car Ownership: Private  
 COMMODITY: 11 Coal  
 Tons per Car: 100  
 Shipment Size: Multiple Car Move  
 Move Revenue: \$100,000

Variable Cost of Service Summary

Railroad	Variable Cost	Loss & Damage	Ex Parte Adjustment	Total Variable Cost
WEST	\$23,840.37	\$5.43	\$910.89	\$24,756.68
EAST	\$29,265.43	\$5.43	\$765.17	\$30,036.03
<b>Total Costs for Move</b>	<b>\$53,105.80</b>	<b>\$10.85</b>	<b>\$1,676.06</b>	<b>\$54,792.72</b>

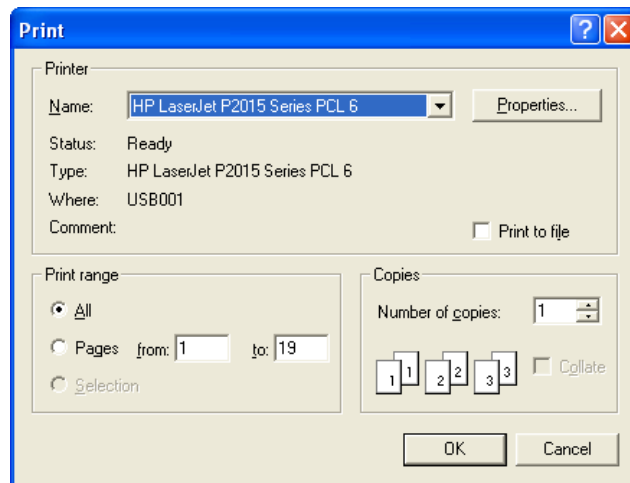
Cost per Hundred Weight \$1.0959  
 Cost per Carload \$2,191.71  
 Cost per Ton \$21.92  
 R/VC Ratio 182.51%

Input Railroad Data File: 2009 Railroad Unit Cost.XML  
 -----File Documentation Statements-----

WEST This railroad data set created on 12/16/2010 Source master file header comment:  
 This unit cost file created 12/16/2010 10:35:39 AM  
 This File Created: 11-01-2010 From URCS File Created on 11/1/2010

EAST This railroad data set created on 12/16/2010 Source master file header comment:  
 This unit cost file created 12/16/2010 10:35:39 AM  
 This File Created: 11-01-2010 From URCS File Created on 11/1/2010

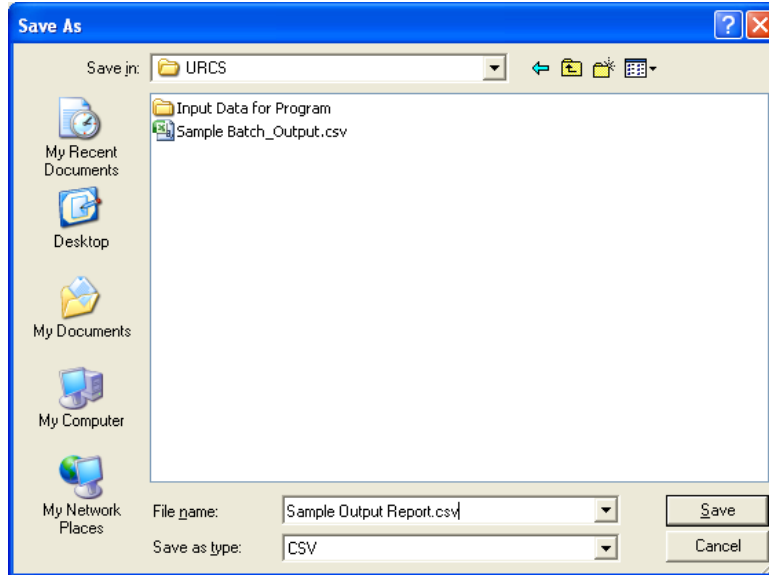
The user can visually review the cost calculations by scrolling through the different pages by using the arrows in the upper right-hand corner of the screen, although a summary of the costs are displayed on the first page. Choose *Select Printer* to print out the report. A standard Windows print box will be displayed.



The user can choose to send the report to the default printer, or select another printer option in the *Name* pull-down menu. For example, select *Adobe PDF* to print out the report to a PDF file. In addition, the user can choose to print out only selected pages of the report.

## *Output File*

Choosing the *Output File* option to write out the 19-page standard costing report in a CSV format. The program will open a *Save As* dialog where the user can define the file name and location of for the CSV file.



This CSV output file allows the user to more easily examine the variable cost calculations of the output report in a spreadsheet.

## New Move Option

This fourth program option resets the *mandatory parameters* and *detailed parameters* in order to cost a new movement. If changes are made to any of the input parameters, it is recommended to check the resulting cost calculations by costing the movement as a New Move.

## Start Screen Option

This fifth program option ends the interactive railroad cost program and sends the user back to the *Start Screen*.

# Chapter 4 – Detailed Movement Parameters

If detailed information about the railroad move is available, then the modifications of detailed parameters may allow for a more precise cost estimate of the movement. If the user does not change these parameters, the program computes average values to be used in the costing calculations. When the *Update Detailed Parameter* button is pressed, the user will be presented with a tabbed screen containing categories of detailed parameters available for this railroad movement. Since some of the parameter tabs or input data are dependent on the type of shipment defined by the user, parameters are only displayed if they are relevant for the movement.

## General Tab

Usually, the first tab of the detailed parameters allows the user to modify some general inputs of the program. The exception to this is if the user defined an intermodal movement, which is a movement with the freight car type of *Flat Car – TOFC*, then the intermodal tab is the first screen displayed. The intermodal tab is described later in this chapter.

	WEST	EAST
Circuity	1.13699996	1.13699996
Empty Loaded Ratio	2.03022885	1.98630762
General Overhead Ratio	1.07285869	1.15126454
Tare Weight	29.6000003	

Return

*Circuity*: The circuity factor (L102) is used to inflate the short line mileage, entered by the user in the *Mandatory Parameter* screen, to derive an estimate of the actual miles traveled. If the user entered the actual mileage, then 1.0 should be entered for this parameter.

*Empty Loaded Ratio*: The empty loaded ratio (L105) reflects the amount of empty car miles incurred for this car type before spotting for another shipment, which is based on the loaded shipment distance. The two ratio extremes for the empty/loaded ratio are: 1.0 that

implies no empty return mileage and 2.0, which implies a 100 percent empty return of the freight car.

*General Overhead Ratio:* This general overhead ratio allocates administrative and other indirect expenses to variable car-mile and car-day costs.

*Tare Weight:* The tare weight (L212) is the weight of an empty freight car.

## Switching Tab

The second tab of the detailed parameters allows the user to modify parameters related to switching.

	WEST	EAST
Cars Given I and I Switch	144.273133	141.151980
Miles between I and I Switch	200	200
SW Engine Min I and I SW	1.30944705	1.95497345
SW Eng Min Industry SW	5.23778820	7.81989431
Number of Interchange SW	1	1
Cars Given Interchange Switch	50.7557213	49.6576905
SW Engine Min Interchange SW	2.88078331	4.30094146
Industry Switch Events	50	50
Spotted to Pulled Ratio	2	

*Cars Given I and I Switch:* The number of cars given intertrain and intratrain switching is based on the total loaded and empty car miles, for all cars in the shipment, divided by 200 miles. This mileage assignment is an industry average figure derived from a historical switching study.

*Miles between I and I Switch:* The average distance between intratrain and intertrain switch is 200 miles. This mileage assignment is an industry average figure derived from a historical switching study.

*SW Engine Min I and I SW:* This statistic measures the weighted average time expended in switching service by yard crews and line haul train crews performing way switching. Separate regional average values for switch engine minutes per car are established for this class of switching service. The required number of switch engine minutes includes an allowance for non-productive time.

*SW Eng Min Industry SW:* This statistic measures the weighted average time expended in industry switching service.

*Number of Interchange SW:* This factor is based on the number of interchange switches of the shipment. This factor is only displayed on a shipment that is interchanged between carriers.

*Cars Given Interchange Switch:* The total number of cars given interchange switching depends on the number of interchange switches for the shipment, times the empty loaded ratio.

*SW Engine Min Interchange SW:* This statistic measures the weighted average time expended in switching service by yard crews and line haul train crews performing way switching. Separate regional average values for switch engine minutes per car are established for this class of switching service. The required number of switch engine minutes includes an allowance for non-productive time.

*Industry Switches:* This factor is based on the number of origin and termination switches of the shipment. Normally this includes two for originate and terminate, one for originate and deliver, one for receive and terminate and none for receive and deliver.

*Spotted to Pulled Ratio:* This is the ratio of empty and loaded cars to loaded cars. The ratio accounts for empty car switching at the origin and destination. Normally the ratio is 2.0 for all car types except for unequipped box cars (1.8) and intermodal flat cars (1.5). These car types are sometimes relocated at the destination without switching the empty car.

# Train Statistics Tab

The third tab of the detailed parameters allows the user to modify parameters related to trains statistics.

	WEST	EAST
Through Locomotives	3.09451436	2.43551659
Way Locomotives	2.18130493	1.50337266
Through Train Weight	5643.99511	4952.04101
Way Train Weight	2029.10815	1646.26892
Through Crew Wages	0	0
Way Crew Wages	0	0
Through Train Miles	568.499982	568.499982
Way Train Miles	0	0

Return

*Through Locomotives:* The program generates this value based on the segment type of the route segment, the shipment size, and the type of freight car.

*Way Locomotives:* The number of locomotives used in way train service only appears if a single or multiple shipment size was selected from the Shipment Section of the *Mandatory Parameter* screen.

*Unit Locomotives:* This is the number of locomotives used in a trainload movement. It only appears if a unit train was selected from the Shipment Section of the *Mandatory Parameter* screen.

*Through Train Weight:* This is the trailing weight of all freight cars and contents for the train movement. For intermodal shipments, the weight of the train includes the weight of the trailer/container, multiplied by the empty loaded trailer/container ratios.

*Way Train Weight:* This is the trailing weight of all freight cars and contents for the way train movement.

*Unit Train Weight:* This is the train weight calculated by taking the total car tare weight in the loaded direction, multiplied by the empty/loaded ratio, plus the weight of the shipment.

*Through Train Wages:* This is the actual crew wages per mile. The crew wages include additives and overheads such as payroll taxes and vacation allowances. If the value is not entered, the program uses an average crew wage per train mile.

*Way Crew Wages:* This is the actual crew wages for a way train mile. If the value is not entered, the program uses an average crew wage per train mile.

*Unit Crew Wages:* This is the actual crew wages per mile for a unit train. The crew wages include additives and overheads such as payroll taxes and vacation allowances. If the value is not entered, the program uses an average crew wage per unit train mile.

*Through Train Miles:* This is the distance for the through train portion of the move.

*Way Train Miles:* This is the distance for the way train portion of the move.

*Unit Train Miles:* This is the distance for the unit train portion of the move.

## Freight Car Miles Tab

The fourth tab of the detailed parameters allows the user to modify parameters related to freight car miles.

The screenshot shows a software window titled "Update Detailed Parameters" with a blue header bar. Below the header is a tabbed interface with the following tabs: "General", "Switching", "Train Statistics", "Freight Car Miles" (which is the active tab), "Freight Car Days", "Freight Car Rental", and "Accessorial Services". The "Freight Car Miles" tab contains a table with two columns, "WEST" and "EAST", and four rows of input fields. The values in the fields are: 0, 0, 4, 4, 2.75, 2.75, and 1, 1. A "Return" button is located at the bottom right of the window.

	WEST	EAST
Actual Miles per Car Day	0	0
Car Miles per Industry Switch	4	4
Car Miles per Interchange Switch	2.75	2.75
Car Miles per I and I Switch	1	1

*Actual Miles per Car Day:* This is the average number of miles accumulated for each 24-hour period a car is actually moving in trains. Yard time at origin, destination and intermediate points is excluded.

*Car Miles per Industry Switch:* This is the number of miles a loaded car is moved within an industry switching terminal area during each switching event. This is only relevant for origin or destination switching events. The default values for these parameters are derived from historical switching studies.

*Car Miles per Interchange Switch:* This is the number of miles a loaded car is moved within an interchange switching area during each switching event. The default values for these parameters are derived from historical switching studies.

*Car Miles per I and I Switch:* This is the number of miles a loaded car is moved within an intertrain and intratrain area during each switching event. The default values for these parameters are derived from historical switching studies.

*Car Miles per Intraterminal Switch:* This is the number of miles a loaded car is moved within an intraterminal switching area.

*Car Miles per Interterminal Switch:* This is the number of miles a loaded car is moved through an interterminal switching area.

## Freight Car Days Tab

The fifth tab of the detailed parameters allows the user to modify parameters related to freight car days.

	WEST	EAST
Running Car Days	3.24686930	3.69158937
Car Days in Yard	14.7994892	15.6098647
Car Days per Industry SW	1	1
Car Days per Interchange SW	0.5	0.5
Car Days per I and I SW	0.5	0.5
Car Days per L and UL SW	2	2

Return

*Running Car Days:* This statistic is the number of days a shipment spends in line haul service. It is based on the car miles of all cars in the shipment, including the empty return movement, divided by the average car miles per car day.



*Car Days in Yard:* This statistic is the number of days a shipment spends in switching service. Its calculation is based on the origin or termination event, the number of interchanges or by intertrain or intratrain switching services.

*Car Days per Industry SW:* This statistic estimates the number of active car days required to complete an industry-switching event. It does not include car days related to car repairs or the storage of cars in freight yards.

For industry switching at the origin, the number of car days includes the time required to move the loaded car from the industry to the terminal yard or to the line haul train. At destination, it includes the time from the arrival of a loaded car at the terminal, or station, to the final placement at the industry siding.

*Car Days per Interchange SW:* This statistic estimates the number of active car days required to complete an interchange switching event. The number of days includes the time from the arrival of a car in a long haul train of the first carrier, until its departure in a line haul train of the second carrier.

*Car Days per I and I SW:* This statistic estimates the number of active car days required for an intratrain and intertrain switch. The number of car days is measured from the arrival in the yard until the departure from the yard.

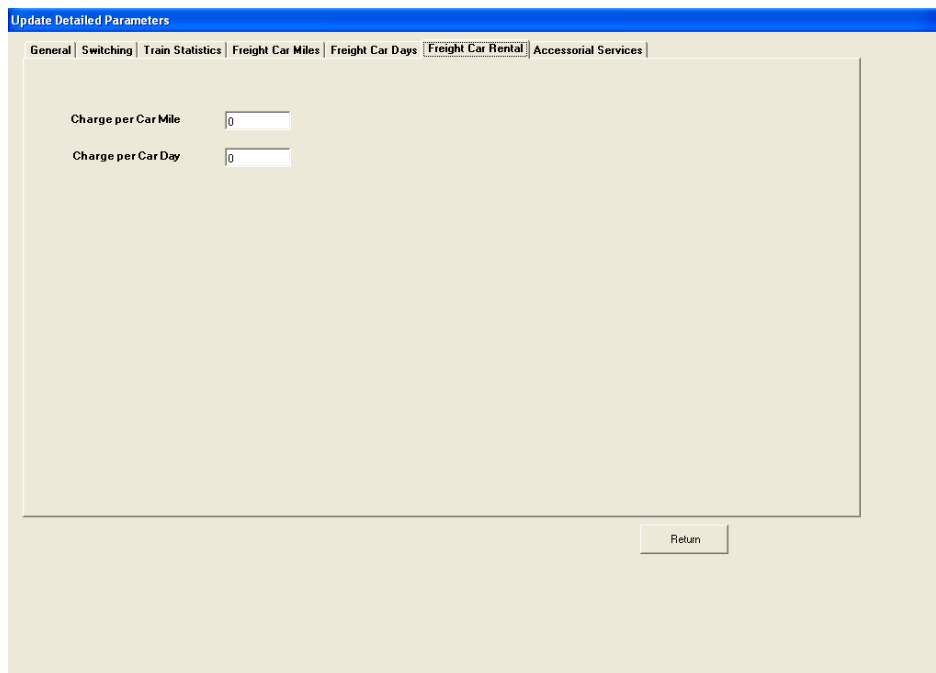
*Car Days per L and UL SW:* This statistic measures the number of days per car, exclusive of demurrage, required for the shipper/consignee to load or unload the contents of the car. The car days are measured from placement of the car at the origin/destination industry location until the car's release back to the railroad. For intermodal flat cars, it measures the time spent within the intermodal terminal.

*Car Days per Intraterminal SW:* This statistic measures the number of days from the placement of the car at the origin industry location until its release back to the railroad at destination industry location.

*Car Days per Interterminal SW:* This statistic measures the number of days from placement of the car at the origin industrial terminal to its release at the destination industrial terminal.

## Freight Car Rental Tab

The sixth tab of the detailed parameters allows the user to modify parameters related to freight car rentals.



The screenshot shows a web application window titled "Update Detailed Parameters". The window has a blue header bar and a navigation menu with tabs: "General", "Switching", "Train Statistics", "Freight Car Miles", "Freight Car Days", "Freight Car Rental" (which is selected), and "Accessorial Services". The main content area is light beige and contains two input fields: "Charge per Car Mile" and "Charge per Car Day", both with a value of "0". A "Return" button is located at the bottom right of the window.

When a railroad-owned freight car is chosen in the *Mandatory Parameters* screen then the following two attributes are available:

*Charge per Car Mile*: This value is the average carrier car miles cost for railroad owned freight cars.

*Charge per Car Day*: This value is the average railroad car day cost for railroad owned freight cars.

When a privately-owned freight car is chosen in the *Mandatory Parameters* screen then only one attribute is available.

*Car Mile Rental Charge*: This value is the average rental cost per mile for privately owned freight cars.

# Accessorial Services Tab

The seventh tab of the detailed parameters allows the user to modify parameters related to accessorial services.

Update Detailed Parameters

General | Switching | Train Statistics | Freight Car Miles | Freight Car Days | Freight Car Rental | **Accessorial Services**

Ton Miles in Lake Transfer

Tons at Coal Terminal

Tons at Ore Terminal

Tons at Other Marine Term

Railroad Will Provide Accessorial Services

Return

*Ton-Miles in Lake Transfer:* This requires the ton miles for the lake transfer service.

*Tons at Coal Terminal:* This value is the number of tons for coal terminal services.

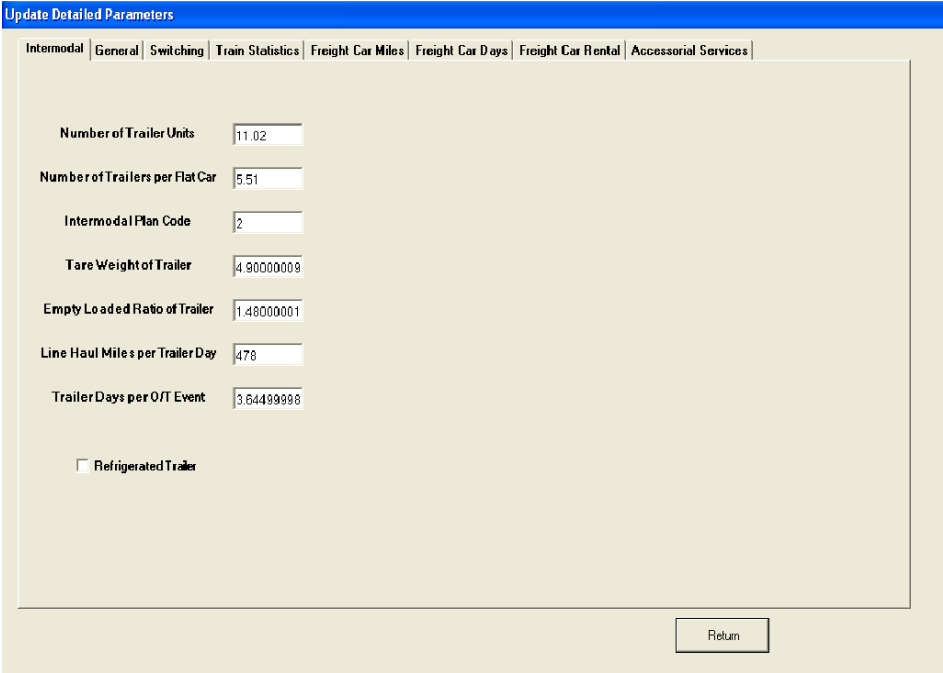
*Tons at Ore Terminal:* This value is the number of tons for ore terminal services.

*Tons at Other Marine Terminal:* This value is the number of tons at other marine terminal services.

*Railroad Will Provide Accessorial Service:* Check this box if cost of accessorial services are included for railroad owned freight cars. The option only appears if a railroad owned freight car was chosen in the *Mandatory Parameter* screen.

# Intermodal Tab

If the user defined an intermodal movement, which is a movement with the freight car type of *Flat Car – TOFC*, then the intermodal tab is the first screen displayed. This tab of the detailed parameters allows the user to modify parameters related to intermodal movements.



*Number of Trailer Units:* This value represents the total number of trailer or container units involved in the shipment. The program recognizes two types of trailer/container units: refrigerated and other. No differentiation is made for the varying lengths of trailers used in railroad intermodal service or between trailers and containers.

*Number of Trailers per Flat Car:* The average number of trailers or containers on one flat car is measured by this parameter.

*Intermodal Plan Code:* There are nine types of intermodal services processed by the program. The default code is 2. These services are provided by railroads under a wide range of commercial arrangements or plans. The plans define the responsibility of the rail carrier for pickup and delivery cost, trailer/container ownership, protective service operations and intermodal car ownership.

Plan	Description
1.0	The railroad provides line haul service between intermodal terminals (ramp to ramp service). This plan excludes trailer costs and pickup and delivery service costs.
2.0	The railroad provides full door to door service with railroad owned trailers. All intermodal costs are included.
2.25	Similar to plan 2.0 except the railroad provides either pickup service at origin or

<b>Plan</b>	<b>Description</b>
	delivery service at destination. All costs, except origin pickup or destination delivery, are included.
2.5	Similar to plan 2.0 except the railroad performs ramp to ramp service with railroad trailers. Pickup and delivery service costs are omitted.
3.0	The railroad provides ramp to ramp service with shipper owned or leased trailers. Trailer costs and pickup and delivery service costs are omitted.
4.0	The railroad provides ramp to ramp service with shipper provided trailers. Trailer ownership and pickup and delivery costs are omitted.
5.1	The railroad provides service using its own or motor common carrier trailers, under through billing. The railroad supplies delivery at destination, while pickup costs at origin are omitted.
5.2	Similar to Plan 5.1 except the railroad supplies pickup services only. Delivery service costs are omitted.
5.3	Similar to Plan 5.1 except the railroad does not supply either pickup or delivery services.

*Tare Weight of Trailer:* This parameter is the average empty weight of the trailer. The default value for this parameter is a non-refrigerated trailer.

*Empty Loaded Ratio of Trailer:* This parameter is the ratio of total loaded plus empty trailer/container miles, divided by loaded trailer/container miles.

*Line Haul Miles per Trailer Day:* This parameter measures the average number of miles per day a trailer/container unit moves while in line haul service.

*Refrigerated Trailer (check box):* If checked, the trailer tare weight will default to the weight for a refrigerated trailer.

If the user, in the *Mandatory Parameter* screen, selected a freight car type of *Flat Car – Multi-Level*, then the intermodal tab has only one input item.

*Number of Autos on Freight Car:* This parameter is the number of motor vehicles contained in the multi level flat car. The default value for this item is the total weight of the shipment divided by two tons.

# Chapter 5 – Railroad Costing Program Menu Options

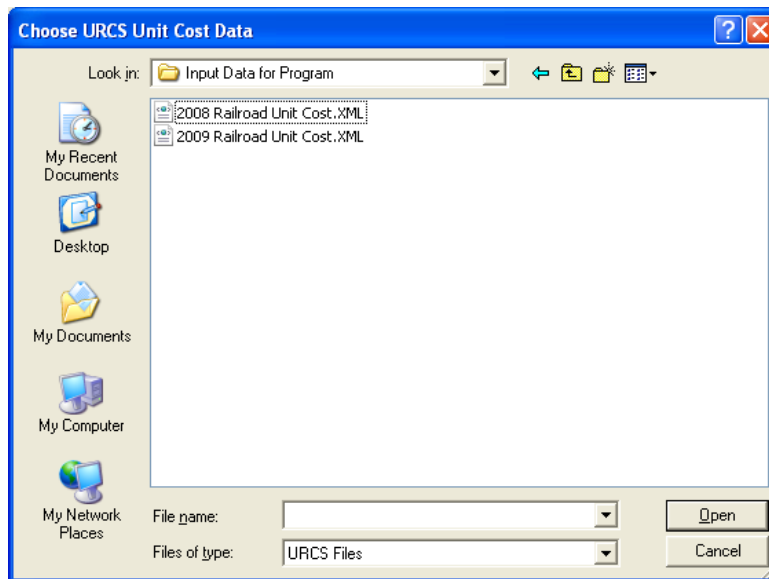
There are three menu options in the *Railroad Costing Program*. Those are *File*, *Options*, and *Help*. These are located in the upper left hand portion of the *Define Railroad Movement* screen.

## File Menu

There are two options in the *File* menu: *Open* and *Exit*.

### *Open Option*

This option allows the user to select a new unit cost input file for the program. It initiates the *Choose URCS Unit Cost Data* dialog allowing the user to choose a particular year's input data.



When the program is first run, the dialog is automatically invoked because the program does not know where the input data file is stored. After the file is selected, the program will continue to use that input file until the user selects another one using the menu's file open option. This option becomes inactive after the *Route Information Section* is defined in the *Mandatory Parameter* screen.

### *Exit Option*

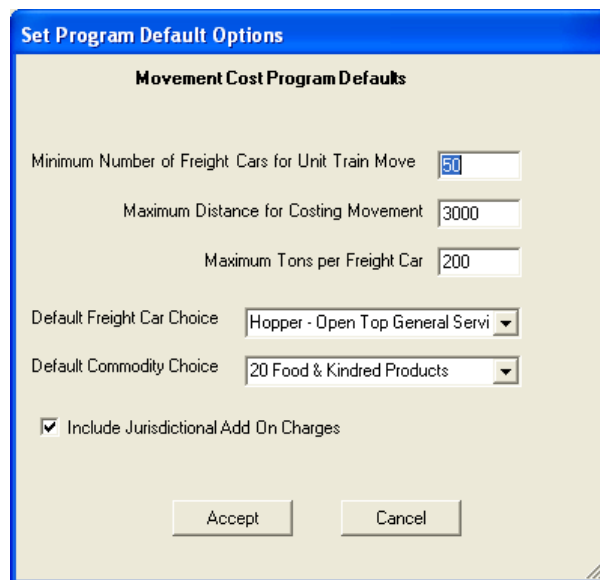
This option allows the user to exit the program. The program can also be closed by clicking on the red "X" in the upper right hand corner of the window.

# Options Menu

There is only one option in the *Options* menu, *Data Defaults*.

## *Data Defaults Option*

This option allows the user to set some of the program default values for the *Railroad Cost Program*. The program does not allow values to fall below the minimum settings or values to be greater than the maximum settings. These should be set to reasonable values to assure railroad cost computations are relevant.



*Minimum Number of Freight Cars for Unit Train Move:* The standard default for the *Railroad Cost Program* is 50 cars for a unit train. The user can change this to a lower value or higher value. The cost produced by the program for a unit train movement is a trainload cost. If the default is set to a lower value the resulting variable costs will appear unreasonably high for a small number of freight cars.

*Maximum Distance for Costing Movement:* The longest relevant distance for a rail segment is defined here.

*Maximum Tons per Freight Car:* This is the largest weight that can be loaded into a freight car.

*Default Freight Car Choice:* This allows the user to set the type of freight car displayed on the drop down combo box in the *Freight Car Parameters*. Set this to the freight car most often used in the railroad movements.

*Default Commodity Choice:* This allows the user to set the type of commodity displayed on the drop down combo box in the *Shipment Parameters*. Since there are 82 commodities used by the program, the user should set the choice to the commodity most often shipped.

*Include Jurisdictional Add-on Charges:* If the costing process is part of a proceeding before the Surface Transportation Board, then this option must be checked. This check box will implement the jurisdictional add-on calculations.

## Help Menu

There is only one option in the *Help* menu, *About*. Selecting this option will display the version number of the *Railroad Cost Program* being used.

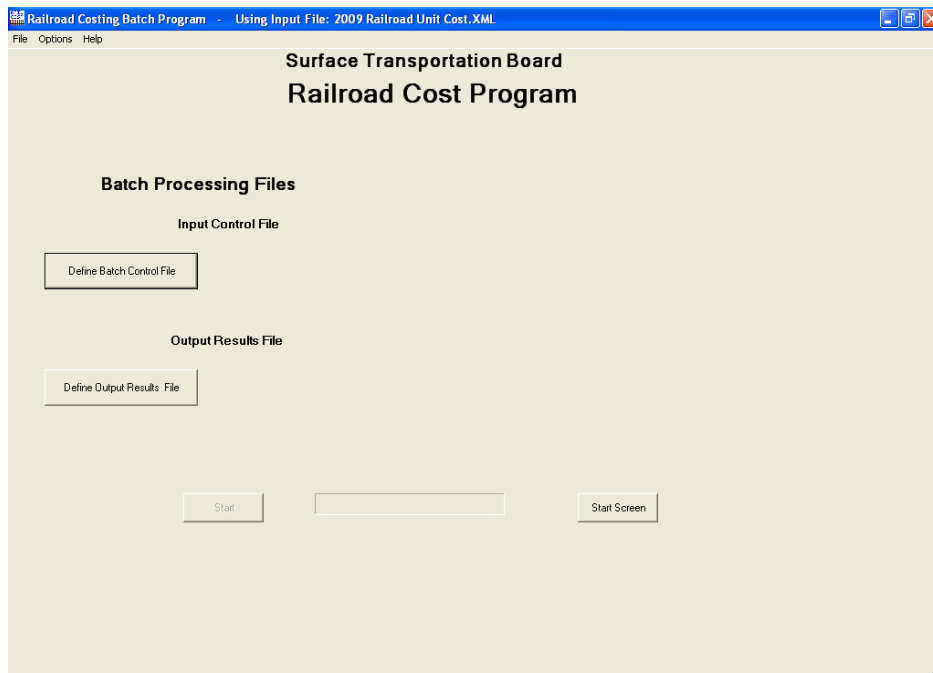


# Chapter 6 – Batch Processing Program

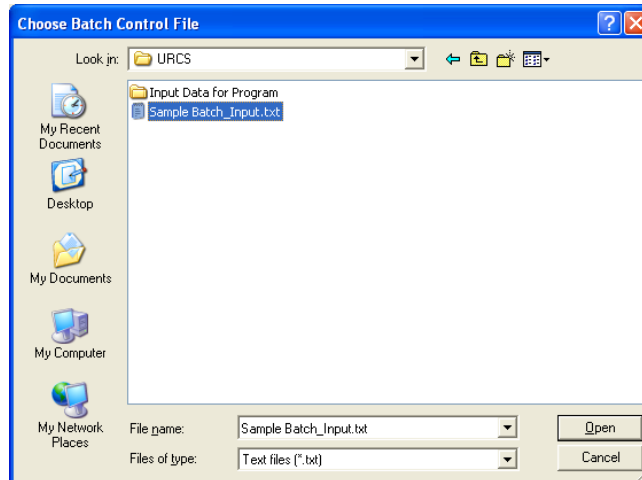
The batch processing program computes the cost of rail movements using a user defined control file. The control file is a text file with each rail segment defined by a small number of processing statements. The file is developed using a text editor program that does not insert special control characters inside the text. Microsoft's *Notepad* program is an example of an acceptable text editor. The normal structure for the file is to define both text and numbers without any special delimiters and to have one or more blank spaces between items. Once the file is completed, the batch option is run and it creates a delimited text output file. This file can be input to a spreadsheet program or to a data base program.

## Running the Batch Program

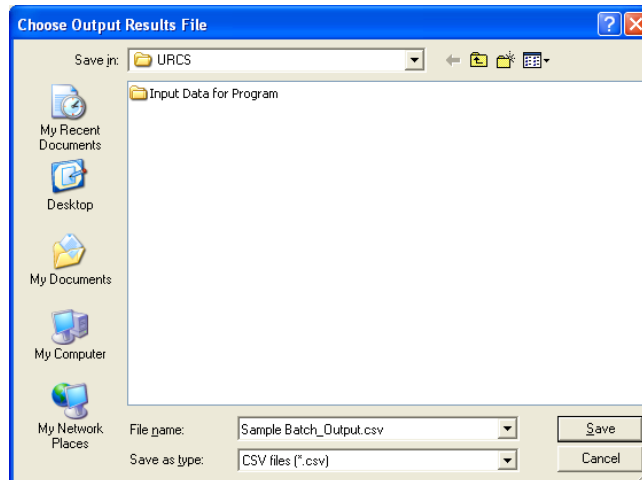
When the batch processing program option is chosen from the Start screen, the following *Railroad Costing Batch Program* screen is displayed:



Pressing the *Define Batch Control File* button brings up the *Choose Batch Control File* dialog screen. The user chooses the batch control file to be processed which has to be created before running the batch program. (See below for more information on the control file statements.)



Pressing the *Define Output Results* file button brings up the *Choose Output Results File* dialog screen to name the output results file. This will be a comma separated value (CSV) file.



To initiate the batch processing program, press the *Start* button. After the process is finished, the output file contains the costed results based on rail movement specifications defined in the input file. Unlike the *Railroad Cost Program*, the batch processing program only costs railroad segments and these segments are not aggregated into a single total cost. The individual segments can be combined into a complete railroad move by the user, or the segments can be defined to cost only a portion of a rail move, using different parameter values.

**IMPORTANT NOTE:** The underlying assumption behind the batch processing program is that the output file is an *intermediate* step, which allows the user to perform additional analysis in a spreadsheet or data base program. For example, the batch processing program cannot allocate the loss & damage expense to multi-carrier movements because the user only provides the distance on the defined segment. The program does not know the total distance needed to allocate the loss & damage to the individual segment.

# Batch Control File Statements

There are two basic program statements used by the batch processing program. The first is OUTPUT statements. These define the output variables computed by the program to include in the output file. The second type of statement is the MOVE or NEW MOVE statement. These are used to define the railroad movement for the costing process.

## Output Processing Statements

These statements define the output values to send to the output file. Output statements must be the first processing statements in the control file.

### **OUTPUT PARAMETERS** <Required Parameter Codes>

This statement allows selected required parameters to be added to the output file. The required parameters identify the characteristics of each railroad movement to be costed, and inclusion of this information can be useful when analyzing the resulting cost data. The required parameter codes are the same as those used in MOVE statements. See the definition of MOVE statements for the proper ID code values.

### **OUTPUT VARIABLES** <User Defined Variable Report Line Numbers>

The detailed report, produced by the *Railroad Cost Program*, contains 703 lines of costing information. One or more of these values can be defined for inclusion in the output file by identifying the report line number(s).

## Move Processing Statements

These statements define the *mandatory parameters* that a user would enter in the interactive *Railroad Cost Program*. They represent the nine basic movement characteristics necessary to estimate the cost of a railroad movement.

### **NEW MOVE** <statements>

### **MOVE** <statements>

The move statements specify the costing parameters such as railroads involved, length of haul, number of freight cars, shipment weight, etc. These statements include both the required parameter set and may include values for the detailed parameter set. Unless otherwise indicated, the user statement contains a parameter ID code and a numeric value for the parameter.

The major difference between NEW MOVE and MOVE statements is a NEW MOVE statement requires all parameters to be defined. It assures that no previously set parameters are being used in a new movement definition. When the program encounters a MOVE statement, it will replace any parameters from the previous statements with the parameters defined within the

current statement. If parameters are left out of the current statement, then the previous parameters will be used until a NEW MOVE statement is encountered. The MOVE statement allows sensitivity analysis of different movement parameters without the burden of redefining the whole movement each time.

In each NEW MOVE (or MOVE) statement, required parameters are defined in the following manner:

<b>Program Code</b>	<b>Parameter Name</b>	<b>Definition</b>
<b>RR</b>	Railroad Code	Any valid railroad ID code or region for the input cost data set (e.g. <b>BNSF, CN, CP, CSXT, KCS, NS, UP, East, or West</b> ).
<b>SG</b>	Segment Type	<b>OT</b> – Railroad originate and terminates shipment; <b>OD</b> – Railroad originates and delivers shipment to another railroad; <b>RD</b> – Railroad receives shipment and delivers to another railroad; <b>RT</b> – Railroad receives shipment and terminates; <b>IA</b> – Intraterminal move; or <b>IR</b> – Interterminal move.
<b>DIS</b>	Segment Distance	Any acceptable mileage for the rail segment. This must be below the maximum distance allowed by the program.
<b>NC</b>	Number of Cars	Any acceptable number of cars, below the maximum number of cars allowed by the program.
<b>FC</b>	Freight Car Code	<b>1</b> – Box Car – 40 ft; <b>2</b> – Box Car – 50 ft; <b>3</b> – Box Car – Equipped; <b>4</b> – Gondola – Plain; <b>5</b> – Gondola – Equipped; <b>6</b> – Hopper – Covered; <b>7</b> – Hopper – Open Top General Service; <b>8</b> – Hopper – Open Top Special Service; <b>9</b> – Refrigerated – Mechanical; <b>10</b> – Refrigerated – Non-Mechanical; <b>11</b> – Flat Car – TOFC; <b>12</b> – Flat Car – Multi-Level; <b>13</b> – Flat Car – General Service; <b>14</b> – Flat Car – Other; <b>15</b> – Tank Car (<22,000 Gallons);

<b>Program Code</b>	<b>Parameter Name</b>	<b>Definition</b>
		<b>16</b> – Tank Car (>=22,000 Gallons); or <b>17</b> – All Other Freight Cars <b>18</b> – Average freight car
<b>OWN</b>	Car Ownership Code	<b>R</b> – Railroad owns the freight car; or <b>P</b> – Shipper owns the freight car.
<b>WT</b>	Tons per Car (Weight)	Any acceptable tonnage, below the maximum tons per car allowed by the program.
<b>COM</b>	Commodity Code	Any one of 82 valid commodity codes (e.g. <b>01</b> -Farm Products, <b>0113</b> -Grains, <b>01195</b> -Potatos, other than sweet, <b>012</b> -Fresh Fruits, <b>013</b> -Fresh Vegetables, etc.). See Appendix 1 for a list of all the valid commodity codes.
<b>SZ</b>	Shipment Size	<b>1</b> – Single car movement (1-5 cars); <b>2</b> – Multi car movement (6-49 cars); or <b>3</b> – Unit train movement (50+ cars).

For example, if the user wanted to calculate the variable cost of a local BNSF movement traveling 500 miles in a single railroad owned equipped boxcar carrying 50 tons of furniture, the following NEW MOVE statement would reflect that movement:

**NEW MOVE RR BNSF SG OT DIS 500 NC 1 FC 3 OWN R WT 50 COM 25 SZ 1**

In this instance, all required parameters have been defined. (**Note:** The NEW MOVE statement and program codes do not have to be in a bold font. That is only done in this example to differentiate between the program codes and the values.) If the user then wanted to compare this previous movement to a 300 mile movement, keeping all the other parameters the same, the following MOVE statement would reflect that movement:

**MOVE DIS 300**

This MOVE statement uses the same parameters as the previous NEW MOVE statement, except that it changes the segment distance from 500 miles to 300 miles.

The definitions for the detailed parameter set are:

<b>Code</b>	<b>Detailed Parameter Description</b>
<b>1</b>	Circuitry
<b>2</b>	Tare weight
<b>3</b>	Empty loaded car mile ratio
<b>4</b>	Spotted to pulled ratio
<b>5</b>	Number of through locomotives
<b>6</b>	Number of way locomotives

<b>Code</b>	<b>Detailed Parameter Description</b>
7	Number of unit locomotives
8	Weight of through train
9	Weight of way train
10	Weight of unit train
11	Through crew wages
12	Way crew wages
13	Unit crew wages
14	Actual through miles
15	Actual way miles
16	Actual unit miles
17	Number of industry switches
18	Number of interchange switches
18	Number of interchange switches
19	Miles between I & I switch
20	Miles between interchange switches
21	Car days per industry switch
22	Car days per interchange switch
23	Car days per I & I switch
24	Car days per intraterminal switch
25	Car days per interterminal switch
26	Car days per L & UL industry switch
27	Car days per L & UL intraterminal switch
28	Car days per L & UL interterminal switch
29	Car miles per industry switch
30	Car miles per interchange switch
31	Car miles per I & I switch
32	Car miles per intraterminal switch
33	Car miles per interterminal switch
34	Cars given industry switch
35	Cars given interchange switch
36	Cars given I & I switch
37	Cars given intraterminal switch
38	Cars given interterminal switch
39	Switch engine minutes per industry switch
40	Switch engine minutes per interchange switch
41	Switch engine minutes per I & I switch
42	Switch engine minutes per intraterminal switch
43	Switch engine minutes per interterminal switch
44	Car days running
45	Car days in yard
46	Car miles per car day
47	Charge per car mile
48	Charge per car day
49	Car mile rental cost
50	General overhead ratio

<b>Code</b>	<b>Detailed Parameter Description</b>
<b>51</b>	Add accessorial services Y – yes add services N – do not add services
<b>52</b>	Ton miles in lake transfer
<b>53</b>	Tons at coal terminal
<b>54</b>	Tons at ore terminal
<b>55</b>	Tons at other marine terminal
<b>56</b>	Number of trailer - container units
<b>57</b>	Number of trailer – container units per flat car
<b>58</b>	Intermodal plan number
<b>59</b>	Line haul miles per trailer day
<b>60</b>	Trailer days per originated or delivered event
<b>61</b>	Tare weight of trailer
<b>62</b>	Empty loaded ratio of trailer
<b>63</b>	Refrigerated trailer Y – yes N – no
<b>64</b>	Number of autos in autorack car

If the user wanted to calculate the variable cost of the same local BNSF movement traveling 500 miles in a single railroad owned equipped boxcar carrying 50 tons of furniture, but to use a circuitry factor of 1.0, rather than the default circuitry factor, the following NEW MOVE statement would reflect that movement:

**NEW MOVE RR BNSF SG OT DIS 500 NC 1 FC 3 OWN R WT 50 COM 25 SZ 1 1 1**

In this case all the required parameters have been defined with the addition of the circuitry factor, which is set to a value of 1.0.

## List of Active Batch Program Statements

The active batch control file program statements are listed below:

**OUTPUT PARAMETERS** <Required Parameter Codes>

**OUTPUT VARIABLES** <User Defined Variable Report Line Numbers>

**NEW MOVE** <Required parameter codes and optional detailed parameter ID codes>

**MOVE** <Required parameter codes and optional detailed parameter ID codes>

**OUTPUT DATA DELIMITED WITH** <Character>

**COMMENT** <User Statements>

Comment statements can be used in a batch control file to provide additional information regarding the movements, but they have no effect on the costing process.

# List of Obsolete Batch Program Statements

The batch control file program statements that are no longer supported in the batch processing program are listed below:

**OUTPUT FILE** <Filename> The output file is now defined in the batch control screen

**OUTPUT DATA NOT INDEXED** Data is not indexed by this program

**OUTPUT DATA INDEXED** <Index value>

**OUTPUT DATA DELIMITED** All output data is delimited

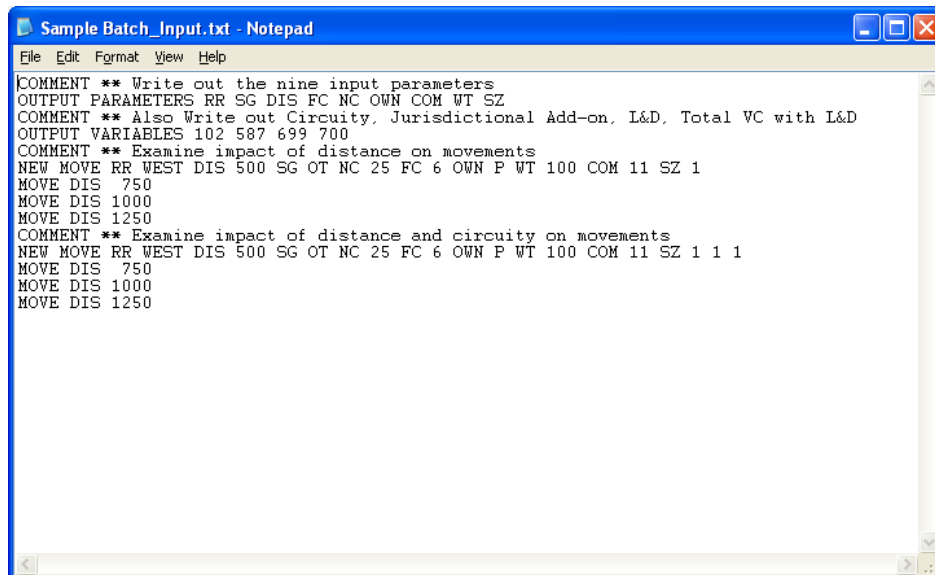
**OUTPUT REPORT SUMMARY** This batch process does not define output reports

**OUTPUT REPORT DETAIL**

**OUTPUT REPORT BOTH**

## Example of a Batch Control File

The batch control file is a text file with each rail segment defined using the program statements discussed above. The file is developed using a text editor program that does not insert special control characters inside the text. The following is an example of a batch control file opened using Microsoft's *Notepad*:

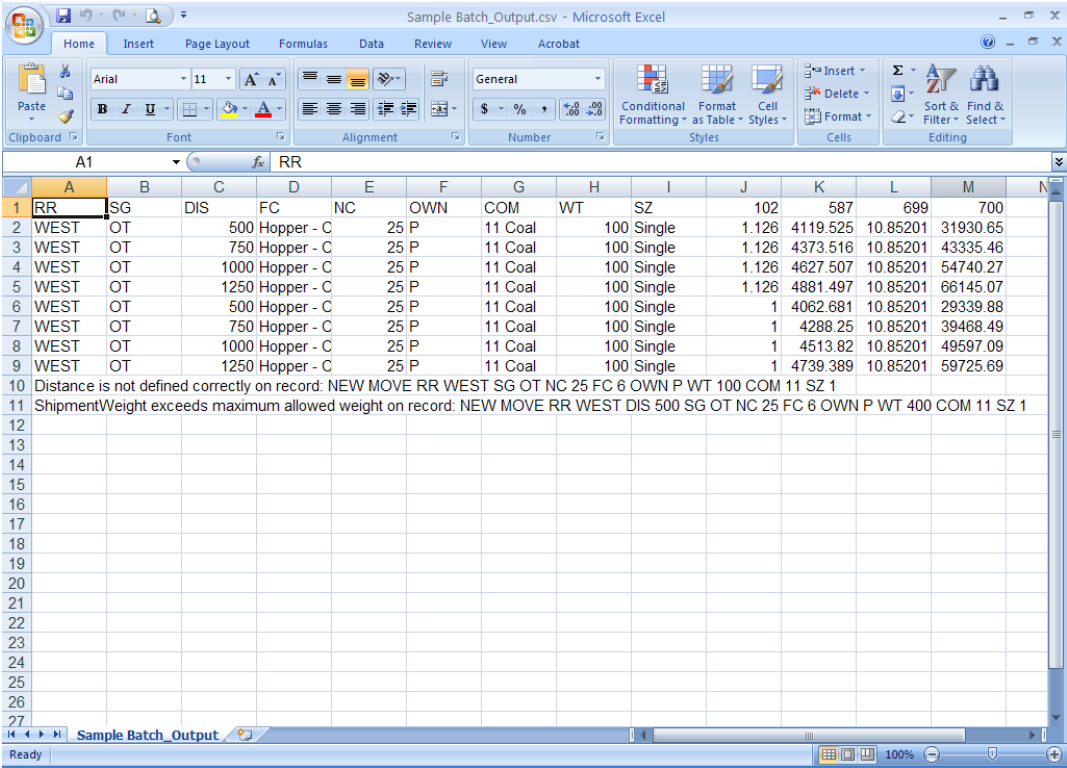


```
Sample Batch_Input.txt - Notepad
File Edit Format View Help
COMMENT ** Write out the nine input parameters
OUTPUT PARAMETERS RR SG DIS FC NC OWN COM WT SZ
COMMENT ** Also Write out Circuitry, Jurisdictional Add-on, L&D, Total VC with L&D
OUTPUT VARIABLES 102 587 699 700
COMMENT ** Examine impact of distance on movements
NEW MOVE RR WEST DIS 500 SG OT NC 25 FC 6 OWN P WT 100 COM 11 SZ 1
MOVE DIS 750
MOVE DIS 1000
MOVE DIS 1250
COMMENT ** Examine impact of distance and circuitry on movements
NEW MOVE RR WEST DIS 500 SG OT NC 25 FC 6 OWN P WT 100 COM 11 SZ 1 1 1
MOVE DIS 750
MOVE DIS 1000
MOVE DIS 1250
```



# Example of an Output Results File

The output results file written out by the *Batch Processing Program* is a comma separated value (CSV) file whose contents depend on the OUTPUT PARAMETERS statement and OUTPUT VARIABLES statement defined by the user in the *Batch Control File*. The following is an example of an output results file opened using Microsoft Excel:



The sample batch control file in the previous section created the first nine lines of this output file. The first line of the output results file contains headers for the columns of data in subsequent rows of the file. Notice that the first nine columns are the OUTPUT PARAMETERS specified in the batch control file, namely, RR, SG, DIS, FC, NC, OWN, COM, WT and SZ. The next four columns are the OUTPUT VARIABLES specified in the batch control file, namely, 102, 587, 699 and 700. There are eight movements that correspond to the NEW MOVE and MOVE statements. Notice how the *distance* (column header DIS) and/or *circuitry factor* (column header 102) changes between the movements, which is reflected in the variable costs.

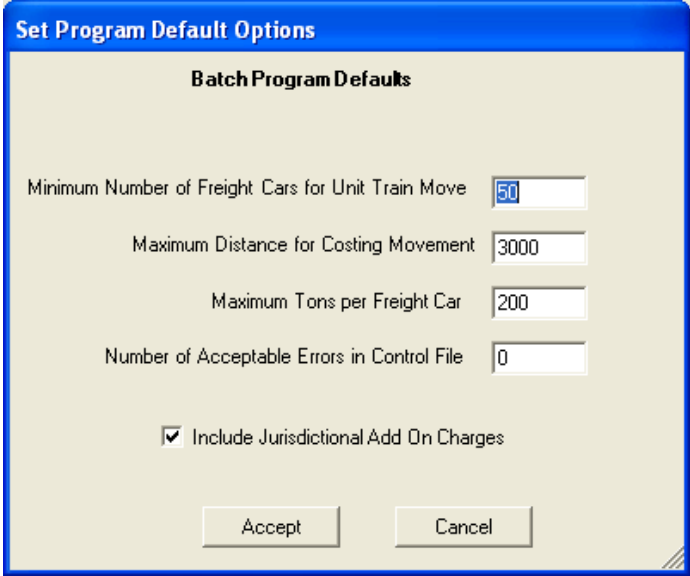
The *Batch Processing Program* provides some error messages if there is a problem with the NEW MOVE or MOVE statements. Notice that line ten of this output file indicates that the distance (DIS parameter) is not defined correctly – it is missing from the NEW MOVE statement. In addition, line eleven indicates that the weight (WT parameter) exceeds the maximum allowable weight, which is defined in the *Data Defaults*. (See the next section.) These provide valuable feedback to the user to help correct any problems with the batch control file.

# Batch Processing Program Menu Options

The *Batch Processing Program* menu options are the same as the three menu options in the *Railroad Costing Program*. Those are *File*, *Options*, and *Help*. These are located in the upper left hand portion of the *Railroad Costing Batch Program* screen. There are two options in the *File* menu, namely, *Open* and *Exit*. There is one option in the *Options* menu, namely, *Data Defaults*. There is one option in the *Help* menu, namely, *About*. The *File* and *Help* menu options are identical to those in the *Railroad Costing Program*. (See Chapter 5 – Railroad Costing Program Menu Options) However, the *Data Defaults* options for the *Batch Processing Program* are slightly different.

## Data Defaults Option

This option allows the user to set some of the program default values for the *Batch Processing Program*. The program does not allow values to fall below the minimum settings or values to be greater than the maximum settings. These should be set to reasonable values to assure railroad cost computations are relevant.



*Minimum Number of Freight Cars for Unit Train Move:* The standard default for the *Railroad Cost Program* is 50 cars for a unit train. The user can change this to a lower value or higher value. The cost produced by the program for a unit train movement is a trainload cost. If the default is set to a lower value the resulting variable costs will appear unreasonably high for a small number of freight cars.

*Maximum Distance for Costing Movement:* The longest relevant distance for a rail segment is defined here.

*Maximum Tons per Freight Car:* This is the largest weight that can be loaded into a freight car.

*Number of Acceptable Errors in Control File:* This allows the user to set the maximum number of acceptable errors contained in the batch control file. This should normally be set to zero.

*Include Jurisdictional Add-on Charges:* If the costing process is part of a proceeding before the Surface Transportation Board, then this option must be checked. This check box will implement the jurisdictional add-on calculations.

# Chapter 7 - Annual Data Files

The Surface Transportation Board issues an annual railroad data file, which is the input data used by this program. The file contains data based on calculations from the URCS Unit Cost Program. That program calculates unit cost and unit operating statistics for each Class 1 Railroad reporting financial data to the STB.

Railroad data sets are contained in an XML formatted data file. This format is text based, defined by a simple set of rules representing the data in a uniform way. XML data is stored between a series of open and closed tags. Unlike most data files, data is not stored in separate entries defined by column headings. Instead, data is stored by fields with separate column attributes. A typical data tag is E1P1L103. E1P1 defines the source table while the L103 defines the source line number. The column data is defined by a series of Cn attributes associated with each line number, where C2 would represent column 2.

```
<E1P1L103 C1="0.602596" C2="0.00344391" C3="0.00259817" />
```

Because the file is text based, railroad data can be changed by a text editor or by a XML editor. An outline of the major entities of each railroad's data set is described.

The first processing tag is the root element. In an XML data file, the root element contains all other data elements. The root element for the annual data file is <UnitCostData>. This tag cannot be modified or the program will reject the file.

The next processing tag is <Railroad>. This tag contains two elements, <Name> and <Title>. The name is a railroad abbreviation and should be relatively short. The program uses the railroad name to identify and look up data. This name is used in the drop down combo box in the *Mandatory Parameter* screen to define railroad routes. Therefore the name must be unique for each railroad data set within the file. The Title attribute does not have to be unique.

After the Railroad tag, the file contains associated data elements with an E address, such as E1P1L103 as in the example above. These tags relate to the historical output of the URCS Unit Cost Program, which produced E worktables as the input set to the *Railroad Cost Program*.

## E1P1 Tags

E1P1 tags represent unit costs for line haul, terminal, clerical and special service operations. The following is a list of the twenty-two lines that contain these unit costs.

E1P1 Tag	Description
L101	Gross ton mile
L102	Car mile other than clerical
L103	Train mile other than crew
L104	Crew train mile

<b>E1P1 Tag</b>	<b>Description</b>
L105	Locomotive unit mile
L106	Other carloads handled
L107	Clerical carloads handled
L108	Other carloads originated or terminated
L109	Clerical carloads originated or terminated
L110	Clerical car mile
L111	Switch engine minutes
L112	Ton miles in lake transfer service
L113	Tons handled at coal terminals
L114	Tons handled at ore terminals
L115	Tons handled at other marine terminals
L116	Refrigerated car miles
L117	Protective service reefer trailer container unit days
L118	Refrigerated trailer container unit days
L119	Other non-refrigerated trailer container unit days
L120	Trailer container unit days loaded and unloaded
L121	Motor vehicle units loaded and unloaded
L122	Trailer container units picked up and delivered

Each line contains three column attributes. The definition of each column attribute is:

<b>Column</b>	<b>Description</b>
C1	Operating unit cost expense
C2	Lease unit cost expense
C3	Return on investment unit expense

## E1P2 Tags

E1P2 tags represent unit costs for freight car ownership and maintenance. The line numbers relate to freight car types processed by URCS.

<b>E1P2 Tag</b>	<b>Description</b>
L201	Box Car – 40 ft
L202	Box Car – 50 ft
L203	Box Car – Equipped
L204	Gondola – Plain
L205	Gondola – Equipped
L206	Hopper – Covered
L207	Hopper – Open Top General Service
L208	Hopper – Open Top Special Service
L209	Refrigerated – Mechanical
L210	Refrigerated – Non-Mechanical

<b>E1P2 Tag</b>	<b>Description</b>
L211	Flat Car – TOFC
L212	Flat Car – Multi-Level
L213	Flat Car – General Service
L214	Flat Car – Other
L215	Tank Car (<22,000 Gallons)
L216	Tank Car (>=22,000 Gallons)
L217	All Other Freight Cars
L218	Auto rack cars
L219	Accessorial car charges
L220	Average freight cars costs
L221	Total cost for multilevel flat cars

Each line contains thirteen column attributes. The definition of each column attribute is:

<b>Column</b>	<b>Description</b>
C1	Car miles in running service, operating unit cost expense for railroad owned equipment
C2	Car miles in running service, lease unit cost expense for railroad owned equipment
C3	Car miles in running service, return on investment unit expense for railroad owned equipment
C4	Car mile in yard switching service, operating unit cost expense for railroad owned equipment
C5	Car mile in yard switching service, lease unit cost expense for railroad owned equipment
C6	Car mile in yard switching service, return on investment unit expense for railroad owned equipment
C7	Car days in running service, operating unit cost expense for railroad owned equipment
C8	Car days in running service, lease unit cost expense for railroad owned equipment
C9	Car days in running service, return on investment unit expense for railroad owned equipment
C10	Car days in yard switching service, operating unit cost expense for railroad owned equipment
C11	Car days in yard switching service, lease unit cost expense for railroad owned equipment
C12	Car days in yard switching service, return on investment unit expense for railroad owned equipment
C13	Car miles in running service, lease unit cost for privately owned equipment

# E1P3 Tags

E1P3 tags represent unit costs for loss and damage claim payments. The line designations, L301 to L382 relate directly to the URCS commodities listed in Appendix 1. There is one column attribute C1, which is unit cost per ton.

# E2P1 Tags

E2P1 tags represent freight car operating statistics. The following line numbers relate to freight car types used in this table:

<b>E2P1 Tag</b>	<b>Description</b>
L101	Box Car – 40 ft
L102	Box Car – 50 ft
L103	Box Car – Equipped
L104	Gondola – Plain
L105	Gondola – Equipped
L106	Hopper – Covered
L107	Hopper – Open Top General Service
L108	Hopper – Open Top Special Service
L109	Refrigerated – Mechanical
L110	Refrigerated – Non-Mechanical
L111	Flat Car – TOFC
L112	Flat Car – Multi-Level
L113	Flat Car – General Service
L114	Flat Car – Other
L115	Tank Car (<22,000 Gallons)
L116	Tank Car (>=22,000 Gallons)
L117	All Other Freight Cars
L118	Average freight cars

Each line contains twenty-nine column attributes. The definition of each column attribute is:

<b>Column</b>	<b>Description</b>
C1	Average tare weight
C2	Current year empty to loaded ratio, for railroad owned equipment
C3	Current year empty to loaded ratio, for private line equipment
C4	Current year empty to loaded ratio, for all freight cars
C5	Local circuitry
C6	Interline circuitry
C7	Average circuitry

<b>Column</b>	<b>Description</b>
C8	Spotted and pulled ratio
C9	Car days per industry switch
C10	Car days per interchange switch
C11	Car days per intraterminal switch
C12	Car days per interterminal switch
C13	Car days per intertrain and intratrain switching
C14	Car days per loading and unloading industry switching
C15	Car days per loading and unloading intraterminal switching
C16	Car days per loading and unloading interterminal switching
C17	Car miles per industry switch
C18	Car miles per interchange switch
C19	Car miles per intraterminal switching
C20	Car miles per interterminal switching
C21	Car miles per intertrain and intratrain switching
C22	Average car miles for railroad owned freight cars per car day
C23	Average miles between intertrain and intratrain switching
C24	Average miles between interchange events
C25	Current year switch engine minutes per industry switch
C26	Current year switch engine minutes per interchange switch
C27	Current year switch engine minutes per intraterminal switch
C28	Current year switch engine minutes per interterminal switch
C29	Current year intertrain and intratrain switching

## E2P2 Tags

E2P2 tags represent other railroad statistics. There is one column attribute, C1, which is the statistic value. The line numbers definitions are as follows:

<b>E2P2 Tag</b>	<b>Description</b>
L201	Average distance in way trains
L202	Average trailer container units per flat car
L203	Average tare weight for a refrigerated trailer - container
L204	Average tare weight other trailer container
L205	Line haul miles per trailer day
L206	Trailer days per originated or terminated event
L207	Empty to loaded ratio for a refrigerated or other trailer – container
L208	Average locomotive units per unit train
L209	Average locomotive units per way train
L210	Average locomotive units per through trains
L211	Average gross tons for a unit train
L212	Average gross tons for a way train



<b>E2P2 Tag</b>	<b>Description</b>
L213	Average gross tons for a through train
L214	Total engine crew wages, excluding train switching
L215	Total train crew wages, excluding train switching
L216	Total crew wages, excluding train switching
L217	Running train miles
L218	Average crew wages assigned to crew train miles
L219	General overhead ratio
L220	Constant cost markup ratio

## E2P3 Tags

E2P3 tags represent unit factors for the jurisdictional add-on process. These are:

<b>E2P3 Tag</b>	<b>Description</b>
L301	Industry switching residual
L302	Station clerical residual
L303	Interchange switching residual
L304	Intertrain and intratrain switching residual
L305	Mileage residual

The following are two columns attributes:

<b>Column</b>	<b>Description</b>
C1	Unit add-on factor for railroad-owned freight cars
C2	Unit add-on factor for privately-owned freight cars

## Chapter 8 - Programming User Interface

This section is for .NET programmers and describes, in detail, the user interface to the costing process. There are two classes available for programmers to control the URCS costing process. The first controls the processing of the input unit cost data file. The second controls the costing process. These classes are contained in .NET dynamic link libraries.

User projects contain source files and other content. Typically, a project build process results in the contents of a project being compiled into an (EXE) or a (DLL) assembly. To use the costing process in a user project, a reference must be added to the reference folder in the .NET Integrated Development Environment's Solution Explorer context menu. The *Add Existing Item* option must add libraries *STBRailroadData.dll* and *STBUnitCost.dll* to the project. The rest of the chapter describes how to invoke the various functions of the costing process to produce railroad variable costs. The programming language used for this documentation is Visual Basic however; any .NET language can use the user interface.

Microsoft developed the .NET platform to replace earlier programming environments such as *Windows API* or *Component Object Modules*. One problem with the .NET platform is that it is not compatible with earlier Windows programming environments, so the classes developed for the costing process are not available to legacy programming languages such as Visual Basic 6.0.

### UnitFactors File Control Class

This class uses the *STBRailroadData* namespace. This namespace must be defined in the user program.

```
Imports STBRailroadData
```

This class controls the processing of railroad unit cost factors XML data files. The class constructor takes the name of the railroad XML file. The user must construct this class with an existing XML file and then pass the class address to the *Movement Cost Class*.

#### UnitFactors Constructor

---

**Function**      The constructor for the unit cost factors class opens the input data file for reading. The *FileName* string contains the complete path and file name for the source XML railroad unit cost file.

**Syntax**          `UnitFactors (string FileName)`

**Example:**        `Dim ETableData As UnitFactors`

```
ETableData = New UnitFactors( "C:\URCS\Railroad Data.XML" )
```

## Movement Cost Class

This class uses the STBRailroadCost namespace. This namespace must be defined in the user program.

```
Imports STBRailroadCost
```

This class controls processing of railroad costs. The constructor requires a previously initialized *Unit Factors file control* class. After the class is constructed, the user manages the railroad costing process by filling in mandatory parameters and any detailed parameters necessary to define a rail movement. Each initialized class calculates a segment costs and returns a double array with total variable cost and all the components of the variable cost calculation. Each railroad must initiate a separate instance of this class. Once a railroad is set as a mandatory parameter, the class internally retrieves the railroad's unit cost data and sets various processing states. The class cannot change this data for another railroad. All other mandatory and detailed parameters can be changed and costs re-calculated within an instance of the class.

---

### MoveCost Constructor

**Function** This is the constructor for the movement cost class. A previously initialized *UnitFactors file control* class variable must be passed.

**Syntax** MoveCost(ETableData As UnitFactors)

**Example:** Dim CostProcess As MoveCost  
CostProcess = New MoveCost(ETableData)

**Return Value** None

---

### Calculate

**Function** Produces railroad variable costs for a cost segment. These variable costs are contained in a double array. The size of this array is 321. This function is invoked after all mandatory parameters are defined, and before the detailed parameters are entered. Many detailed parameters are dependent on the settings of mandatory parameters, so a calculation is necessary before detailed parameters are entered.

**Syntax** Calculate() As Double()

**Example:** Dim FVals(321) As Double  
FVals = CostProcess.Calculate()

**Return Value** Returns a double array of segment costs values. See *Location of Movement Cost Data Within FVals Array* table for the list of array locations and the associated

costing values they contain. If there is an error, such as a missing mandatory parameter or a parameter out of range, then all values in the array are returned as 0. To check for an error, test FVals(0) greater than 0.

## Mandatory Parameters

The costing process requires all nine mandatory parameter values be defined before calculating segment costs. If all mandatory parameters are not correctly entered and the calculate function is invoked, the class returns a double array with all values set to 0. All mandatory parameters are property functions and can be set or retrieved through the Property Names defined in the following table. Note that some of the property settings are different than mandatory values entered in the *Batch Program* or the *Railroad Cost Program*.

Property Name	Data Type	Description
CarrierID	String	Railroad abbreviation from the Unit Factors data base.
SegmentType	Integer	Type of railroad segment, the following values are valid: <b>1</b> - Originate & Terminate <b>2</b> - Originate & Deliver <b>3</b> - Receive & Terminate <b>4</b> - Receive & Deliver <b>6</b> - Intraterminal Move <b>7</b> - Interterminal Move
Distance	Double	Segment mileage - estimated or actual
FreightCar	Integer	The Freight Car, the following values are valid: <b>1</b> - Box, General Service <b>2</b> - Box, General Service <b>3</b> - Box, Equipped General Service <b>4</b> - Gondola, General Service <b>5</b> - Gondola, Equipped General Service <b>6</b> - Covered Hopper <b>7</b> - General Service Hopper <b>8</b> - Open Special Service Hopper <b>9</b> - Mechanical Refrigerator <b>10</b> - Non-mechanical Refrigerator <b>11</b> - TOFC Flat <b>12</b> - Multi Level Flat <b>13</b> - General Service Flat <b>14</b> - Other Flat Car <b>15</b> - Tank Car - Less than 22,000 Gallons <b>16</b> - Tank Car - More than 22,000 Gallons <b>17</b> - All other freight cars

Property Name	Data Type	Description
		<b>18</b> - Average all freight cars
NumberOfCars	Integer	Number of Freight Cars in Move
CarOwnership	Integer	The owner of the freight car, valid values: <b>1</b> - Railroad owned car <b>2</b> - Privately owned car
CommodityCode	Integer	The type of commodity hauled, valid index values are 1 to 82. See Appendix 1 for associated STCC values.
ShipmentWeight	Double	Weight of the shipment in tons per carload
ShipmentSize	Integer	The size of the shipment. Valid values are: <b>1</b> - Single Car Movement <b>2</b> - Multiple Car Movement <b>3</b> - Unit Train Movement

## Detailed Parameters

The costing process can accept specific adjustments to define the details of the movement. These parameters are optional, default values exist for each one. Before detailed parameters can be set, the `Calculate()` function must be invoked to compute the default values. The program rejects updating of detailed parameters unless costs are calculated with the minimal parameter set completely defined. These parameters can be set and retrieved through the property names described in the following table.

Property Name	Data Type	Description
Accessorial	Boolean	This sets the accessorial services for railroad owned freight cars. The default value is true.
AutosShip	Double	Number of automobiles on a multi level flat car.
CDIASW	Double	Car days per intraterminal switch
CDIESW	Double	Car days per interterminal switch
CDIISW	Double	Car days per I & I switch
CDIndSW	Double	Car days per industry switch
CDIntSW	Double	Car days per interchange switch
CDLUIASW	Double	Car days per loading & unloading for intraterminal switch
CDLUIESW	Double	Car days per loading & unloading for interterminal switch
CDLUIIndSW	Double	Car days per loading & unloading for industry switch
CDRun	Double	Running car days

<b>Property Name</b>	<b>Data Type</b>	<b>Description</b>
CDYard	Double	Total car days in yard
Circuitry	Double	Circuitry factor to inflate estimated miles to actual miles
CMCD	Double	Actual miles per car day
CMIASW	Double	Car miles per intraterminal switch
CMIESW	Double	Car miles per interterminal switch
CMIIISW	Double	Car miles per I & I switch
CMIndSW	Double	Car miles per industry switch
CMIntSW	Double	Car miles per interchange switch
CMRent	Double	Private freight car, car mile rental charge
FCIASW	Double	Freight cars given intraterminal switch
FCIESW	Double	Freight cars given interterminal switch
FCIISW	Double	Freight cars given I & I terminal switch
FCInt	Double	Number of freight cars given interchange switch
GenOverhead	Double	General overhead ratio
IndustrySwitches	Double	Number of industry switches
InterChangeSwitches	Double	Number of interchange switches
LERatio	Double	Empty to loaded ratio for freight car
MilesIISW	Double	Average miles between I & I switch
MilesInterSW	Double	Average miles between interchange events
RRCDCCharge	Double	Charge per car day for railroad owned car
RRCMCharge	Double	Charge per car mile for railroad owned car
SPRatio	Double	Spotted to pulled ratio
SWEngMinIA	Double	Switch engine minutes for intraterminal switch
SWEngMinIE	Double	Switch engine minutes for interterminal switch
SWEngMinII	Double	Switch engine minutes for I & I switch
SWEngMinInd	Double	Switch engine minutes per industry switch
SWEngMinInt	Double	Switch engine minutes per interchange switch
TareWeight	Double	Average tare weight of an empty freight car
TFCIsRef	Boolean	Trailer container unit is refrigerated
TFCLERatio	Double	L/E ratio for trailer container
TFCLineMi	Double	Line haul miles per trailer day
TFCperFlat	Double	Average number of trailers on flat car
TFCPlanCode	Double	TOFC/COFC service plan code
TFCTareWT	Double	Average tare weight for trailer/container
TFCTrailerDays	Double	Trailer days per origination or termination event
TFCTrailers	Double	Number of trailers in shipment
ThroughCWages	Double	Crew wages for through train
ThroughLoco	Double	Average locomotives in through trains
ThroughMiles	Double	Through train miles including circuitry

Property Name	Data Type	Description
TonsCoal	Double	Tons handled at coal terminals
TonsLake	Double	Tons handled at lake transfer service
TonsMarine	Double	Tons handled in other marine terminal
TonsOre	Double	Tons handled in ore terminal
UnitCWages	Double	Crew wages for unit train
UnitLoco	Double	Average locomotives for a unit train
UnitMiles	Double	Unit train miles including circuitry
WayCWages	Double	Crew wages for way train
WayLoco	Double	Average locomotives for way train
WayMiles	Double	Way train miles including circuitry
WeightThrough	Double	Average gross tons for a through train
WeightUnit	Double	Average gross tons for a unit train
WeightWay	Double	Average gross tons for a way train

## Programming Example of the User Interface

```
Imports STBRailroadCost 'Reference the STBRailroadCost.DLL
Imports STBRailroadData 'Reference the STBRailroadData.DLL

Module RailCostExample

Sub Main()
    'Define references to processing classes
    Dim ETableData As UnitFactors
    Dim CostProcess As MoveCost

    'Construct the two classes
    Dim InputFileName As String = "\XML File\2002Railroad Unit Cost.XML"

    ETableData = New UnitFactors(InputFileName)
    CostProcess = New MoveCost(ETableData)

    'Define a double array for processing results
    Dim FVals(321) As Double

    'Set mandatory parameters
    CostProcess.CarrierID = "CN"
    CostProcess.SegmentType = 1 'Originate & Terminate
    CostProcess.Distance = 1000 'Take shipment 1,000 miles
    CostProcess.FreightCar = 7 'Use a General service hopper
    CostProcess.NumberOfCars = 1 'Shipment is in one car
    CostProcess.CarOwnership = 2 'Privately owned freight car
    CostProcess.CommodityCode = 2 'Grain commodity
    CostProcess.ShipmentWeight = 100 'loaded at 100 tons per car
    CostProcess.ShipmentSize = 1 'Single carload movement

    'Calculate after mandatory parameters are defined
    FVals = CostProcess.Calculate()
```

```

'Now set detailed parameters
CostProcess.Circuitry = 1 'Set circuitry to 1, using actual miles
CostProcess.CMRent = 0 'Set private car mile rental charge to 0

'Calcualte the final variable costs after shipment has been defined
FVals = CostProcess.Calculate()

Dim TotalVariableCost As Double
TotalVariableCost = FVals(0)

'Change the freight car to covered hopper
CostProcess.FreightCar = 6

FVals = CostProcess.Calculate
TotalVariableCost = FVals(0)

'Get the private car rental charge for this movement
Dim PrivateCarRent As Double
PrivateCarRent = CostProcess.CMRent
'The private car rent is 0 because we previously set it to 0.

End Sub

End Module

```



## Location of Movement Cost Data Within FVALS Array

FVALS Location	Report Line	Movement Cost Account
0	696	TOTAL VARIABLE COST FOR THE SEGMENT
1	101	SHORT LINE MILES
2	102	CIRCUITY FACTOR
3	103	ACTUAL MILES INCLUDING CIRCUITY
4	104	ACTUAL UNIT TRAIN MILES INCLUDING CIRCUITY
5	105	E/L RATIO, THIS CAR
6	106	ACTUAL WAY TRAIN MILES INCLUDING CIRCUITY
7	107	ACTUAL THROUGH TRAIN MILES INCLUDING CIRCUITY
8	108	TOTAL UNIT TRAIN MILES INCLUDING EMPTY RETURN
9	109	TOTAL WAY TRAIN MILES INCLUDING EMPTY RETURN
10	110	TOTAL THROUGH TRAIN MILES INCLUDING EMPTY RETURN
11	111	TOTAL TRAIN MILES INCLUDING EMPTY RETURN
12	201	NUMBER OF FREIGHT CARS
13	202	TCU'S PER FLAT CAR
14	203	NUMBER OF TCUS
15	204	TCU FREIGHT CARS
16	205	CAR MILES INCLUDING EMPTY RETURN
17	206	UC PER CM-OPR
18	207	VC-CM-OPR
19	208	UC PER CM-DRL
20	209	VC-CM-DRL
21	210	UC PER CM-ROI
22	211	VC-CM-ROI
23	212	TARE WEIGHT (TONS) THIS CAR TYPE
24	213	FREIGHT CAR TARE TON MILEAGE
25	214	TARE WEIGHT (TONS) OF ONE TCU -OTHER
26	215	E/L RATIO - TCU
27	216	TCU TARE TON MILEAGE
28	217	WEIGHT OF SHIPMENT (TONS)
29	218	SHIPMENT NET TON MILES
30	219	GROSS TON MILES
31	220	UC PER GTM - OPR
32	221	VC - GTM - OPR
33	222	UC PER GTM - DRL

<b>FVALS Location</b>	<b>Report Line</b>	<b>Movement Cost Account</b>
34	223	VC - GTM – DRL
35	224	UC PER GTM - ROI
36	225	VC - GTM - ROI
37	226	AVERAGE LOCO UNITS/UNIT TRAIN
38	227	AVERAGE LOCO UNITS/WAY TRAIN
39	228	AVERAGE LOCO UNITS/THROUGH TRAIN
40	229	UNIT TRAIN LOCO UNIT MILES
41	230	WAY TRAIN LOCO UNIT MILES
42	231	THROUGH TRAIN LOCO UNIT MILES
43	232	AVE TRAILING GROSS TONS-UNIT ROUND TRIP
44	233	AVE TRAILING GROSS TONS-WAY ROUND TRIP
45	234	AVE TRAILING GROSS TONS-THROUGH ROUND TRIP
46	235	GROSS TONS - CARS & CONTENTS OTHER
47	236	PERCENT OF UNIT TRAIN TONNAGE
48	237	PERCENT OF WAY TRAIN TONNAGE
49	238	PERCENT OF THROUGH TRAIN TONNAGE
50	239	UNIT TRAIN LUM (ALLC.)
51	240	WAY TRAIN LUM (ALLC.)
52	241	THR. TRAIN LUM (ALLC.)
53	242	TOTAL SHIPMENT LUM (ALLOCATED)
54	243	UC PER LUM-OPR
55	244	VC-LUM-OPR
56	245	UC PER LUM-DRL
57	246	VC-LUM-DRL
58	247	UC PER LUM-ROI
59	248	VC-LUM-ROI
60	250	SHIPMENT ORIGINATION/TERMINATION
61	251	CARLOADS ORIGINATED/TERMINATED TOFC
62	252	CARLOADS ORIGINATED/TERMINATED OTHER
63	253	CARLOADS HANDLED
64	254	CARLOADS HANDLED NOT TOFC
65	255	UC PER CM-CLR-OPR
66	256	VC-CM CLR-OPR
67	257	UC PER CLOT-CLR-OPR
68	258	VC-CLOT CLR-OPR
69	259	UC PER HAND-CLR-OPR
70	260	VC-HAND CLR-OPR
71	261	UC PER CLOT-OTHER-OPR
72	262	VC-CLOT-OTHER-OPR

<b>FVALS Location</b>	<b>Report Line</b>	<b>Movement Cost Account</b>
73	263	UC PER HAND-OTHER-OPR
74	264	VC-HAND-OTHER-OPR
75	265	UC PER HAND-OTHER-DRL
76	266	VC-HAND-OTHER-DRL
77	267	UC PER HAND-OTHER-ROI
78	268	VC-HAND-OTHER-ROI
79	269	SHIPMENT SHARE-UNIT TRAIN MILES
80	270	SHIPMENT SHARE-WAY TRAIN MILES
81	271	SHIPMENT SHARE-THR. TRAIN MILES
82	272	TOTAL TRAIN MILES (ALLOCATED)
83	273	ACTUAL CREW WAGE/TRAIN MILE-UNIT
84	274	ACTUAL CREW WAGE/TRAIN MILE-WAY
85	275	ACTUAL CREW WAGE/TRAIN MILE-THR.
86	276	AVERAGE/WAGES PER TRAIN MILE
87	277	CREW WAGES ADJ. RATIO-UNIT TRAIN
88	278	CREW WAGES ADJ. RATIO-WAY TRAIN
89	279	CREW WAGES ADJ. RATIO-THR. TRAIN
90	280	UC PER TM-CREW OPR
91	281	VC-TM-CREW OPR-UNIT TRAIN
92	282	VC-TM-CREW OPR-WAY TRAIN
93	283	VC-TM-CREW OPR-THROUGH TRAIN
94	284	TOTAL VC-TM-CREW OPR
95	285	UC PER TM-OTHER-OPR
96	286	VC-TM-OTHER-OPR
97	287	UC PER TM-OTHER-DRL
98	288	VC-TM-OTHER-DRL
99	289	UC PER TM-OTHER-ROI
100	290	VC-TM-OTHER-ROI
101	301	SEM PER INDUSTRY SWITCH EVENT
102	302	SEM PER INTERCHANGE SWITCH EVENT
103	303	SEM PER I&I TRAIN SWITCH EVENT
104	304	SPOTTED-PULLED RATIO THIS CAR
105	305	INDUSTRY SWITCH EVENTS
106	306	AVE MILES BET. INTERCHANGE EVENT
107	307	NUMBER OF INTERCHANGE EVENTS
108	308	NUMBER OF CARS INTERCHANGED
109	309	AVE MILES BETWEEN I&I SW EVENT
110	310	CARS GIVEN I&I SWITCH
111	311	TOTAL SEM-INDUSTRY

<b>FVALS Location</b>	<b>Report Line</b>	<b>Movement Cost Account</b>
112	312	TOTAL SEM-INTERCHANGE
113	313	TOTAL SEM-I&I TRAIN
114	314	TOTAL SEM
115	315	UC PER SEM-OPR
116	316	VC-SEM-OPR
117	317	UC PER SEM-DRL
118	318	VC-SEM-DRL
119	319	UC PER SEM-ROI
120	320	VC-SEM-ROI
121	321	CARS-INTRATERM SWITCHING (USER)
122	322	CARS-INTERTERM SWITCHING (USER)
123	323	CARS-INTRATERMINAL SWITCHING INCLUDING EMPTY
124	324	CARS-INTERTERMINAL SWITCHING INCLUDING EMPTY
125	325	SEM PER INTRATERMINAL SWITCH
126	326	SEM PER INTERTERMINAL SWITCH
127	327	TOTAL SEM INTRATERM
128	328	TOTAL SEM INTERTERM
129	329	VC-INTRA-SEM-OPR
130	330	VC-INTRA-SEM-DRL
131	331	VC-INTRA-SEM-ROI
132	332	VC-INTER-SEM-OPR
133	333	VC-INTER-SEM-DRL
134	334	VC-INTER-SEM-ROI
135	401	TOTAL CAR MILES
136	402	RENTAL COST PER CAR MILE
137	403	GENERAL OVERHEAD RATIO
138	404	UC PER CM-RENTAL
139	405	VC-CM-RENTAL
140	406	TOTAL CAR MILES
141	407	ACTUAL CHARGE PER CAR MILE
142	408	GENERAL OVERHEAD RATIO
143	409	VC-CM-TOTAL
144	410	UC PER CM(R)-OPR
145	411	VC-CM(R)-OPR
146	412	UC PER CM(R)-DRL
147	413	VC-CM(R)-DRL
148	414	UC PER CM(R)-ROI
149	415	VC-CM(R)-ROI
150	416	INDUSTRY SWITCH EVENT (L&E)

<b>FVALS Location</b>	<b>Report Line</b>	<b>Movement Cost Account</b>
151	417	INTERCHANGE SWT EVENT (L&E)
152	418	I&I TRAIN SWT EVENT (L&E)
153	419	CM(Y)/INDUSTRY SWITCH (L-E)
154	420	CM(Y)/INTERCHANGE SWITCH (L-E)
155	421	CM(Y)/I&I TRAIN SWITCH (L-E)
156	422	CM(Y)-INDUSTRY
157	423	CM(Y)-INTERCHANGE
158	424	CM(Y)-I&I TRAIN
159	425	CM(Y)-TOTAL
160	426	UC PER CM(Y)-OPR
161	427	VC-CM(Y)-OPR
162	428	UC PER CM(Y)-DRL
163	429	VC-CM(Y)-DRL
164	430	UC PER CM(Y)-ROI
165	431	VC-CM(Y)-ROI
166	432	TOTAL CAR DAYS
167	433	ACTUAL CHARGE PER DAY
168	434	VC-CD-TOTAL
169	435	AVERAGE CM(R)/CD(R)
170	436	CAR DAYS-RUNNING
171	437	UC PER CD(R)-OPR
172	438	VC-CD(R)-OPR
173	439	UC PER CD(R)-DRL
174	440	VC-CD(R)-DRL
175	441	UC PER CD(R)-ROI
176	442	VC-CD(R)-ROI
177	443	CD(Y)/INDUSTRY SWITCH (L OR E)
178	444	CD(Y)/INTERCHANGE SWT (L OR E)
179	445	CD(Y)/I&I TRAIN SWITCH (L OR E)
180	446	CD(Y)-INDUSTRY(L&E )
181	447	CD(Y)-INTERCHANGE(L&E)
182	448	CD(Y)-I&I TRAIN(L&E)
183	449	CD(Y)-PER LOADING & UNLOADING FOR INDUSTRY SWITCH
184	450	CD(Y)-L&UL
185	451	CD(Y) TOTAL
186	452	UC PER CD(Y)-OPR
187	453	VC-CD(Y)-OPR
188	454	UC PER CD(Y)-DRL

<b>FVALS Location</b>	<b>Report Line</b>	<b>Movement Cost Account</b>
189	455	VC-CD(Y)-DRL
190	456	UC PER CD(Y)-ROI
191	457	VC-CD(Y)-ROI
192	458	UC PER CM(R)-OPR
193	459	VC-CM(R)-OPR
194	460	UC PER CM(R)-DRL
195	461	VC-CM(R)-DRL
196	462	UC PER CM(R)-ROI
197	463	VC-CM(R)-ROI
198	464	UC PER CM(Y)-OPR
199	465	VC-CM(Y)-OPR
200	466	UC PER CM(Y)-DRL
201	467	VC-CM(Y)-DRL
202	468	UC PER CM(Y)-ROI
203	469	VC-CM(Y)-ROI
204	470	UC PER CD(R)-OPR
205	471	VC-CD(R)-OPR
206	472	UC PER CD(R)-DRL
207	473	VC-CD(R)-DRL
208	474	UC PER CD(R)-ROI
209	475	VC-CD(R)-ROI
210	476	UC PER CD(Y)-OPR
211	477	VC-CD(Y)-OPR
212	478	UC PER CD(Y)-DRL
213	479	VC-CD(Y)-DRL
214	480	UC PER CD(Y)-ROI
215	481	VC-CD(Y)-ROI
216	482	CM(Y) PER INTRATERMINAL EVENT
217	483	CM(Y) PER INTERTERMINAL EVENT
218	484	TOTAL CM(Y) INTRATERMINAL
219	485	TOTAL CM(Y) INTERTERMINAL
220	486	VC-INTRA-CM(Y)-OPR
221	487	VC-INTRA-CM(Y)-DRL
222	488	VC-INTRA-CM(Y)-ROI
223	489	VC-INTER-CM(Y)-OPR
224	490	VC-INTER-CM(Y)-DRL
225	491	VC-INTER-CM(Y)-ROI
226	492	CD(Y) PER INTRATERMINAL SWITCH
227	493	CD(Y)-L&UL-INTRATERMINAL

<b>FVALS Location</b>	<b>Report Line</b>	<b>Movement Cost Account</b>
228	494	CD(Y) PER INTERTERMINAL SWITCH
229	495	CD(Y)-L&UL-INTERTERMINAL
230	496	TOTAL CD(Y) INTRATERMINAL
231	497	TOTAL CD(Y) INTERTERMINAL
232	498	VC-INTRA-CD(Y)-OPR
233	499	VC-INTRA-CD(Y)-DRL
234	499A	VC-INTRA-CD(Y)-ROI
235	499B	VC-INTER-CD(Y)-OPR
236	499C	VC-INTER-CD(Y)-DRL
237	499D	VC-INTER-CD(Y)-ROI
238	501	LAKE TRANSFER TON MILES
239	502	UC PER TON MILE-OPR
240	503	VC-TON MILE-OPR
241	504	UC PER TON MILE-DRL
242	505	VC-TON MILE-DRL
243	506	UC PER TON MILE-ROI
244	507	VC-TON MILE-ROI
245	508	COAL TERMINAL TONS
246	509	UC PER TON-OPR
247	510	VC-OPR
248	511	UC PER TON-DRL
249	512	VC-DRL PER TON
250	513	UC PER TON-ROI
251	514	VC-ROI PER TON
252	515	ORE TERMINAL TONS
253	516	UC PER TON-OPR
254	517	VC-OPR
255	518	UC PER TON-DRL
256	519	VC-DRL
257	520	UC PER TON-ROI
258	521	VC-ROI
259	522	OTHER MARINE TERMINAL TONS
260	523	UC PER TON-OPR
261	524	VC-OPR
262	525	UC PER TON-DRL
263	526	VC-DRL
264	527	UC PER TON-ROI
265	528	VC-ROI
266	529	MVU'S HANDLED

<b>FVALS Location</b>	<b>Report Line</b>	<b>Movement Cost Account</b>
267	530	UC PER MVU
268	531	VC-MVU L&UL
269	532	LOADED CAR MILES
270	533	UC PER CAR MILE
271	534	VC-REF-PROTECT
272	535	WEIGHT OF SHIPMENT (TONS)
273	536	UC PER TON
274	537	LOSS & DAMAGE CLAIM EXPENSE
275	540	TCUS IN SHIPMENT
276	541	TCU L&UL INCLUDING EMPTY RETURN
277	542	UC PER TCU L&UL-OPR
278	543	VC-TCU-L&UL-OPR
279	544	UC PER TCU, L/UL-DRL
280	545	VC-TCU, L/UL-DRL
281	546	UC PER TCU, L/UL-ROI
282	547	VC TCU, L/UL-ROI
283	548	LINE HAUL MILEAGE
284	549	LINE HAUL TCU DAYS
285	550	DAYS ORIGIN/DESTINATION PER TCU
286	551	TOTAL TCU DAYS O&T
287	552	TOTAL TCU DAYS
288	553	UC REF TCU DAY-OPR
289	554	VC REF TCU-OPR
290	555	UC REF TCU-DRL
291	556	VC REF TCU-DRL
292	557	UC REF TCU-ROI
293	558	VC REF TCU-ROI
294	559	UC REF TCU-PROTECT-OPR
295	560	VC REF TCU-PROTECT-OPR
296	561	UC TCU, NONREF.-OPR
297	562	VC TCU-NR-OPR
298	563	UC TCU-NR-DRL
299	564	VC TCU-NR-DRL
300	565	UC TCU-NR-ROI
301	566	VC TCU-NR-ROI
302	570	TCU'S GIVEN P&D SERVICE
303	571	UC/TCU GIVEN P&D OPR
304	572	VC-TCU P&D
305	573	INDUSTRY SWITCHING EVENTS



<b>FVALS Location</b>	<b>Report Line</b>	<b>Movement Cost Account</b>
306	574	UC INDUSTRY SWITCHING RESIDUAL
307	575	SWITCHING ADD ON
308	576	CARLOADS ORIGINATED & TERMINATED
309	577	UC STATION CLERICAL RESIDUAL
310	578	CARLOADS ORIGINATED & TERMINATED RESIDUAL
311	579	CARLOADS INTERCHANGED
312	580	UC INTERCHANGE SWITCHING RESIDUAL
313	581	INTERCHANGE SWITCHING ADD ON
314	582	FREIGHT CAR MILES
315	583	UC I & I SWITCHING RESIDUAL
316	584	I & I SWITCHING ADD ON
317	585	UC MILEAGE RESIDUAL
318	586	CAR MILE ADD ON
319	587	TOTAL JURISDICTIONAL ADD ON
320	697	CONSTANT COST MARK UP RATIO

Note that report lines 696 to 704, from the *Railroad Cost Program* are calculated values. The following computations produce each line:

Line 696 = Fvals(0) unless the Jurisdictional Add-on is selected, then:

Line 696 = Fvals(0) + Fvals(319)

Line 697 = Fvals(320)

Line 698 = Line696 \* Line697

Line699 = Fvals(274) (The loss and damage figure is a complete movement value and needs to be allocated by some percentage to segment moves, which is usually done on a mileage basis.)

Line700 = Line696 + Line699

Line701 = Line698 + Line699

Line702 = Line700 / (20 \* Number of Cars \* Tons per Car)

Line703 = Line701 / (20 \* Number of Cars \* Tons per Car)

Line704 = Freight Revenue / L700 (If no freight revenue is entered, L704 is not written out.)

## Appendix 1 - Commodities

<b>Index</b>	<b>STCC</b>	<b>Commodity Title</b>
1	01	Farm Products
2	0113	Grains
3	01195	Potatoes, Other than Sweet
4	012	Fresh Fruits/Tree Nuts
5	013	Fresh Vegetables
6	01*	Other Farm products
7	10	Metallic Ores
8	11	Coal
9	14	Non-Metallic Minerals
10	20	Food & Kindred Products
11	2011	Fresh Meats
12	202	Dairy Products
13	203	Canned Fruits/Vegetables
14	204	Grain Mill Products
15	2041	Flour
16	2042	Prepared Feeds
17	2043	Cereal Preparations
18	2044	Milled Rice/Flour/Meal
19	2045	Prepared Flour
20	2046	Corn Milling Products
21	2062	Refined Sugar
22	20821	Beer/Ale
23	2084	Wines /Brandy Spirits
24	20851	Whiskey /Blended Liquors
25	209	Miscellaneous Food Preparations
26	20*	Other Food & Kindred Products
27	21	Tobacco Products
28	24	Lumber & Wood Products
29	2421	Lumber/Dimension Stock
30	2432	Plywood or Veneer
31	24*	Other Lumber & Wood Products
32	25	Furniture & Fixtures
33	26	Pulp & Paper Products
34	26211	Newsprint
35	26213	Printing Paper
36	263	Paperboard/Fibreboard
37	264	Conv Paper/Paperboard
38	26471	Sanitary Tissues
39	26*	Other Paper Products
40	28	Chemicals
41	281	Industrial Chemicals
42	2812	Potassium or Sodium

<b>Index</b>	<b>STCC</b>	<b>Commodity Title</b>
43	282	Synthetic Fibers/Resins/Rubber
44	289	Miscellaneous Chemical Products
45	28*	Other Chemicals
46	29	Petroleum or Coal Products
47	30	Rubber & Miscellaneous Plastics
48	301	Rubber Tires/Innertubes
49	30*	Other Rubber Products
50	32	Stone, Clay, Glass
51	321	Flat Glass
52	3295	Non-metallic Minerals/Earth
53	32*	Other Stone Products
54	33	Primary Metal Products
55	3312	Iron/Steel Products
56	3352	Aluminum Shapes
57	33*	Other Primary Metal Products
58	34	Fabricated Metal Products
59	344	Fabricated Structural Metal
60	34*	Other Fabricated Metal Products
61	35	Non-Electrical Machinery
62	351	Engines/Turbines
63	352	Farm Machinery
64	353	Construction/Mining/Hand Machinery
65	35*	Other Non-Electrical Machinery
66	36	Electrical Machinery
67	361	Electrical Transport Distribution Equipment
68	363	Household Appliances
69	365	Radio or TV sets
70	36*	Other Electrical Machinery
71	37	Transportation Equipment
72	37111	Automobiles
73	37112	Trucks
74	3714	Motor Vehicle Parts
75	37*	Other Transportation Equipment
76	44	Freight Forwarder Traffic
77	45	Shipper Association Traffic
78	46	Miscellaneous Mixed Shipments
79	461	Miscellaneous Mixed Shipments not TOFC
80	46*	Other Miscellaneous Mixed Shipments
81	48	Hazardous Materials
82	*	Other Commodities

The asterisks (\*) in the above STCC values denote any numerical value, which will cause the program to select the “Other” commodity loss and damage value. For example, entering “014” or “015” would select the loss and damage for “Other Farm products” even though “014” represents Livestock and “015” represents Poultry.