

Surface Transportation Board

Railroad Cost Program



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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 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 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. When appropriate, user generated cost estimates should 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 will 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, a movement cost option and a batch processing option. The opening screen requires a choice of one of these two options. The operation of the railroad movement cost option is detailed in Chapter 3. 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 eight *Mandatory Parameters* to define a railroad movement. All of these parameters must be defined in order for the program to calculate relevant costs.

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.

Program options for defining output from the cost calculations are: user defined data sets for other programs, user defined data elements for a formatted printout, or a standard printout detailing each costing step necessary to compute the cost of rail service.

Installing the Railroad Cost Program

The program cannot be used on Windows 95 or older operating systems. This 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), or Windows XP Home and Windows XP Professional.

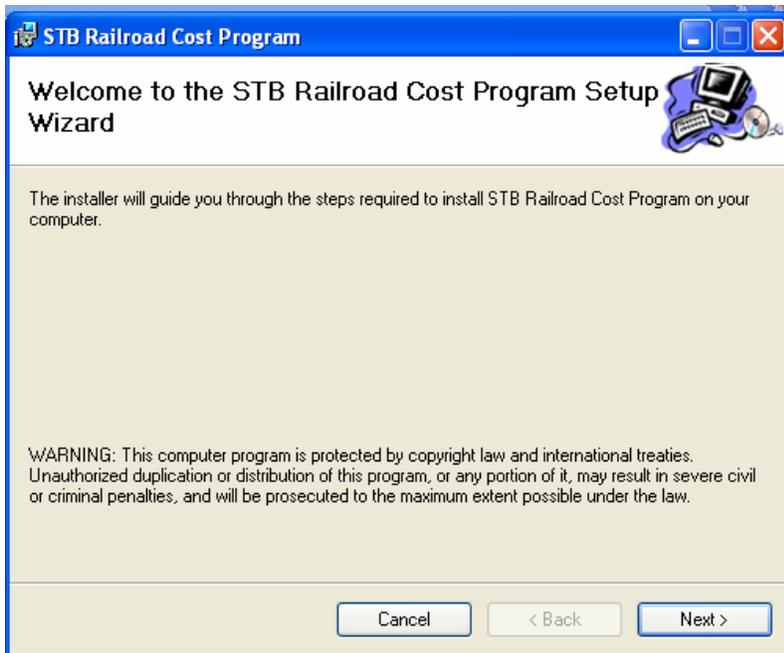
The .NET Framework is included in Windows 2003 Server and as an optional installation from Windows XP Service Pack 1. According to Microsoft, .NET Framework will be a standard part of future Microsoft operating systems. Any machine with the Framework already installed, from any source, can run this program.

Installation CD

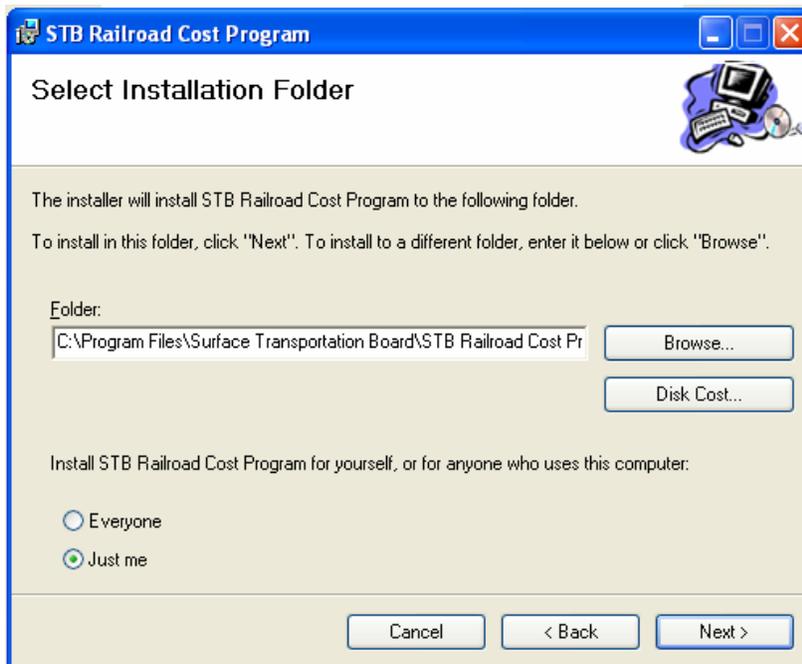
Insert the CD-ROM into a drive and open the drive directory.

To begin the installation, double-click [setup.exe](#)

If the installation occurs on a machine without the .NET Framework Runtime, an error message box will appear, stating that the .NET Framework must be installed first. If that occurs, exit the Railroad Cost Program setup. Navigate to the folder *Microsoft Upgrade* on this installation CD. The *Microsoft Upgrade* folder contains a copy of Microsoft's .NET Framework Runtime Package, *Dotnetfx.exe*. Double-click [dotnetfx.exe](#) and follow the installation directions. After the .NET Framework Runtime has been installed and the computer has been rebooted, run [setup.exe](#) again to install the Railroad Cost Program.

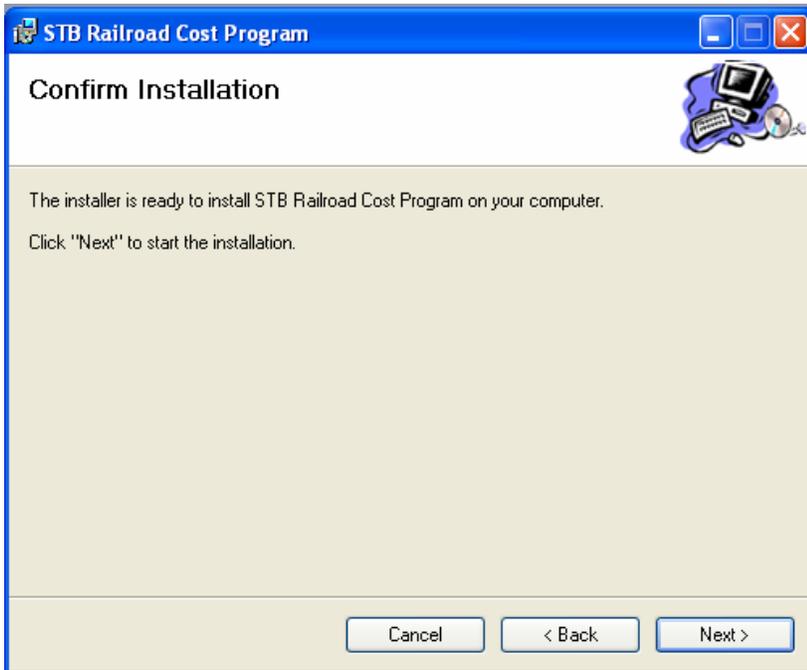


The first dialog box displays the setup screen. Click *Next* to continue.



This dialog box specifies the program directory. The default directory is under the *Program Files* directory. If this is not acceptable, click *Browse* and change it.

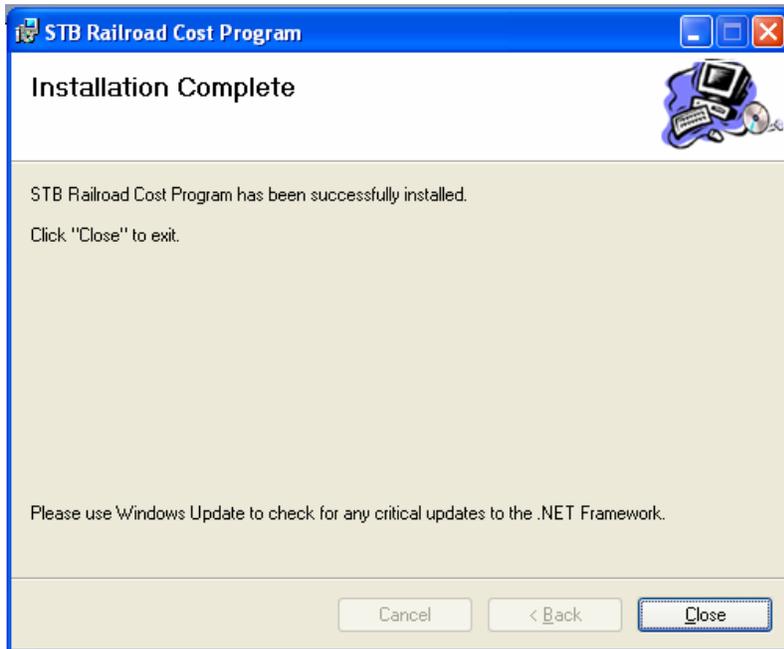
There is an option to install this program for any user of a computer, or just the user installing the program. The default is the user installing the program.



This dialog box asks for confirmation that the set-up directory is correct. Press *Next* to continue the installation.



Setup.exe will now continue the installation process without further prompting.



When the installation is complete, the program will be available through the Windows *Start Menu- All Programs - Railroad Cost - Railroad Cost Program.*

Copy Program Data File to User Folder

The installation CD has a folder, *Input Data for Program*, containing the input data file for this program. Move the data from this folder to a working folder on your computer. The data can be placed anywhere on the computer. The first time the program is run, it will ask the user to define the path to the working folder.

Chapter 2

Railroad Cost Basics

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 earlier sections.

The first section in railroad costing computes train mile statistics. These statistics are divided into *through train*, *way train* and, if necessary, *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.

Calculation of Mileage by Train Type

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, they can be entered and the circuitry factor set to 1. 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 empty movement. These calculated miles by type of train are used by the succeeding steps in the costing process.

Calculation of the 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)

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

The calculations 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

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, both 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

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

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.

Terminal Costs

The next 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 Intertrain and Intratrain Switching

The calculations for this class of costs are contained on output lines 301 through 318. 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

Output lines 319 through 332 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.

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

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

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

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.

Railroad Owned Cars – Accessorial Services

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, both running and yard miles and car-days, both running and yard days.

Railroad Owned Cars – Intraterminal and Interterminal Switching

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

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 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. Car Refrigerated Protective services are computed for refrigerated cars and is 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 probably does 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

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 by net shipment weight. See output lines 535 through 537.

Intermodal Special Service Costs

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* are calculated in output lines 548 through 566 and are 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 cost 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-On's

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-on's are based on industry switching events and on carloads originated and terminated. These costs are contained in output lines 573 through 578. The single and multiple car movement add-on's are based on carloads interchanged and freight car miles. These costs are contained in output lines 579 through 586.

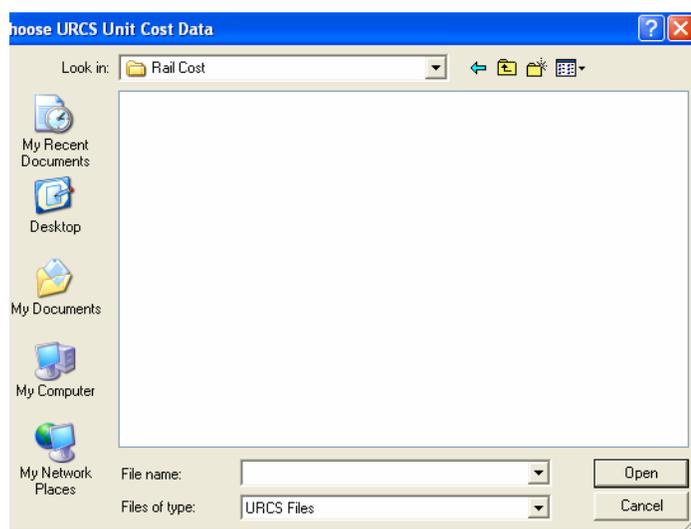
Summary of Shipment Costs

Output lines 601 through 703 contain the summary of all variable costs for the shipment. The constant cost markup ratio, line 697, is applied to total variable cost to develop fully allocated cost. Output lines 702 and 703 develop the unit cost per hundredweight for variable and fully allocated costs.

Chapter 3

Railroad Cost Program

The first time the program is run, a file dialog will appear requesting the user to identify a unit cost data file. After the file is identified, the program will continue to use that unit cost file in subsequent sessions until the user selects a new file. Use the menu *File* command to open the input file dialog.



The *Mandatory Parameter* set contains the ten basic shipment characteristics necessary to estimate the cost of a railroad movement. Once these parameters are 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. 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 definition, in the *Mandatory Parameter* screen, is defined in three sections. The first section develops the route information. The user determines the railroad(s) and routing distance(s) between origin and destination. After the route has been completely defined, the next section is the freight car definition. The last section determines shipment characteristics.

Route Information Section

The first parameter is *the originating railroad*. When a unit cost file is opened, all the railroads contained in the file are available through a drop down combo box. Choose the origin railroad.



The screenshot shows a form titled "Define Movement Segments" with three input fields. The first field is labeled "Railroad" and contains a dropdown menu with "NS" selected. The second field is labeled "Distance in Miles" and is an empty text box. The third field is labeled "Shipment Type" and contains a dropdown menu with "Originate & Terminate" selected.

The next parameter is *distance*. This is the one-way shipment distance for the selected railroad.

Shipment type is the next parameter. The proper shipment type for the origin railroad is contained in a drop down menu, with four choices as follows:

Originate and Terminate – shipment is moved by one railroad from origin to destination.

Originate and Deliver – shipment is moved by the origin railroad and delivered to another railroad.

Intraterminal – the shipment is moved within a local terminal area by one railroad.

Interterminal – the shipment is moved between local terminal areas by two railroads.

If the chosen shipment type is Originate and Terminate or Intraterminal, then the shipment is defined as far as the routing is concerned, and the program moves into defining freight car and shipment parameters. Otherwise, the next railroad in the routing structure is defined through the drop down railroad combo box. The distance for the railroad must be entered and then the shipment type. If the user chooses Interterminal, then the program will automatically drop to defining other mandatory parameters. For an Originate & Deliver choice, there are two options:

Receive and Terminate – shipment is moved by the receiving railroad and delivered at the destination.

Receive and Deliver – shipment is moved by the receiving railroad and delivered to another railroad.

The route is continued until the Receive and Terminate choice is designated.

Define Movement Segments

Railroad	Distance in Miles	Shipment Type
<input type="text" value="UP"/>	<input type="text"/>	<input type="text" value="Originate & Terminate"/>

Railroad Movement Segments

UP Originates - takes shipment 1,000 miles

While the route segments are being defined, the lower screen will summarize each segment and how it fits into the total movement. When the movement is completely defined, then the cursor will drop into the freight car category.

Freight Car Section

Freight Car

Number

Type

Freight Car Ownership

Railroad

Private

Number of Freight Cars – The number of freight cars used in the shipment is specified in the number box.

Type of Freight Car – There are seventeen freight cars used by the costing program, defined by a drop down combo box.

Box, General Service Unequipped (40 foot)
Box, General Service Unequipped (50 foot)
Box, General Service Equipped
Gondola, General Service Unequipped
Gondola, General Service Equipped
Covered Hopper
General Service Hopper
Open Special Service Hopper
Mechanical Refrigerator
Non-mechanical Refrigerator
Intermodal Flat Car
Multi Level Flat Car
General Service Flat Car
Other Flat Car
Tank Car, less than 22,000 gallons
Tank Car, more than 22,000 gallons
All Other Freight Cars

Freight Car Ownership – There are two choices: *Railroad* for railroad owned freight car or *Private* for private owned freight car.

Shipment Section

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

- Tons per Car**: A text input field.
- Commodity**: A dropdown menu with "20821 Beer" selected.
- Freight Charge**: A text input field.
- Type of Train**: Three radio button options: **Single**, **Multiple**, and **Unit**.

Tons Per Car – The weight of the freight is entered on a tons per car basis. The program will compute total movement tons based on the number of freight cars.

Shipment Commodity – Is defined by a drop down combo box. There are 81 commodities defined by this program. They are listed in Appendix 1.

Freight Charge – Enter the total dollars charged by the railroad for the shipment. Although freight charge is in the mandatory parameter screen, it is an optional input. If left blank, the program will compute the cost of rail service. If defined, the program computes the revenue to variable cost ratio, which is an estimate of the profitability of this shipment to the railroad.

Type of Train – There are three types of trains processed by this program:

Single Carload Movement – Calculates variable costs for a single car only or for a small number of cars tendered under separate waybills.

Multi Carload Movement – Calculates costs usually based on six or more cars usually tendered under one waybill.

Unit Train Movement – The program calculates unit train costs on a trainload basis. Normally fifty or more freight cars must be entered to calculate relevant variable costs for the train movement.

After all mandatory parameters are entered, the user has a choice of program options. The first is to update *Detailed Parameters*. These are specific cost parameters that provide increased precision to the estimate of movement variable cost. These parameters are discussed in detail in the next chapter.

The second option is to calculate the variable 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 *Freight Car* parameters, to *Shipment* parameters, or to *Detailed Parameters*. When the button is pressed, the variable cost will be recalculated and the resulting figures will reflect the impact of the changes.



Process Results

There are two choices available for program output. One is the standard report and one is the user defined output report.

Print Standard Report

Choosing this option opens a print preview dialog displaying a 19-page report. This is the standard costing report, which displays the basic calculations used to determine total railroad variable cost. The user can decide to print the report to the default printer, or to look at the report on their screen.

Output File

Choosing this option outputs the user-defined report. This option is only active if the user has defined a customized output file through the *Options* menu. The program will open a file dialog to define the output file. After the output file is defined, the program will continue to append user output to this file until the user quits the *Railroad Cost Program*.

New Move

This restarts the railroad cost program to cost a new movement.

Quit

The final option is to quit the program

Chapter 4

Change Detailed Movement Parameters

If detailed information about the railroad move is available, then the modifications of detailed parameters will 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.

Intermodal

If the user defined an intermodal move, which is a freight car equal to a *TOFC Flat Car*, then the intermodal tab is the first screen displayed.

Parameter	Value
Number of Trailer Units	1.82863998
Number of Trailers per Flat Car	1.82863998
Intermodal Plan Code	2
Tare Weight of Trailer	4.19999980
Empty Loaded Ratio of Trailer	1.48000001
Line Haul Miles per Trailer Day	478

Refrigerated Trailer

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. 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 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 *Multi Level Flat* freight car, 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.

General

General	Switching	Train Statistics	Freight Car Miles
			UP
Circuitry			1.20200002
Empty Loaded Ratio			1.99448382
General Overhead Ratio			1.08468115
Tare Weight			28.79999992

Circuitry – The circuitry factor is used to inflate the short line mileage, entered 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 – This parameter reflects the amount of empty car movement before spotting for another shipment, which results from 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 ratio allocates administrative and other indirect expenses to variable car-mile and car-day costs.

Tare Weight – This statistic is the weight of an empty freight car.

Switching

General	Switching	Train Statistics	Freight Car Miles
			UP
	Cars Given I and I Switch		11.9868480
	Miles between I and I Switch		200
	SW Engine Min I and I SW		1.69141244
	SW Eng Min Industry SW		6.76565027
	Industry Switches		4
	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.

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

General	Switching	Train Statistics	Freight Car Miles
			UP
		Through Locomotives	2.70903468
		Way Locomotives	2.38394069
		Through Train Weight	5214.73828
		Way Train Weight	2206.93237
		Through Crew Wages	0
		Way Crew Wages	0
		Through Train Miles	1202.00002
		Way Train Miles	0

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

Way Locomotives – The number of locomotives used in way train service only appears if a single or multiple type of train 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

General	Switching	Train Statistics	Freight Car Miles
			UP
Actual Miles per Car Day		<input type="text" value="729.129211"/>	
Car Miles per Industry Switch		<input type="text" value="4"/>	
Car Miles per I and I Switch		<input type="text" value="1"/>	

Actual Miles per Car Day – This measures 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 measures 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 measures 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 measures 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 measures the number of miles a loaded car is moved within an intraterminal switching area.

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

Freight Car Days

General	Switching	Train Statistics	Freight Car Miles	Freight Car Days
		UP		
	Running Car Days	<input type="text" value="3.28799006"/>		
	Car Days in Yard	<input type="text" value="13.9934240"/>		
	Car Days per Industry SW	<input type="text" value="1"/>		
	Car Days per I and I SW	<input type="text" value="0.5"/>		
	Car Days per L and UL SW	<input type="text" value="2"/>		

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 care 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 estimate 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

General	Switching	Train Statistics	Freight Car Miles	Freight Car Days	Freight Car Rental
Charge per Car Mile <input type="text" value="0"/>					
Charge per Car Day <input type="text" value="0"/>					

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 private 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

General	Switching	Train Statistics	Freight Car Miles	Freight Car Days	Freight Car Rental	Accessorial Services
<p>Ton Miles in Lake Transfer <input type="text" value="0"/></p> <p>Tons at Coal Terminal <input type="text" value="0"/></p> <p>Tons at Ore Terminal <input type="text" value="0"/></p> <p>Tons at Other Marine Term <input type="text" value="0"/></p> <p><input checked="" type="checkbox"/> Railroad Will Provide Accessorial Services</p>						

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 from the *Mandatory Parameter* screen.

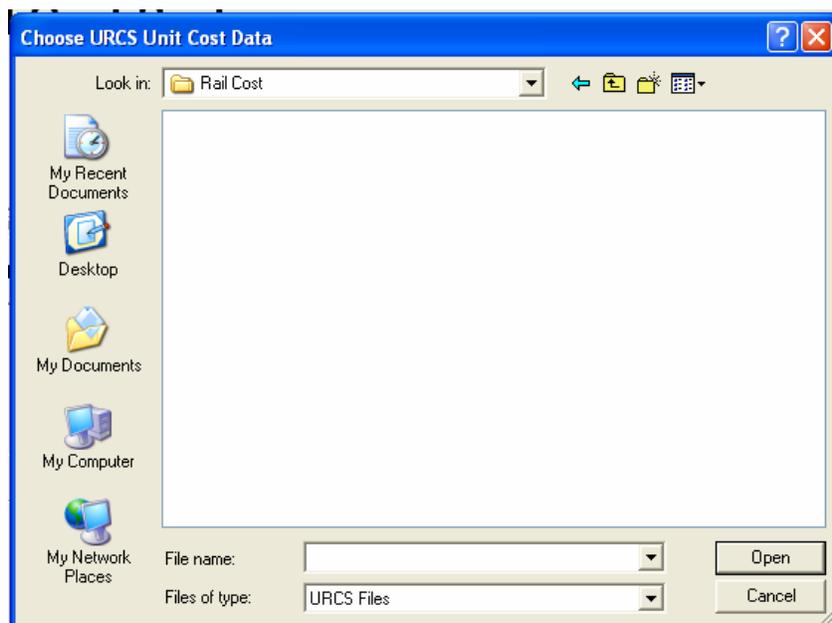
Chapter 5

Program Menu Options

There are two menu options in the *Railroad Costing Program*. These are *File* and *Options*.

File

Open – This option allows the user to define a new unit cost input file for the program. It initiates an open file dialog allowing the user to choose the input data set. 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 – allows the user to exit the program. It performs the same function as the Quit button on the user input screen.

Options

Data Defaults – 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.

The screenshot shows a dialog box titled "Set Program Default Options" with a blue header. The main content area is titled "Movement Cost Program Defaults" and contains several input fields and a checkbox. The fields are: "Minimum Number of Freight Cars for Unit Train Move" with a text box containing "50"; "Maximum Distance for Costing Movement" with a text box containing "4000"; "Maximum Tons per Freight Car" with a text box containing "200"; "Default Freight Car Choice" with a dropdown menu showing "Box, Equip. Gen. Service"; and "Default Commodity Choice" with a dropdown menu showing "20821 Beer". At the bottom, there is a checked checkbox labeled "Include Jurisdictional Add On Charges" and two buttons: "Accept" and "Cancel".

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.

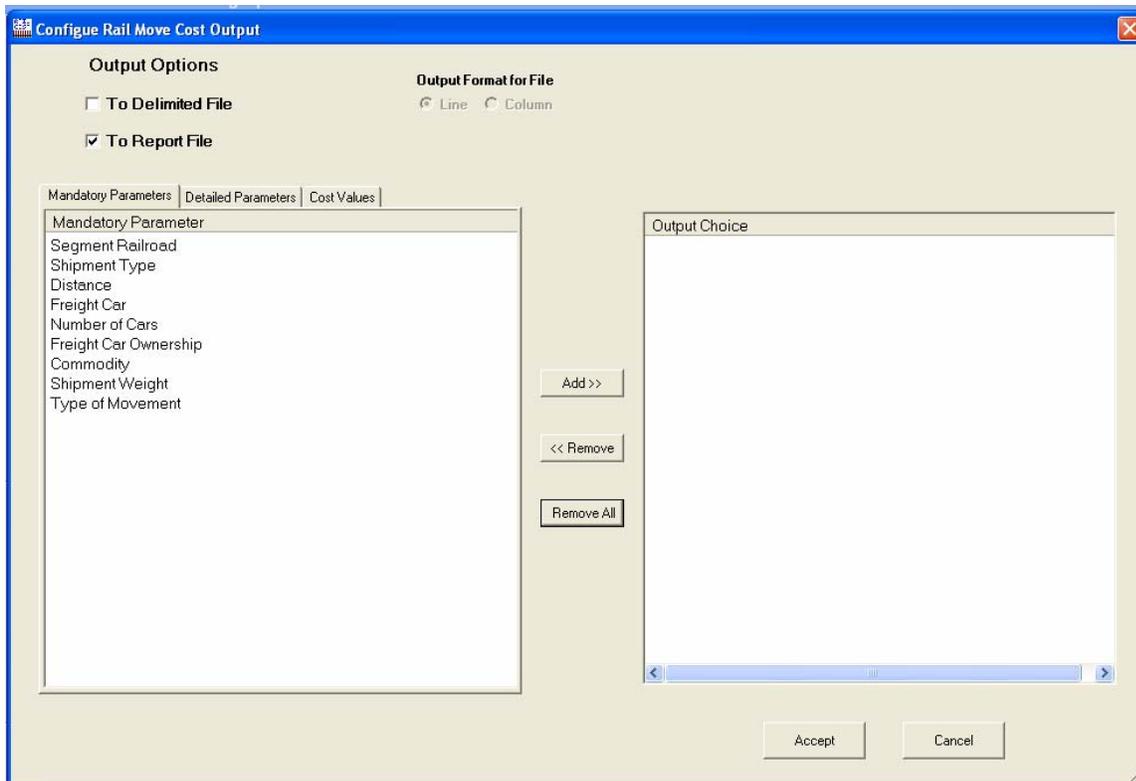
Default Freight Car Choice – This allows the user to set the type of freight car displayed on the drop down combo box in the Freight Car Parameters. Set this to the freight car most often used in the railroad movements.

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 81 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.

Output Defaults

To create customized program output this option is the first step. There are two choices for user output, a delimited file importable into a spreadsheet or database, and a fixed formatted report file.



If the delimited file check box is selected, then the user has the option of setting the format of the data to delimited lines or to columns. The delimited line option sets the output for each railroad segment to a line format. The column option sets the output for each railroad segment into a single column format.

One of the two output options must be checked before the user defined parameters can be chosen.

There are two list boxes on this option screen, the available data items from the program for output, and the list box for the user selected items to include in their output report. The program parameters list box has three tabs; *Mandatory Parameters*, *Detailed Parameters*, and *Cost Values*. The *Mandatory Parameters* tab has the user input items from the first costing screen. The *Detailed Parameters* tab contains all the parameters the user can set in the detailed parameter screen. Finally, the *Cost Values* tab contains the program's costing elements. The user should select each output parameter by highlighting the parameter in its associated tab, then use the *Add* and *Remove* buttons to move the choice in or out of the output list box. The output parameters should be chosen in the order they will appear in the report. When all parameters have been set, the *Accept* button must be pressed. If the *Cancel* button is chosen, no changes for this option selection will be implemented.

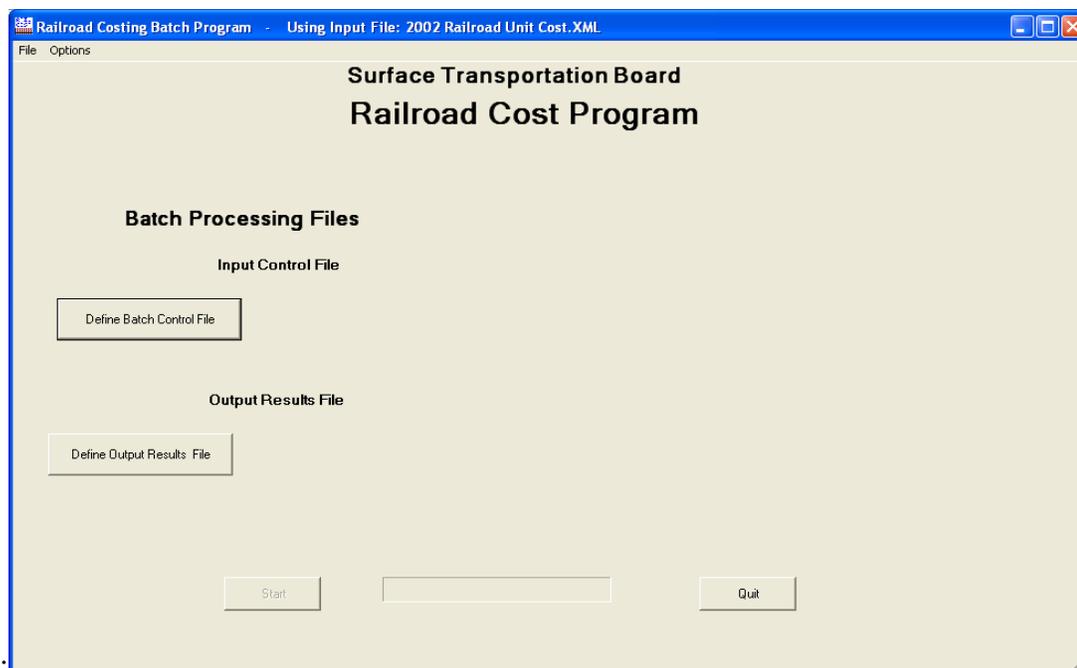
Chapter 6

Batch Processing Program

The batch processor 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 initial screen, the following screen is displayed:



Pressing the *Define Batch Control File* button brings up a file dialog screen. The user chooses the batch control file to be processed. Pressing the *Define Output Results* file button brings up a file dialog screen to name the output results file.

After the process is started, 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, or the segments can be defined to cost a portion of a rail move, using different parameter values. The underlying assumption behind the batch process is that the railroad costing is an intermediate step for a more complete analysis contained in a spreadsheet or data base program.

Control File Statements

The control statements are based on a methodology developed for the previously released DOS costing program. Some of the statements used in the old program are no longer relevant. However, the current program processes and ignores any obsolete statements contained in input control files.

There are two basic program statements used by the batch processor. 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 value.

OUTPUT VARIABLES <User Defined Variable Report Line Numbers>

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

OUTPUT DATA DELIMITED WITH <character>

The legacy program had a delimited or fixed format option. This program only produces delimited output file. If this statement is not included in the control file, the default delimiter is the comma. If the user wishes to produce output with a different delimiter, then this statement will read the character and use it to separate the output values.

Move Processing Statements

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 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 MOVE statement, required parameters are defined in the following manner:

Program Code	Parameter name	User definition
RR	Railroad code	Any valid railroad ID code for the input cost data set
MT	Type of shipment code	OT – Railroad originate and terminates shipment OD – Railroad originates and delivers shipment to another railroad RT – Railroad receives shipment and terminates RD – Railroad receives shipment and delivers to another railroad IA – Intraterminal move IR - Interterminal move
DIS	Segment distance	Any acceptable mileage for the rail segment, must be below the maximum distance allowed by the program
FC	Freight car code	1 – Box car general service 40 feet 2 – Box car general service 50 feet 3 – Box car general service equipped 4 – Gondola general service unequipped 5 – Gondola general service equipped 6 – Covered hopper 7 – General service hopper 8 – Open special service hopper 9 – Mechanical refrigerator 10 – Non-mechanical refrigerator 11 – Intermodal flat car 12 – Multi level flat car 13 – General service flat car 14 – Other type of flat car 15 – Tank car less than 22,000 gallons 16 – Tank car greater than 22,000 gallons 17 – All other freight cars 18 – Average freight car
NC	Number of freight cars	Any acceptable number of cars, below the maximum number of cars allowed by the program
OWN	Freight car owner	R – Railroad owns the freight car P – Shipper owns the freight car
COM	Commodity code of the shipment	See Appendix 1 for all the valid commodity codes

Program		
Code	Parameter name	User definition
WT	Tons per car	Any acceptable tonnage, below the maximum tons per car allowed by the program.
CMT	Type of costing movement	1 – Individual carload movement 2 – Multi carload movement 3- Unit train movement

Examples of move statements:

NEW MOVE rr BNSF mt OT dis 100 fc 3 nc 1 own R com 45 wt 100 cmt 1

In this instance, all required parameters have been defined.

MOVE dis 200

This statement uses the same parameters as the previous NEW MOVE statement, replacing the segment distance with 200 miles.

The definitions for the detailed parameter set are:

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

Code	Detailed Parameter
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
51	Add accessorial services Y – yes add services N – do not add services
52	Ton miles in lake transfer
53	Tons at coal terminal
54	Tons at ore terminal
55	Tons at other marine terminal
56	Number of trailer - container units
57	Number of trailer – container units per flat car
58	Intermodal plan number

Code	Detailed Parameter
59	Line haul miles per trailer day
60	Trailer days per originated or delivered event
61	Tare weight of trailer
62	Empty loaded ratio of trailer
63	Refrigerated trailer Y – yes N – no
64	Number of autos in autorack car

An example of a MOVE statement including a detailed parameter:

NEW MOVE rr BNSF mt OT dis 100 fc 3 nc 1 own R com 45 wt 100 cmt 1 1 1.0

In this case all the required parameters were defined with the addition of a circuitry factor of 1.0.

List of Active Batch Program Statements

OUTPUT PARAMETERS <Required Parameter Codes?>

OUTPUT DATA DELIMITED WITH <Character>

OUTPUT VARIABLES <Detailed cost report line numbers for each variable>

NEW MOVE <Required parameter codes and optionally detailed parameter ID numbers and values>

MOVE <Required parameter codes and detailed parameter ID numbers and values>

COMMENT <User Statements> Comment statements can be used in a batch control file but they have no effect on the costing process.

List of Obsolete Batch Program Statements

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

COMMENT ** These statements can appear on any line of the batch control file **

COMMENT - they are used to document user batch processing

Comment - batch control statements are not case sensitive

comment

OUTPUT PARAMETERS RR MT FC

Comment - in this case we are going to accumulate, in the output file, the railroad, Comment the movement type, and type of freight car used in the costing process

Comment

OUTPUT VARIABLES 218 700

Comment – this statement includes computed shipment net ton miles (line 218)

Comment and the total variable shipment cost (line 700). These lines are defined

Comment in the detailed report from the *Railroad Cost Program*.

Comment

Comment ** In 2002 There were 7 Railroads and two regions **

Comment

NEW MOVE RR CN MT OD DIS 1000 FC 7 NC 1 OWN P COM 0113 WT 100 CMT 1

Comment – The NEW MOVE statement requires all mandatory parameters be defined.

Comment This statement defines a segment with CN originating and delivering to Comment another railroad. CN takes the shipment 1000 miles in a general service

Comment hopper, privately owned freight car. 100 tons of grain product is being

Comment shipped as a single carload railroad move.

Comment

MOVE RR NS

Comment – This MOVE statement includes all the mandatory parameters from the

Comment previous statement except the Norfolk Southern Railroad is now the

Comment railroad being costed

MOVE RR CSXT

MOVE RR BNSF

MOVE RR KCS

MOVE RR CP

MOVE RR UP

MOVE RR CN 1 1.0 15 33

COMMENT - this MOVE statement costs CN again and modifies two detailed

Comment parameters. In this case Circuitry (1) is being changed to 1.0

Comment and Way Train Miles (15) are being changed to 33.

Example of an Output Results File

```
"CN","OT","General Service Hopper",107600,1641.33083665208,  
"NS","OT","General Service Hopper",107600,1571.0770068688,  
"CSXT","OT","General Service Hopper",107600,1602.25527873842,  
"BNSF","OT","General Service Hopper",107600,1525.95929221599,  
"KCS","OT","General Service Hopper",107600,1436.68025716762,  
"CP","OT","General Service Hopper",107600,1423.94371544316,  
"UP","OT","General Service Hopper",107600,1412.36961833295,  
"CN","OT","General Service Hopper",106684.180625517,1623.59421249554,
```

The batch control file in the last section created this output file. The railroad, movement type and freight car are displayed as mandatory parameters, while net ton miles and total variable cost is produced from the costing process. The various MOVE statements determined the results of these values.

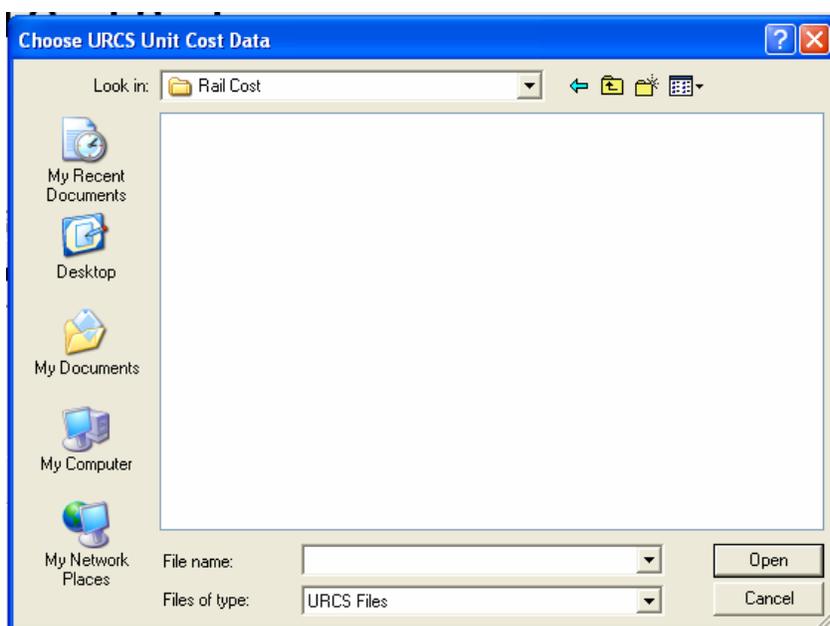
Batch Process Menu Options

There are two menu options in the Batch Costing Program. These are *File* and *Options*

File

Open – This option allows the user to define a new unit cost input file for the program. It initiates an open file dialog allowing the user to choose the input data set. When the batch process 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.

Exit – allows the user to exit the program. It performs the same function as the Quit button on the user input screen.



Options

The program default options screen allows the user to set the program default values for the batch process. The program will not allow user defined parameters to fall below the minimum settings or values to be greater than the maximum settings. These should be set to reasonable values to assure the railroad cost computations are relevant. With the exception of the error count default, all these options are exactly the same as for the *Railroad Cost Program*.

Set Program Default Options

Batch Program Defaults

Minimum Number of Freight Cars for Unit Train Move

Maximum Distance for Costing Movement

Maximum Tons per Freight Car

Number of Acceptable Errors in Control File

Include Jurisdictional Add On Charges

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 is the total number of processing line errors allowed by the batch processor. When the program encounters a movement specification error, such as a parameter out of range or a missing required parameter, it will write an error statement to the output file on the line that caused the processing error. The user can define the number of error lines that are acceptable in the context of the batch processing.

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.

```
<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.

- L101 Gross ton mile
- L102 Car mile other than clerical
- L103 Train mile other than crew
- L104 Crew train mile
- 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:

- 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.

- L201 40 foot general box car
- L202 50 foot general box car

L203	Equipped box car
L204	Plain gondola
L205	Equipped gondola
L206	Covered hopper
L207	General service hopper
L208	Open special service hopper
L209	Mechanical refrigerator
L210	Non-mechanical refrigerator
L211	TOFC flat car
L212	Multi level flat car
L213	General service flat car
L214	Other flat car
L215	Tank car, less than 22,000 gallons
L216	Tank car, more than 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:

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:

- | | |
|------|------------------------------------|
| L101 | 40 foot general box car |
| L102 | 50 foot general box car |
| L103 | Equipped box car |
| L104 | Plain gondola |
| L105 | Equipped gondola |
| L106 | Covered hopper |
| L107 | General service hopper |
| L108 | Open special service hopper |
| L109 | Mechanical refrigerator |
| L110 | Non-mechanical refrigerator |
| L111 | TOFC flat car |
| L112 | Multi level flat car |
| L113 | General service flat car |
| L114 | Other flat car |
| L115 | Tank car, less than 22,000 gallons |
| L116 | Tank car, more than 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:

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
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:

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
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:

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:

C1	Unit add-on factor for railroad 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.
ShipmentType	Integer	Type of railroad movement, the following values are valid: 1 - Originate & Terminate 2 - Originate & Deliver 3 - Receive & Terminate 4 - Receive & Deliver 6 - Intraterminal Move 7 - Interterminal Move
Distance	Double	Segment mileage - estimated or actual
FreightCar	Integer	The Freight Car, the following values are valid: 1 - Box, General Service 2 - Box, General Service 3 - Box, Equipped General Service 4 - Gondola, General Service 5 - Gondola, Equipped General Service 6 - Covered Hopper 7 - General Service Hopper 8 - Open Special Service Hopper 9 - Mechanical Refrigerator 10 - Non-mechanical Refrigerator 11 - TOFC Flat 12 - Multi Level Flat 13 - General Service Flat 14 - Other Flat Car 15 - Tank Car - Less than 22,000 Gallons 16 - Tank Car - More than 22,000 Gallons 17 - All other freight cars 18 - Average all freight cars

Property Name	Data Type	Description
NumberOfCars	Integer	Number of Freight Cars in Move
CarOwnership	Integer	The owner of the freight car, valid values: 1 - Railroad owned car 2 - Privately owned car
CommodityCode	Integer	The type of commodity hauled, valid index values are 1 to 82. See Appendix A for associated STCC values. The first commodity listed is 1 and the last is 81. Index 82 is all other commodities.
ShipmentWeight	Double	Weight of the shipment in tons per carload
TypeOfMovement	Integer	The type of costing movement. Valid values are: 1 - Single Car Movement 2 - Multiple Car Movement 3 - 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
CDLUASW	Double	Car days per loading & unloading for intraterminal switch

Property Name	Data Type	Description
CDLUIESW	Double	Car days per loading & unloading for interterminal switch
CDLUIndSW	Double	Car days per loading & unloading for industry switch
CDRun	Double	Running car days
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
CMIISW	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
TFCLsRef	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

Property Name	Data Type	Description
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
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.ShipmentType = 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.TypeOfMovement = 1 'Single carload movement

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

'Now set detailed parameters
CostProcess.Circuity = 1 'Set circuity 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

FVALS Location	Report Line	Movement Cost Account
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

FVALS Location	Report Line	Movement Cost Account
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

FVALS Location	Report Line	Movement Cost Account
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)

FVALS Location	Report Line	Movement Cost Account
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
189	455	VC-CD(Y)-DRL

FVALS Location	Report Line	Movement Cost Account
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
228	494	CD(Y) PER INTERTERMINAL SWITCH

FVALS Location	Report Line	Movement Cost Account
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
267	530	UC PER MVU

FVALS Location	Report Line	Movement Cost Account
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
306	574	UC INDUSTRY SWITCHING RESIDUAL

FVALS Location	Report Line	Movement Cost Account
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)

If the Jurisdictional add on is desired, 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

Line700 = Line696 + Line699

Line701 = Line698 + Line699

Line702 = Line700 / (Shipment weight * 20)

Line703 = Line701 / (Shipment weight * 20)

Appendix 1

Program Commodities

Index	STCC	Commodity Title
1	01	Farm Products
2	0113	Grain
3	01195	Potatoes other than Sweet
4	012	Fresh Fruits
5	013	Fresh Vegetables
6	01	All other Farm products
7	10	Metallic Ores
8	11	Coal
9	14	Nonmetallic Minerals
10	20	Food and Kindred Products
11	2011	Fresh meats
12	202	Dairy Products
13	203	Canned Fruits and Vegetables
14	204	Grain Mill Products
15	2041	Flour
16	2042	Prepared Feeds
17	2043	Cereals
18	2044	Rice
19	2045	Prepared Flour
20	2046	Corn Products
21	2062	Refined Sugar
22	20821	Beer
23	2084	Wines
24	20851	Whiskey
25	209	Miscellaneous Food Preparations
26	20	All other Food Products
27	21	Tobacco Products
28	24	Lumber and Wood except Furniture
29	2421	Lumber and Dimension Stock
30	2432	Plywood or Veneer
31	24	All other Lumber and Wood Products
32	25	Furniture and Fixtures
33	26	Pulp, Paper and Allied Products
34	26211	Newsprint
35	26213	Printing Paper
36	263	Fiberboard, Paperboard, and Pulp board
37	264	Processed Paper and Paperboard
38	26471	Sanitary Tissues
39	26	All other Pulp, Paper and Allied Products

Index	STCC	Commodity Title
40	28	Chemicals
41	281	Industrial Chemicals
42	2812	Potassium or Sodium
43	282	Synthetic Fibers, Resins, Rubber
44	289	Miscellaneous Chemical Products
45	28	All other Chemicals
46	29	Petroleum or Coal Products
47	30	Rubber and Miscellaneous Plastics
48	301	Rubber Tires and Inter Tubes
49	30	All other Rubber Products
50	32	Stone, Clay and Glass Products
51	321	Flat Glass
52	3295	Nonmetallic Earth and Minerals
53	32	All other Stone and Clay, Glass Products
54	33	Primary Metal Products
55	3312	Primary Iron and Steel Products
56	3352	Aluminum Basic Shapes
57	33	All other Primary Metal Products
58	34	Fabricated Metal Products
59	344	Fabricated Structural Metal Products
60	34	All other Fabricated Metal Products
61	35	Machinery except Electrical
62	351	Engines and Turbines
63	352	Farm Machinery
64	353	Construction Machinery
65	35	All other Machinery except Electrical
66	36	Electrical Machinery
67	361	Electrical Transport Distribution Equipment
68	363	Household Appliances
69	365	Radio or TV sets
70	36	All other Electrical Machinery
71	37	Transportation Equipment
72	37111	Passenger Cars
73	37112	Trucks
74	3714	Motor Vehicle Parts
75	37	All other Transportation Equipment
76	44	Freight Forwarder Traffic
77	45	Shipper Association Traffic
78	46	Miscellaneous Mixed Shipments
79	461	Miscellaneous Mixed Shipments not Including TOFC
80	46	All other Mixed Shipments
81	48	Hazardous Materials