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PORTSIM v.4.3: User's Manual

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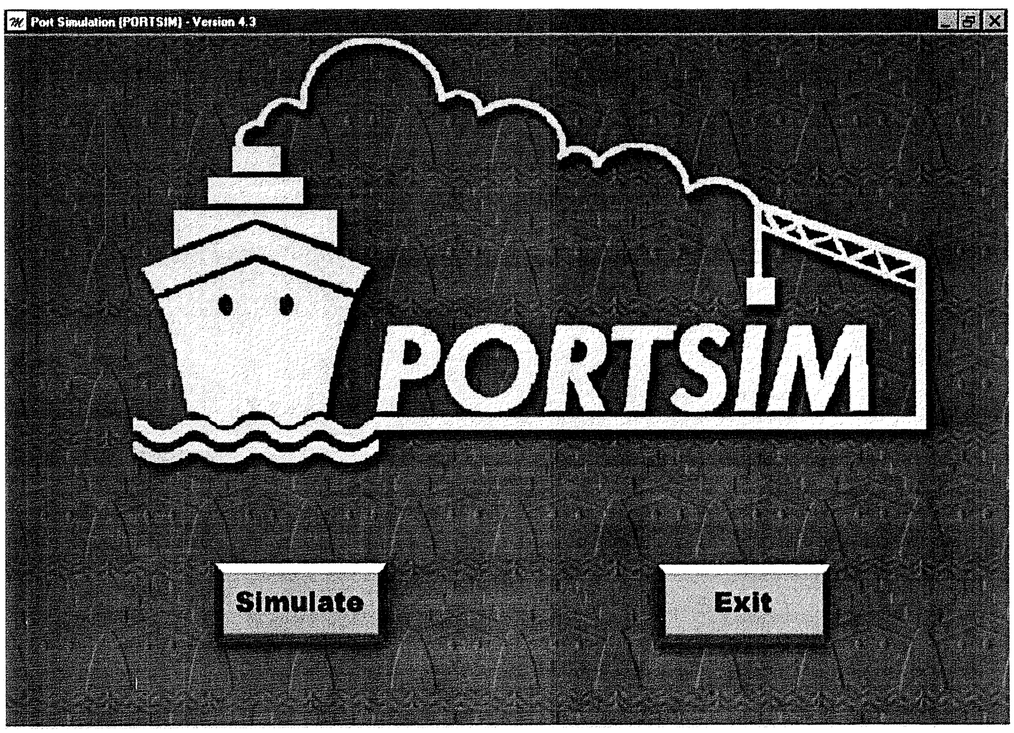

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1 Scope

This manual documents the capabilities and functions of the Port Simulation (PORTSIM) Model, Version 4.3, which operates on Windows NT 4.0 or Windows 2000. Step-by-step procedures for using PORTSIM are provided.

PORTSIM is a discrete-event simulation model that allows for a comprehensive analysis of all critical seaport operations for embarkation. It is applicable to ports worldwide. This simulation system addresses the complexities of port operations and gives you a way to measure the desirability of any given plan of action.

PORTSIM models all cargo items, ships, and port infrastructure resources as individual objects. A typical scenario may process more than 10,000 cargo items. Cargo is simulated from the time it arrives at a port to the time it is loaded onto a ship.

Note that PORTSIM Version 4.3 models only embarkation activities. Modeling of debarkation currently is being handled under another software framework.

You can use PORTSIM to specify the availability of port resources to provide the most realistic simulation possible. The simulation provides detailed information on cargo throughput and infrastructure utilization.

With PORTSIM, you can simulate the movement of entire military units through a specified port. You can also selectively constrain resources or operational parameters, to identify potential bottlenecks. To support your analysis, the software provides utilization statistics for all port resources (e.g., gates, staging areas, interchange yards, berths, inspectors, and container handling equipment). Simulation results are presented in three ways. (1) During the simulation run, utilization information is presented graphically in real time as continuous display "meters" that can help you monitor activity and identify potential problems visually as they develop. (2) During the run, you can also view a summary screen showing the current status of transports and cargo. (3) After the run, reports and graphs showing the final results can be viewed and saved.

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2 References

For information on TARGET data, users are referred to *Transportability Analysis Reports Generator (TARGET) User's Manual,* August 2000.

References used in validation efforts are cited in the appendixes.

For assistance with standard features of the Microsoft Windows NT 4.0 or Windows 2000 operating system, users are referred to the system documentation.

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3 Software Summary

3.1 Software Description

PORTSIM is intended to help military planners and port operators measure the throughput of a port for any given plan of action. In PORTSIM, cargo is simulated from the time it arrives at the port (at either a gate or a rail entry point) to the time it is loaded onto a ship. The software is designed to help you answer the following questions:

- How long does it take to move equipment and supplies through the port (clearance)?
- What and where are the bottlenecks and limiting resources that restrict movement through the port?
- Why are operations not completed by the required time?
- What are the implications if certain port resources are either constrained or made available?
- What is the port's throughput capability, given explicit assumptions on assets, resources, and scenarios?

Table 3.1 gives the major features of PORTSIM. Table 3.2 lists the processes and resources modeled.

PORTSIM combines a discrete-event simulation with a traditional high-level scheduling system. With this fine-grained, high-fidelity modeling, you can perform very detailed analyses of port infrastructure. For example, you can simulate the movement of entire military units through a specified port, with each individual cargo item (e.g., piece of equipment) represented. A typical scenario may require processing of more than 10,000 pieces of equipment.

Table 3.1 PORTSIM Features

Extensive scenario and parameter editing options
Options for importing force data
Real-time display of resource utilization
Data on resource utilization and throughput, at several levels of detail

Table 3.2 Processes and Resources Simulated

Embarkation Processes Simulated	
Reception	
Staging	
Ship arrival, loading, and departure	
Elements Simulated	
Infrastructure resources	Transportation assets
Gates	Highway
Berths	• Convoyed vehicles
Staging areas	• Flatbed trucks carrying vehicles
Interchange yards	• Flatbed trucks carrying containers
End ramps	Railway
Rail spurs	• Flatcars carrying vehicles
Locomotives	• Flatcars carrying containers
Container handlers	Water
Cranes	• Ships
Personnel	Cargo
Drivers	Vehicles
Inspectors	Containers
Stevedores	Pallets
	Helicopters
	Residual equipment
	Watercraft

You can also selectively constrain resources or operation parameters, in order to identify potential bottlenecks. For example, because open staging is explicitly modeled, you can analyze how constraining the available staging area affects the overall throughput capability of the port.

To evaluate the simulation, you can

- View continuous graphical displays ("meters") of resource utilization as the simulation runs. These displays may reveal a problem as it develops.
- View a summary screen during the simulation run showing current status of transports, cargo, and ships.
- Examine utilization statistics for all port resources (e.g., gates, staging areas, berths, inspectors, and container handling equipment) after a simulation has completed.
- Examine detailed histories of transport and cargo item processing.

3.2 Software Inventory

The PORTSIM Version 4.3 distribution contains the following software and data:

- PORTSIM Version 4.3 executable.
- Java Runtime Environment (Java Hotspot™ client version 1.3.0-c).
- Java-based graphics and report software (version 5.33).
- Java-based database access software.
- Microsoft Access database.
- Sample force data files.
- Sample scenario.

3.3 Hardware Requirements

- Minimum requirement of a Pentium processor (e.g., 300 MHz) running Windows NT 4.0 or Windows 2000.
- A minimum of 128 MB of RAM; however, 256 MB or more of RAM is recommended.
- 2 GB of disk space.
- Color monitor with a resolution of 1024 × 768.

3.4 Data Requirements

Some basic, unclassified data on forces, ports (a total of five), and transportation assets are distributed with PORTSIM. These data are suitable for demonstration and training on the software. The force data files that are provided in the PORTSIM distribution are "PORTSIM Export Files" for several different generic units. However, to perform analyses of port operations involving specific, actual units, you will need output from the TARGET model. The TARGET model determines the transport assets required to move a specified force.

You can use TARGET to create a "PORTSIM Export File" for loading into PORTSIM. This export file contains all the force and transport asset data required for PORTSIM to run. To select such a file for a PORTSIM run, use the Select Force button available through the New Scenario or Modify Scenario command (see Section 5.2 or 5.7, respectively). See the TARGET User's Manual for instructions on running TARGET and generating PORTSIM Export Files.

3.5 Software Requirements

PORTSIM requires the Microsoft Access database management system. Two databases are provided in the distribution: one for Access 2000 and one for Access 97. During installation, the ODBC connection for PORTSIM is configured to use the Access 2000 database. Systems running Access 97 may need to be reconfigured to connect to the Access 97 database.

3.6 General Approach to Simulating Port Operations in PORTSIM

Figure 1 illustrates the queues, processes, and flows that are represented in PORTSIM. In a simulation, various types of cargo arrive at a port (reception); proceed through various handling, staging, and inspection processes; and finally are loaded onto ships. Depending on the cargo type and transportation method (e.g., vehicles that arrive via convoys, flatbed trucks, or rail flatcars), cargo will take different pathways through these processes. These pathways are distinguished in Figure 1.

Also illustrated in Figure 1 is the notion of queuing times, which reflect the time required for clearing each cargo item through the queues (gates and staging) and the time required for arriving ships to gain access to berths. A simulation concludes with the loaded ships departing from the berths. Sections 3.6.1 through 3.6.4 describe the simulation components and processes in more detail.

3.6.1 Simulation Components

The PORTSIM simulation software is based on the following three concepts, which are represented in software components.

- **Resources:** Resources are the critical elements that constrain the port's ability to process cargo. Port resources include infrastructure at the port, as well as container handling equipment and personnel. The resources modeled in PORTSIM are listed in Table 3.2. These finite resources are used at appropriate points in the defined processes. If they are unavailable or if shortages develop, they can limit the port's throughput capability.

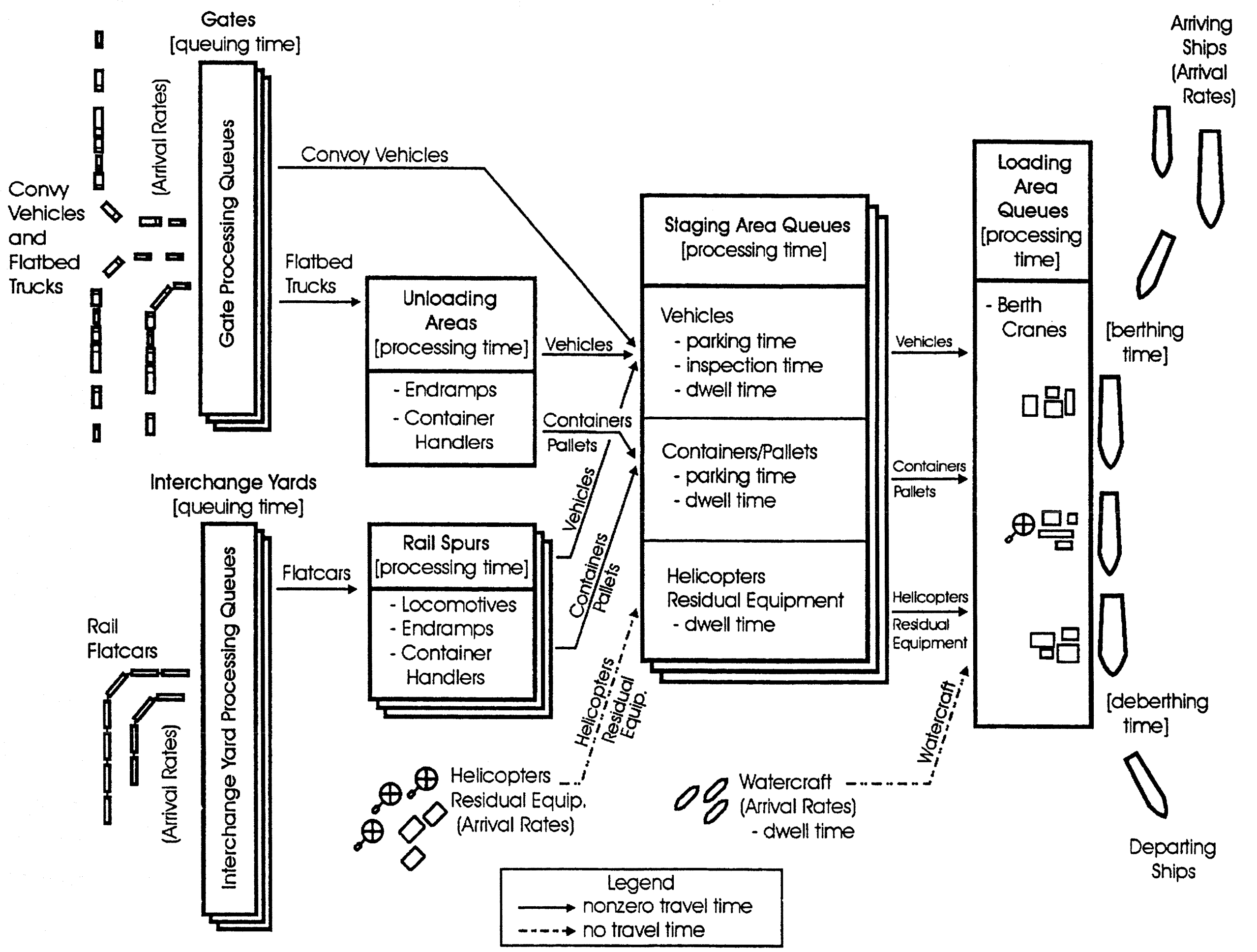

Figure 1. PORTSIM Queuing and Flows

- **Queues:** Queues are the mechanism used for items that need to wait to be processed. Queues *within* the port are represented as finite and have a maximum size, which is expressed in square feet or length of track, for example. Queues for *entry* to the port (i.e., at gates, interchange yards, and berths) are represented as infinite and can hold as many items as need to wait. For example, if vehicles arriving at the gate need to wait for processing, it is assumed that the area outside the gate in which the vehicles can wait is unlimited.

- **Event list and scheduler:** The event list is the mechanism used to manage events (e.g., arriving at a staging area from a gate). Events are processed on the basis of the time associated with the request. The event list is connected to the simulation clock.

3.6.2 Cargo and Activities

PORTSIM simulates detailed processes for embarkation of vehicles, containers, pallets, helicopters, residual equipment, and watercraft. For these cargo types, PORTSIM models the following major embarkation activities:

- **Reception:** All processes needed to accept cargo items at the entry points to the port and to transport those items to the staging areas. The entry points to the port are the gates (for highway entry) and the interchange yards (for railway entry). (However, helicopters, watercraft, and residual equipment proceed directly to staging without an explicit "reception" process.)

- **Staging:** All processes needed to park cargo items in appropriate locations before ships arrive and to inspect individual items.

- **Ship loading:** All processes needed to call forward the cargo items to the berths when ships arrive and to load them onto the ships by means of the appropriate loading method (i.e., roll-on, roll-off [RORO] or lift-on, lift-off [LOLO]).

3.6.3 Transportation Processes

Figure 1 represents the general convoy vehicle processes that are required at the port of embarkation and illustrates possible pathways of convoy vehicles moving through the port. Included are gate queuing and staging prior to final ship loading.

This figure also illustrates the flatbed truck processes that are required at the port of embarkation and shows the possible movement of cargo arriving via this transport mode through the port. Flatbed trucks move from the gate queues to unloading areas, where containers and vehicles are removed for processing in the staging area.

Finally, Figure 1 shows rail transport processes required at the port, including queuing at the interchange yard and being transported to rail spurs for unloading containers and vehicles.

3.6.4 Ship Processes

PORTSIM also simulates detailed processes for ship operations at the port, including (1) docking at the berth, (2) calling forward appropriate cargo items, (3) loading cargo items, and (4) departing from the berth. In addition to these processes, PORTSIM addresses the issue of ship/berth matching by classifying ship types and assigning the acceptable ship types for each berth.

Ships are classified into one of four types:

- Roll-on/roll-off (RORO).
- Container.
- Breakbulk.
- Barge.

Note that while each ship is categorized as a single "type," it may be assigned capacities to carry more than one type of cargo (e.g., RORO ships may have the capacity to carry containers, in addition to vehicles). However, the single "type" category is the critical parameter for matching ships with berths.

Each berth is designated as being able to accommodate one or more of the four ship types. In addition, the ship/berth matching logic verifies that each berth is long enough and deep enough to accommodate the prospective ship assignments.

This logic ensures that, overall, ships arriving at the port are handled at the appropriate berths. This decision alone can greatly affect the overall throughput capability of the port, since differences in assets available at particular berths will result in different loading process times.

3.7 Input to Simulations

The PORTSIM model requires three main sets of inputs, which are briefly described in the following sections:

1. The port infrastructure and its operating characteristics.
2. Force cargo transports, cargo physical characteristics, and transport arrival rates.
3. Available ships and their physical characteristics.

3.7.1 Port Infrastructure Inputs

Detailed port infrastructure information for PORTSIM originates from the MTMCTEA databases. The resulting PORTSIM Access database identifies the resources and container handling equipment that are available at specific ports. It provides a baseline constraint under which all analyses need to be conducted.

The PORTSIM database makes all identified port resources available in a default configuration, and it can be used as the basis for building customized scenarios. The PORTSIM interface does not provide the capability to create additional resources. However, port infrastructure data can be altered by modifying the PORTSIM database directly (consult a database expert for assistance).

3.7.2 Land Transportation Inputs

The land transportation inputs to PORTSIM consist of data on the number, characteristics, cargo, and arrival times of:

- Convoyed vehicles.
- Commercial trucks carrying vehicles or containers.
- Commercial trains carrying vehicles or containers.

Typically, this input comes from a data file produced by the TARGET model.This data file (called the "PORTSIM Export File") is based on the equipment characteristics associated with a specific time-phased force deployment data (TPFDD) file. The TPFDD file specifies the units involved in the deployment, their equipment, and the timing of the deployment. The "PORTSIM Export File" contains specific information on the cargo that will be moving through the port and the associated means of transport.

Working with the list of units identified in the TPFDD and the cargo associated with those units, the TARGET model matches the cargo items with the necessary flatbed trucks or flatcars on which they will arrive at the port. For example, TARGET would indicate that a flatbed truck loaded with two unique military vehicles will arrive at the port by highway. This type of data is included in the "PORTSIM Export File" generated by TARGET.

Arrival times are determined by the arrival profile that you specify within PORTSIM. An arrival profile can be either deterministic or stochastic. Ways of using the stochastic and deterministic modes in PORTSIM are discussed in Appendix A.

3.7.3 Ship Inputs

Detailed information on ship characteristics is provided in the ship database distributed with PORTSIM. These data allow PORTSIM to determine which berths at the port will be able to serve the needs of the ships in the most efficient manner. In addition, they allow PORTSIM to accurately portray the amount of cargo that can be loaded onto a particular ship. For each ship, the following information is available: ship name, generic type, ship class, dimensions (beam, length, draft), stow factor, designation of whether the ship is self-sustaining, cargo capacities (breakbulk, RORO, and container), and default loading times and ranges for the cargo items modeled in PORTSIM.

PORTSIM uses these data as defaults for the ship parameters, which you can then customize. You can specify an arrival sequence and either deterministic or stochastic arrival time. Ways of using the stochastic and deterministic modes in PORTSIM are discussed in Appendix A.

3.8 Output of Simulations

3.8.1 Output Reports

PORTSIM provides summaries and detailed reports on resource utilization and the processing history of cargo items, transportation assets, and ships. Table 3.3 lists the available output reports and the information they provide.

3.8.2 Output Graphs

The PORTSIM output graphs provide a high-level view of the throughput of the port. You can use these graphs to compare performance and resource use across different scenarios and to identify areas within the port that create bottlenecks.

Port resources for which utilization graphs are available include gates, berths, drivers, container handlers, inspectors, staging areas, end ramps, interchange yards, locomotives, and rail spurs.

In addition to utilization and throughput graphs, the output categories also include: (a) clearance profiles (arrival, ready, and loading times) for different cargo types, (b) cargo statistics (by cargo and transport type), and (c) port congestion summaries.

Table 3.3 PORTSIM Output Reports

Cargo Report	Port Utilization Report	Ship Report	Ship Summary Report
• Time of arrival at the port • Time parked in staging • Time available to be loaded • Time loaded onto ship • Loading rate • Ship loaded onto **Cargo Transport Report** • Identification numbers for all cargo items	For each port infrastructure asset: • Percent utilization • Average and max. queue sizes • No. of cargo items processed per day **Scenario Information Report** All scenario data and parameter settings	General: • No. of ships • Queue info. For each ship: • Time of arrival at berth • Name of berth arrived at • Percent full • Cargo summary (no. items, sq. ft., short and measure-ment tons)	General tracking summary for each ship **Hourly Summary Report** Hourly status summary of queues and flows **Convoy, Train, and Cargo Summary Reports** Summary of queues and flows

3.9 Modes of Operation

You can create scenarios that run in a deterministic mode, that is, with all parameters set to fixed values, or in a stochastic mode, that is, with parameters that vary randomly according to ranges or distributions that you set. See Appendix A for details.

3.10 Security and Privacy

> **Warning!** *At present, **all** data used and generated by PORTSIM are accessible to **all** users who have access to the network server and directories from which PORTSIM operates.* If you use classified data, you must ensure that appropriate safeguards are in place to prevent unauthorized access to those directories, and you are responsible for following all of the procedures required for working in a classified facility.

As delivered, PORTSIM incorporates one level of protection against unauthorized access, namely the username and a password needed to access the Windows NT or Windows 2000 operating system. The system administrator can edit user names and passwords, as required. *At present, **all** data used and generated by PORTSIM are accessible to **all** users who have access to the network disk drives from which PORTSIM operates.*

The PORTSIM software itself is unclassified, but the data and applications it is used for may be classified. You can label a scenario as unclassified or classified at whatever level is needed (see Sections 5.2 and 5.7). This label appears on any reports you print out. Any classified data (as well as unclassified data) used by PORTSIM will be stored either in the Scenario directory under the subdirectory POEstandalone (scenario specifications and simulation output) or in the Data directory (force data).

3.11 Assistance and Problem Reporting

Requests for assistance with model and problem reports should be directed to the PORTSIM program manager (currently J. Joines) at MTMCTEA.

3.12 Tips for Using PORTSIM Effectively

Save scenario changes before working with another scenario or exiting

If you want to save changes to the scenario specifications or parameters, you must do one of these actions before loading another scenario or exiting PORTSIM:

- Execute a simulation using the revised scenario, or
- Use the Save Scenario or Save Scenario As... command on the Scenario menu (see Section 5.4 or 5.5, respectively).

Save changes before exiting a parameter data window

If you have made a change to data in a parameter window, choose Save Data before you close the window or move on to the next item in the sequence. This step is especially important when you are specifying parameters for several instances of the same type of item, e.g., gates. The Save Data command works only for the visible window. For more details, see the instructions for the specific window in Section 6.

Start with a short simulation time

If you are creating or modifying a scenario (see Section 5.2 or 5.7), you should initially use a short simulation time, for example, 50 to 100 hours. If the simulation runs successfully, you can then use longer times. This precaution is helpful because it is possible to specify parameters that conflict, which will cause the simulation to stall. If such conflicts arise, the entire simulation time may pass without producing useful results. If this happens, you cannot save the state of the simulation and continue later with a longer simulation time. If a simulation stalls, or if you stop it midway, you must restart it from the beginning.

Generate reports and graphs immediately after a run

At present, PORTSIM stores the results of a simulation only until the program is run again, at which time the results of the previous run are removed. Thus, if you run a simulation and then exit PORTSIM, the data from that run will still be available when you reopen PORTSIM (as long as no one has run the same scenario in the intervening time).

Do not use the close button to close the program or windows

Do not use the "close" button — the ☒ at the top right corner of a window. If you use this button, some data may be lost. To close the PORTSIM program itself, always use the EXIT option on the menu bar. To close a PORTSIM window, always click the button displayed within the body of the window (OK, Cancel, or Done, depending on the window). Exiting this way ensures that all values are saved properly.

Use multiple windows (with care)

In general, you can have several data windows open once. You may want to have certain windows open for referance while creating or modifying a scenario, running a simulation, or reviewing results. However, note that changes in one window are NOT automatically reflected to other open windows. In general, to update the data displayed, you must close and redisplay the window.

> **Note on Parameters:** An automated consistency test runs at the beginning of each simulation. It will prevent the simulation from running and will display an error message if missing data are detected. It does not, however, guarantee that the simulation will run error-free. The tips in the remainder of this section can help you avoid problems.

Specify port resources as available for military use

When you create a scenario, you must specify which gates, staging areas, interchange yards, and berths are available for military use. Unless at least one of each of these resources is available to the simulation, the cargo cannot move through the port. Use the Parameters / Modify Port Parameters command (see Section 6.3): on the parameter window for each of these port resources, check the box labeled Available For Military Use.

Check your parameters for consistency and potential conflicts

The following are examples of issues you need to consider when specifying parameters.

- Make sure at least one *military* gate is available for each kind of transport involved (e.g., convoy, flatbed trucks); see Section 6.3.2.

- You must select one or more specific ships for loading (see Section 5.2 or 5.7). If you do not specify a ship, arriving cargo will simply be staged and the simulation will not be completed.

- When you select the percentage of the staging area that will be set aside for military use, you should consider how much of this military staging area will actually be available for staging after lanes are allotted for vehicle movements (see Section 6.3.3).

- Check that each type of cargo can be accommodated throughout the process. For example, if your specifications include containers, at least one staging area must be available to handle containers.

- Check that the number of drivers is equal to or greater than the Maximum Call Forward parameter (see Section 6.3.4, Parameters / Modify Port Parameters / Berth Parameters).

Match the ships to the cargo

Make sure that the ships chosen to arrive at the port can accommodate the cargo types (see Section 5.2 or 5.7). For example, convoy vehicles can be loaded onto RORO ships but not onto container ships.

Use deterministic or stochastic parameters (or a mix of both)

The controls for running a PORTSIM scenario deterministically or stochastically are not located in a single master switch but rather are divided among the following three categories of operations:

- Cargo arrival.
- Port operations.
- Ship arrival.

Each of these categories can be independently set up to run deterministically or stochastically. As a result, you have significant flexibility in choosing the combinations most appropriate to issues of interest. Detailed instructions for setting up PORTSIM deterministically and/or stochastically are given in Appendix A.

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4 Access to the Software

This section provides information on software installation and setup, initiating a session, and stopping or suspending work.

4.1 Software Setup

4.1.1 Familiarization

In general, PORTSIM uses the operating conventions of the Windows NT 4.0 or Windows 2000 operating system. Consult the user manual for your version of Windows for instructions on using the mouse, the cursor, and menus. For specific tips on using PORTSIM effectively, see Section 3.1.2.

4.1.2 Access Control

4.1.2.1 Obtaining a Username and Password

You must be able to access both the Windows NT 4.0 or Windows 2000 system and the database software to run PORTSIM. The system administrator (or whoever is responsible for this function) can provide a system account and password. You do not need any other accounts or passwords..

4.1.2.2 Security and Privacy Issues for Storing Media

Any reports or graphs that must be saved or printed should be labeled with a descriptive name so that the file will be useful and easily identifiable at a later time (see Section 8.4.1 for reports and 8.5.1 for graphs). On all PORTSIM reports, the scenario name appears at the top of the report. This name is also the name of the file containing the scenario data. Any saved or printed media must be maintained in a secure environment suitable to their level of classification.

4.1.3 Installation and Configuration

PORTSIM 4.3 is distributed on a single CD-ROM. The CD contains a single file, a self-installing executable named setup43.exe. To install PORTSIM 4.3 on your computer, do the following:

1. Place the CD into your PC.

2. From Windows Explorer, run the file setup43.exe on the CD.

3. Specify the root directory for PORTSIM as requested.

4. Follow the prompts to complete the installation.

   The PORTSIM directory structure and its contents are loaded onto your PC under the root directory you specified, an ODBC connection to the PORTSIM Access database is created, and a PORTSIM 4.3 icon is placed onto your desktop for easy access to PORTSIM.

5. If you are running Microsoft Access 2000, the installation is now complete.

   If you are running Microsoft Access 97, you must manually establish the ODBC connection for System DSN PORTSIM_TEST to point to the file <*PORTSIM root directory*>\data\portsim_prod97.mdb. Once this is done, the installation is complete.

6. A sample scenario named Test_Sav is provided in the distribution. You should run this scenario first to ensure that the installation has completed correctly.

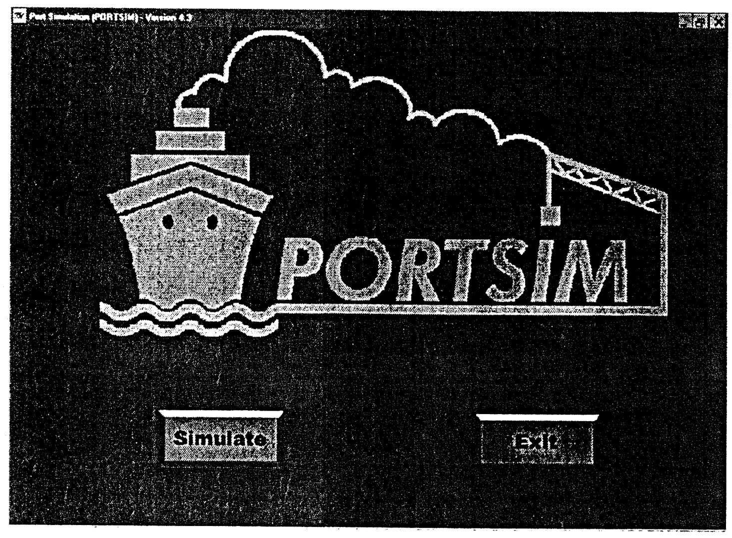
4.2 Initiating a Session

1. To start PORTSIM, double-click the PORTSIM shortcut icon on your desktop or access the program through the Windows Start menu. Initially, two MS-DOS windows are displayed. (These windows remain open in the background while you work in PORTSIM. At this stage in the development of PORTSIM, the MS-DOS windows are visible for the programmers' use. Most users will not need to access this information.)

> **Warning!** Do ***not*** close either of the MS-DOS windows. Doing so automatically closes PORTSIM.

> **Note:** If the MS-DOS windows are in the way, you can minimize them by going to the upper right corner of each window and clicking the ▀ button. The window shrinks to a button on the task bar.

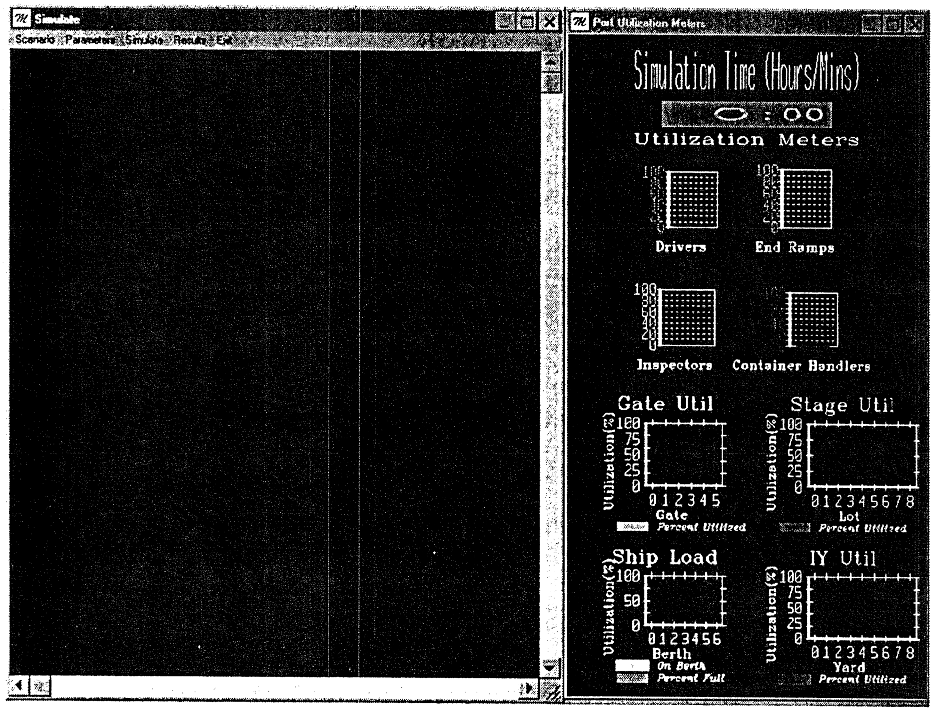
Once PORTSIM has completely loaded all of the data sets required for the program, the Port Simulation (PORTSIM) - Version 4.3 window opens.



Port Simulation (PORTSIM) — Version 4.3 Window

> **Note:** The time required to open the Port Simulation (PORTSIM) — Version 4.3 window varies according to the personal computer or workstation used.

2. To begin using PORTSIM, click on the Simulate button on the Port Simulation (PORTSIM) - Version 4.3 window. The Simulate window and the Port Utilization Meters window are displayed. The functions available from the menu bar in the Simulate window are described in Sections 5 through 8. The data displayed by the meters are described in the section on running simulations (Section 7).



Simulate Window (left) and Port Utilization Meters Window (right)

> **Warning!** Do ***not*** close the Simulate or Port Utilization Meters windows. Doing so automatically closes PORTSIM, and you will *lose all unsaved data from the current scenario or simulation.* Otherwise, these windows operate like typical windows in Microsoft Windows applications. Instructions on closing PORTSIM are given in Section 4.3.

4.3 Stopping or Suspending Work

> **Warning!** Changes to a scenario are saved when a simulation run is started and are retained if the run is aborted. If you load a different scenario or exit PORTSIM without first saving the current scenario or running a simulation, *any changes to scenario data will be lost.* To save the changes permanently, you ***must*** either run a simulation or use the Save Scenario or Save Scenario As... command (see Section 5.4 or 5.5, respectively).

To ensure that a PORTSIM session terminates cleanly and completely, always use the button displayed within the window (e.g., Exit, Close, or Done), rather than the Windows close button (☒) or keyboard shortcuts. To exit PORTSIM, do the following:

1. On the menu bar of the Simulate window (see Section 4.2), click Exit. A drop-down menu is displayed.

2. On the drop-down menu, select Exit. The Port Simulation (PORTSIM) — Version 4.3 window is displayed.

3. On that window, click the EXIT button. The program closes.

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5.1 Scenario Menu — Overview

5.1.1 What Is a PORTSIM Scenario?

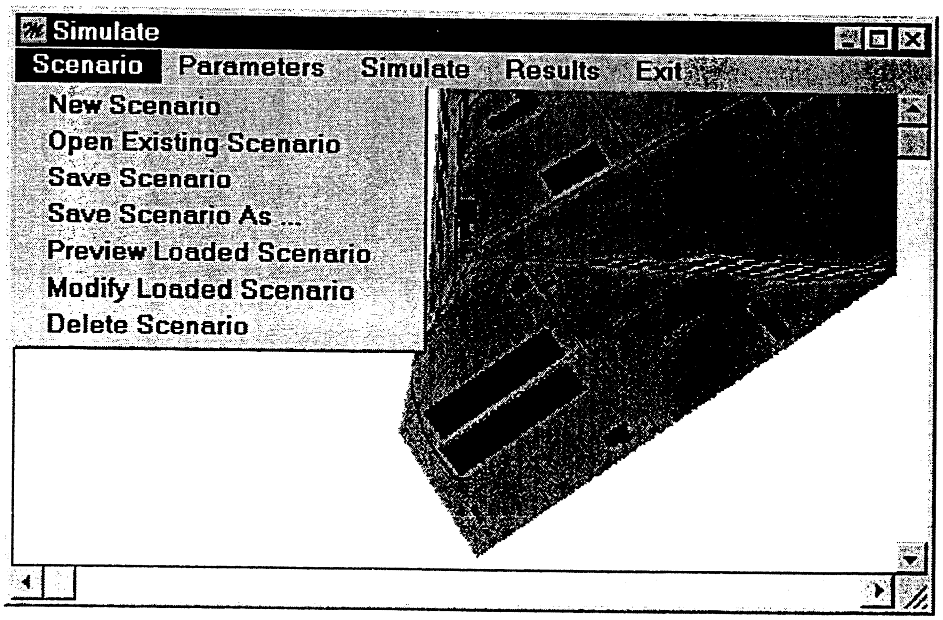
A PORTSIM scenario consists of two types of information:

1. **Baseline data** on the selected port, force, and ships, which are imported from existing databases. You specify this type of data by using the Scenario menu, as described in this section. (If you want to use ports, forces, or ships that are not included with PORTSIM, consult with database experts, who can create the necessary files.)

2. **Parameters** specified or modified by the user for the specific scenario, e.g., ship arrival times, berth characteristics. You specify this type of data by using the Parameters menu, as described in Section 6.

5.1.2 What Are the Scenario Commands?

The commands available through the Scenario menu are shown below, followed by a brief description of the function of each command. Depending on what you have done in the current session, some commands may be grayed out and unavailable. For legibilty, screens are shown with all commands visible.



Scenario Commands

- New Scenario — Create an entirely new scenario based on data from the PORTSIM database or data that you supply.
- Open Existing Scenario — Load an existing scenario either for use in a simulation run or for modification.
- Save Scenario — Save all specifications in the currently loaded scenario.
- Save Scenario As... — Save changes to a scenario under a different scenario name.
- Preview Loaded Scenario — Examine the data in a scenario before, during, or after a simulation run. This window can remain open while a simulation is running.
- Modify Loaded Scenario — Change any of the baseline data. The functions are the same as those available through the New Scenario command. Before you can use this command, you must load a scenario by using the Open Existing Scenario command.
- Delete Scenario — Permanently remove a scenario.

5.1.3 How Do I Work with Scenarios?

In PORTSIM, you can only work with one scenario at at time.

1. To begin using a PORTSIM scenario, go to the Scenario menu on the Simulate window (see page 5-1) and select either

   - The New Scenario command (to create an entirely new scenario).

   OR

   - The Open Existing Scenario command. Skip to Step 3.

> **Warning!** If you load a different scenario or exit PORTSIM without first running a simulation or saving the new or modified scenario, *all changes to scenario data will be lost.* To save the changes permanently, you ***must*** either run a simulation or use the Save Scenario or Save Scenario As... command.

2. If you are creating a new scenario, specify the scenario data.

   a. Use the New Scenario window (displayed by the New Scenario command) to specify the following baseline scenario data (see Section 5.2):
      - Classification
      - Port
      - Force (including, indirectly, arrival timing)
      - Ship list
      - Ship arrival mode
      - Ship/berth assignment mode.

   b. Use the commands on the Parameters menu (see Chapter 6) to make all other changes to parameters (e.g., vehicle gate processing time or container loaded time).

   c. Go to Step 4.

3. If you are working with an existing scenario, modify the data.

   a. If desired, use the Preview Loaded Scenario command to display a summary report with a subset of the scenario parameters. This window does not have any editing capabilities.

   b. Use the Modify Loaded Scenario command (Section 5.3) to alter the baseline scenario data (see list of data in Step 2.a).

   c. Use the commands on the Parameters menu (see Chapter 6) to make all other changes to parameters (e.g., vehicle gate processing time or container loaded time).

4. Use the other commands on the Scenario menu to save or delete the scenario.

5. Use the commands on the Simulate and Results menus (see Sections 7 and 8, respectively) to run simulations and display reports and graphs of the results.

5.2 Scenario / New Scenario

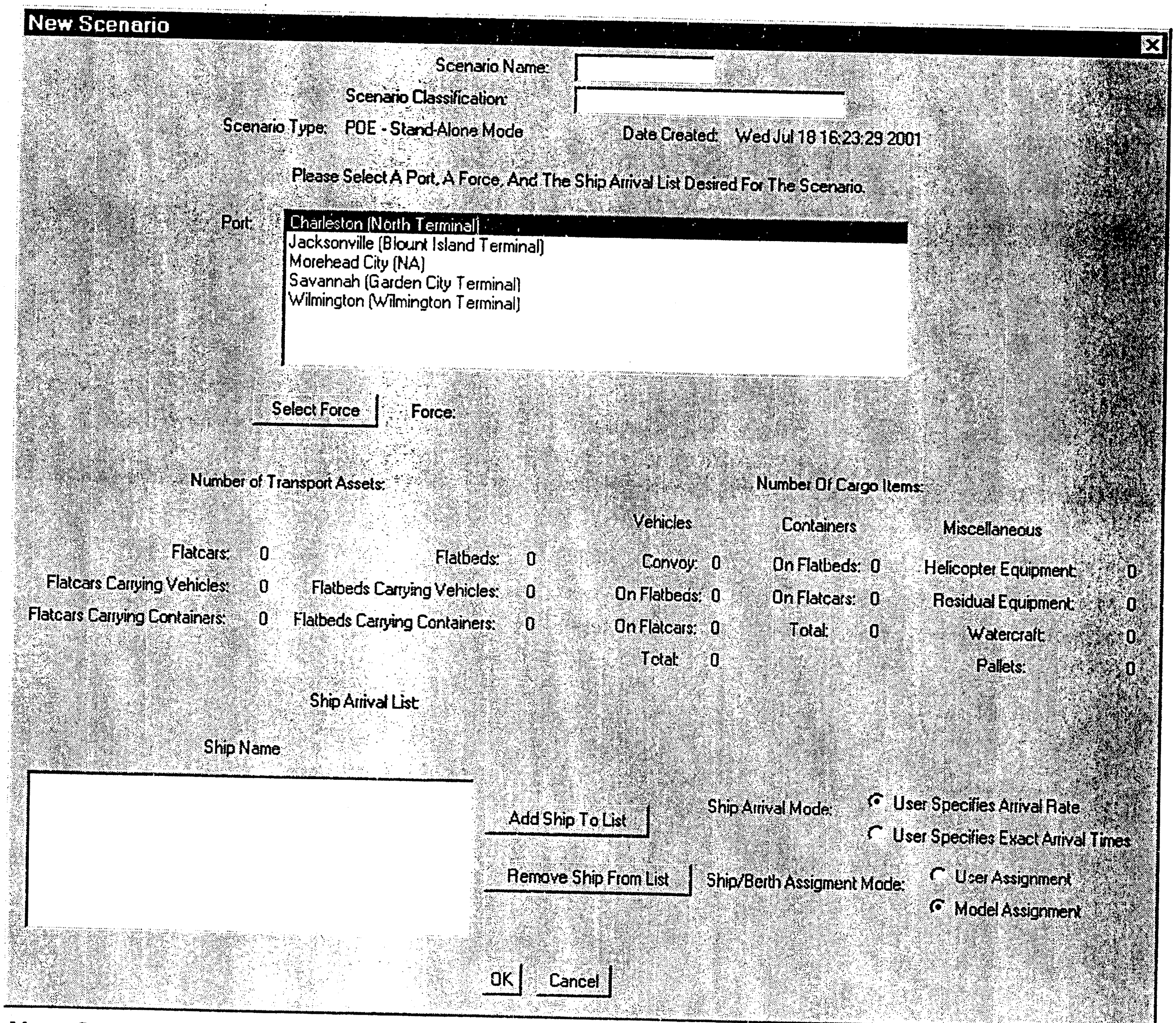
To create a new scenario, do these six steps:

1. Identify the scenario (Section 5.2.1).
2. Select a port (Section 5.2.2).
3. Select a force (Section 5.2.3).
4. Select ships and ship options (Section 5.2.4).
5. Save the scenario (5.2.5).
6. Customize the scenario parameters (Section 5.2.6 and Section 6).

> **Warning!** If you load a different scenario or exit PORTSIM without first saving the current scenario or running a simulation, *any changes to scenario data will be lost.* To save changes permanently, you ***must*** either run a simulation or use the Save Scenario or Save Scenario As... command (see Section 5.4 or 5.5, respectively).

5.2.1 New Scenario — Identify Scenario

1. **Start a New Scenario.** From the Scenario menu on the Simulate window, select New Scenario. The New Scenario window is displayed. If at any time you wish to discontinue creating the scenario, click on Cancel. However, all data entered to that point will be lost.



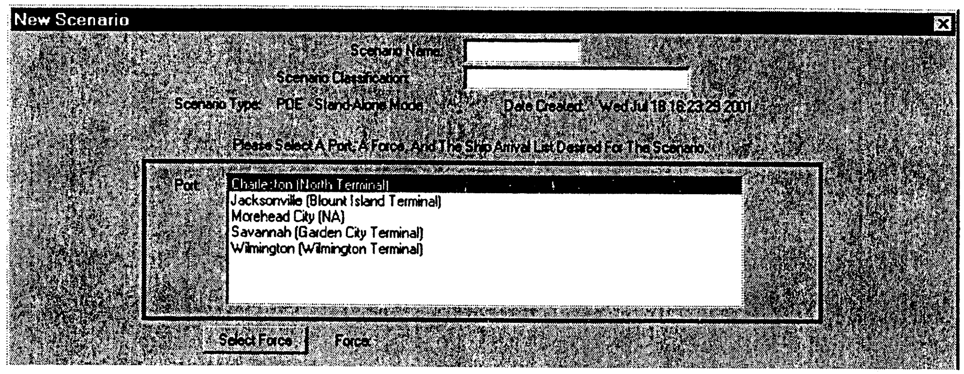
New Scenario Window

2. **Name the scenario.** In the Scenario Name box, enter a descriptive name for the scenario. This name is used as the filename, so it must follow the rules for filenames in Windows NT 4.0 and Windows 2000. That is, you can use spaces, but avoid special characters. The scenario name appears on reports and graphs.

3. **Specify classification.** In the Scenario Classification box, enter the classification level, e.g., For Official Use Only, Secret, etc. This label is displayed or printed on all reports and graphs produced from this scenario. However, PORTSIM does not restrict or authorize access to classified data (see Section 3.10).

5.2.2 New Scenario — Select Port

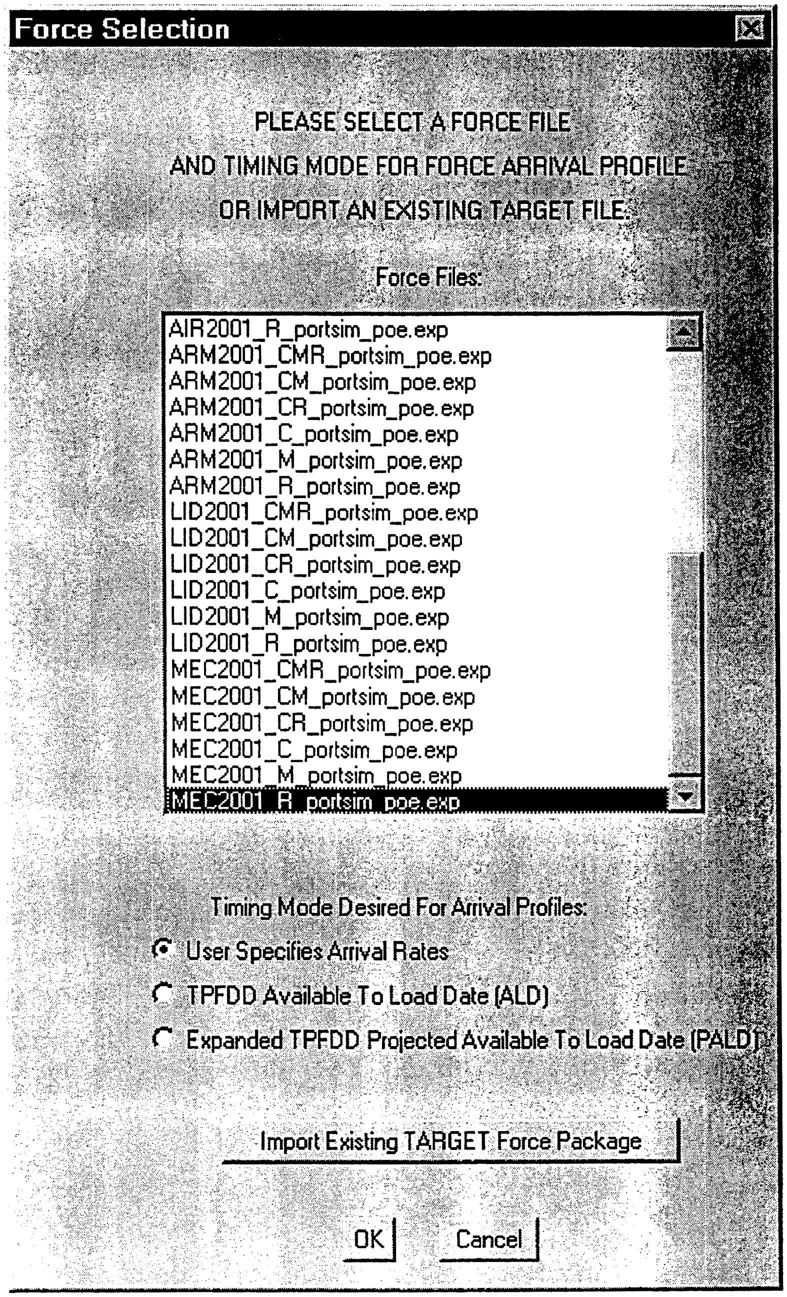
In the Port list box on the New Scenario window, highlight the port you wish to use. (You do not need to double-click to select.) If necessary, scroll through the list of ports.



Port List (outlined)

5.2.3 New Scenario — Select Force

1. **Begin force selection.** On the New Scenario window, click on the Select Force button. The Force Selection window is displayed.



Force Selection Window

2. **Specify the force to be modeled.** Choose one of the following options:

   - To use a force package included in the PORTSIM distribution or a custom force package that is saved in the same directory as the distribution files (the force subdirectory within the data subdirectory), go to Step 3.

     OR

   - To use a force package saved in some other directory, go to Step 4.

3. **Use force data from the standard directory.**

   a. **Select the force package.** On the New Scenario window, in the Force Package box, highlight the filename corresponding to the force you want to model. (You do not need to double-click to select.) Scroll through the list if necessary. (The details of the equipment specified by the selected force package will be displayed when you return to the New Scenario window in Step 5).

> **Note: Force filename conventions.** The force files distributed with PORTSIM use the following naming convention to indicate the transport modes the force requires:
> c — convoyed vehicles
> m — commercial highway
> r — commercial rail.
> Thus, armored_mr.lst is a force that requires commercial highway and commercial rail transport.

b. **Specify the timing mode.** For the radio buttons under the heading Timing Mode Desired For Arrival Profiles, do one of the following.

- If you want to use the User Specifies Arrival Rates option (the default), no action is needed under this heading; go to Step 5. However, you must specify the arrival data elsewhere by using the Modify Arrival Mode Time Parameters on the Parameters menu (see Section 6.6).

- If you want to use the TPFFD Available to Load Date (ALD) option or the Expanded TPFFD Projected Available to Load Date (PALD) option, click the appropriate radio button and go to Step 4. To use these options, you must have a suitable force file available.

> **Note:** The force timing mode is specified separately from — and can be different than — the ship timing mode (see Section 5.2.4). For more discussion on this and other aspects of specifying arrival profiles, see Appendix A.

> **Note:** Not all timing modes are available for all forces. If you select a timing mode that is incompatible with the force you have selected, you will see an error message when you attempt to exit the Force Selection window.

4. **Use force data from TARGET file.** On the Force Selection window, click on the Import Existing TARGET Force Package button at the bottom of the window. A window will open requesting the name of the directory and filename where the force package can be found.

   These TARGET Force Package files are created by the TARGET model. Please refer to the TARGET User's Manual for a step-by-step procedure for using TARGET to create a "PORTSIM Export File" (the term used within TARGET).

5. **Continue setting up the new scenario.** On the Force Selection window, click on OK. If you have selected an incompatible timing mode, an error message is displayed. Otherwise, a message is displayed that says Loading Force Data: Please Wait. When that process is complete, the New Scenario window is displayed.

   If you wish to change your force selection at this point, return to Step 1.

   The middle area of the New Scenario window now displays information about the selected force. The selected force is identified on the line labeled Force, to the right of the Select Force button. This line identifies the location of the force data file by its directory within the PORTSIM directory and its filename. The left side of the window lists the rail and highway transport assets associated with the selected force. The right side of the window lists the cargo associated with the force.

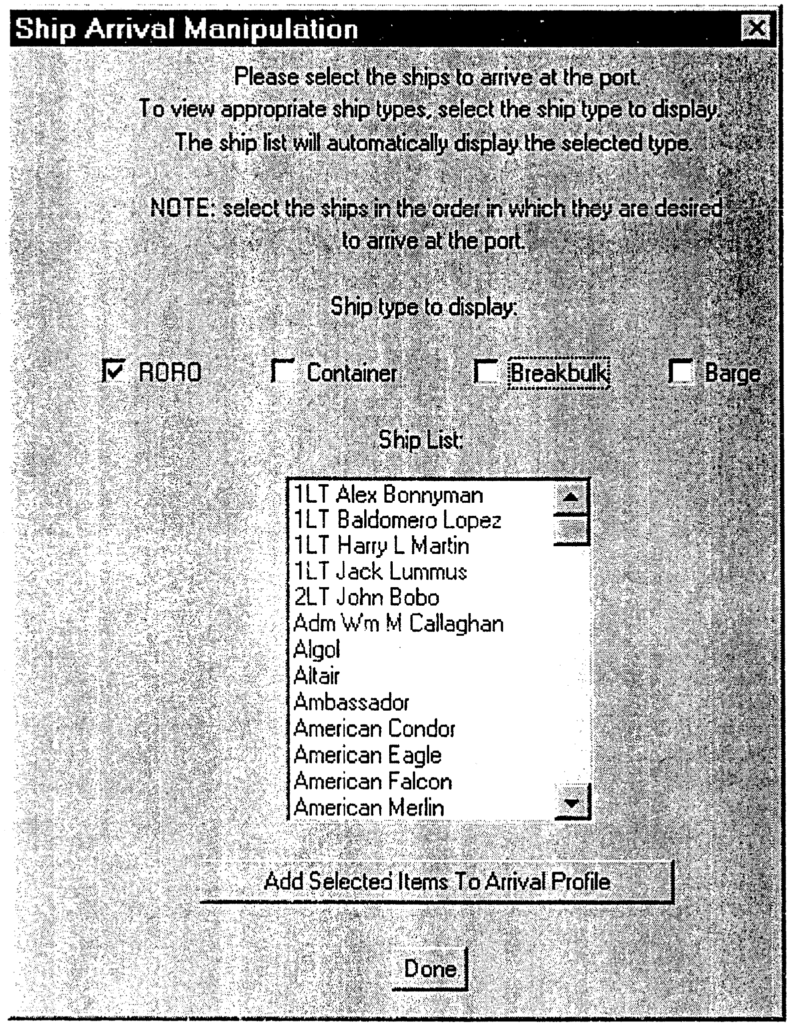
5.2.4 New Scenario — Select Ships and Ship Options

To construct a list of ships available to the embarkation operation, do these four steps:

1. Select and add ships to list (Section 5.2.4.1).
2. If necessary, delete previously selected ships (Section 5.2.4.2).
3. Specify mode for timing ship arrival (Section 5.2.4.3).
4. Specify how ships will be assigned to berths (Section 5.2.4.4).

5.2.4.1 Select and Add Ship(s)

1. **Display ship list.** On the New Scenario window, click on the Add Ship To List button. The Ship Arrival Manipulation window is displayed. Repeat Steps 2 through 6 until you have added all the ships you want to include in the scenario, then go to Section 5.2.4.3 to specify the arrival timing.



Ship Arrival Manipulation Window

2. **Cancel actions.**

   - To return to the scenario without adding ships, click Done.
   - To change a previous selection, go to Step 7.

3. **Choose the ship type.** On the Ship Arrival Manipulation window, click on the box for the type of ship you want to add (RORO, Container, Breakbulk, or Barge). All ships of that type in the PORTSIM database are displayed in the Ship List box.

   To see detailed specifications of each ship you must use Microsoft Access to view the ship database file. The Access database containing ship information is stored in the data directory and is named portsim_prod.mdb.

4. **Choose a ship.** In the Ship List, highlight the name(s) of the specific ship(s) you want to add. (You do not need to double-click to select.) You can add several ships *of a single type* at once:

   - To add several consecutive ships: (1) click on the name of the first ship you want to add, (2) press and hold the Shift key, and (3) click on the last ship you want to add. All the ship names in this range will be highlighted.

   - To add several ships from different points in the sequence: (1) press and hold the Ctrl key while you (2) click on the name of each ship you want to add. All the selected ship names will be highlighted.

Warning! Before you switch to another ship type or click Done, be sure to click on Add Selected Items To Arrival Profile, otherwise the entries for the current type will not be saved.

Caution: If you want to use the rate-based mode for assigning ship arrival times (see Section 5.2.4.3 and Appendix A), PORTSIM requires you to select ships *in order of arrival*. You can delete a ship from anywhere in the sequence, but you cannot insert a ship into the sequence except at the end. Thus, you may find it helpful to review all of the available ships and construct the ship arrival profile off-line before you actually enter the sequence in PORTSIM.

5. **Add the ship(s).** To add the selected ship(s) to the arrival profile, click the Add Selected Items To Arrival Profile button. The selected ship(s) is(are) now shown on the New Scenario window in the Ship Arrival List box.

   At this point, both the New Scenario window and the Ship Arrival Manipulation window are visible. To switch between them, click on the window that you want to view. It becomes the active window. To add another ship, return to Step 3.

> **Note:** If you specify that a ship will make multiple trips, the model treats the two trips as if they were two different ships. Thus, you must make sure that the arrival time for the additional trip(s) is/are realistic. PORTSIM does not test to make sure that the arrival times are "reasonable." As a result, a simulation can show the same ship docked at two berths at the same time (not recommended!).
>
> If you specify multiple trips for any ship, PORTSIM requires that you use the User Specifies Exact Arrival Times mode for setting arrival times (see Section 5.2.4.3). (This mode can also be accessed through the Modify Loaded Scenario command; see Section 5.7).
>
> If you have chosen to have a particular ship make multiple trips, the ship name will be followed by the trip number, e.g., American Spitfire-2.

6. **Exit.** When you have completed the arrival profile, go to the Ship Arrival Manipulation window and click Done.

7. **Cancel.** Ships are only added when you click the Add Selected Items To The Arrival Profile button. If you have changed your mind about:

    - A selection you have already added, you must use the Remove Ship From List option on the New Scenario window (see Section 5.2.4.2).

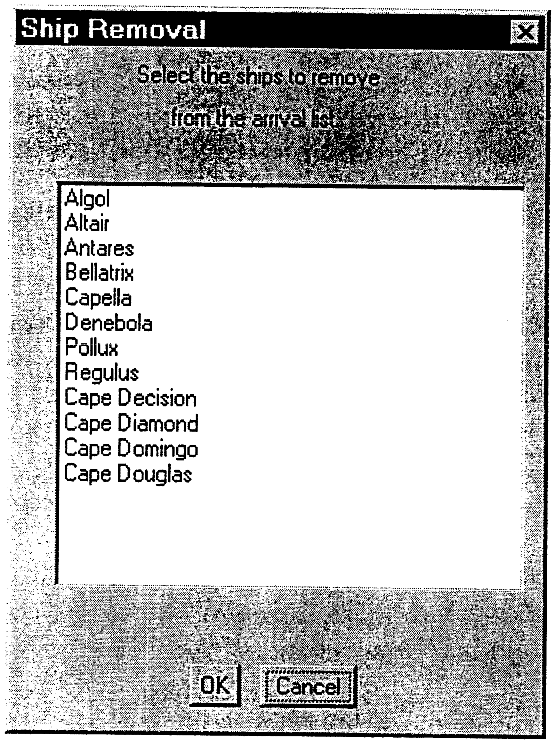
    - A selection you have highlighted but not yet added, click Done. The New Scenario window is displayed.

5.2.4.2 Delete Ship(s)

1. To remove a ship from the ship arrival profile, do the following:

   a. Click on the New Scenario window to make it the active window.

   b. On this window, click on the Remove Ship From List button. The Ship Removal window is displayed. It shows a list of all ships currently in the ship arrival profile.



Ship Removal Window

2. Do one of the following:

   - If you want to return to the scenario without deleting anything, click Cancel.

   - Otherwise, highlight the ship(s) you want to delete. (You do not need to double-click to select.) There are two ways to delete multiple ships, by using the Shift or Ctrl key (see Step 4 in Section 5.2.4.1):

3. Once you have highlighted the ship(s) to be deleted, click on OK. The New Scenario window is displayed. The deletions are reflected in the Ship Arrival List.

5.2.4.3 Specify Ship Arrival Mode

On the New Scenario window, in the area in the lower right labeled Ship Arrival Mode:, select the timing mode you want to use to determine when ships arrive at the port. Do one of the following:

- Choose User Specifies Arrival Rate. (This is the default selection). You must specify the arrival interval by using the Modify Arrival Mode Time Parameters / Ships command on the Parameters menu (see Section 6.6.3). This option can be used in either stochastic or deterministic mode (see Appendix A).

  OR

- Choose User Specifies Exact Arrival Time (deterministic mode only). You must specify exact arrival times by using the Modify Ship Parameters command on the Parameters menu (see Section 6 and Appendix A).

  Note that the ship timing mode is specified separately from — and can be different than — the force arrival timing mode.

5.2.4.4 Specify Berth Assignment Mode

Use the options under the heading Ship/Berth Assignment Mode to specify how ships are matched to available berths. Choose one of the following modes:

- User Assignment —In this mode, you select allowed berths for each ship. If all berths of the allowed type(s) are occupied, the ship waits for the first vacancy.
  - Click on the User Assignment radio button.
  - At some point before running a simulation with the new scenario, use the Parameters / Modify Ship Parameters (Section 6.6.3) command to specify, for each ship, what berth(s) the ship is allowed to dock at.
- Model Assignment — This is the default mode. In this mode, PORTSIM uses a matching algorithm (see Section 3.6.4) to assign ships to available berths. You do not have to do anything else.

> **Caution:** If you select the User Assignment mode, you *must* specify the berth assignment parameter for each ship manually.

5.2.5 New Scenario — Save

Once you have specified the name and classification level, the port, the force (with transport and timing modes), the ship arrival profile, and the ship arrival timing mode, you can save the scenario by clicking OK. One of the following responses happens.

- If you have not specified a required item, an error message is displayed. On the error message, click OK to return to the New Scenario window to specify the missing information. Depending on the nature of the missing data, you may see a second error message. Click on OK again to return to the New Scenario window.

- If all required information has been provided, a message is displayed that says Loading Scenario. Please wait. When the data have loaded, the Simulate window is displayed.

5.2.6 New Scenario — Customize

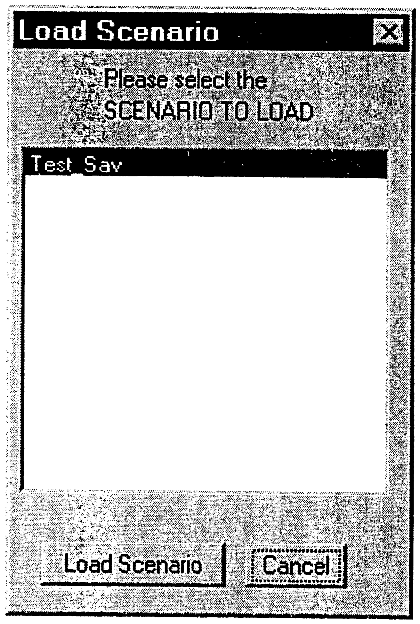
Once you have specified the baseline data for the scenario by means of these steps, you can use the commands on the Parameters menu to customize the simulation parameters for the port, ships, processes, and arrival patterns. See Section 6 for details.

5.3 Scenario / Open Existing Scenario

Warning! If you load a different scenario or exit PORTSIM without first saving the current scenario or running a simulation, *any changes to scenario data will be lost.* To save changes permanently, you ***must*** either run a simulation or use the Save Scenario or Save Scenario As... command. (see Section 5.4 or 5.5, respectively).

Before you can run a simulation based on an existing scenario or modify the parameters of an existing scenario, you must use the Open Existing Scenario command on the Scenario menu to load the desired existing data.

1. **Choose a scenario.** From the Scenario menu on the Simulate window, select Open Existing Scenario. The Load Scenario window is displayed.



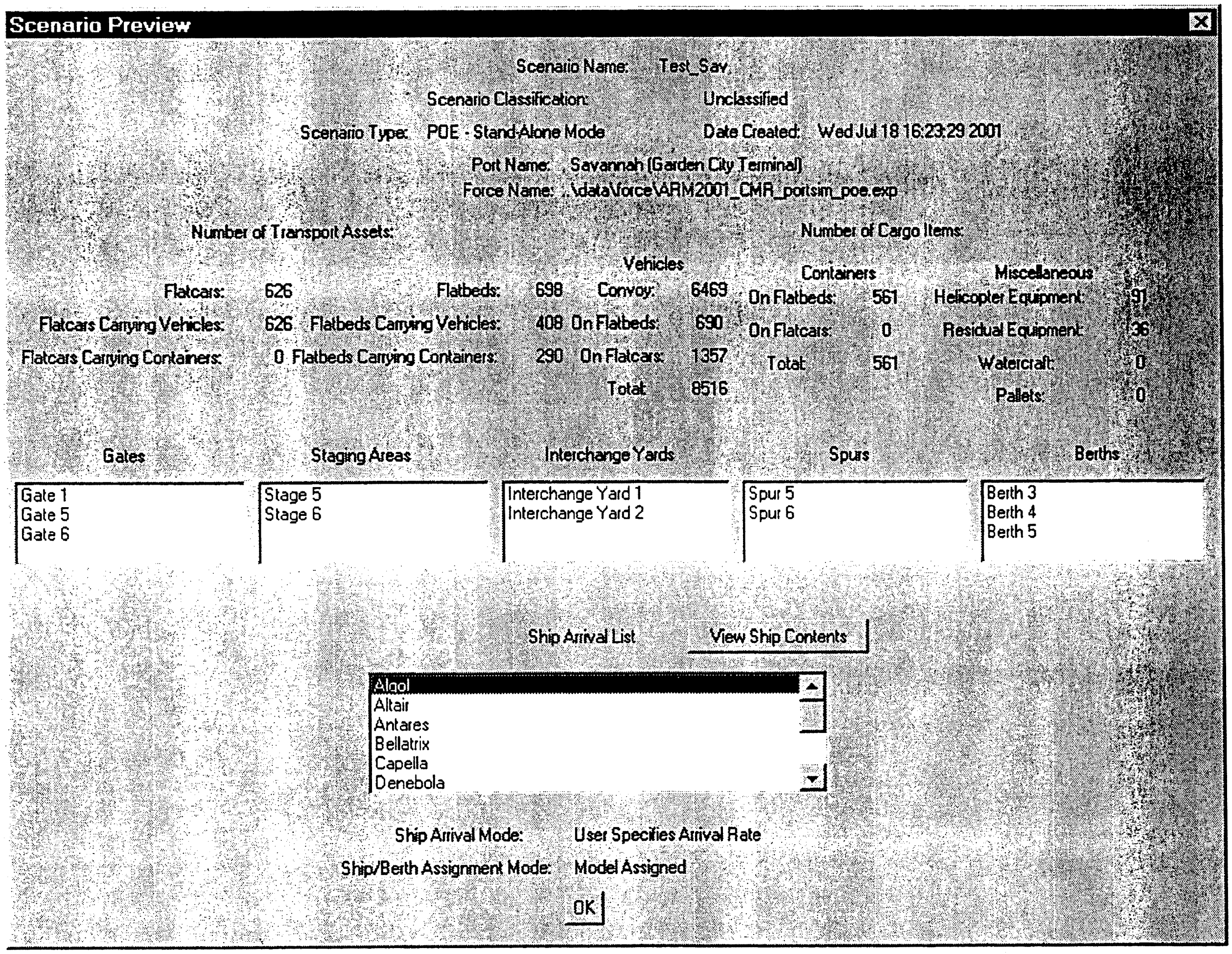
Load Scenario Window

Do one of the following:

- If you do not want to open a scenario, click Cancel.
- Otherwise, highlight the name of the scenario you want to use. (You do not need to double-click to select.) If necessary, scroll through the list of scenarios to locate the one you want.

2. **Load the scenario data.** Click on the Load Scenario button. A message is displayed that says Loading Scenario. Please wait. Depending on the size of the scenario and the speed of your computer, there may be a slight delay.

   Next, the Scenario Preview window is displayed. The exact information displayed will differ from what is shown here, depending on the characteristics of the scenario you selected.



Scenario Preview Window

The Scenario Preview window summarizes the following scenario data.

Scenario identification (at the top)

- Scenario Name:
- Scenario Classification:
- Scenario Type: (always POE Stand-Alone Mode)
- Date Created:
- Port Name:
- Force Name: (directory and filename of the file from which the force data are taken)

Transportation assets (left side) and cargo items (right side) associated with the selected force

- Number of Transport Assets: (numbers of flatcars and flatbeds and type of cargo [vehicles or containers])
- Number of Cargo Items:
  - Vehicles (by mode of transport and total)
  - Containers (by mode of transport and total)
  - Miscellaneous (helicopters, residual equipment, watercraft, and pallets)

Port infrastructure resources that have been made available to the embarkation operation

- Gates
- Staging Areas
- Interchange Yards
- Spurs
- Berths

Ship arrival information

- Ship Arrival List
- View Ship Contents (button)
- Ship Arrival Mode:
- Ship/Berth Assignment Mode:

> **Note:** The Scenario Preview window is also displayed by other commands, and the View Ship Contents button is intended for use during or after a simulation run. Thus, the View Ship Contents button may be grayed out and inactive, depending on how you have been using PORTSIM during the current session.

3. **Verify scenario data.** Check that the port infrastructure resources (gates, staging areas, etc.) are appropriate for the transportation assets and cargo specified. For example, if any cargo will arrive by highway, at least one gate must be available. Similarly, the specified staging should be appropriate to accommodate the arriving equipment (e.g., wheeled or tracked). There may also be other consistency issues of this type.

   After examining the data do one of the following:

   - If the data are correct, go to Step 4.

   - If changes are needed, go to Section 5.7 and use the Modify Loaded Scenario command on the Scenario menu to make the changes.

4. **Exit.** To return to the Simulate window, click OK. A map of the port used in your scenario is displayed in the Simulate window.

   If you wish, you can resize the Simulate window to display more of the map at once. Depending on the port, you may need to scroll horizontally or vertically to see parts of the map.

5.4 Scenario / Save Scenario

The Save Scenario command allows you to save all scenario data.

1. From the Scenario menu, select the Save Scenario command. A notice saying Scenario Saved Successfully is displayed.

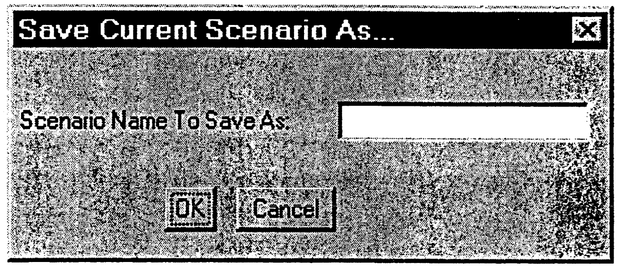
2. To continue using PORTSIM, click OK on the notice window.

This command saves all changes made to the baseline data and parameters of the current scenario. It overwrites the previous scenario data file with a new file having the same name but containing all the new data.

5.5 Scenario / Save Scenario As...

If you plan to make or have already made substantial changes to a scenario, you may want to use this command to save the changes in a new version of the scenario.

1. From the Scenario menu, select the Save Scenario As... command. The Save Current Scenario As... window is displayed



Save Current Scenario As...

2. Do one of the following:

   - If you do not want to save the scenario under a different name, click Cancel. The Simulate window is displayed.

   - Otherwise, in the Scenario Name To Save As: box, enter a new descriptive name for the scenario. This text is used as the filename, so it must follow the rules for filenames in Windows NT 4.0 and Windows 2000. That is, you can use spaces, but avoid special characters. The scenario name appears on reports and graphs.

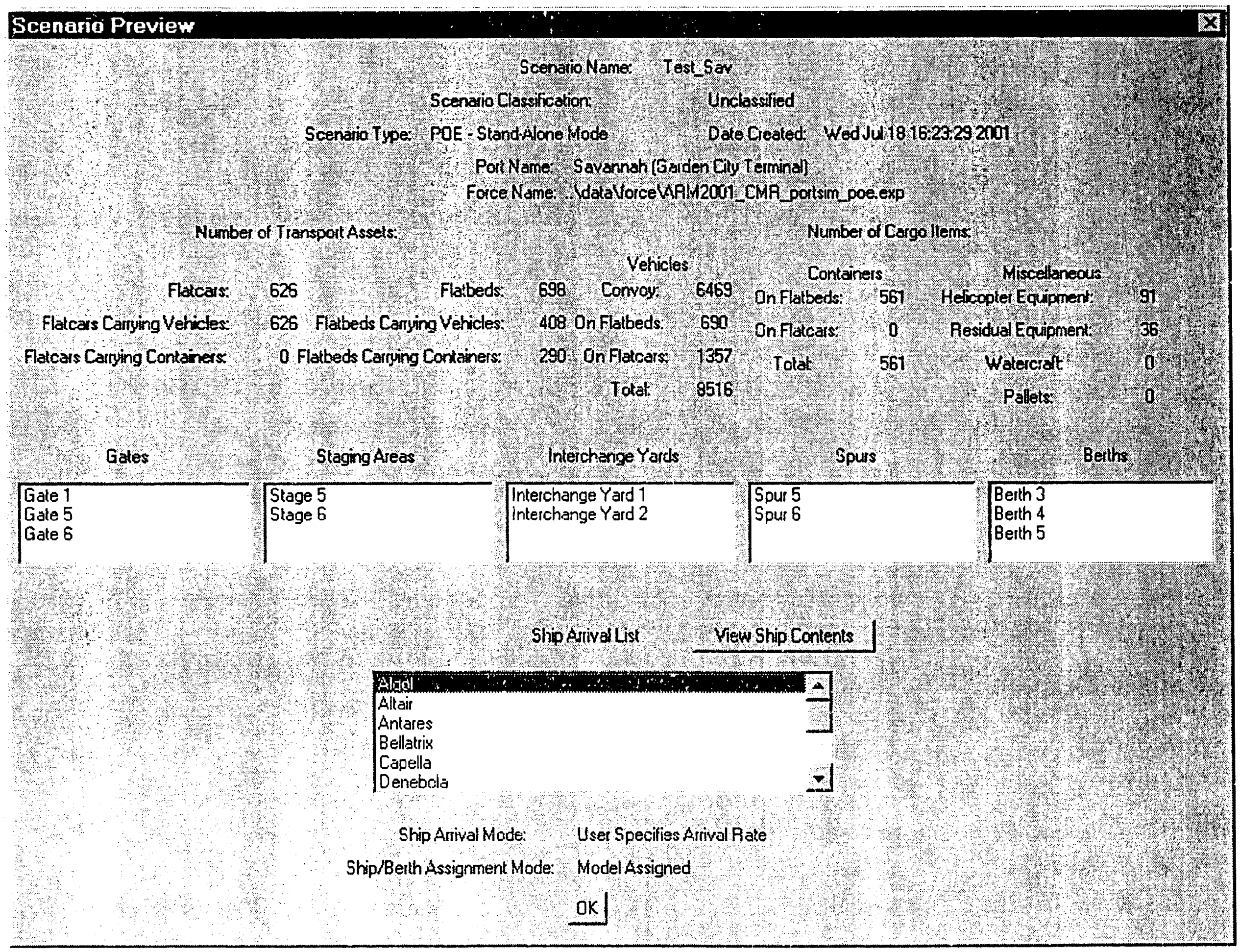
3. To save the scenario under the new name, click OK. A notice saying Scenario Saved Successfully is displayed.

4. To continue using PORTSIM, click OK on the notice window. The new version of the scenario is now included in the list of scenarios when you use the Scenario / Open Existing Scenario command (Section 5.3).

5.6 Scenario / Preview Loaded Scenario

Use the Preview Loaded Scenario command to view the data for the scenario currently loaded (i.e., open) in PORTSIM. (To switch to a different scenario, you can use the New Scenario, Open Existing Scenario, or Modify Loaded Scenario commands on the Scenario menu; see Sections 5.2, 5.3, or 5.7, respectively.)

1. **Display general data.** From the Scenario menu, select the Preview Loaded Scenario command. The Scenario Preview window is displayed, showing data from the currently loaded scenario. The window you see may look slightly different from the one shown. If you have not yet loaded a scenario, an error message is displayed. For an explanation of this window, see the discussion of the Scenario / Open Existing Scenario command in Section 5.3.

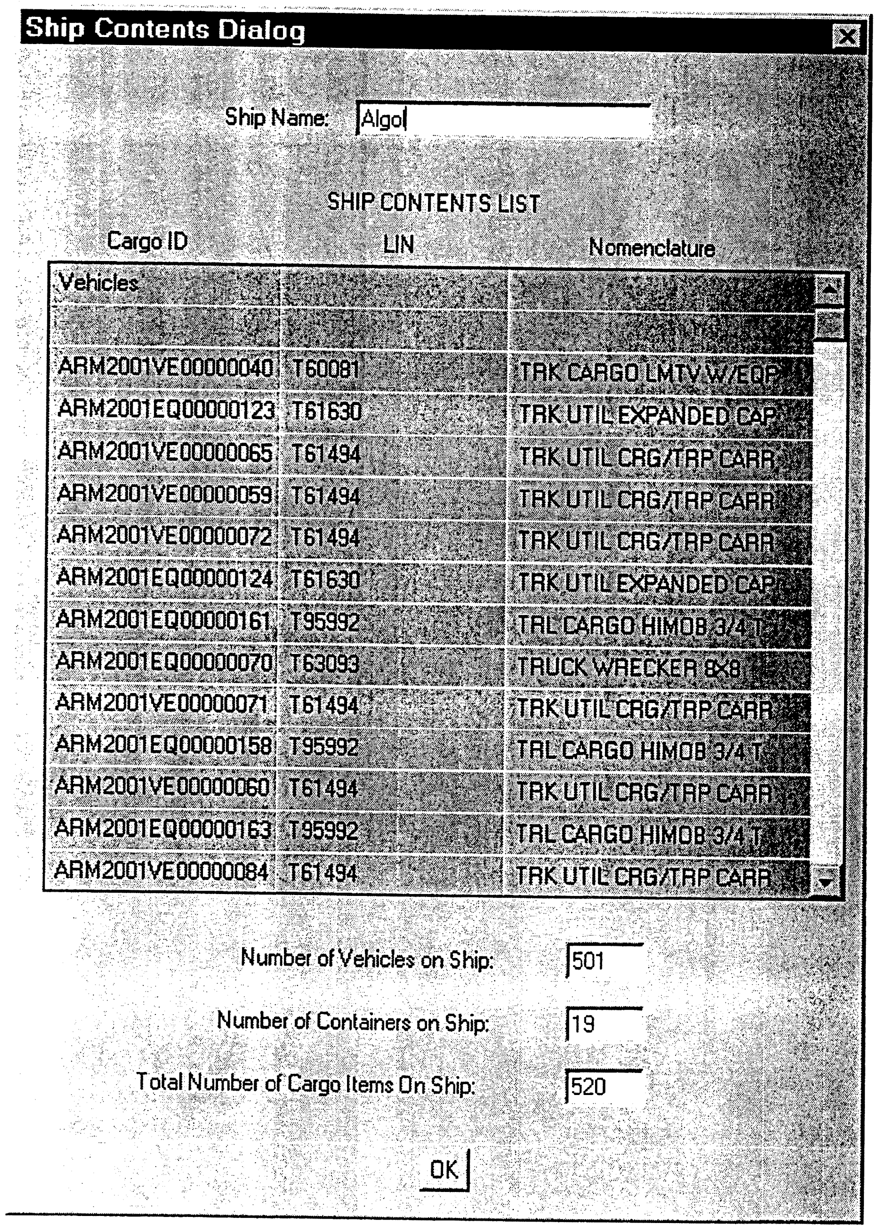


Scenario Preview Window

2. **Display ship contents.** During or after a simulation run, use the View Ship Contents button on the Scenario Preview window to display the cargo loaded on a particular ship.

   a. On the Scenario Preview window, highlight a ship in the Ship Arrival List box.

   b. Click on the View Ship Contents button. The Ship Contents Dialog window is displayed. Data in this window cannot be edited. (A similar profile can be obtained by sorting the Detailed Cargo Report by ship [see Section 8.4.2].)



Ship Contents Dialog Window

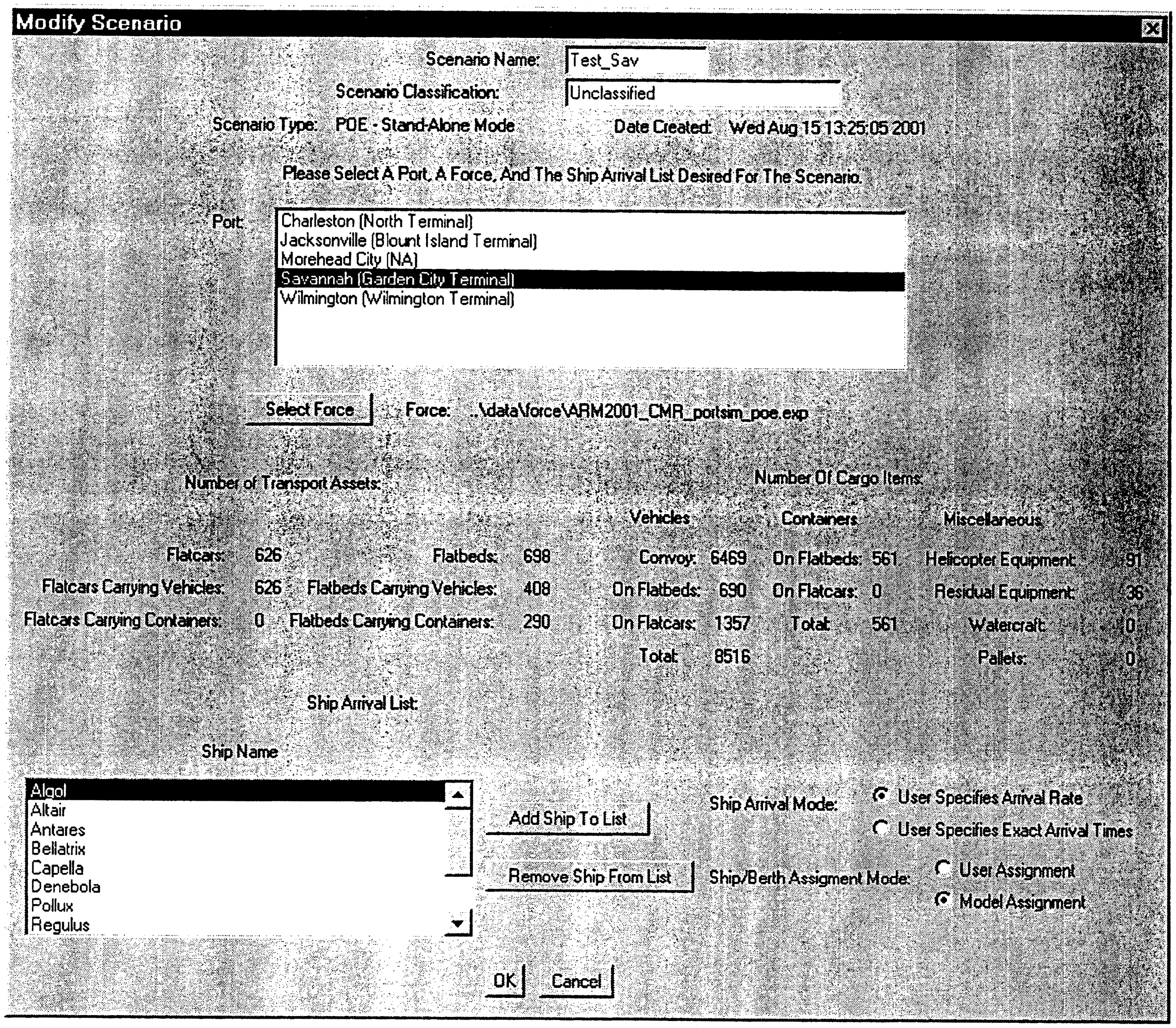
5.7 Scenario / Modify Loaded Scenario

> **Warning!** If you make changes by using this command, save those changes before you load a different scenario or exit PORTSIM (see Steps 4 and 5). Otherwise, all changes will be lost.

> **Warning!** If you want to keep the original scenario intact, save the changed scenario *under a new name **before*** you run any simulations with the new data (see Steps 4 and 5). Otherwise, if you select the Simulate command, PORTSIM will automatically save the currently loaded scenario — including the changed data — under the old filename.

1. **Load the scenario to modify.** From the Scenario menu, select Open Existing Scenario and continue as discussed in Section 5.3.

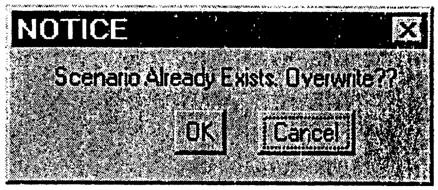
2. **Begin modifying scenario.** From the Scenario menu, select Modify Loaded Scenario. The Modify Scenario window is displayed. If no scenario is loaded when you select the Modify Loaded Scenario command, an error message is displayed.



Modify Scenario Window

3. **Make changes.** The Modify Scenario window offers the same options for specifying scenario features as the New Scenario window. To modify the selected scenario, follow the instruction for creating a scenario (Section 5.2). To cancel all changes at any point, click Cancel on the Modify Scenario window.

4. **Record changes and exit.** To record the changes made in the Modify Scenario window, click OK. If the name in the Scenario Name box is the same as the original scenario name, a notice is displayed asking you to confirm that you want to overwrite the existing data:

   Do one of the following:

   - If you **do** want to overwrite the original data (i.e., save the new changes under the old name), click OK.

   - If you **do not** want to overwrite the original data, click Cancel. The Modify Scenario window is re-displayed. In the Scenario Name box, enter a new name for the modified scenario. To save the data under the new name, click OK. The Simulate window is displayed.

5. **Permanently save changes.** To complete the process of saving the changes, do one of the following:

   - To save changes under the old name, from the Scenario menu, select Save Scenario (Section 5.4).

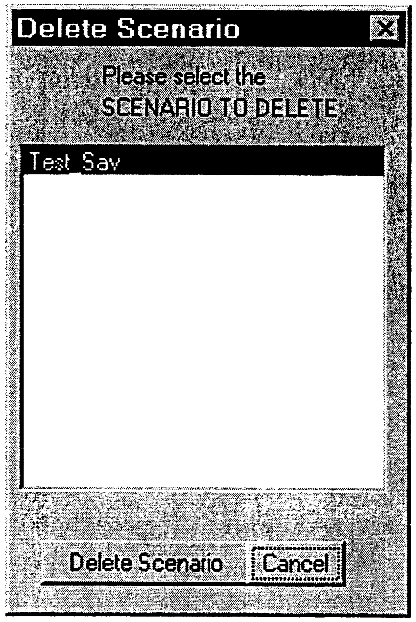
     OR

   - To save the modified scenario under a new name, from the Scenario menu, select Save Scenario As...(Section 5.5).

5.8 Scenario / Delete Scenario

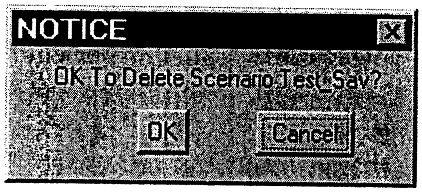
1. **Display list of scenarios.** From the Scenario menu, select Delete Scenario. The Delete Scenario window is displayed.

2. **Choose scenario to delete.** On the list of scenarios, highlight the one you want to remove. Only one scenario can be deleted at a time.



Delete Scenario Window

3. **Delete.** Verify that the correct scenario is highlighted. Click the Delete Scenario button. A confirmation notice is displayed that shows the name of the selected scenario.



Next, do one of the following:

- To proceed with deleting the scenario, click OK. The Simulate window is displayed.

  OR

- If you do not want to delete the specified scenario, click Cancel. The Delete Scenario window is displayed. Do one of the following:

  - Highlight a different scenario to delete (go to Step 2).

    OR

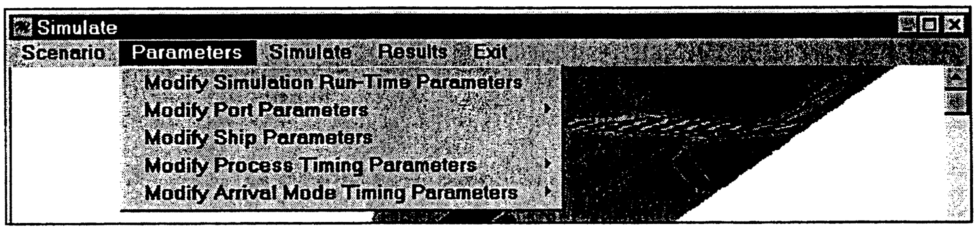
  - Click Cancel to return to the Simulate window without deleting a scenario.

6 Parameters Menu

6.1 Parameters Menu — Overview

The Parameters menu allows you to refine the specifications of a scenario that you created or opened by using the Scenario menu.

Before you can use the Parameters menu, you must first load a scenario into PORTSIM, either by creating a new scenario (see Section 5.2) or opening an existing one (see Section 5.3).



Parameters Commands

6.1.1 What Are the Parameters Commands?

The following list gives you an overview of the commands on the Parameters menu and the kinds of properties you can modify. Depending on what you have done in the current session, some commands may be grayed out and unavailable. For legibilty, screens are shown with all commands visible.

- Modify Simulation Run-Time Parameters — Specify how much time will elapse within the simulation.
- Modify Port Parameters — Specify characteristics for assets such as gates, open staging areas, berths, container handling equipment, interchange yards, and rail spurs.
- Modify Ship Parameters — Specify characteristics such as cargo capacities, types of cargo items accepted, cargo loading times, arrival times (for exact arrival time mode), and berth assignment.
- Modify Process Timing Parameters — Specify process times for vehicles, containers, railcars, ships, and flatbeds; cargo loading times for ships; and dwell times for cargo in open staging.
- Modify Arrival Mode Timing Parameters — Specify arrival times (for rate-based arrival) for convoy vehicles, flatbeds, ships, trains, helicopters, residual equipment, and watercraft.

6.1.2 How Do I Work with Parameters?

The following is the basic sequence for evaluating the effects of different parameters:

1. Select a scenario and make any desired changes to the baseline data (Section 5).

2. Modify the parameters as outlined here in Sections 6.

3. Save the data or run the simulation (Section 5 or 7, respectively).

4. Review the results (Section 8).

After you examine the results, you can return repeatedly to the Parameters menu to do sensitivity analyses on one or more parameters of interest.

> **Warning!** *Clicking the Save Data or OK button on a parameter window only saves the data in memory, not in the scenario file on disk.* To save parameter changes permanently without running a scenario, you **must** select the Save Scenario (Section 5.4) or Save Scenario As... (Section 5.5) command from the Scenario menu on the Simulate window. If you run the scenario immediately (Section 7), all changes are saved automatically.

> **Warning!** PORTSIM does not provide an "undo" capability for parameter editing. Thus, before making major changes, you may want to save a backup copy of the original scenario.

While using the Parameters command, you have three options for reverting to original data, depending on what you have already done.

(1) If you have not yet saved data for a particular parameter to memory via the Save Data or OK button, you can use the Cancel or Done button and then choose that parameter again.

(2) However, if you have already used the Save Data or OK button, the only way to undo your changes is to reload the scenario.

(3) If you have saved the scenario to disk by the Save or Save As... command, you will have to re-enter data manually or use a backup version of the scenario file.

The following are some additional tips regarding the parameters windows:

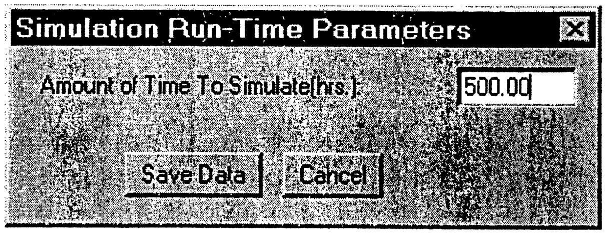
- Parameters that do not apply to a selected instance of a resource or that are not currently used in PORTSIM are grayed out.
- Where there is more than one instance of resource (e.g., gates), the window will have a "previous" and "next" button (e.g., Previous Gate and Next Gate). Use these buttons to cycle through the available items of that type. When you reach the last item, using the "next" button will redisplay the first item in the list. Likewise, when you are at the first item, using the "previous" button will display the last item in the list. Also, see the note below.
- For recommendations on specifying consistent and reasonable parameters, see Section 3.12, Tips for Using PORTSIM Effectively.

Note: When there is more than one instance of a resource, an individual resource item is identified in two ways in the associated parameter window. A *sequence number* is displayed in the upper right corner: e.g., Gate: 1 Of 7. This sequence number is assigned automatically by PORTSIM and corresponds to the alphabetical listing of the resource items. The *name* of the item (the name by which the resource is known at the port) is given on the next line: e.g., West Gate 3. For ports where gates, berths, etc., are numbered, use care when selecting the gate. For example, a Parameters window might show both Gate: 2 of 12 (PORTSIM numerical identifier) and Gate Name: Gate 11 (the name used at the port). However, in all reports, graphs, and summary screens, the name is used.

6.2 Modify Simulation Run-Time Parameters

Use the Modify Simulation Run-Time Parameters command to specify the amount of time to simulate.

1. **Select command.** From the Parameters menu on the Simulate window, select Modify Simulation Run-Time Parameters. The Simulation Run-Time Parameters window is displayed. To return to the Simulate window without specifying a time, click Cancel.



Simulation Run-Time Parameters Window

2. **Enter time.** Enter the length of time, in hours, that you want to simulate the selected scenario. (Note that this is elapsed time in the simulated situation, not the computational processing time.)

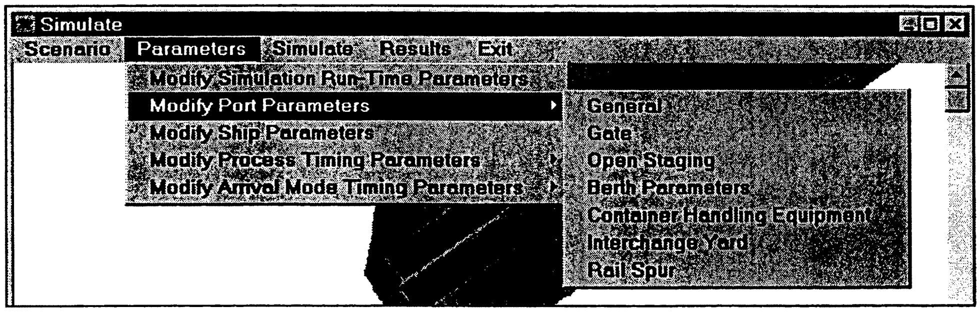
3. **Record data.** To record the run-time and go on to specify other parameters, click Save Data. The Simulate window is displayed.

4. **Save changes.** If you run the scenario immediately (Section 7), all changes are saved automatically. To save parameter changes permanently without running the scenario, you **must** select the Save Scenario (Section 5.4) or Save Scenario As… (Section 5.5) command from the Scenario menu on the Simulate window.

Note: A point to bear in mind when choosing a simulation run-time is that *you can pause a simulation to check its progress, but you cannot suspend it.* That is, you cannot exit PORTSIM and resume the simulation later. **Recommendation:** The first time you use a new or significantly changed scenario, select a short run-time. If any parameters have been specified incorrectly, this short initial run will reveal the problems quickly.

6.3 Parameters / Modify Port Parameters

The port parameters that can be modified are organized into the following categories, available through the Modify Port Parameters option on the Parameters menu: General, Gate, Open Staging, Berth Parameters, Container Handling Equipment, Interchange Yard, and Rail Spur.



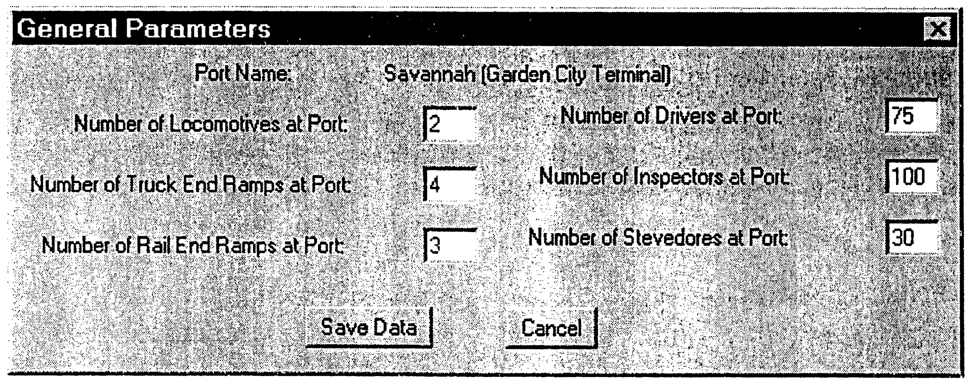
Modify Port Parameters Commands

6.3.1 Parameters / Modify Port Parameters / General

> **Note:** Verify that the resources are consistent with the needs of the embarking force. For example, if vehicles will be arriving on flatbeds, the port must have at least one end ramp.

1. **Select command.** To modify the specifications for the general infrastructure and resources at the port, select the Parameters menu on the Simulate window, then select Modify Port Parameters, and then select General. The Port Parameters window is displayed.

   Is it assumed that all of the resources shown in the Port Parameters window are available for military use. If you are working with a new scenario, this window shows generic default data that you should examine carefully and adjust appropriately. To return to the Simulate window without taking any other action, click Cancel.



Port Parameters [General] Window

2. **Modify numerical parameters.** Place the cursor in the white box beside the parameter you want to change. Delete the old number and enter the new number. Repeat for each parameter you want to change.

3. **Record data and continue.** To record the general port data and go on to specify other parameters, click Save Data. The Simulate window is displayed.

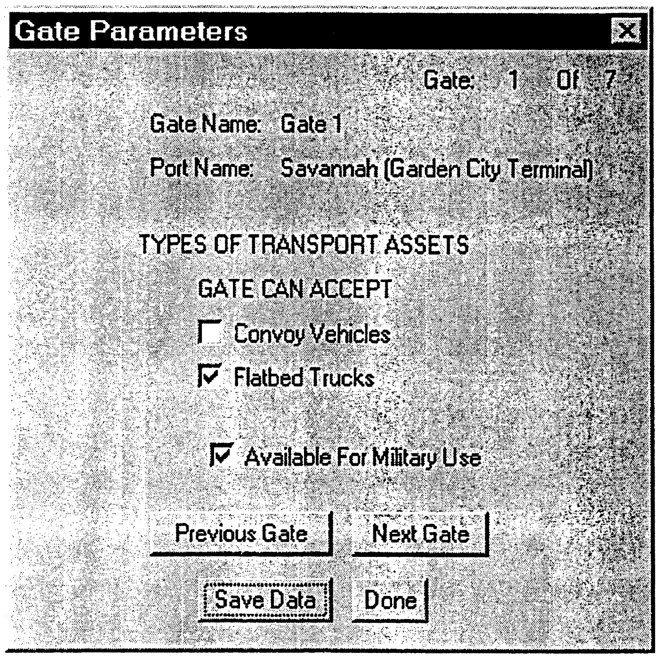
4. **Save changes.** If you run the scenario immediately (Section 7), all changes are saved automatically. To save parameter changes permanently without running the scenario, you must select the Save Scenario (Section 5.4) or Save Scenario As… (Section 5.5) command from the Scenario menu on the Simulate window.

6.3.2 Parameters / Modify Port Parameters / Gate

> **Note:** Verify that the gate resources are consistent with the needs of the embarking force. For example, if the scenario involves convoys, at least one gate must be set to handle convoys.

1. **Select command.** To modify the specifications for the gates at the port, select the Parameters menu on the Simulate window, then select Modify Port Parameters, and then select Gate. The Gate Parameters window is displayed.

   If you are working with a new scenario, this window shows generic default data that you should examine carefully and adjust appropriately. To return to the Simulate window without taking any other action, click Done.



Gate Parameters Window

2. **Identify the gate displayed.** Check which gate is currently displayed: the Gate Name is shown near the top of the Gate Parameters window. The sequential gate number assigned by PORTSIM is displayed at the top of the window, along with the total number of gates. Do one of the following:

   - If you want to modify a different gate, go to Step 3.

     OR

   - If the correct gate is shown, go to Step 4.

> **Note:** The gate number is simply a sequential number assigned by PORTSIM. It should not be confused with the gate name as contained in the baseline port data (Section 5) and displayed in the field labeled Gate Name.

3. **Change gate.** To select a gate, click on the Previous Gate button or Next Gate button until the desired gate is displayed, then go to Step 4.

4. **Specify asset types the gate can accommodate.** To select or de-select a type of asset, click on the box next to the asset name (Convoy Vehicles or Flatbed Trucks) to display or remove a checkmark. A checkmark means that the asset type can be accepted at this gate.

5. **Specify military use.** Make sure the Available For Military Use box (near the bottom of the window) is correctly specified. A checkmark means the resource is available for military use. Click on the box to display or remove a checkmark.

> **Note:** If the embarking force includes highway vehicles, at least one gate at the port must be identified as available for military use. Otherwise, this portion of the simulation will not progress after the vehicles reach the gates.

6. **Record entries.** To save your specifications for the *current* gate, click on Save Data.

> **Warning!** Before you move on to another gate, you **must** click on Save Data first. Otherwise, your entries for the current gate will be lost.

7. **Continue.** To continue, do one of the following.

   - If you want to modify another gate, repeat Steps 2 through 7 for each gate you want to modify.

     OR

   - If you are finished modifying gates, click Done. The Simulate window is displayed.

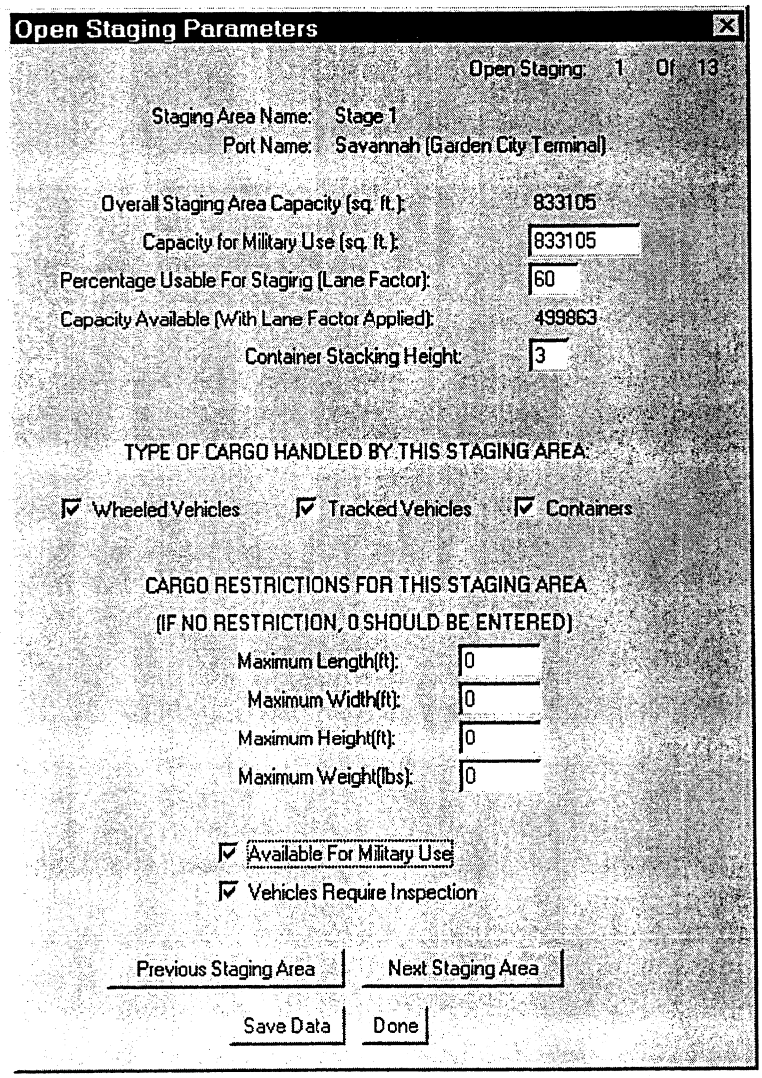
8. **Save changes.** If you run the scenario immediately (Section 7), all changes are saved automatically. To save parameter changes permanently without running the scenario, you must select the Save Scenario (Section 5.4) or Save Scenario As… (Section 5.5) command from the Scenario menu on the Simulate window.

6.3.3 Parameters / Modify Port Parameters / Open Staging

> **Note:** Verify that the characteristics of the open staging areas are consistent with the needs of the embarking force. For example, if the force includes convoyed vehicles, verify that at least one staging area can accept wheeled vehicles.

1. **Select command.** To modify the specifications for the open staging areas at the port, select the Parameters menu on the Simulate window, then select Modify Port Parameters, and then select Open Staging. The Open Staging Parameters window is displayed.

   If you are working with a new scenario, this window shows generic default data that you should examine carefully and adjust appropriately. To return to the Simulate window without taking any other action, click Done.



Open Staging Parameters Window

2. **Identify area displayed.** Check which open staging area is currently displayed: the staging area name is shown near the top of the Open Staging Parameters window. The sequential open staging area number assigned by PORTSIM is displayed at the top of the window, along with the total number of areas. Do one of the following:

   - If you want to modify a different area, go to Step 3.

     OR

   - If the correct area is shown, go to Step 4.

> **Note:** The open staging number is simply a sequential number assigned by PORTSIM. It should not be confused with the staging area name as contained in the baseline port data (Section 5) and displayed in the field labeled Staging Area Name.

3. **Change area.** To select an area, click on the Previous Staging Area button or Next Staging Area button until the desired area is displayed, then go to Step 4.

> **Note:** At least one open staging area at the port must be identified as available for military use.

4. **Specify available area.** The total square footage of the staging area is displayed on the line labeled Overall Staging Area Capacity (sq.ft).

   a. In the Capacity for Military Use (sq. ft.) box, enter the square footage of this staging area that is available to the embarkation operation. By default, all available staging area is allocated to military use.

   b. In the Percentage Usable For Staging (Lane Factor) box, enter the percentage of the military capacity (which you entered in Step 4.a) that will remain *after* traffic lanes are allotted. For example, if 60% of the capacity will be available, enter 60. When you save the data on this window (Step 10), the line Capacity Available (With Lane Factor Applied) will be updated to reflect the total square footage actually available for storage.

5. **Specify container stacking.** In the Container Stacking Height box, enter how many containers can be stacked, e.g., 2.

6. **Specify cargo types the area can accommodate.** To select or de-select a type of cargo, click on the box next to the cargo name (Wheeled Vehicles, Tracked Vehicles, or Containers) to display or

remove a checkmark. A checkmark means that the cargo type can be accepted at this gate.

7. **Specify restrictions on cargo item dimensions.** Do one of the following:

   - If there are no restrictions, enter *zero* in the boxes for Maximum Length(ft), Maximum Width(ft), Maximum Height(ft), and Maximum Weight(lbs).

   OR

   - If there are restrictions, enter the values for Maximum Length(ft), Maximum Width(ft), Maximum Height(ft), and Maximum Weight(lbs).

8. **Specify military use.** Make sure the Available For Military Use box (near the bottom of the window) is correctly specified. A checkmark means the resource is available for military use. Click on the box to display or remove a checkmark.

9. **Specify inspections.** Make sure the Vehicles Require Inspection box is correctly specified. A checkmark means inspections are required. Click on the box to display or remove a checkmark.

10. **Record entries.** To save your specifications for the *current* area, click on Save Data.

> **Warning!** Before you move on to another staging area, you must click on Save Data first. Otherwise, your entries for the current staging area will be lost.

11. **Continue.** To continue, do one of the following.

    - If you want to modify another open staging area, repeat Steps 2 through 11 for each area you want to modify.

    OR

    - If you are finished modifying open staging areas, click Done. The Simulate window is displayed.

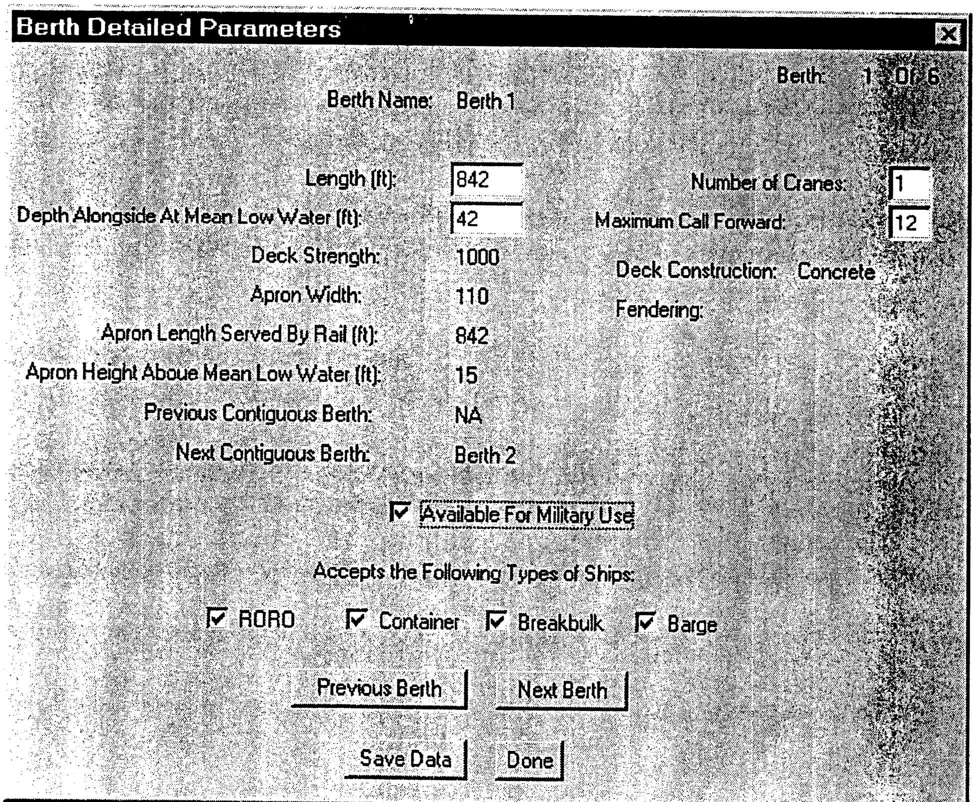
12. **Save changes.** If you run the scenario immediately (Section 7), all changes are saved automatically. To save parameter changes permanently without running the scenario, you must select the Save Scenario (Section 5.4) or Save Scenario As… (Section 5.5) command from the Scenario menu on the Simulate window.

6.3.4 Parameters / Modify Port Parameters / Berth Parameters

> **Note:** Verify that the berth characteristics are consistent with the needs of the arriving ships. For example, verify that there is at least one berth that can accommodate the longest ship.

1. **Select Command.** To modify the specifications for the berths at the port, select the Parameters menu on the Simulate window, then select Modify Port Parameters, and then select Berth Parameters. The Berth Detailed Parameters window is displayed.

   If you are working with a new scenario, this window shows the default data for the selected port. To return to the Simulate window without taking any other action, click Done.



Berth Detailed Parameters Window

2. **Identify berth displayed.** Check which berth is currently displayed: the berth name is shown near the top of the Berth Detailed Parameters window. The sequential berth number assigned by PORTSIM is displayed at the top of the window, along with the total number of berths. Do one of the following:

    - If you want to modify a different berth, go to Step 3.

      OR

    - If the correct berth is shown, go to Step 4.

> **Note:** The berth number is simply a sequential number assigned by PORTSIM. It should not be confused with the berth name as contained in the baseline port data (Section 5) and displayed in the field labeled Berth Name.

3. **Change berth.** To select a berth, click on the Previous Berth button or Next Berth button until the desired berth is displayed, then go to Step 4.

4. **Modify parameters.** The current values for the berth parameters are displayed in white boxes. Enter different parameter values as necessary.

5. **Specify military use.** Make sure the Available For Military Use box (near the bottom of the window) is correctly specified. A checkmark means the resource is available for military use. Click on the box to display or remove a checkmark.

6. **Specify ship types accepted.** Under the heading Accepts the Following Types of Ships, make sure the correct types are checked. To select or deselect a type, click on the box beside the type name (RORO, Container, Breakbulk, or Barge) to display or remove a checkmark.

7. **Record entries.** To save your specifications for the *current* berth, click on Save Data.

> **Warning!** Before you move on to another berth, you must click on Save Data first. Otherwise, your entries for the current berth will be lost.

8. **Continue.** To continue, do one of the following.

   - If you want to modify another berth, repeat Steps 2 through 8 for each berth you want to modify.

     OR

   - If you are finished modifying berths, click Done. The Simulate window is displayed.

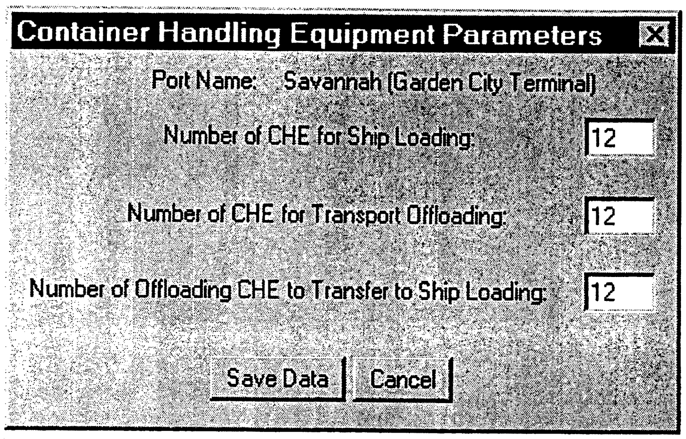
9. **Save changes.** If you run the scenario immediately (Section 7), all changes are saved automatically. To save parameter changes permanently without running the scenario, you must select the Save Scenario (Section 5.4) or Save Scenario As... (Section 5.5) command from the Scenario menu on the Simulate window.

6.3.5 Parameters / Modify Port Parameters / Container Handling Equipment

> **Note:** Verify that the container handling resources are consistent with the needs of the embarking force. For example, if the cargo includes containers, verify that the port has at least one container handler.

1. **Select command.** To modify the specifications for the container handling equipment at the port, select the Parameters menu on the Simulate window, then select Modify Port Parameters, and then select Container Handling Equipment. The Container Handling Equipment Parameters window is displayed.

   If you are working with a new scenario, this window shows the default data for the selected port. To return to the Simulate window without taking any other action, click Cancel.



Container Handling Equipment Parameters Window

2. **Modify parameters.**

   a. In the Number of CHE for Ship Loading: box, enter the number of container handling equipment available for ship loading, if different from the default.

   b. In the Number of CHE for Transport Offloading: box, enter the desired number, if different from the default.

   c. In the Number of Offloading CHE to Transfer to Ship Loading: box, enter the number of CHE that will be released to assist in ship loading after all containers have been offloaded from their transports.

3. **Record entries.** To save your specifications for container handling equipment, click on Save Data.

4. **Continue.** To continue (after you have recorded your entry), click Cancel. The Simulate window is displayed.

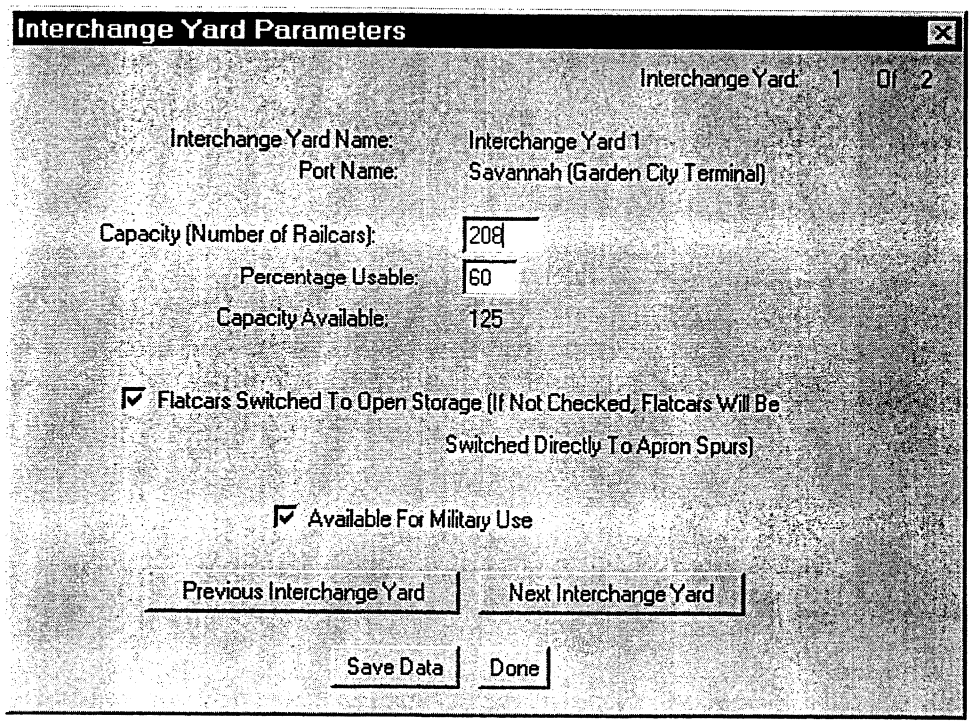
5. **Save changes.** If you run the scenario immediately (Section 7), all changes are saved automatically. To save parameter changes permanently without running the scenario, you must select the Save Scenario (Section 5.4) or Save Scenario As… (Section 5.5) command from the Scenario menu on the Simulate window.

6.3.6 Parameters / Modify Port Parameters / Interchange Yard

> **Note:** Verify that the characteristics of the interchange yards are consistent with the needs of the embarking force. For example, verify that there is a yard that can accommodate the longest train specified in the train arrival profile.

1. **Select command.** To modify the specifications for the interchange yards at the port, select the Parameters menu on the Simulate window, then select Modify Port Parameters, and then select Interchange Yard. The Interchange Yard Parameters window is displayed.

   If you are working with a new scenario, this window shows generic default data that you should examine carefully and adjust appropriately. To return to the Simulate window without taking any other action, click Done.



Interchange Yard Parameters Window

2. **Identify yard displayed.** Check which interchange yard is currently displayed: the interchange yard name is shown near the top of the Interchange Yard Parameters window. The sequential interchange yard number assigned by PORTSIM is displayed at the top of the window, along with the total number of yards. Do one of the following:

- If you want to modify a different yard, go to Step 3.

  OR

- If the correct yard is shown, go to Step 4.

> **Note:** The interchange yard number is simply a sequential number assigned by PORTSIM. It should not be confused with the interchange yard name as contained in the baseline port data (Section 5) and displayed in the field labeled Interchange Yard Name.

3. **Change yard.** To select an interchange yard, click on the Previous Interchange Yard button or Next Interchange Yard button until the desired yard is displayed, then go to Step 4.

4. **Modify parameters.** The current values for the interchange yard parameters are displayed in white boxes. Enter different parameter values as necessary.

5. **Specify military use.** Make sure the Available For Military Use box (near the bottom of the window) is correctly specified. A checkmark means the resource is available for military use. Click on the box to display or remove a checkmark.

6. **Record entries.** To save your specifications for the *current* yard, click on Save Data.

> **Warning!** Before you move on to another yard, you **must** click on Save Data first. Otherwise, your entries for the current yard will be lost.

7. **Continue.** To continue, do one of the following.

   - If you want to modify another yard, repeat Steps 2 through 7 for each yard you want to modify.

     OR

   - If you are finished modifying yards, click Done. The Simulate window is displayed.

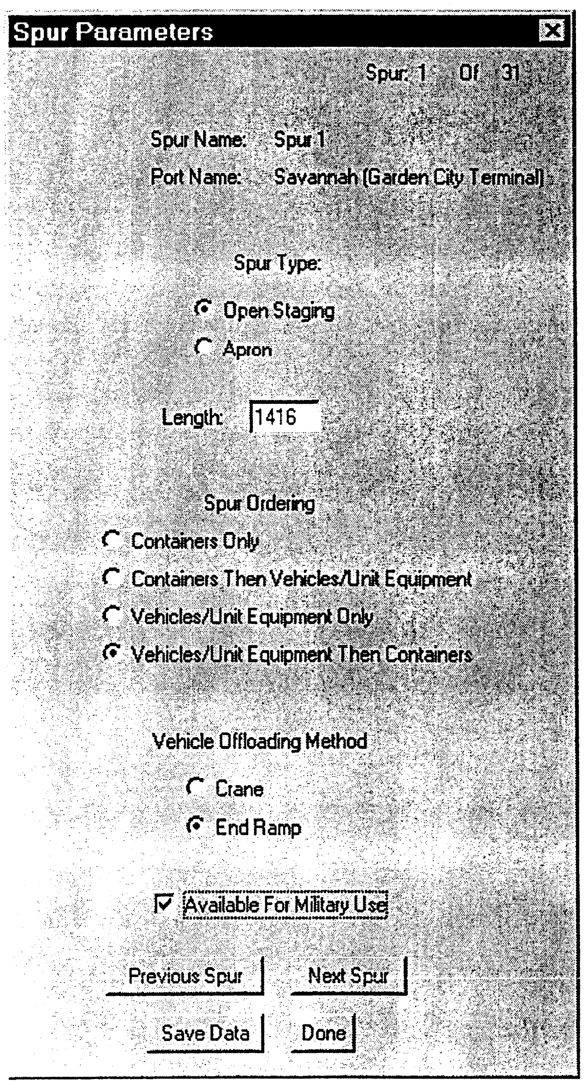
8. **Save changes.** If you run the scenario immediately (Section 7), all changes are saved automatically. To save parameter changes permanently without running the scenario, you must select the Save Scenario (Section 5.4) or Save Scenario As... (Section 5.5) command from the Scenario menu on the Simulate window.

6.3.7 Parameters / Modify Port Parameters / Rail Spur

> **Note:** Verify that the characteristics of the rail spurs are consistent with the needs of the embarking force. For example, if the force includes vehicles, verify that at least one spur can accommodate vehicles.

1. To modify the specifications for the rail spur(s) at the port, select the Parameters menu on the Simulate window, then select Modify Port Parameters, and then select Rail Spur. The Spur Parameters window is displayed.

   If you are working with a new scenario, this window shows generic default data that you should examine carefully and adjust appropriately. To return to the Simulate window without taking any other action, click Done.



Spur Parameters Window

2. **Identify spur displayed.** Check which rail spur is currently displayed: the spur name is shown near the top of the Spur Parameters window. The sequential spur number assigned by PORTSIM is displayed at the top of the window, along with the total number of spurs. Do one of the following:

   - If you want to modify a different spur, go to Step 3.

     OR

   - If the correct spur is shown, go to Step 4.

> **Note:** The spur number is simply a sequential number assigned by PORTSIM. It should not be confused with the spur name as contained in the baseline port data (Section 5) and displayed in the field labeled Spur Name.

3. **Change spur.** To select a spur, click on the Previous Spur button or Next Spur button until the desired spur is displayed, then go to Step 4.

4. **Select spur type.** Under the heading Spur Type, click the radio button for the desired type.

5. **Specify length.** In the Length box, enter a new value, if necessary. Length cannot be zero.

6. **Select loading order.** Under the heading Spur Ordering, click the radio button for the desired sequence in which cargo types will be loaded.

7. **Select offloading method.** Under the heading Vehicle Offloading Method, click the radio button for the method for removing vehicles from incoming railcars.

8. **Specify military use.** Make sure the Available For Military Use box (near the bottom of the window) is correctly specified. A checkmark means the resource is available for military use. Click on the box to display or remove a checkmark.

9. **Record entries.** To save your specifications for the *current* spur, click on Save Data.

> **Warning!** Before you move on to another spur, you **must** click on Save Data first. Otherwise, your entries for the current spur will be lost.

10. **Continue.** To continue, do one of the following.

    - If you want to modify another spur, repeat Steps 2 through 10 for each spur you want to modify.

      OR

    - If you are finished modifying spurs, click Done. The Simulate window is displayed.

11. **Save changes.** If you run the scenario immediately (Section 7), all changes are saved automatically. To save parameter changes permanently without running the scenario, you must select the Save Scenario (Section 5.4) or Save Scenario As... (Section 5.5) command from the Scenario menu on the Simulate window.

6.4 Parameters / Modify Ship Parameters

> **Note:** Verify that the ships specified are consistent with the needs of the embarking force. For example, if the force includes containers, verify that at least one ship can accept containers.

1. **Select command.** To modify the specifications for the ships in the scenario, select the Parameters menu on the Simulate window, then select Modify Ship Parameters. The Ship Parameters window is displayed.

   If you are working with a new scenario, this window shows generic default data that you should examine carefully and adjust appropriately. To return to the Simulate window without taking any other action, click Done.

2. **Identify the ship displayed.** Check which ship is currently displayed. The following fields listed at the top of the Ship Parameters window identify the ship:

   - Ship: This ship's sequence number (assigned automatically by PORTSIM) and the total number of ships in this scenario.
   - Ship Name: The name by which the ship is known.
   - Generic Type: The cargo type designation.
   - Class: The identifier for the class to which the ship belongs.
   - Beam: The ship's beam dimension, in feet.
   - Trip Number: Trip to which the displayed data apply.

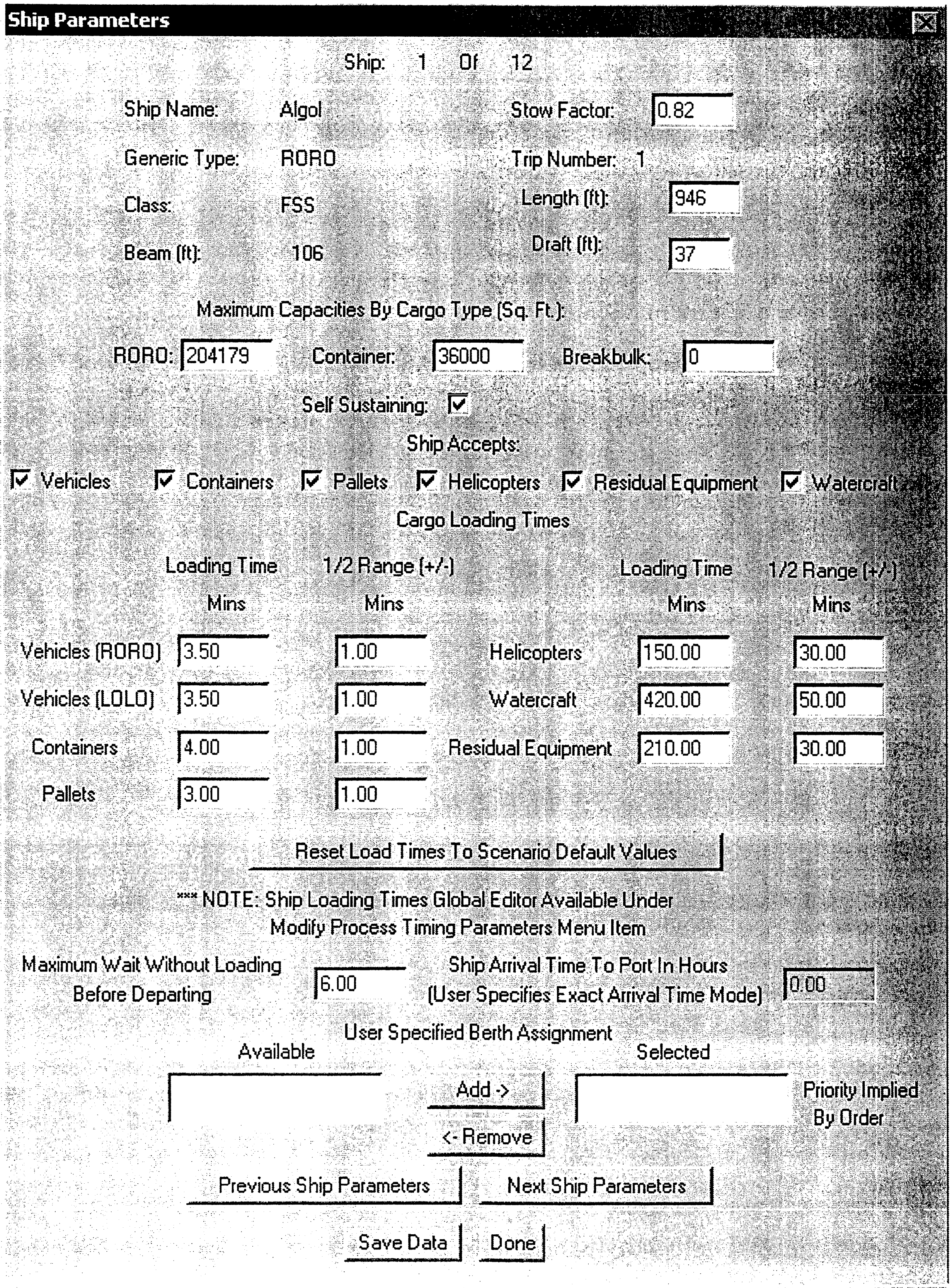
Once you have identified the ship, do one of the following:

- If you want to modify a different ship, go to Step 3.

  OR

- If the correct ship is shown, go to Step 4.

3. **Change ship.** To select another ship, click on the Previous Ship Parameters button or Next Ship Parameters button until the desired ship is displayed, then go to Step 4.



Ship Parameters Window

4. **Specify physical characteristics.** In the white boxes at the top right of the window, modify the ship characteristics as necessary:

   - Stow Factor:
   - Length: (in feet)
   - Draft: (in feet)

   Typically, these values do not need to be modified. However, if you want to use a ship that is not in the database, you can use this section to specify the "modified" ship.

5. **Specify cargo parameters.** Under the heading Maximum Capacities By Cargo Type (Sq. Ft.), in the middle of the window, enter the capacities for RORO, Container, and Breakbulk cargo in square feet.

> **Caution:** When specifying cargo parameters, *do not* use commas: e.g., use 50000, *not* 50,000. Commas are read as decimal points.

6. **Specify self-sustaining.** Make sure the Self Sustaining: box is correctly specified. A checkmark means the ship is self-sustaining (i.e., has its own crane). Click on the box to display or remove a checkmark.

7. **Specify cargo types accepted.** Under the heading Ship Accepts, make sure the correct cargo types are selected. The default is that all types are accepted (indicated by a checkmark beside the name). To select or deselect a type, click the box next to the cargo type name (Vehicles, Containers, Pallets, Helicopters, Residual Equipment, or Watercraft) to display or remove a checkmark.

8. **Specify loading times.** Use the boxes under the heading Cargo Loading Times to specify the ship's loading times for Vehicles (RORO), Vehicles (LOLO), Containers, Pallets, Helicopters, Watercraft, and Residual Equipment.

   To specify times, do the following for each cargo type:

   a. In the Loading Time box, enter a time in minutes and decimal fraction of minutes (e.g., 5.25).

> **Note:** You can make the same changes to several ships simultaneously by using the Ship Loading Times Global Editor, which is available through the Parameters / Modify Process Timing Parameters command (see Section 6.5.6). This editor also allows you to revert *either* to scenario defaults or to database defaults for one ship or several ships at once.

b. In the 1/2 Range (+/-) box, enter the maximum amount by which the loading time can vary (plus or minus) from the time specified in Step 8.a. For example, if the loading time is 3.50 minutes and you specify a range of 1.05, the actual loading time for a particular item could vary from 2.45 to 4.55 minutes. PORTSIM will generate a vehicle loading time at random within this range.

c. If you want to revert to the scenario default times, click the Reset Load Times To Default Values button. All loading times will be reset.

9. **Specify wait time.** In the Maximum Wait Without Loading Before Departing box, enter a time in hours and decimal fraction of hours, e.g., 1.20.

10. **Specify arrival time, if necessary.** What you do with the Ship Arrival Time To Port In Hours box depends on the ship arrival mode (rate-based or exact-time-based) that was initially specified in the scenario. The ship arrival modes are discussed in Section 5.2.4 under the Scenario / New Scenario command and in Appendix A. To change the ship arrival mode in an existing scenario, go to Section 5.7 for the Scenario / Modify Loaded Scenario command.

    Do one of the following.

    - If the scenario was specified with rate-based ship arrival, the box Ship Arrival Time To Port In Hours is grayed out and inactive. Go to Step 11.

    - If the scenario was specified with exact-time-based ship arrival, the box Ship Arrival Time To Port In Hours is active, and you must enter an arrival time in hours for this ship (calculated from simulation start time).

> **Note:** If this is one of multiple trips for this ship, you must allow suitable cycle time for loading and unloading and for travel to and from the destination.

11. **Specify berth options.** Do one of the following.

- If the scenario specifies the Ship/Berth Assignment Mode as Model Assigned (see Section 5.2.4), the Available list box (under the heading User Specified Berth Assignment) is blank. Go to Step 12.

- If the scenario specifies the Ship/Berth Assignment Mode as User Assigned (see Section 5.2.4), you must select the berth(s) that the ship is allowed to use.

  Under the heading User Specified Berth Assignment, the Available list box (on the left) lists all the berths that have been specified as available for military use, and the Selected list box (on the right) lists the berths currently selected as available to this ship.

  a. **Choose the berth(s) to be added or removed.** In the appropriate list box, highlight the desired berths. You can select multiple berths at once.

     - To add several consecutive berths: (1) click on the name of the first berth you want to add, (2) press and hold the Shift key, and (3) click on the last ship you want to add. All the ship names in this range will be highlighted.

     - To add several berths from different points in the sequence: (1) press and hold the Ctrl key while you (2) click on the name of each ship you want to add. All the selected berth names will be highlighted.

Note: The order of berths in the Selected list box determines priority, i.e., the ship will first attempt to dock at the first berth listed, then at the second berth, if the first is unavailable.

  b. **Record selection.** Do one of the following.

     - To add the specified berths, click the Add button. The berth names are displayed in the Selected list box.

       OR

     - To remove the specified berths, click the Remove button. The berth names are removed from in the Selected list box.

12. **Record entries.** To save your specifications for the *current* ship, click on Save Data.

> **Warning!** Before you move on to another ship, you **must** click on Save Data first. Otherwise, your entries for the current ship will be lost.

13. **Continue.** To continue, do one of the following.

    - If you want to modify another ship, repeat Steps 2 through 13 for each ship you want to modify.

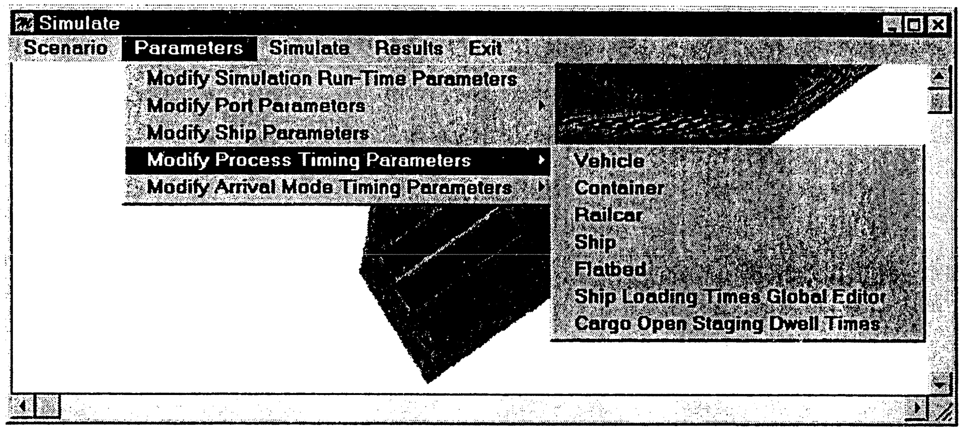
    OR

    - If you are finished modifying ships, click Done. The Simulate window is displayed.

14. **Save changes.** If you run the scenario immediately (Section 7), all changes are saved automatically. To save parameter changes permanently without running the scenario, you **must** select the Save Scenario (Section 5.4) or Save Scenario As… (Section 5.5) command from the Scenario menu on the Simulate window.

6.5 Parameters / Modify Process Timing Parameters

Use the Modify Process Timing Parameters command on the Parameters window to modify vehicle, container, railcar, ship (berthing and deberthing), and flatbed processing times; cargo loading times; and dwell times for cargo in open staging.



Modify Process Timing Parameters Commands

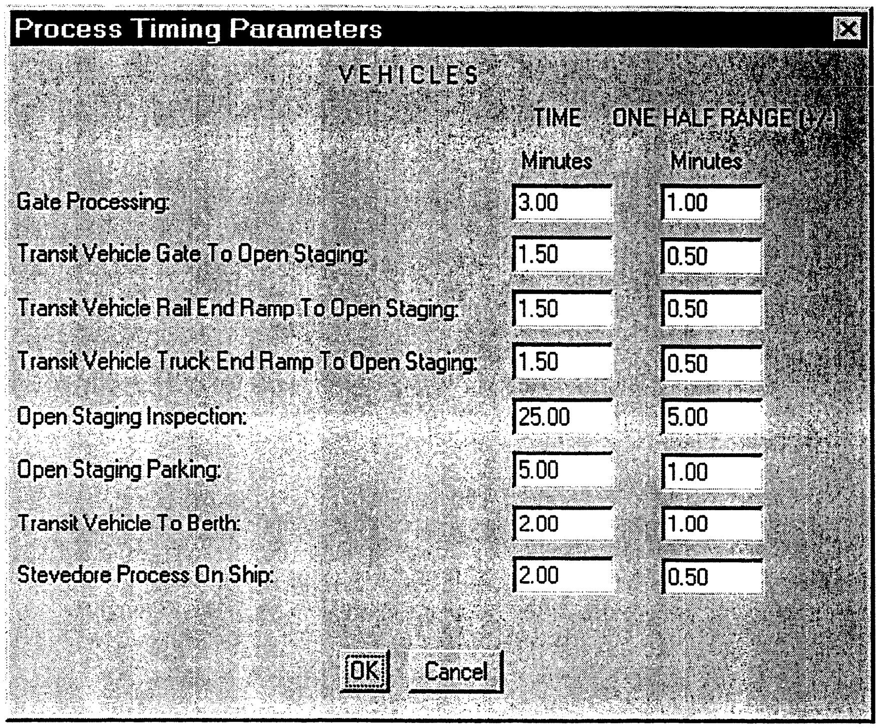
Note: Verify that the process timings have been assigned reasonable values and ranges.

Note: Each process timing parameter is specified as a baseline TIME (in decimal minutes) and +/- RANGE (in decimal minutes). The +/- RANGE sets the maximum variation from the baseline. PORTSIM will generate a specific value at random within this range. For example, if TIME is 3.80 and +/- RANGE is 1.10, the value of the parameter can range from 2.70 to 4.90.

6.5.1 Parameters / Modify Process Timing Parameters / Vehicle

1. **Select command.** To modify the timings for vehicle processing, select the Parameters menu on the Simulate window, then select Modify Process Timing Parameters, then select Vehicle. The Process Timing Parameters window is displayed, with the heading VEHICLES.

   If you are working with a new scenario, this window shows generic default data that you should examine carefully and adjust appropriately. To return to the Simulate window without taking any other action, click Cancel.



Process Timing Parameters (VEHICLES) Window

2. **Specify timings.** To change a value on the Process Timing Parameters window, click on the appropriate box, delete the current value, and enter the new value.

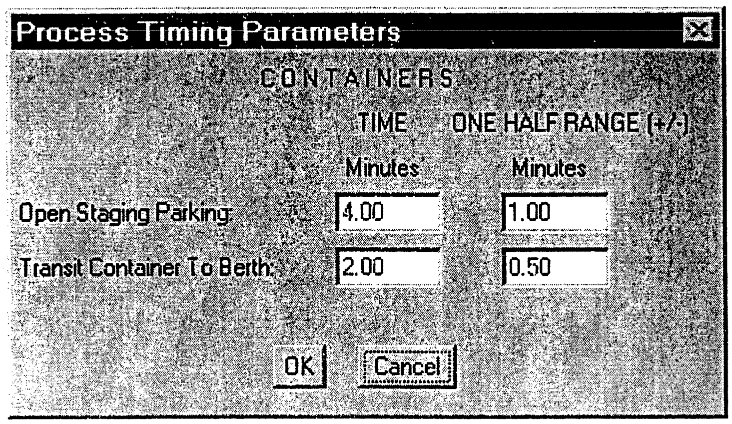
3. **Record entries.** When you have completed updating the vehicle timing specifications, record all your entries by clicking OK.

4. **Save changes.** If you run the scenario immediately (Section 7), all changes are saved automatically. To save parameter changes permanently without running the scenario, you **must** select the Save Scenario (Section 5.4) or Save Scenario As… (Section 5.5) command from the Scenario menu on the Simulate window.

6.5.2 Parameters / Modify Process Timing Parameters / Container

1. **Select command.** To modify the timings for container processing, select the Parameters menu on the Simulate window, then select Modify Process Timing Parameters, then select Container. The Process Timing Parameters window is displayed, with the heading CONTAINERS.

   If you are working with a new scenario, this window shows generic default data that you should examine carefully and adjust appropriately. To return to the Simulate window without taking any other action, click Cancel.



Process Timing Parameters (CONTAINERS) Window

2. **Specify timings.** To change a value on the Process Timing Parameters window, click on the appropriate box, delete the current value, and enter the new value.

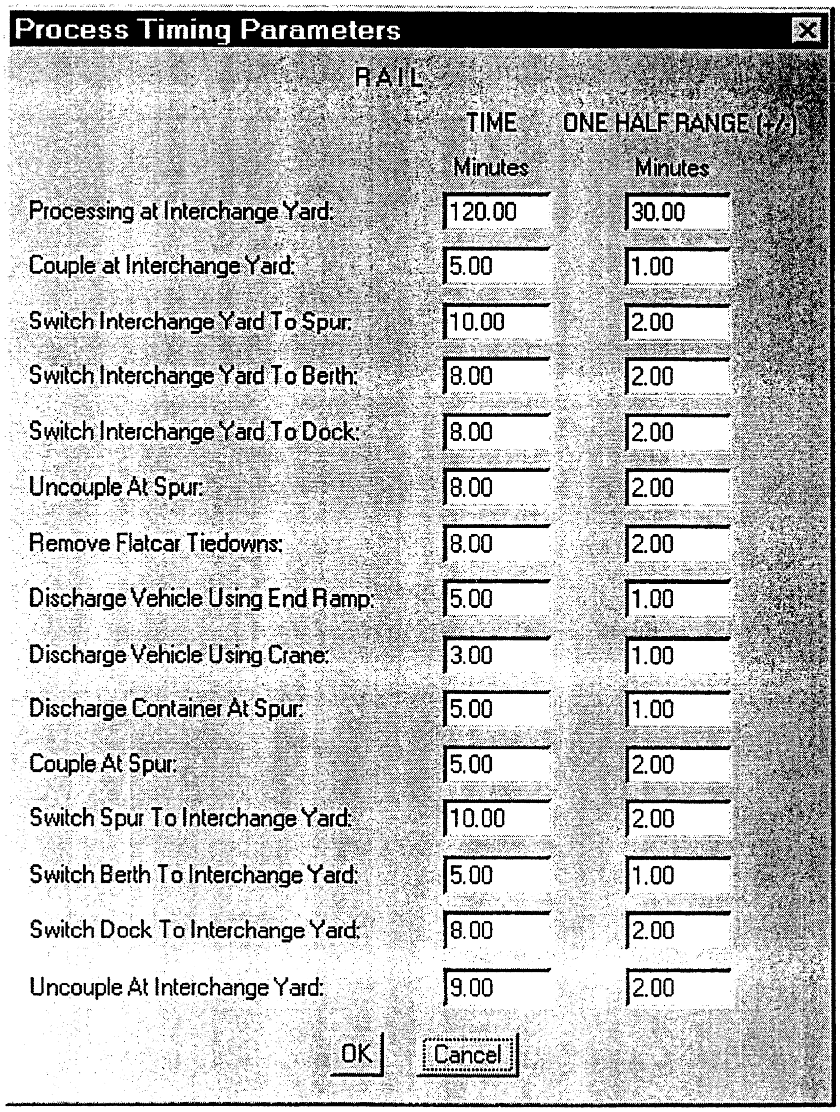
3. **Record entries.** When you have completed updating the container timing specifications, record all your entries by clicking OK.

4. **Save changes.** If you run the scenario immediately (Section 7), all changes are saved automatically. To save parameter changes permanently without running the scenario, you **must** select the Save Scenario (Section 5.4) or Save Scenario As... (Section 5.5) command from the Scenario menu on the Simulate window.

6.5.3 Parameters / Modify Process Timing Parameters / Railcar

1. **Select command.** To modify the timings for railcar processing, select the Parameters menu on the Simulate window, then select Modify Process Timing Parameters, then select Railcar. The Process Timing Parameters window is displayed, with the heading RAIL.

   If you are working with a new scenario, this window shows generic default data that you should examine carefully and adjust appropriately. To return to the Simulate window without taking any other action, click Cancel.



Process Timing Parameters (RAIL) Window

2. **Specify timings.** To change a value on the Process Timing Parameters window, click on the appropriate box, delete the current value, and enter the new value.

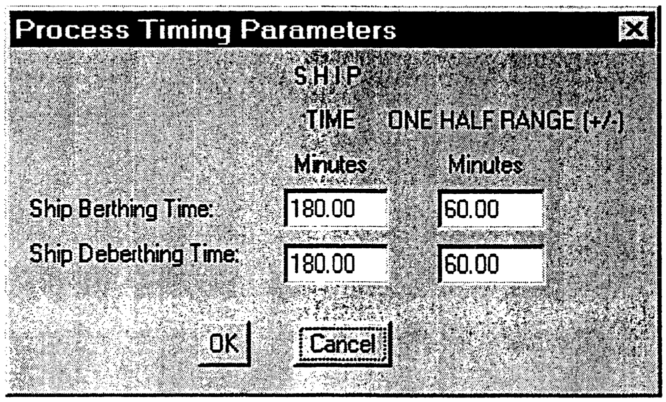
3. **Record entries.** When you have completed updating the railcar timing specifications, record all your entries by clicking OK.

4. **Save changes.** If you run the scenario immediately (Section 7), all changes are saved automatically. To save parameter changes permanently without running the scenario, you **must** select the Save Scenario (Section 5.4) or Save Scenario As... (Section 5.5) command from the Scenario menu on the Simulate window.

6.5.4 Parameters / Modify Process Timing Parameters / Ship

1. **Select command.** To modify the timings for ship berthing and/or deberthing, select the Parameters menu on the Simulate window, then select Modify Process Timing Parameters, then select Ship. The Process Timing Parameters window is displayed, with the heading SHIP.

   If you are working with a new scenario, this window shows generic default data that you should examine carefully and adjust appropriately. To return to the Simulate window without taking any other action, click Cancel.



Process Timing Parameters (SHIP) Window

2. **Specify timings.** To change a value on the Process Timing Parameters window, click on the appropriate box, delete the current value, and enter the new value.

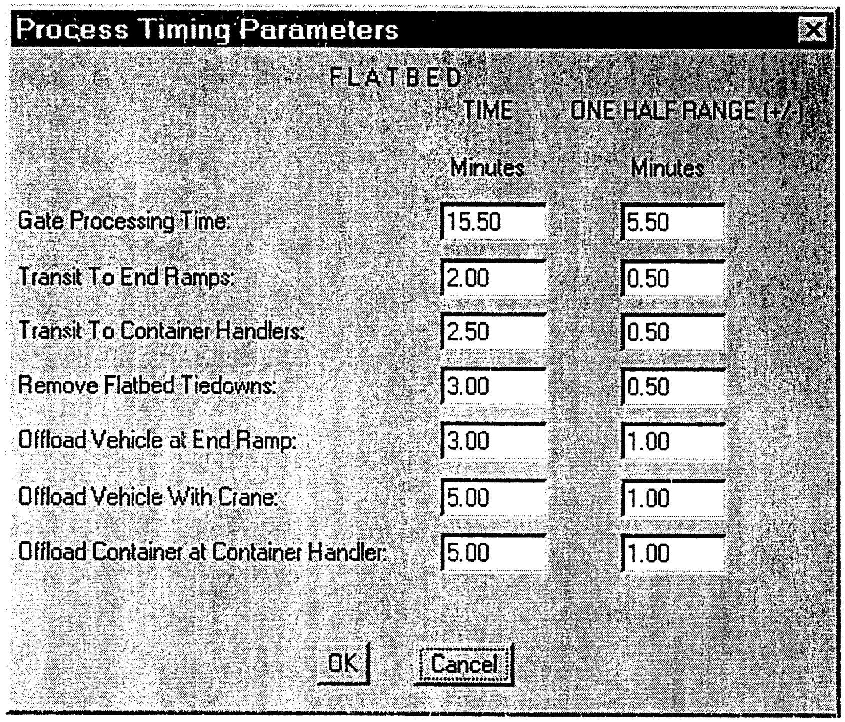
3. **Record entries.** When you have completed updating the ship timing specifications, record all your entries by clicking OK.

4. **Save changes.** If you run the scenario immediately (Section 7), all changes are saved automatically. To save parameter changes permanently without running the scenario, you **must** select the Save Scenario (Section 5.4) or Save Scenario As... (Section 5.5) command from the Scenario menu on the Simulate window.

6.5.5 Parameters / Modify Process Timing Parameters / Flatbed

1. **Select command.** To modify the timings for flatbed processing, select the Parameters menu on the Simulate window, then select Modify Process Timing Parameters, then select Flatbed. The Process Timing Parameters window is displayed, with the heading FLATBED.

   If you are working with a new scenario, this window shows generic default data that you should examine carefully and adjust appropriately. To return to the Simulate window without taking any other action, click Cancel.



Process Timing Parameters (FLATBED) Window

2. **Specify timings.** To change a value on the Process Timing Parameters window, click on the appropriate box, delete the current value, and enter the new value.

3. **Record entries.** When you have completed updating the flatbed timing specifications, record all your entries by clicking OK.

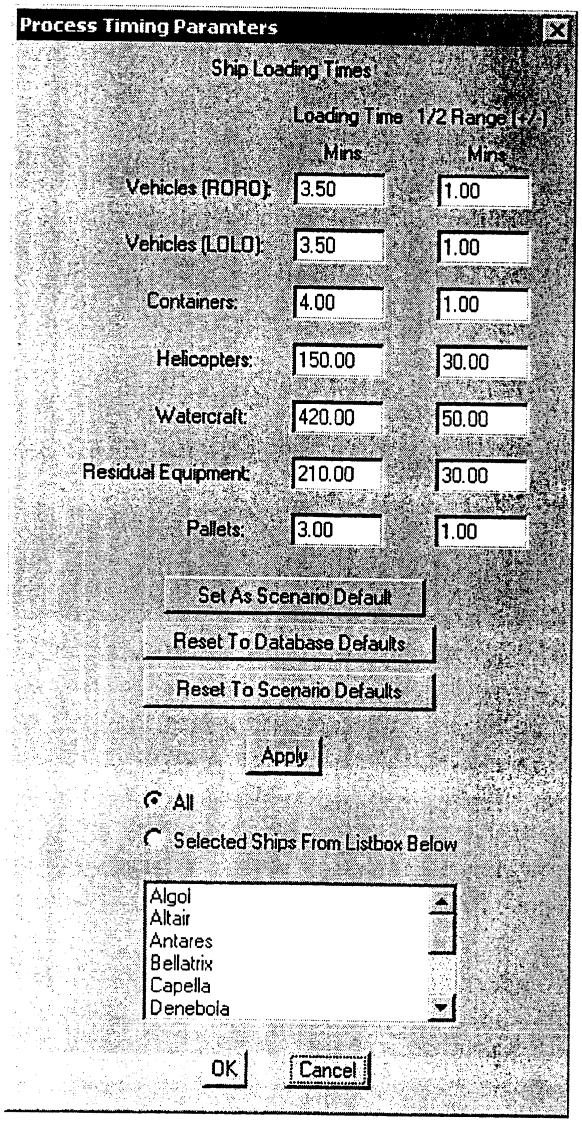
4. **Save changes.** If you run the scenario immediately (Section 7), all changes are saved automatically. To save parameter changes permanently without running the scenario, you **must** select the Save Scenario (Section 5.4) or Save Scenario As… (Section 5.5) command from the Scenario menu on the Simulate window.

6.5.6 Parameters / Modify Process Timing Parameters / Ship Loading Times Global Editor

Use the Ship Loading Times Global Editor command to modify loading times and ranges for an individual ship, for a group of ships, or for all ships in the scenario. You can revert to either the default values for the scenario or to the values stored in the PORTSIM ship database.

1. **Display loading times.**

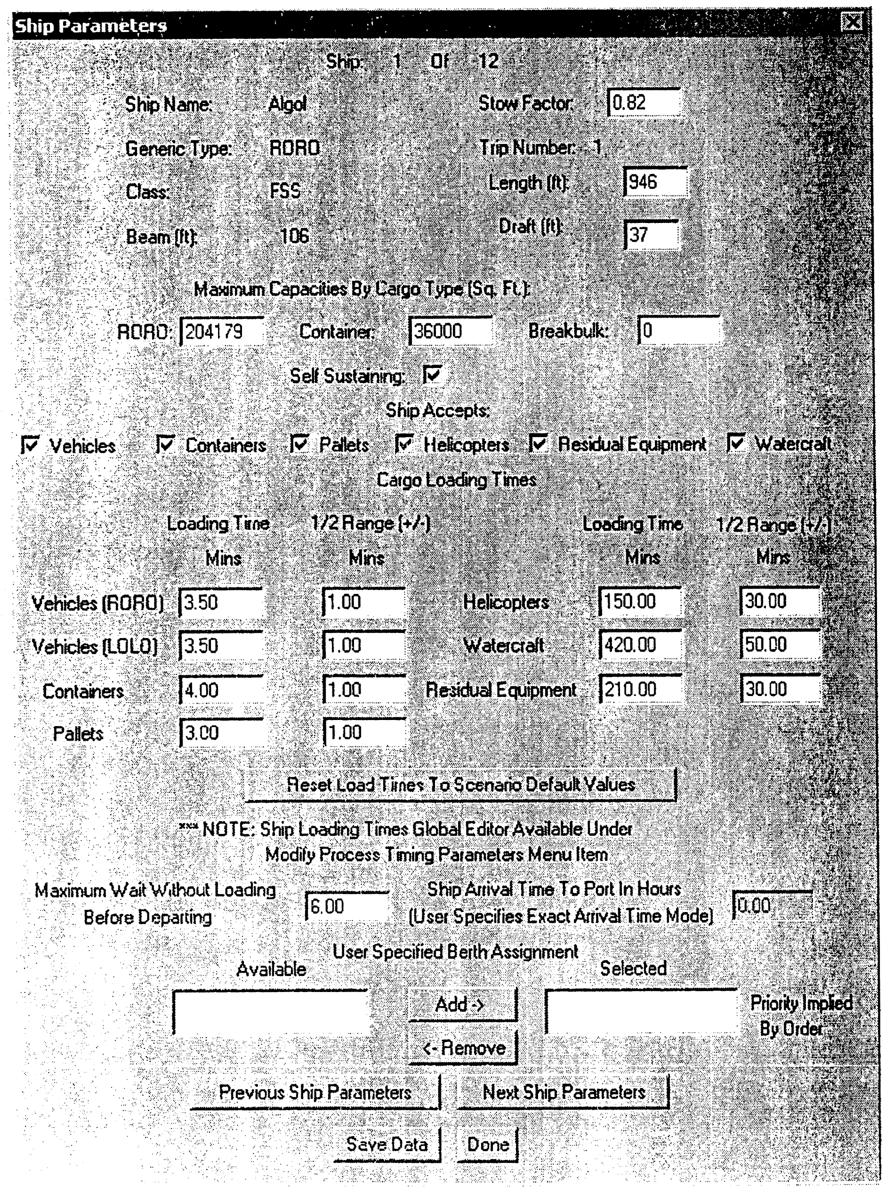
   a. *Display editing window.* On the Simulate window, select Parameters, then Modify Process Timing Parameters, then Ship Loading Times Global Editor. The Process Timing Parameters window is displayed, with the heading Ship Loading Times.



Process Timing Parameters (Ship Loading Times) Window

Note: The times displayed in the Loading Time and 1/2 Range (+/-) columns do NOT correspond to the current values for ship(s) highlighted in the list/scroll box at the bottom of the window.

b. *Display current values, if desired.* You may want to see the values of ship loading times in the currently loaded scenario. On the Parameters menu, select Modify Ship Parameters (see Section 6.4). The Ship Parameters window is displayed. Leave this window open as you perform the following procedure. However, do not make modifications on the Ship Parameters window while performing the following procedure.



Ship Parameters Window

> **Note:** The Ship Parameters window is NOT automatically updated when you make changes through the Ship Loading Times Global Editor command (see Step 6).

2. **Modify times.** There are three ways to change the values in the Loading Time and 1/2 Range (+/-) columns. Do one of the following.

   - *Set manually.* For each value you want to change, click in the appropriate box, delete the current value, and enter the new value.

     OR

   - *Use database default.* To reset loading times to the values specified in the PORTSIM baseline ship database, click the Reset To Database Defaults button. The database values are displayed in the Loading Time and 1/2 Range (+/-) columns.

     OR

   - *Use scenario default.* To reset loading times to the default values specified in the currently loaded scenario, click the Reset To Scenario Defaults button. The default values are displayed in the Loading Time and 1/2 Range (+/-) columns.

3. **Record new values.** To record all values currently displayed in the Loading Time and 1/2 Range (+/-) columns, do *one or both* of the following.

> **Caution:** When you record values, the updates are immediate and cannot be undone except by returning to Step 2 and reentering the previous values, by exiting PORTSIM without running or saving the scenario, or by loading a different scenario.

   - *Set as new default.* To record the displayed values as the default values, click the Set As Scenario Default button. The display does not change, but the specified values will be applied to any new ships added to the scenario.

   - *Apply to ships.* To record the the displayed values for ship(s) already in the scenario, go to Step 4.

4. **Select ship(s) to modify.**

   a. Use the radio buttons above the list/scroll box to select the ship(s) to which the updated loading times apply. Click one of the following radio buttons:

      - All — changes values for all ships currently in the scenario, but does *not* affect any ship(s) that may be added in the future.

        OR

      - Selected Ships From Listbox Below.

   b. Do one of the following.

      - If you clicked All, skip to Step 5.

        OR

      - If you clicked Selected Ships From Listbox Below, go to the list/scroll box and highlight the ship(s) whose parameters you want to change. Select multiple ships in sequence by using Shift; select multiple ships out of sequence by using Ctrl (see Section 5.2.4.1 for details).

5. **Apply specified times to selected ship(s).** To update the loading times for the ship(s) selected in Step 4, click the Apply button.

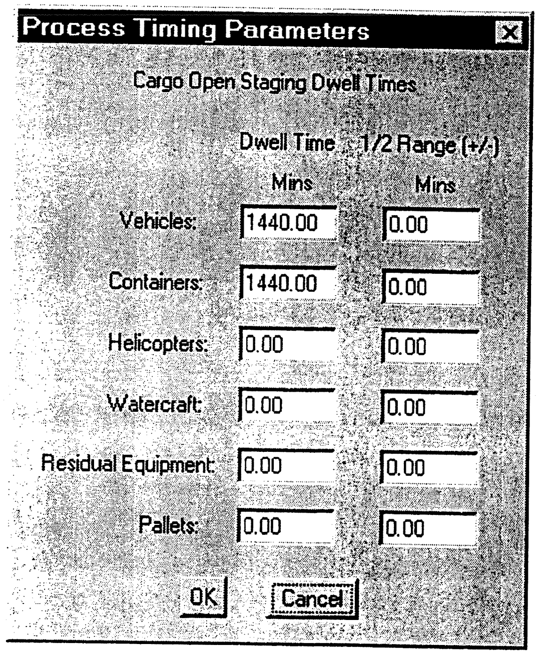
6. **View updated values, if desired.** If you are using the Ship Parameters window and want to see updated data for a particular ship, click on the Previous Ship Parameters or Next Ship Parameters button to display data for a different ship and then click again as needed to redisplay the data for the ship of interest (see Section 6.4).

7. **Save changes.** If you run the scenario immediately (Section 7), all changes are saved automatically. To save parameter changes permanently on disk without running the scenario, you **must** select the Save Scenario (Section 5.4) or Save Scenario As… (Section 5.5) command from the Scenario menu on the Simulate window.

6.5.7 Parameters / Modify Process Timing Parameters / Cargo Open Staging Dwell Times

1. **Select command.** To modify the cargo open staging dwell times, select the Parameters menu on the Simulate window, then select Modify Process Timing Parameters, then select Cargo Open Staging Dwell Times. The Process Timing Parameters window is displayed, with the heading Cargo Open Staging Dwell Times.

   If you are working with a new scenario, this window shows generic default data that you should examine carefully and adjust appropriately. To return to the Simulate window without taking any other action, click Cancel.



Process Timing Parameters (Cargo Open Staging Dwell Times) Window

2. **Specify timings.** To change a value on the Process Timing Parameters window, click on the appropriate box, delete the current value, and enter the new value.

3. **Record entries.** When you have completed updating the cargo open staging dwell times, record all your entries by clicking OK.

4. **Save changes.** If you run the scenario immediately (Section 7), all changes are saved automatically. To save parameter changes permanently without running the scenario, you **must** select the Save Scenario (Section 5.4) or Save Scenario As... (Section 5.5) command from the Scenario menu on the Simulate window.

6.6 Parameters / Modify Arrival Mode Timing Parameters

The availability of the Modify Arrival Mode Timing Parameters command depends of the mode specified in the scenario. (You can check which mode is used by using the Preview Loaded Scenario command; see Section 5.6).

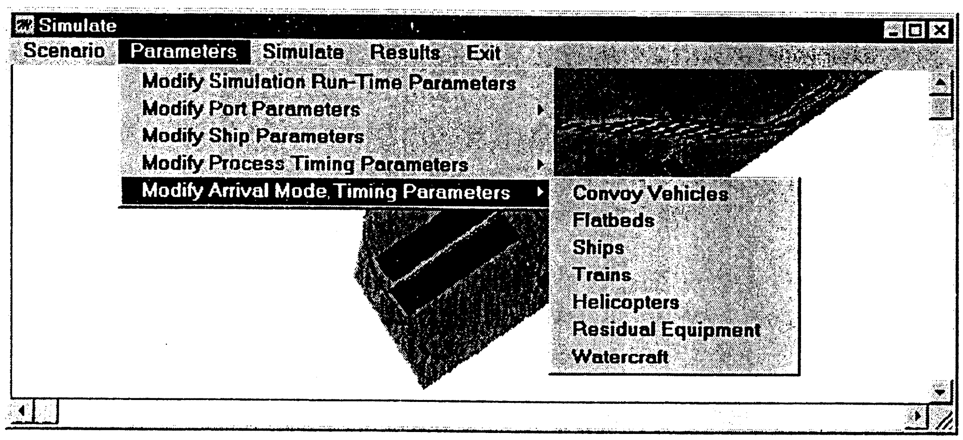
> **Note:** You can change the ship arrival mode at any time via the Modify Loaded Scenario command (see Section 5.7).

- If the scenario is set to User Specifies Exact Arrival Times, you cannot use the Modify Arrival Mode Timing Parameters command for ships. This entry will be grayed out in the menu. Instead, you must specify arrival times for each ship by using the Parameters / Modify Ship Parameters command (see Section 6.4).

- If the scenario is set to User Specifies Arrival Rates for ship arrival or force arrival, use the Modify Arrival Mode Timing Parameters command on the Parameters window to modify arrival times for convoy vehicles, flatbeds, ships, trains, helicopters, residual equipment, and watercraft. Entries are specified in decimal minutes or decimal hours, depending on the cargo type.

  On each arrival timing window, you must specify stochastic or deterministic arrival. See Appendix A for a discussion on using arrival modes in PORTSIM.

> **Note:** Verify that the arrival timings are reasonable given the overall length of the simulation and that the size of the arriving groups is also reasonable.

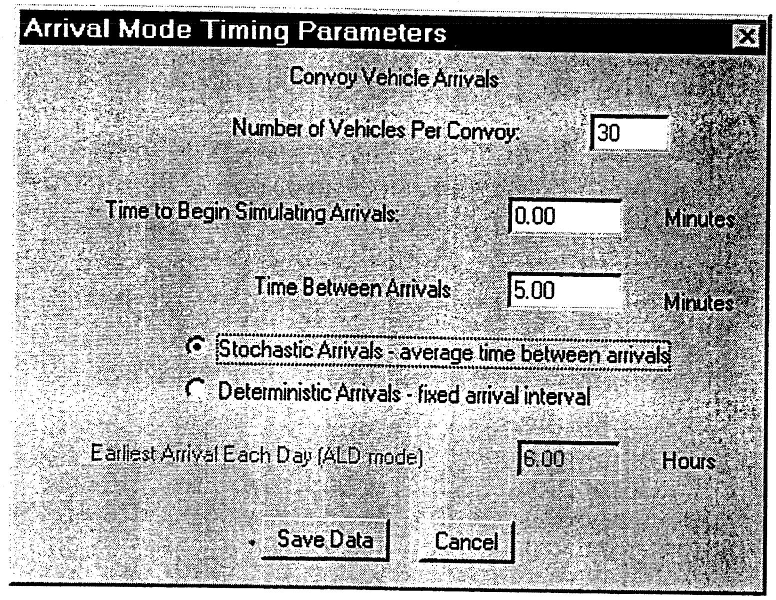


Modify Arrival Mode Timing Parameters Commands

6.6.1 Parameters / Modify Arrival Mode Timing Parameters / Convoy Vehicles

1. **Select command.** To modify the arrival times for convoy vehicles, select the Parameters menu on the Simulate window, then select Modify Arrival Mode Timing Parameters, then select Convoy Vehicles. The Arrival Mode Time Parameters window is displayed, with the heading Convoy Vehicle Arrivals.

   If you are working with a new scenario, this window shows generic default data that you should examine carefully and adjust appropriately. To return to the Simulate window without taking any other action, click Cancel.



Arrival Mode Time Parameters Window for Convoy Vehicle Arrivals

2. **Specify timings.** In the white boxes, enter new values as needed.

3. **Specify mode.** Click on the radio button for the desired mode: Stochastic Arrivals or Deterministic Arrivals (see Appendix A).

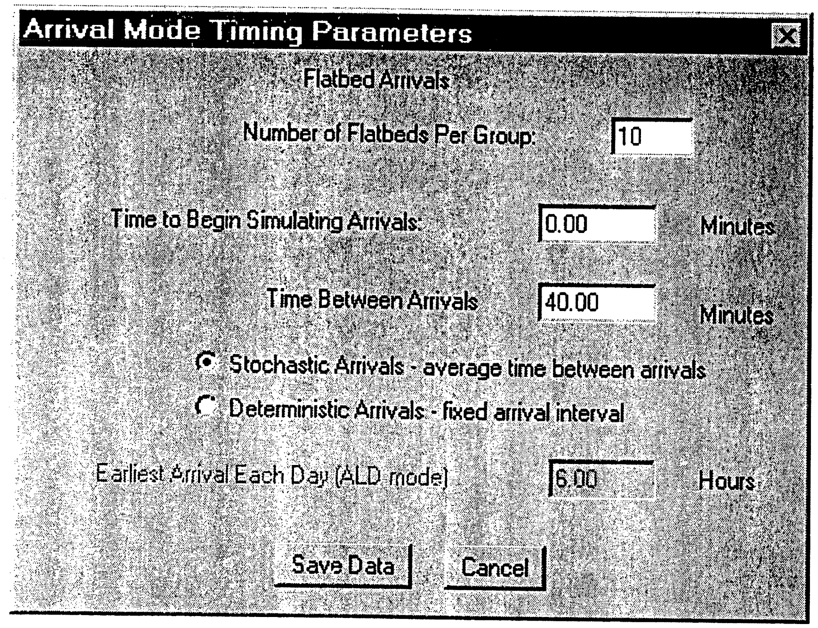
4. **Record entries.** When you have completed updating the convoy vehicle arrival specifications, record all your entries by clicking Save Data. The Simulate window is displayed.

5. **Save changes.** If you run the scenario immediately (Section 7), all changes are saved automatically. To save parameter changes permanently without running the scenario, you **must** select the Save Scenario (Section 5.4) or Save Scenario As... (Section 5.5) command from the Scenario menu on the Simulate window.

6.6.2 Parameters / Modify Arrival Mode Timing Parameters / Flatbeds

1. **Select command.** To modify the arrival times for flatbeds, select the Parameters menu on the Simulate window, then select Modify Arrival Mode Timing Parameters, then select Flatbeds. The Arrival Mode Time Parameters window is displayed, with the heading Flatbed Arrivals.

   If you are working with a new scenario, this window shows generic default data that you should examine carefully and adjust appropriately. To return to the PORTSIM Simulate window without taking any other action, click Cancel.



Arrival Mode Time Parameters Window for Flatbed Arrivals

2. **Specify timings.** In the white boxes, enter new values as needed.

3. **Specify mode.** Click on the radio button for the desired mode: Stochastic Arrivals or Deterministic Arrivals (see Appendix A).

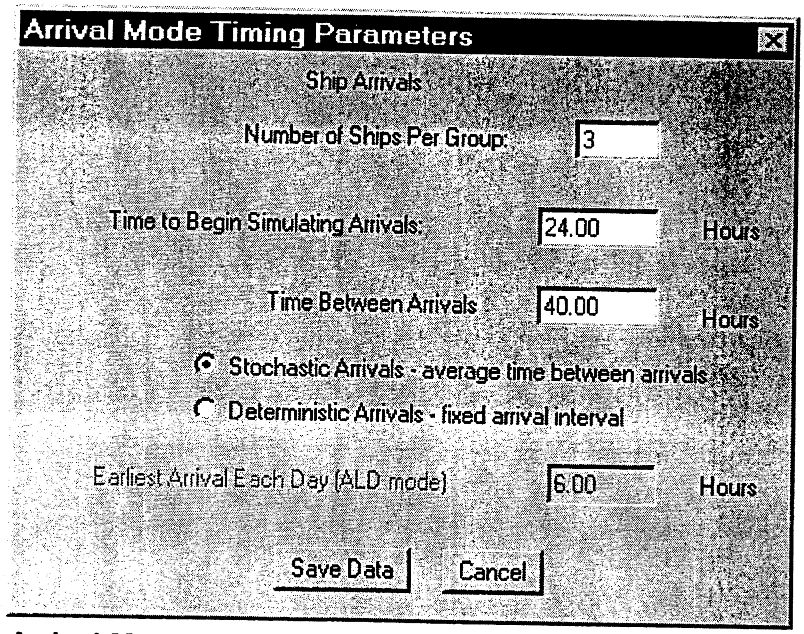
4. **Record entries.** When you have completed updating the flatbed arrival specifications, record all your entries by clicking Save Data. The Simulate window is displayed.

5. **Save changes.** If you run the scenario immediately (Section 7), all changes are saved automatically. To save parameter changes permanently without running the scenario, you must select the Save Scenario (Section 5.4) or Save Scenario As… (Section 5.5) command from the Scenario menu on the Simulate window.

6.6.3 Parameters / Modify Arrival Mode Timing Parameters / Ships

1. **Select command.** To modify the port arrival times for ships, select the Parameters menu on the Simulate window, then select Modify Arrival Mode Timing Parameters, then select Ships. The Arrival Mode Time Parameters window is displayed, with the heading Ship Arrivals.

   If you are working with a new scenario, this window shows generic default data that you should examine carefully and adjust appropriately. To return to the PORTSIM Simulate window without taking any other action, click Cancel.



Arrival Mode Time Parameters Window for Ship Arrivals

2. **Specify timings.** In the white boxes, enter new values as needed.

3. **Specify mode.** Click on the radio button for the desired mode: Stochastic Arrivals or Deterministic Arrivals (see Appendix A).

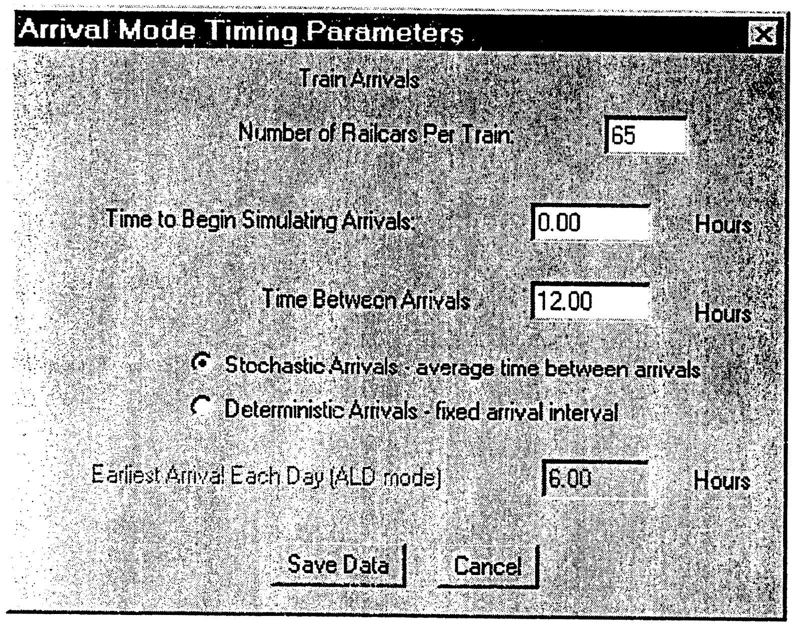
4. **Record entries.** When you have completed updating the ship arrival specifications, record all your entries by clicking Save Data. The Simulate window is displayed.

5. **Save changes.** If you run the scenario immediately (Section 7), all changes are saved automatically. To save parameter changes permanently without running the scenario, you **must** select the Save Scenario (Section 5.4) or Save Scenario As... (Section 5.5) command from the Scenario menu on the Simulate window.

6.6.4 Parameters / Modify Arrival Mode Timing Parameters / Trains

1. **Select command.** To modify the arrival times for trains, select the Parameters menu on the Simulate window, then select Modify Arrival Mode Timing Parameters, then select Trains. The Arrival Mode Time Parameters window is displayed, with the heading Train Arrivals.

   If you are working with a new scenario, this window shows generic default data that you should examine carefully and adjust appropriately. To return to the PORTSIM Simulate window without taking any other action, click Cancel.

   Arrival Mode Time Parameters Window for Train Arrivals

2. **Specify timings.** In the white boxes, enter new values as needed.

3. **Specify mode.** Click on the radio button for the desired mode: Stochastic Arrivals or Deterministic Arrivals (see Appendix A).

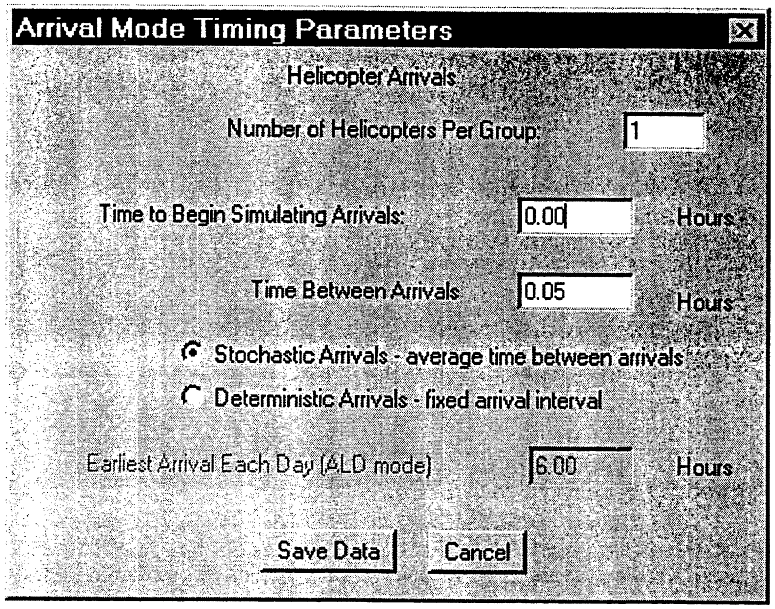
4. **Record entries.** When you have completed updating the train arrival specifications, record all your entries by clicking Save Data. The Simulate window is displayed.

5. **Save changes.** If you run the scenario immediately (Section 7), all changes are saved automatically. To save parameter changes permanently without running the scenario, you **must** select the Save Scenario (Section 5.4) or Save Scenario As… (Section 5.5) command from the Scenario menu on the Simulate window.

6.6.5 Parameters / Modify Arrival Mode Timing Parameters / Helicopters

1. **Select command.** To modify the arrival times for helicopters, select the Parameters menu on the Simulate window, then select Modify Arrival Mode Timing Parameters, then select Helicopters. The Arrival Mode Time Parameters window is displayed, with the heading Helicopter Arrivals.

   If you are working with a new scenario, this window shows generic default data that you should examine carefully and adjust appropriately. To return to the Simulate window without taking any other action, click Cancel.

   Arrival Mode Time Parameters Window for Helicopter Arrivals

2. **Specify timings.** In the white boxes, enter new values as needed.

3. **Specify mode.** Click on the radio button for the desired mode: Stochastic Arrivals or Deterministic Arrivals (see Appendix A).

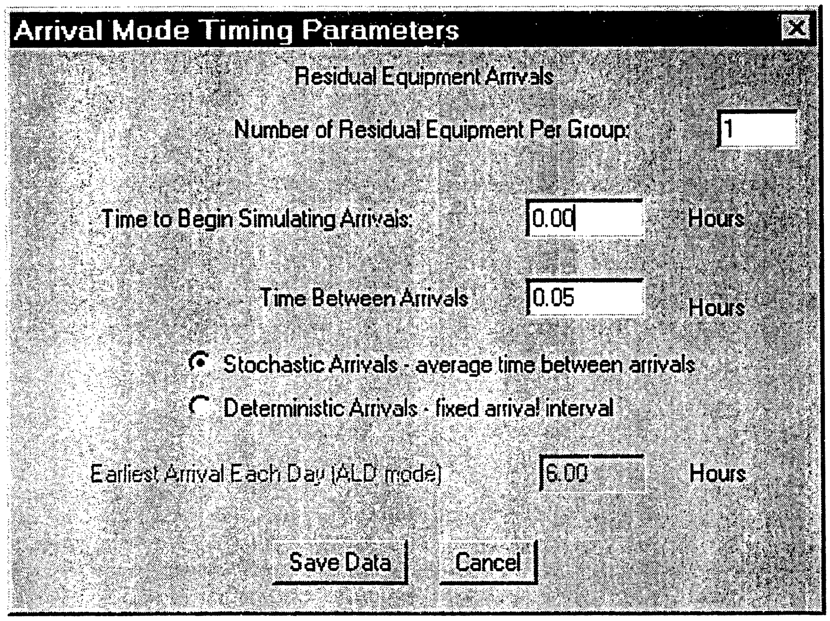
4. **Record entries.** When you have completed updating the helicopter arrival specifications, record all your entries by clicking Save Data. The Simulate window is displayed.

5. **Save changes.** If you run the scenario immediately (Section 7), all changes are saved automatically. To save parameter changes permanently without running the scenario, you **must** select the Save Scenario (Section 5.4) or Save Scenario As… (Section 5.5) command from the Scenario menu on the Simulate window.

6.6.6 Parameters / Modify Arrival Mode Timing Parameters / Residual Equipment

1. **Select command.** To modify the arrival times for residual equipment, select the Parameters menu on the Simulate window, then select Modify Arrival Mode Timing Parameters, then select Residual Equipment. The Arrival Mode Time Parameters window is displayed, with the heading Residual Equipment Arrivals.

   If you are working with a new scenario, this window shows generic default data that you should examine carefully and adjust appropriately. To return to the Simulate window without taking any other action, click Cancel.



Arrival Mode Time Parameters Window for Residual Equipment Arrivals

2. **Specify timings.** In the white boxes, enter new values as needed.

3. **Specify mode.** Click on the radio button for the desired mode: Stochastic Arrivals or Deterministic Arrivals (see Appendix A).

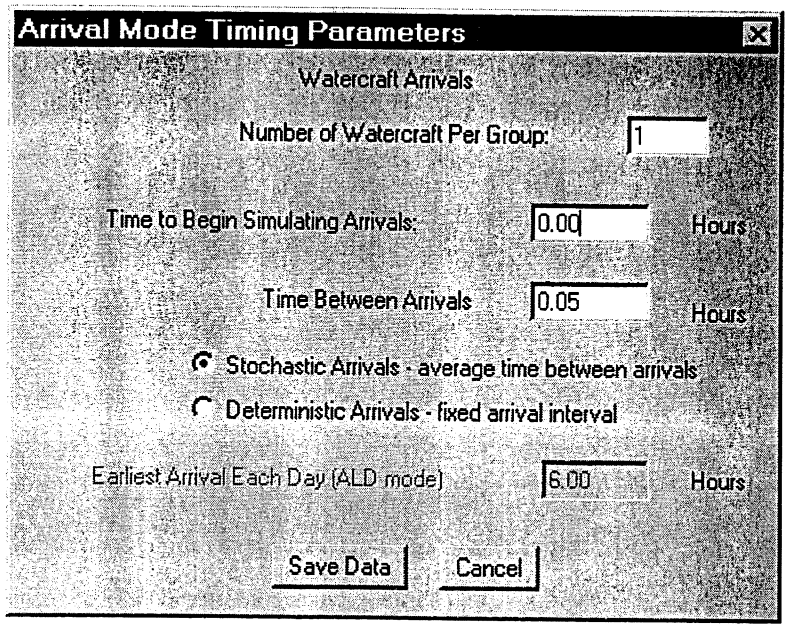
4. **Record entries.** When you have completed updating the residual equipment arrival specifications, record all your entries by clicking Save Data. The Simulate window is displayed.

5. **Save changes.** If you run the scenario immediately (Section 7), all changes are saved automatically. To save parameter changes permanently without running the scenario, you **must** select the Save Scenario (Section 5.4) or Save Scenario As… (Section 5.5) command from the Scenario menu on the Simulate window.

6.6.7 Parameters / Modify Arrival Mode Timing Parameters / Watercraft

1. **Select command.** To modify the arrival times for watercraft, select the Parameters menu on the Simulate window, then select Modify Arrival Mode Timing Parameters, then select Watercraft. The Arrival Mode Time Parameters window is displayed, with the heading Watercraft Arrivals.

   If you are working with a new scenario, this window shows generic default data that you should examine carefully and adjust appropriately. To return to the Simulate window without taking any other action, click Cancel.



Arrival Mode Time Parameters Window for Watercraft Arrivals

2. **Specify timings.** In the white boxes, enter new values as needed.

3. **Specify mode.** Click on the radio button for the desired mode: Stochastic Arrivals or Deterministic Arrivals (see Appendix A).

4. **Record entries.** When you have completed updating the watercraft arrival specifications, record all your entries by clicking Save Data. The Simulate window is displayed.

5. **Save changes.** If you run the scenario immediately (Section 7), all changes are saved automatically. To save parameter changes permanently without running the scenario, you **must** select the Save Scenario (Section 5.4) or Save Scenario As… (Section 5.5) command from the Scenario menu on the Simulate window.

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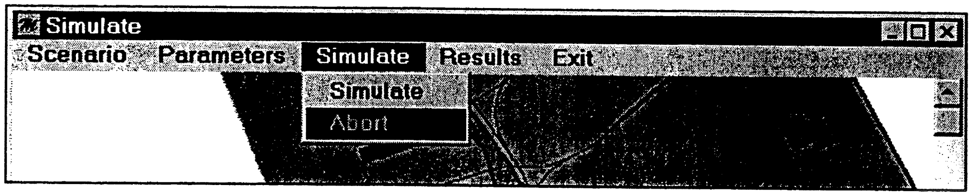
7 Simulate Menu

7.1 Simulate Menu — Overview

Use the Simulate menu to start and stop simulation runs. The Simulate command on this menu executes the currently loaded scenario. Depending on what you have done in the current session, some commands may be grayed out and unavailable. For legibilty, screens are shown with all commands visible. The simulation executes continuously for the run-time specified in the scenario unless you interact with PORTSIM (see Section 7.1.2). The Abort command halts the simulation and saves the results obtained to that point. You cannot resume an aborted simulation.



Simulate Commands

7.1.1 How Do I Work with Simulations?

Viewing data during simulations. As a simulation runs, the resource utilization rates are displayed in animated "meters" (see Section 7.2.2), and you can also use other commands to view summary data (see Section 7.1.2).

Changing simulation parameters. If you want to change the length of the simulation, use the Modify Simulation Run-time Parameters command on the Parameters menu.

> **Warning!** Never change any scenario data while a simulation is running. The results will be unpredictable at best.

> **Note:** Executing a simulation automatically saves all changes made in the scenario specifications since the last run. These changes are retained if the run is aborted.

7.1.2 How Do Scenario Commands Work with Other PORTSIM Features?

While a simulation is running, the Generate Reports and Generate Graphs commands on the Results menu are not available and are grayed out. However, there are other ways to monitor some aspects of a simulation during a run.

You can use two commands on the Results menu to display current status and messages: View Current Status Report and View Scenario Messages (see Section 8.2 and 8.3, respectively).

The View Current Status Report command displays a window containing data on the progress of the simulation. It includes the status of transport arrivals and offloading; transport congestion; cargo arrival, readiness, and loading; convoy congestion; and ship arrival and loading status. When this window is displayed, it is a fixed snapshot of the simulation status at that instant in simulated time. You can select Auto Update to have the window automatically updated at fixed intervals.

The View Scenario Messages command displays the Scenario Status Messages window, which lists messages generated during the simulation. The window is continuously updated as the simulation proceeds. There are a few general types of messages. They include, but are not limited to, messages generated by the following events: the arrival, berthing, and deberthing of ships; ship/berth assignments; and port congestion problems.

To review the baseline scenario, use the Preview Loaded Scenario command on the Scenario menu (see Sections 5). The simulation will continue running. To check additional scenario specifications, you use the various commands on the Parameters menu (see Section 6); however, doing so causes the simulation to pause. When you close the specification screens, the simulation resumes.

In general, if you click on a menu item while a simulation is running, the simulation clock pauses. Depending on the menu and command you select, the simulation may remain paused or it may resume.

7.1.3 How Are Simulation Results Saved?

PORTSIM saves the results of a simulation in a scenario-specific subdirectory in the POEstandalone subdirectory within the Scenarios directory. Results from previous runs of the same scenario are overwritten. To keep previous results, you must save the scenario with a new name.

The output files are saved in a directory having a name identical to the scenario name, with the addition of the extension ".out" — for example, the results of the latest run of Test Scenario12 would be saved in the directory Test Scenario12.out.

7.2 Simulate

7.2.1 Run a Simulation

1. **Prepare scenario.**

   a. Load an existing scenario or create a new one (use the Open Existing Scenario or New Scenario command on the Scenario menu; see Section 5).

   b. If necessary, modify the scenario (use the Modify Loaded Scenario command on the Scenario menu and the commands on the Parameters menu; see Sections 5 and 6, respectively).

   c. If necessary, change the simulation run-time (use the Modify Simulation Run-Time Parameters command on the Parameters menu; see Section 6). For the first run with a new or substantially modified scenario, you may wish to use a short run-time to quickly diagnose any conflicts in the scenario specifications (see Section 3.12, Tips for Using PORTSIM Effectively).

   d. If necessary, save the changes under a new name (use Save Scenario As... command on the Scenario menu; see Section 5). Otherwise, all changes will be saved in the current scenario when you start the simulation run.

2. **Execute simulation.** To begin a simulation run, select the Simulate menu on the Simulate window, then select the Simulate command.

   If you have run this scenario previously within the same session, a brief message is displayed that says Resetting Scenario. Please Wait.

   The Scenario Status Message window is displayed, which displays messages reflecting PORTSIM's automated parameter checking process.

   When the parameter check is complete, the simulation clock begins running, and the graphs on the Port Utilization Meters window begin to change, reflecting the ongoing activity in the simulation. For more explanation of the data in the Port Utilization Meters window, see Section 7.2.2.

> **Warning!** Do not close the Port Utilization Meters window. If you do, PORTSIM will close immediately, and you may lose data. You *can*, however, minimize or move it. When minimized, the window will shrink to an icon in the taskbar: . To redisplay the window, click on that icon.

You can use other applications while the simulation is running. However, depending on the size of the simulation, the speed of both the simulation and the other applications may be affected.

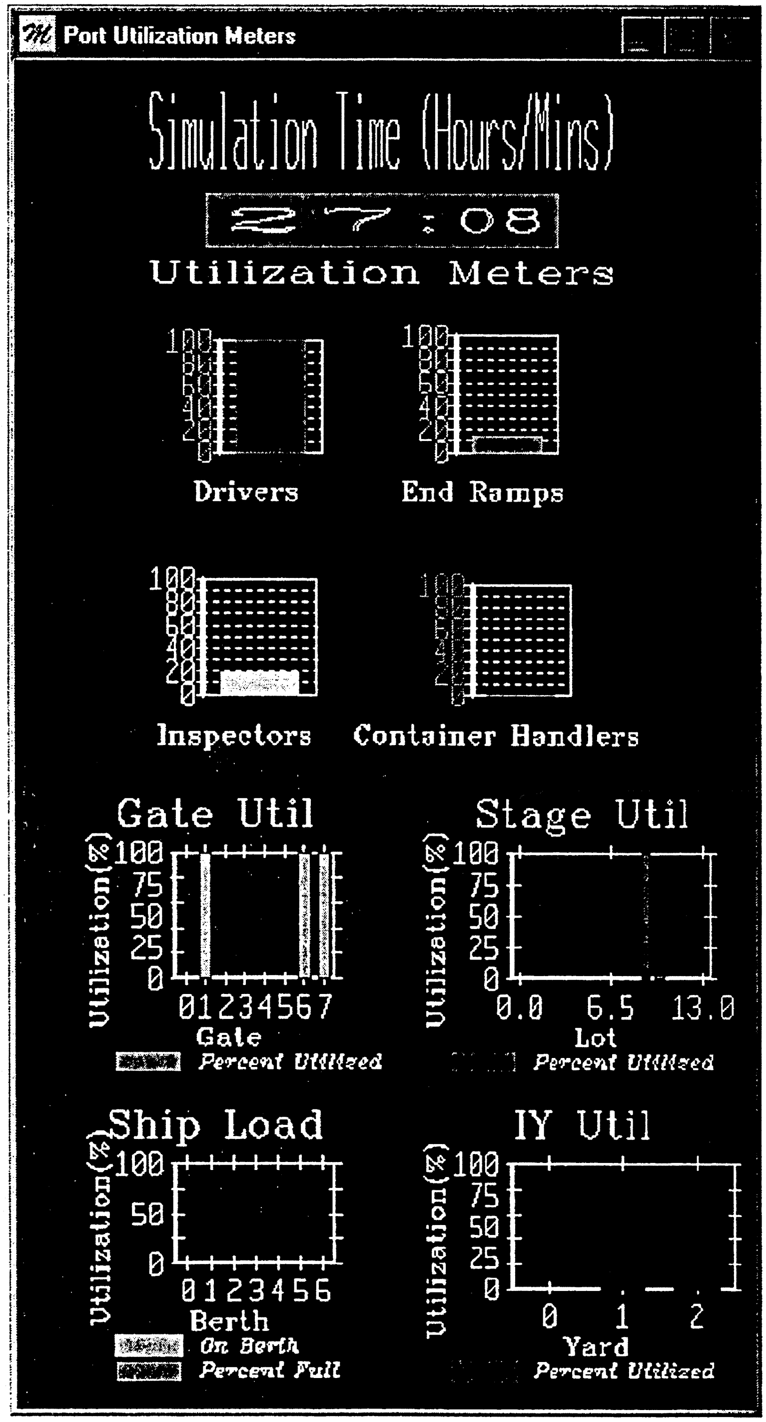
When the simulation finishes, PORTSIM briefly displays a message: Writing Scenario Output. Please wait. On the Port Utilization Meters window, the clock shows the total elapsed simulation time, and the graphs show the final state of the simulation.

3. **Review final results.** You can review the output of the simulation by using the Results menu on the Simulate window (see Section 8).

> **Note:** PORTSIM saves the results of a simulation in the POEstandalone subdirectory within the Scenarios directory. Results from previous runs of the same scenario are overwritten. The output files are saved in a directory having a name identical to the scenario name, with the addition of the extension ".out"—for example, the results of the latest run of Test Scenario12 would be saved in the directory Test Scenario12.out.

7.2.2 Port Utilization Meters

During a simulation run, the Port Utilization Meters window (shown below) displays the activity of the simulation as animated graphs. These graphs provide a "real-time" picture of the embarkation process. This window is displayed when you open PORTSIM. It is not interactive and only displays data. To display other and more detailed data about the simulation run, you can use commands on the Results menu (see summary in Section 7.1.2 and details in Section 8).



Port Utilization Meters Window during a Simulation

Warning! Do not close the Port Utilization Meters window. If you do, PORTSIM will close immediately, and you may lose data. You *can* minimize or move it, however. When minimized, the window will shrink to an icon in the taskbar: . To redisplay the window, click on that icon.

7.2.2.1 Nature of Meter Display

The graphs for drivers, end ramps, inspectors, and container handlers reflect the percentage of the total number of each currently being utilized. The graphs for gates, staging areas, ships, and interchange yards reflect the percent utilization of individual resources at the port being simulated, e.g., percentage utilization of gate 1.

Each resource item may not be labeled individually; rather, the x-axis may be labeled simply with a range. If there are 13 staging areas, for example, the axis will be labeled with 0, 6.5, and 13. Staging area 9 would be represented by a bar appropriately located between 6.5 and 13.

> **Note:** The number on the x axis refers to the sequence number assigned to the resource within PORTSIM, which may not be the same as the number by which the resource is known at the port.

7.2.2.2 Details of Meters

Simulation Time. The elapsed simulation time (simulation clock) is displayed at the top of the Port Utilization Meters window. This clock displays time in hours and minutes (in the format hhh:mm).

Drivers, Endramps, Inspectors, Container Handlers. These graphs show what percentage of the total number of available persons or equipment is being utilized.

Gate Utilization. Gate utilization is represented as either 0% (not in use) or 100% (in use).

Stage Utilization. Each staging area (lot) is represented by a separate bar that shows the percent utilization for that area.

Ship Loading. This meter shows two things: (1) which berths are currently occupied and (2) how full each ship is. Occupied berths are represented with a pale blue bar as 100% utilized. Superimposed on this blue bar is a purple bar showing what percentage of the ship's capacity has been filled. Note that this meter represents only the ships that are currently on berth. Other ships may have arrived but have nowhere to dock or may already be loaded. To see the number of ships that have arrived and been loaded (while the simulation is running), use the View Current Status Report command on the Results menu.

IY [Interchange Yard] Utilization. Each interchange yard is represented by a separate bar that shows the percent utilization for that yard.

7.3 Abort

To end a simulation before the full run-time elapses, select Simulate on the Simulate window, then select Abort. PORTSIM displays a brief message that says Writing Scenario Output. Please wait.

On the Port Utilization Meter window, the clock shows the elapsed simulation time, and the graphs show the final state of the simulation. All simulation results to that point are saved, and you can review them by using the Results menu on the Simulate window (see Section 8).

Note: You cannot resume an aborted simulation.

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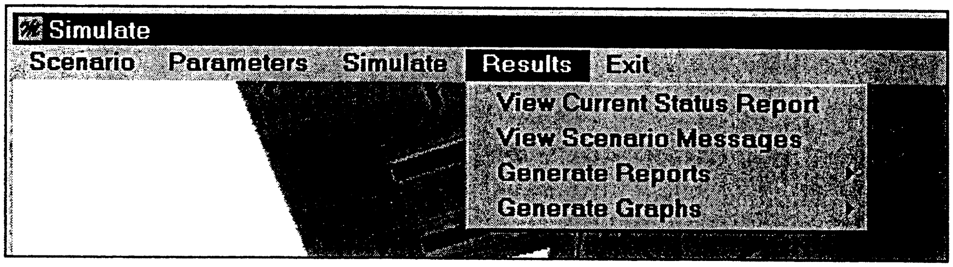
8 Results Menu

8.1 Results Menu — Overview

The commands on the Results menu allow you to (1) display the current status of the simulation and display scenario messages at any time and (2) create reports and graphs for the completed simulation.



Results Commands

The following list provides an overview of the commands on the Results menu and the type of information available through each command. Depending on what you have done in the current session, some commands may be grayed out and unavailable. For legibilty, screens are shown with all commands visible.

- View Current Status Report — Once a simulation has been started, this command can be used at any time. Use this command to display an overview of the status of the transport vehicles, cargo items, and ships involved in the simulated embarkation. Refer to Section 8.2 for a detailed description of this command.

- View Scenario Messages — Once a simulation has been started, this command can be used at any time. Use this command to display a list of scenario messages, which describe what happened at specified times during the simulation. Refer to Section 8.3 for a detailed description of this command.

- Generate Reports — This command can be used only after the simulation has finished running. Use this command to generate as many as 10 different scenario simulation reports. Refer to Section 8.4 for a detailed description of this command.

- Generate Graphs — This command can be used only after the simulation has finished running. Use this command to display as many as 13 different graphs. Refer to Section 8.5 for a detailed description of this command.

8.2 Results / View Current Status Report

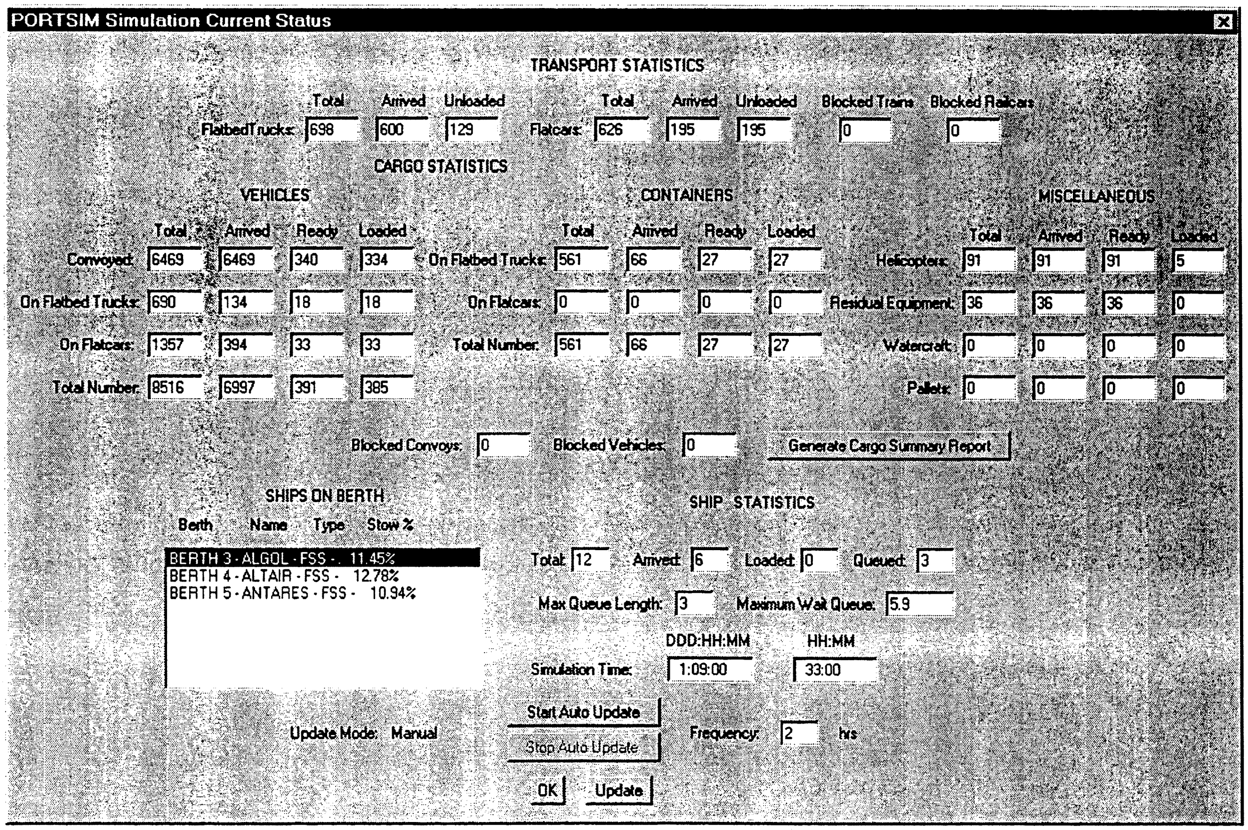
Use the View Current Status Report command to display the PORTSIM Simulation Current Status window, which provides an overview of the status of the transport vehicles, cargo items, and ships involved in the simulated embarkation. This command can be used while the simulation is running or after the simulation is complete. If you have not yet run a simulation for the scenario, this command is grayed out on the Results menu and does not operate.

The PORTSIM Simulation Current Status window complements the Port Utilization Meters window and provides information that is not available on the meters. For example, this report shows whether any trains, railcars, convoys, or vehicles are blocked from progressing through the port. If activity on the utilization meters stalls, this window may show the reason. As another example, this report helps provide a more complete picture of the ships in the scenario. The Ship Loading utilization meter shows only the ships currently berthed. Others may have arrived but have nowhere to dock; still others may be loaded and on their way. The PORTSIM Simulation Current Status window displays the number of ships in these two categories (at the bottom of the window, under Ship Statistics).

> **Note:** You can edit the fields in the PORTSIM Simulation Current Status window, but the changes will have no effect. The original values will be displayed the next time you open or update this window.

1. **Display the window.** On the Results menu, select View Current Status Report. The PORTSIM Simulation Current Status window is displayed.

   Options are available for setting the update mode and generating a summary for printing.



PORTSIM Simulation Current Status Window

2. **Update display.** You have two options for updating this display as the simulation progresses — manual (default) or automatic. Do one of the following.

   - For *manual updating*, click the Update button. The simulation data and the line labeled Simulation Time are updated once. The time is given both in days, hours, and minutes (DDD:HH:MM) and in total hours and minutes (HH:MM).

     OR

   - For *automatic updating*, do the following:

     a. In the box labeled Frequency: enter the amount of simulation time (in hours) between updates.

     b. Click the Start Auto Update button. The line labeled Update Mode changes to read Automatic. The simulation data and the line labeled Simulation Time are updated automatically at the interval specified. The time is given both in days, hours, and minutes (DDD:HH:MM) and in total hours and minutes (HH:MM).

     c. To discontinue automatic updating, click the Stop Auto Update button. The line labeled Update Mode changes to read Manual.

3. **Get cargo summary.** To view a summary of the cargo data only (e.g., for printing), click the Generate Cargo Summary Report button. The PORTSIM Cargo Summary Report is displayed. This report is also available through the Results / Generate Reports command; see Section 8.4.11 for details.

4. **Close window.** To close the window, click OK. The Simulate window is displayed. You can reopen the PORTSIM Simulation Current Status window at any time.

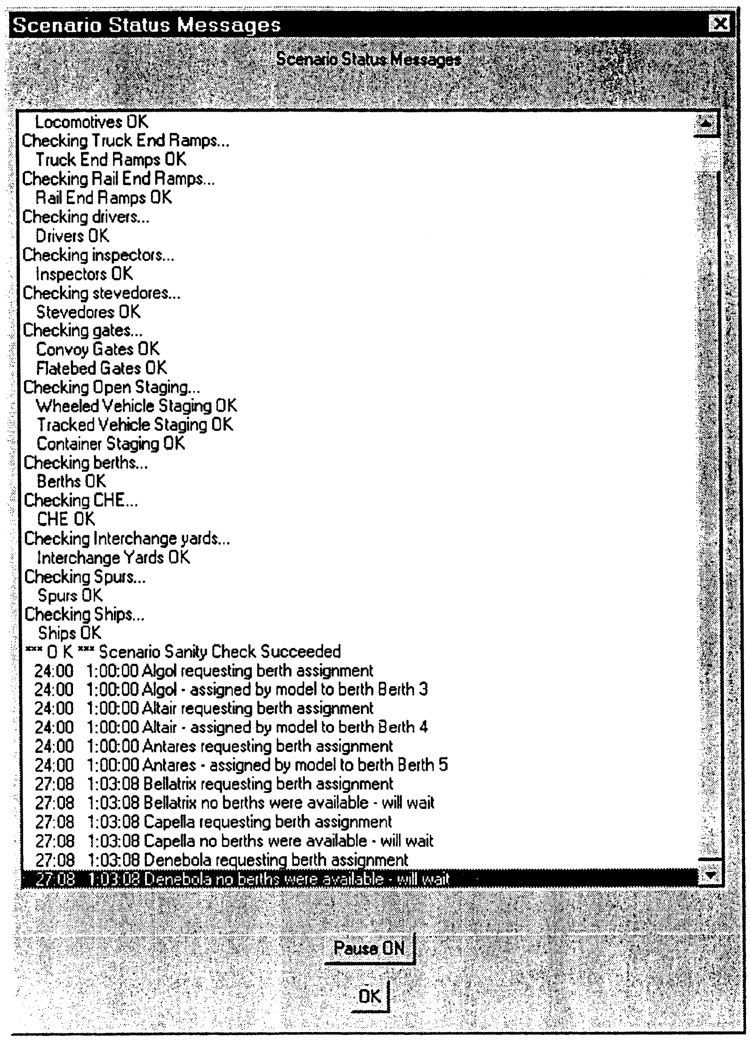
8.3 Results / View Scenario Messages

Use the View Scenario Messages command to display a list of messages that describe what has occurred during the simulation. This command can be used at any time (i.e., while the simulation is running or after the simulation is complete). However, if you have not yet run a simulation for the scenario, this command is grayed out on the Results menu and does not operate.

1. **Display messages.**

   - This Scenario Status Messages window is automatically displayed when you use the Simulate command (see Section 7). If the window is already displayed, go to step 2.

   - Otherwise, on the Results menu, select View Scenario Messages. The Scenario Status Messages window is displayed.



Scenario Status Message Window

2. **Control display updates.** As the default, the window updates continuously, and old messages are scrolled out of view at the top of the window.

   a. Use the scroll bar at any time to view previous messages.

   b. To stop the automatic updating temporarily, click the Pause ON button. The button name changes to Pause OFF. No new messages will be displayed until you perform Step 2.c.

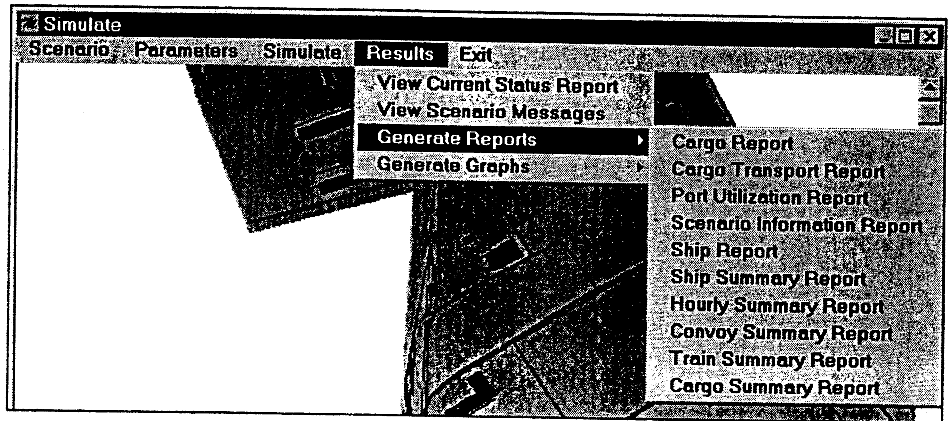
   c. To resume continuous updating, click the Pause OFF button. The button name changes to Pause ON.

3. **Close window.** To close the Scenario Status Message window, click the Done button. The window closes.

8.4 Results / Generate Reports

> **Note:** Before you can use the Generate Reports command, you must first create or open a scenario (see Section 5.2 or 5.3, respectively) and run the scenario simulation (see Section 7.2.1).

Use the Generate Reports command to display a submenu that lists the different types of reports that can be generated. This command can be used only after a scenario simulation has been run. If you have not yet run a simulation for the scenario, this command is grayed out on the Results menu and does not operate.



Generate Reports Submenu

You can customize the information displayed, print all or part of a report, and save the results in different formats for later use. For details, see Section 8.4.1, Working with Reports. The following commands are available on the Results / Generate Reports submenu:

- Cargo Report: Identifies every cargo item that passed through the port by SRC UIC, Unit Index, LIN ID (line item number ID), LIN, and standard nomenclature. For each item, gives arrival and throughput times and the name of the ship the item was loaded onto (see Section 8.4.2).

- Cargo Transport Report: For each cargo item, identifies the transport on which the item arrived (see Section 8.4.3).

- Port Utilization Report: Provides final utilization figures for each resource type (see Section 8.4.4). (Full details at the daily or hourly level are available on the associated graphs; see Section 8.5, Results / Generate Graphs).

- Scenario Information Report: Lists the original input to the simulation (see Section 8.4.5).

- Ship Report: Provides an overview of ship arrival, queuing, and loading and details for each ship, including critical times and cargo characteristics (see Section 8.4.6).

- Ship Summary Report: Identifies all ships by name and summarizes their activity during the embarkation operation (see Section 8.4.7).

- Hourly Summary Report: Displays summary data on the processing and loading of cargo (see Section 8.4.8).

- Convoy Summary Report: Displays summary data on the processing of convoyed vehicles into staging (see Section 8.4.9).

- Train Summary Report: Displays summary data on the processing of railcars into interchange yards (see Section 8.4.10).

- Cargo Summary Report: Displays summary data on the processing and loading of cargo (see Section 8.4.11).

8.4.1 Working with Reports

Note 1: Before you can work with a report, you must first display the report. Refer to Sections 8.4.2 through 8.4.11 for descriptions of how to display each report.

Note 2: The software module used to generate and manipulate reports is generic and thus contains some options that are not relevant to PORTSIM. In particular, PORTSIM has not been designed to make use of the Import command, and it may not function properly if used.

Reports may take some time (possibly a few minutes) to generate, particularly for a large scenario or a long-running simulation. Several report windows can be open at the same time. Most of the reports are displayed as one or more tables within a window.

Accessing Display and Output Commands

The commands for working with reports can be accessed by three methods. The options available and their output differ slightly depending on which method you choose. To access the display and output commands,

- Click on the File menu, at top left of each report window. This action displays the File commands. These commands act upon the report as a whole.

  OR

- Right-click *within* the report window but *outside* any table. This action displays the report pop-up commands. These commands are the same, and have the same effect, as the File commands, except that the Close command is not available.

  OR

- Right-click within a table. This action displays the table pop-up commands. These commands act only upon the information in the table from which they were displayed.

The following sections describe in detail how these commands are used to (1) modify a report, (2) print a report, and (3) save a report.

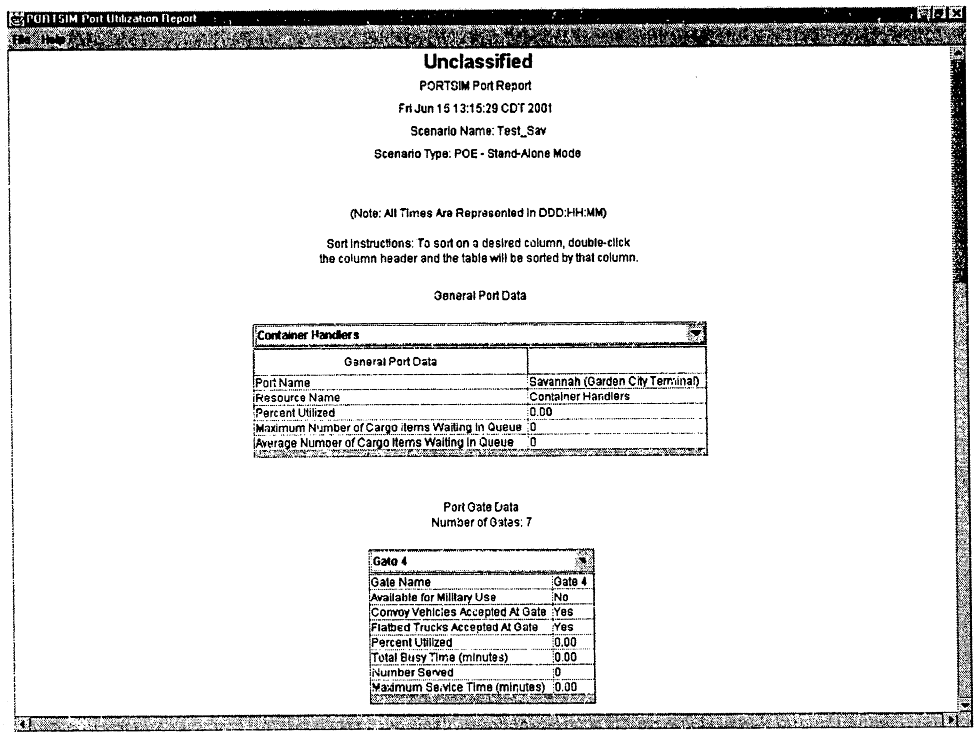
Note: The commands for working with reports refer to "items." An *item* is an instance of a data table. An item can be duplicated, deleted, printed, and saved independently from the report as a whole.

8.4.1.1 Modifying a Report

Several options are available for modifying a report: you can select a different instance of a resource, add or delete tables, expand or collapse the display, change the column width in a table, sort on a column, and rearrange the columns. This section describes these options.

Selecting a Resource

Many report tables contain a drop-down list/scroll box at the top of the table. This box identifies the type of resource or particular instance of a resource for which data are displayed in the table.



Drop-down List/Scroll Box

Use the following procedure to select a different type of information or a different instance of the resource displayed in a table.

1. Click the drop-down list/scroll box ▼. A drop-down list is displayed.

2. Click the desired item. The drop-down list closes, the selected item is displayed in the drop-down list/scroll box, and a new table is displayed.

Adding and Deleting Tables

The table pop-up commands window contains two commands that can be used to modify a report:

- Duplicate Item.
- Delete Item.

For example, these two commands would be used to create a report that contains only tables of port gate data (i.e., one table for each gate). *These commands act only on the table from which they are selected.* Use the following procedure to use these commands.

1. Right-click *and hold* the mouse button on the table that is to be duplicated or deleted. The table pop-up commands window opens.

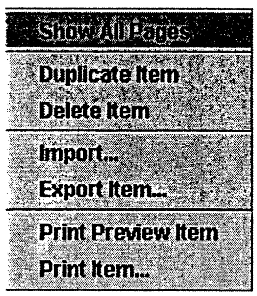


Table Pop-up Commands

2. Select the desired command to be used. The command is highlighted when selected.

3. Release the right mouse button. The table pop-up commands window closes and the desired action takes place.

Expanding and Collapsing the Display

In general, reports display data on only one instance of a resource (e.g., gate) at a time. Use the Show All Pages command to expand the report by displaying a separate table for each instance of each resource. Use the Paginate command to return to the short (collapsed) version of the report. To access these commands, do one of the following.

- Right-click within the report but outside the tables. The Report Pop-up commands window opens.
- Right-click within a table. The table pop-up commands window opens.
- Click on the File menu. The File commands are displayed.

Changing Column Width

Many of the table columns can be widened to display all the information contained within a cell. When this situation is the case, the mouse cursor changes to a left-right arrow when it is passed over a column boarder in the table header. Left-click and drag the left-right arrow in the desired direction. Release the mouse button when the column is at the desired width.

> **Note:** If you perform this operation to the extent that the column disappears off the right side of the table, double click any table header that is still displayed. The missing column will be redisplayed.

Sorting on a Column

In general, if a table has a header (instead of or in addition to a drop-down list/scroll box), you can display the information in ascending order by any column. Just double-click anywhere in the desired column and the information in the table is displayed accordingly.

Rearranging Columns

In general, if a table has a header (instead of or in addition to a drop-down list/scroll boxes), you can rearrange the columns. Click and hold the desired column heading and drag it to the new location. When the mouse button is released, the column automatically moves into place for the new alignment.

8.4.1.2 Printing Reports

The report(s) generated from the scenario simulation results can be printed. Two methods are available for printing reports:

- Through the File menu Print... command.
- Through the pop-up command window Print... and Print Item... commands.

When the Paginate command is active, only the table currently displayed is printed. When the Show All Pages command is active, all pages in the report are printed. To display the report as it will appear on the page before it is printed, select either the Print Preview command on the File menu, or the Print Preview or Print Preview Item commands on the pop-up command window.

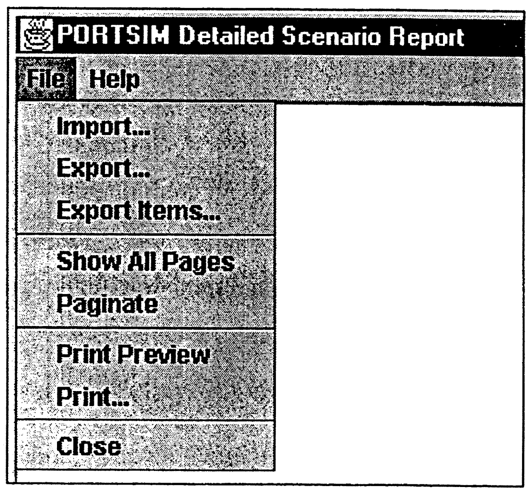
8.4.1.3 Saving Reports

After a report has been generated, it can be saved by exporting it in a different file format. Four methods are available for exporting a graph. Two are through the File commands, and the other two are through the pop-up commands. This section describes these four methods.

Save Via File Commands

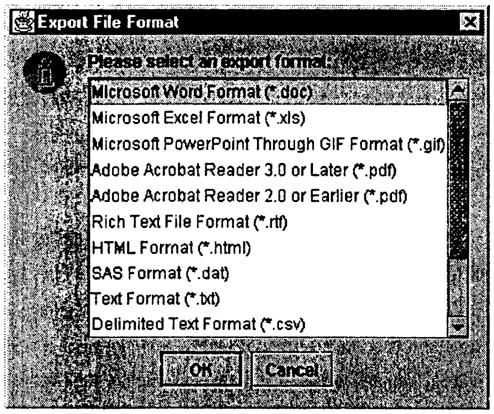
The File menu on each report window contains two commands that allow you to export a report. These commands are Export... and Export Items... . When saving a report, the same procedure is used regardless of which command is used. A report exported using the Export... command contains all the tables in the report and the report header information. A report exported using the Export Items... command includes a separate file for each table in the report. Use the following procedure to export a report.

> **Note:** The files created by the Export Items command do NOT contain the report header information, e.g., classification level or scenario name.



File Commands

1. On the File menu, click the Export... or Export Items... command. The Export File Format window opens.

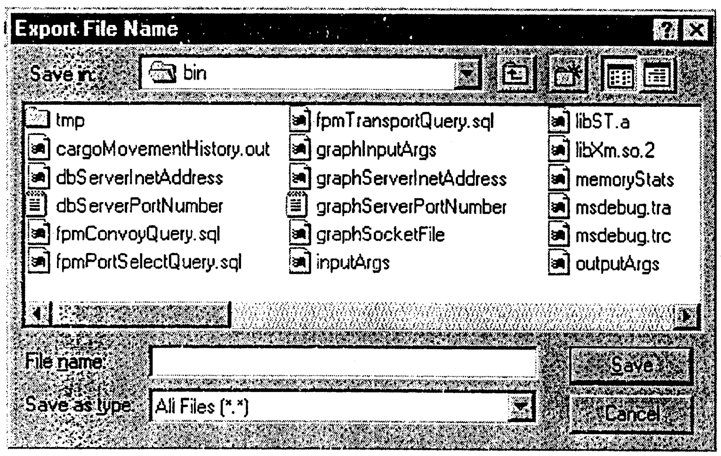


Export File Format Window

2. Scroll down the list box on the Export File Format window until the name of the desired file format is displayed.

3. Click the name of the selected file format. The file format name is highlighted when selected.

4. Click OK. The Export File Name window opens.



Export File Name Window

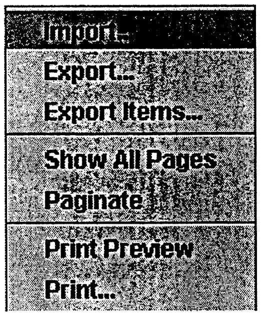
5. Select a "saving location" for the report. That is, identify the location on your computer or network where the file is to be saved and enter it in the Save in: text box on the Export File Name window.

6. Enter a name for this report in the File name: text box.

7. Click Save. The Export File Name window closes and the file is saved in the designated location.

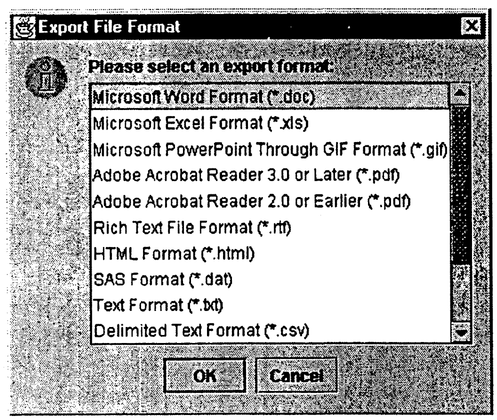
Save Via Report Pop-up Commands

1. Right-click anywhere in the report that is outside a table to display the report pop-up commands window. The pop-up commands window contains the Export... and Export Items... commands that allows you to export a report. Use the following procedure to export a report.



Report Pop-up Commands

2. Click either the Export... or Export Items... command. The Export File Format window opens.

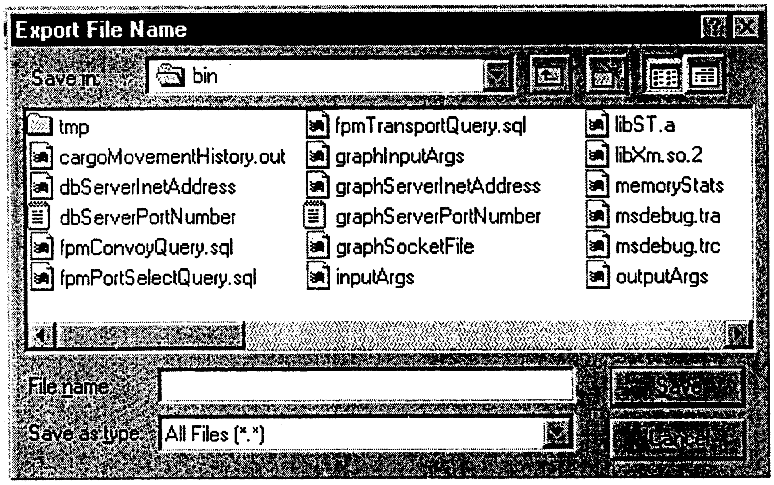


Export File Format Window

3. Scroll down the list box on the Export File Format window until the name of the desired file format is displayed.

4. Click the name of the selected file format. The file format name is highlighted when selected.

5. Click OK. The Export File Name window opens.



Export File Name Window

6. Select a "saving location" for the report. That is, identify the location on your computer or network where the file is to be saved and enter it in the Save in: text box on the Export File Name window.

7. Enter a name for this report in the File name: text box.

8. Click Save. The Export File Name window closes and the file is saved in the designated location.

Save Via Table Pop-up Commands

1. Right-click anywhere in a table to display the table pop-up commands window. The pop-up commands window contains the Export... and Export Items... commands that allows you to export a table. Use the following procedure to export a table.

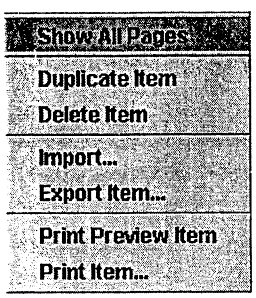
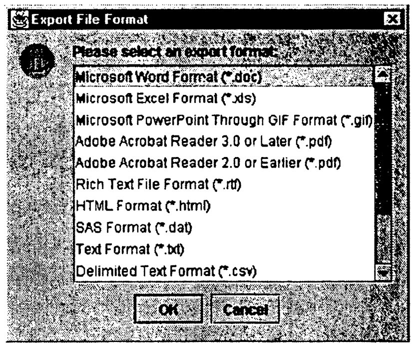


Table Pop-up Commands

2. Click the Export Items... command. The Export File Format window opens.

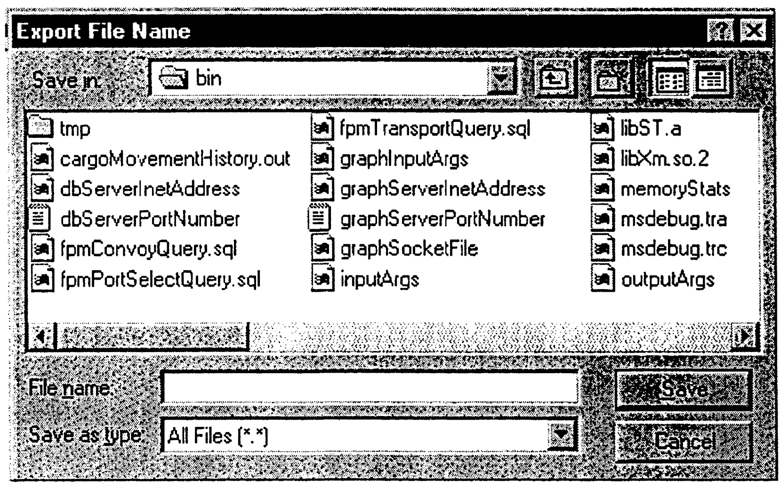


Export File Format Window

3. Scroll down the list box on the Export File Format window until the name of the desired file format is displayed.

4. Click the name of the selected file format. The file format name is highlighted when selected.

5. Click OK. The Export File Name window opens.



Export File Name Window

6. Select a "saving location" for the report. That is, identify the location on your computer or network where the file is to be saved and enter it in the Save in: text box on the Export File Name window.

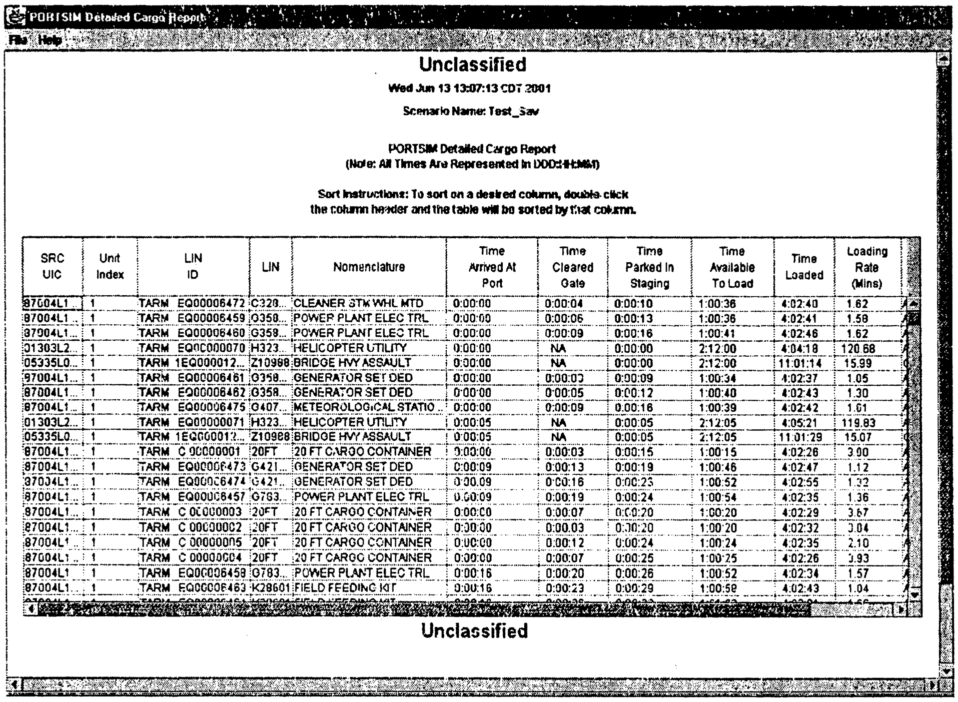
7. Enter a name for this table in the File name: text box.

8. Click Save. The Export File Name window closes and the file is saved in the designated location.

8.4.2 Cargo Report

Use the Cargo Report command to display data on the history of cargo items. On the Simulate window, select Results, then Generate Reports, then Cargo Report. The PORTSIM Detailed Cargo Report window is displayed in a new window.

For information on modifying how the report is displayed and on printing and saving the data, see Section 8.4.1, Working with Reports.



PORTSIM Detailed Cargo Report

File Help

Unclassified

Wed Jun 13 13:07:13 CDT 2001

Scenario Name: Test_Sav

PORTSIM Detailed Cargo Report
(Note: All Times Are Represented In DDD:HH:MM)

Sort Instructions: To sort on a desired column, double-click
the column header and the table will be sorted by that column.

SRC UIC	Unit Index	LIN ID	LIN	Nomenclature	Time Arrived At Port	Time Cleared Gate	Time Parked In Staging	Time Available To Load	Time Loaded	Loading Rate (Mins)
87004L1...	1	TARM EQ00006472	C328...	CLEANER STM WHL MTD	0:00:00	0:00:04	0:00:10	1:00:36	4:02:40	1.62
87004L1...	1	TARM EQ00006459	G358...	POWER PLANT ELEC TRL	0:00:00	0:00:06	0:00:13	1:00:36	4:02:41	1.58
87004L1...	1	TARM EQ00006460	G358...	POWER PLANT ELEC TRL	0:00:00	0:00:09	0:00:16	1:00:41	4:02:46	1.62
01303L2...	1	TARM EQ00000070	H323...	HELICOPTER UTILITY	0:00:00	NA	0:00:00	2:12:00	4:04:18	120.68
05335L0...	1	TARM 1EQ000012...	Z10988	BRIDGE HVY ASSAULT	0:00:00	NA	0:00:00	2:12:00	11:01:14	15.99
87004L1...	1	TARM EQ00006461	G358...	GENERATOR SET DED	0:00:00	0:00:03	0:00:09	1:00:34	4:02:37	1.05
87004L1...	1	TARM EQ00006462	G358...	GENERATOR SET DED	0:00:00	0:00:05	0:00:12	1:00:40	4:02:43	1.30
87004L1...	1	TARM EQ00006475	G407...	METEOROLOGICAL STATIO...	0:00:00	0:00:09	0:00:16	1:00:39	4:02:42	1.61
01303L2...	1	TARM EQ00000071	H323...	HELICOPTER UTILITY	0:00:05	NA	0:00:05	2:12:05	4:05:21	119.83
05335L0...	1	TARM 1EQ000012...	Z10988	BRIDGE HVY ASSAULT	0:00:05	NA	0:00:05	2:12:05	11:01:29	15.07
87004L1...	1	TARM C 00000001	20FT	20 FT CARGO CONTAINER	0:00:00	0:00:03	0:00:15	1:00:15	4:02:26	3.00
87004L1...	1	TARM EQ00006473	G421...	GENERATOR SET DED	0:00:09	0:00:13	0:00:19	1:00:46	4:02:47	1.12
87004L1...	1	TARM EQ00006474	G421...	GENERATOR SET DED	0:00:09	0:00:16	0:00:23	1:00:52	4:02:55	1.32
87004L1...	1	TARM EQ00006457	G783...	POWER PLANT ELEC TRL	0:00:09	0:00:19	0:00:24	1:00:54	4:02:35	1.36
87004L1...	1	TARM C 00000003	20FT	20 FT CARGO CONTAINER	0:00:00	0:00:07	0:00:20	1:00:20	4:02:29	3.67
87004L1...	1	TARM C 00000002	20FT	20 FT CARGO CONTAINER	0:00:00	0:00:03	0:00:20	1:00:20	4:02:32	3.04
87004L1...	1	TARM C 00000005	20FT	20 FT CARGO CONTAINER	0:00:00	0:00:12	0:00:24	1:00:24	4:02:35	2.10
87004L1...	1	TARM C 00000004	20FT	20 FT CARGO CONTAINER	0:00:00	0:00:07	0:00:25	1:00:25	4:02:26	3.93
87004L1	1	TARM EQ00006458	G783...	POWER PLANT ELEC TRL	0:00:16	0:00:20	0:00:26	1:00:52	4:02:34	1.57
87004L1...	1	TARM EQ00006463	K28601	FIELD FEEDING KIT	0:00:16	0:00:23	0:00:29	1:00:58	4:02:43	1.04

Unclassified

PORTSIM Detailed Cargo Report

The PORTSIM Detailed Cargo Report lists every cargo item that entered the port during the simulation. The items are indexed by several types of identification (columns 1-5): the SRC UIC, the Unit Index, the LIN ID (line item number identifier), LIN, and Nomenclature (a standard text identifier). For each item, the report also gives the time that critical events occurred (columns 6-10), gives the loading rate (column 11), and identifies which ship the item was loaded onto (column 12).

Times are given in days, hours, and minutes (DDD:HH:MM). The value NA indicates that the column is not applicable to the item in that row. For information on how to interpret the PORTSIM Detailed Cargo Report, see Appendixes B, C, and D, which discuss how this report was used in three verification studies on the operation of PORTSIM.

Note: When you prepare to print the PORTSIM Detailed Cargo Report, bear these two points in mind. (1) All the columns may not fit on one page, so rows may be split across two pages. (2) Depending on the nature of the scenario, this report can become very long. You can use the Print Preview command to find out how many pages are in the report. You can also use the Print Preview command to select a single page or range of pages for printing (see Section 8.4.1.2).

8.4.3 Cargo Transport Report

Use the Cargo Transport Report command to display data on how cargo items arrived at the port.

On the Simulate window, select Results, then Generate Reports, then Cargo Transport Report. The PORTSIM Detailed Transport Report window is displayed.

For information on modifying how the report is displayed and on printing and saving the data, see Section 8.4.1, Working with Reports.

PORTSIM Detailed Transport Report

File Help

Unclassified

Wed Jun 13 13:18:03 CDT 2001

Scenario Name: Test_Sav

PORTSIM Detailed Transport Report
(Note: All Times Are Represented In DDD:HH:MM)

Sort instructions: To sort on a desired column, double-click the column header and the table will be sorted by that column.

SRC UIC	Unit Index	Transport ID	Transport LIN	LIN ID	LIN	Nomenclature
87004L100	1	TARM EQ00006472	C32887	TARM EQ00006472	C32887	CLEANER STM WHL MTD
87004L100	1	TARM EQ00006459	G35851	TARM EQ00006459	G35851	POWER PLANT ELEC TRL
87004L100	1	TARM EQ00006460	G35851	TARM EQ00006460	G35851	POWER PLANT ELEC TRL
01303L200	1	TARM EQ00000070	H32361	TARM EQ00000070	H32361	HELICOPTER UTILITY
05335L000	1	TARM 1EQ00001231	Z10988	TARM 1EQ00001231	Z10988	BRIDGE HVY ASSAULT
87004L100	1	TARM EQ00006461	G35851	TARM EQ00006461	G35851	GENERATOR SET DED
87004L100	1	TARM EQ00006462	G35851	TARM EQ00006462	G35851	GENERATOR SET DED
87004L100	1	TARM EQ00006475	G40744	TARM EQ00006475	G40744	METEOROLOGICAL STATIO
01303L200	1	TARM EQ00000071	H32361	TARM EQ00000071	H32361	HELICOPTER UTILITY
05335L000	1	TARM 1EQ00001232	Z10988	TARM 1EQ00001232	Z10988	BRIDGE HVY ASSAULT
87004L100	1	TARM HF00000006	40FLAT	TARM C 00000001	20FT	20 FT CARGO CONTAINER
87004L100	1	TARM EQ00006473	G42170	TARM EQ00006473	G42170	GENERATOR SET DED
87004L100	1	TARM EQ00006474	G42170	TARM EQ00006474	G42170	GENERATOR SET DED
87004L100	1	TARM EQ00006457	G78306	TARM EQ00006457	G78306	POWER PLANT ELEC TRL
87004L100	1	TARM HF00000007	40FLAT	TARM C 00000003	20FT	20 FT CARGO CONTAINER
87004L100	1	TARM HF00000006	40FLAT	TARM C 00000002	20FT	20 FT CARGO CONTAINER
87004L100	1	TARM HF00000008	40FLAT	TARM C 00000005	20FT	20 FT CARGO CONTAINER
87004L100	1	TARM HF00000007	40FLAT	TARM C 00000004	20FT	20 FT CARGO CONTAINER
87004L100	1	TARM EQ00006458	G78306	TARM EQ00006458	G78306	POWER PLANT ELEC TRL
87004L100	1	TARM EQ00006463	K28601	TARM EQ00006463	K28601	FIELD FEEDING KIT
87004L100	1	TARM EQ00006464	K28601	TARM EQ00006464	K28601	FIELD FEEDING KIT

Unclassified

PORTSIM Detailed Transport Report

For each cargo item, the PORTSIM Detailed Transport Report records which transport vehicle delivered the item to the port. The transport vehicle is identified on the left, in columns 1-4 (SRC UIC, Unit Index, Transport ID, and Transport LIN), and the cargo item is identified on the right, in columns 5-7 (LIN ID, LIN, and Nomenclature). For example, if LIN ID is the same as Transport ID, then that piece of cargo is a self-propelled item. This report gives some of the same information as the Detailed Cargo Report, but it does not include times or ships.

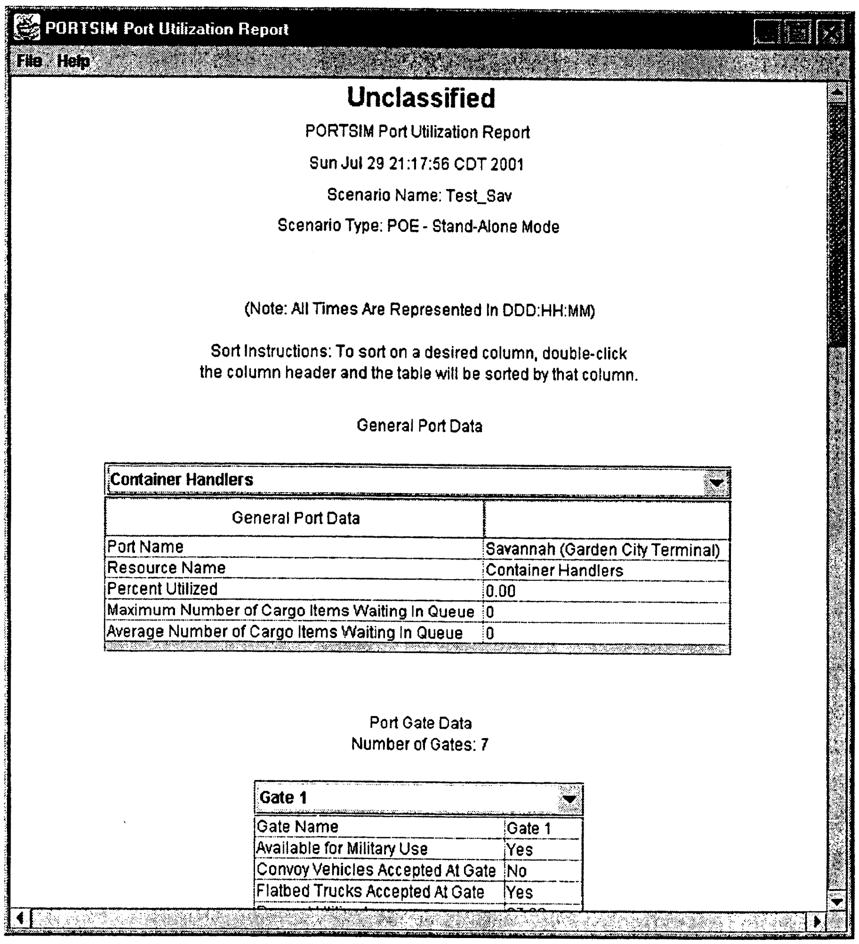
8.4.4 Port Utilization Report

Use the Port Utilization Report command to display summary data on the utilization of port resources. For each resource, the PORTSIM Port Utilization Report provides utilization and summary information. Full details at the daily or hourly level are available on associated graphs; see Section 8.5, Results / Generate Graphs.

8.4.4.1 Procedure to Display Report

1. On the Simulate window, select Results, then Generate Reports, then Port Utilization Report. The PORTSIM Port Utilization Report window is displayed. The results are displayed in tables.

2. Adjust display, if needed. Where there is more than one instance of a resource (e.g., multiple gates), use the list box at the top of the table for that resource to select a specific instance for display. As the default, the report shows one instance of each resource (other than the general port resources), but there are other options for selecting and arranging the data. The details are given in Section 8.4.1, Working with Reports.



PORTSIM Port Utilization Report

8.4.4.2 Report Description

In the PORTSIM Port Utilization Report, resource data are displayed in tables. The title of each table gives the resource name and the total number of that resource (including both military and nonmilitary) available at the port. Times are reported in days, hours, and minutes (DDD:HH:MM), or in hours, depending on whether they reflect "time stamps" or durations, respectively.

The following data tables are displayed. The details provided by these tables are shown in the set of illustrations following the list.

- General Port Data
  - Container Handlers
  - Drivers
  - End Ramps
  - Inspectors
  - Locomotives
- Port Gate Data
- Port Interchange Yard Data
- Port Rail Spur Data
- Port Staging Data
- Port Berth Data

General Port Data

Container Handlers

General Port Data	
Port Name	Savannah (Garden City Terminal)
Resource Name	Container Handlers
Percent Utilized	0.00
Maximum Number of Cargo Items Waiting In Queue	0
Average Number of Cargo Items Waiting In Queue	0

General Port Data Table [select resource from list box; see next illustration]

General Port Data

Locomotives

Container Handlers
Drivers
End Ramps
Inspectors
Locomotives

Average Number of Cargo Items Waiting In Queue	0

General Port Data List Box

Port Gate Data
Number of Gates: 7

Gate 1

Gate Name	Gate 1
Available for Military Use	Yes
Convoy Vehicles Accepted At Gate	No
Flatbed Trucks Accepted At Gate	Yes
Percent Utilized	37.20
Total Busy Time (minutes)	11159.27
Number Served	730
Maximum Service Time (minutes)	20.98

Port Gate Data Table [select gate from list box]

Port Interchange Yard Data
Number of Interchange Yards: 2

Interchange Yard 1

Interchange Yard Name	Interchange Yard 1
Interchange Yard Available for Military Use	Yes
Flatcars Switched To Open Storage	Yes
Boxcars Switched To Covered Storage	No
Number Served	443

Port Interchange Yard Data Table [select interchange yard from list box]

Port Rail Spur Data
Number of Rail Spurs: 31

Spur 1

Spur Name	Spur 1
Available for Military Use	No
Spur Type	OPEN STAGING
Offload Vehicles Using	End Ramp
Tangent Length	1416
Spur Ordering	Vehicles/Unit Equipment Then Containers
Total Number of Railcars Served	0
Number of Vehicles Served	0
Number of Containers Served	0

Port Rail Spur Data Table [select rail spur from list box]

Port Staging Data
Number of Staging Areas: 13

Stage 1

Staging Area Name	Stage 1
Available For Military Use	No
Total Number of Cargo Items Served	0
Number of Wheeled and Towed Vehicles Served	0
Number of Tracked Vehicles Served	0
Number of Containers Served	0
Number of Pallets Served	0
Number of Helicopters Served	0
Number of Residual Equipment Served	0
Wheeled and Towed Vehicles Allowed	Yes
Tracked Vehicles Allowed	Yes
Containers Allowed	Yes
Maximum Length Restriction(ft) (0 represents NO RESTRICTION)	0
Maximum Width Restriction(ft) (0 represents NO RESTRICTION)	0
Maximum Height Restriction(ft) (0 represents NO RESTRICTION)	0
Maximum Weight Restriction(ft) (0 represents NO RESTRICTION)	0

Port Staging Data Table [select staging area from list box]

Port Berth Data
Number of Berths: 6

Berth 1

Berth Name	Berth 1
Berth Available for Military Use	No
Percent Utilized	0.00
Total Busy Time (hours)	0.00
Number of Ships Served	0
Number of Vehicles Served	0
Number of Containers Served	0
Number of Pallets Served	0
Number of Helicopters Served	0
Number of Residual Equipment Served	0
Maximum Service Time (hours)	0.00
Cranes - Percent Utilized	0.00
Cranes - Maximum Length of Queue	0
Cranes - Average Length of Queue	0

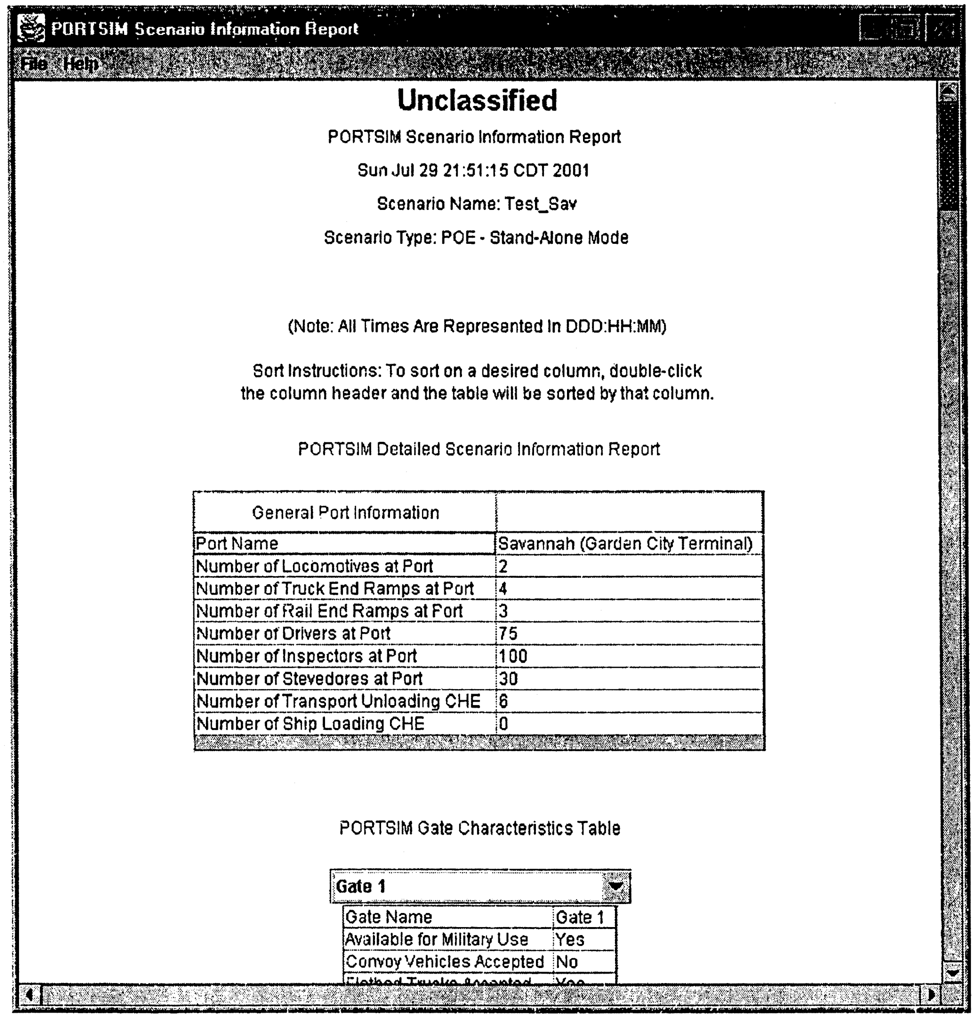
Port Berth Data Table [select berth from list box]

8.4.5 Scenario Information Report

Use the Scenario Information Report command to display all scenario data and parameters used during the simulation run.

8.4.5.1 Procedure to Display Report

1. On the Simulate window, select Results, then Generate Reports, then Scenario Information Report. The PORTSIM Scenario Information Report window is displayed in a new window.



PORTSIM Scenario Information Report

File Help

Unclassified

PORTSIM Scenario Information Report

Sun Jul 29 21:51:15 CDT 2001

Scenario Name: Test_Sav

Scenario Type: POE - Stand-Alone Mode

(Note: All Times Are Represented In DDD:HH:MM)

Sort Instructions: To sort on a desired column, double-click the column header and the table will be sorted by that column.

PORTSIM Detailed Scenario Information Report

General Port Information	
Port Name	Savannah (Garden City Terminal)
Number of Locomotives at Port	2
Number of Truck End Ramps at Port	4
Number of Rail End Ramps at Port	3
Number of Drivers at Port	75
Number of Inspectors at Port	100
Number of Stevedores at Port	30
Number of Transport Unloading CHE	6
Number of Ship Loading CHE	0

PORTSIM Gate Characteristics Table

Gate 1

Gate Name	Gate 1
Available for Military Use	Yes
Convoy Vehicles Accepted	No

PORTSIM Scenario Information Report

2. **Adjust display, as needed.** Where the scenario includes more than one instance of a resource type (e.g., gates), you can choose which instance to display. To display data for a resource, select the appropriate instance in the list box at the top of the table for that resource (e.g., the PORTSIM Gate Characteristics Table). You may need to scroll down the list to locate the resource you want.

   As the default, the report shows one instance of each resource, but there are other options for selecting and arranging the data. For details on displaying reports, see Section 8.4.1, Working with Reports.

3. **Review data.** You may need to scroll down in a table to see all the data for the selected resource.

4. **Record data.** To get a comprehensive printout or file including all scenario data and parameters, use the pagination, printing, and exporting options available by right-clicking on the report (see Section 8.4.1.1, Modifying a Report).

8.4.5.2 Report Overview

Because PORTSIM Scenario Information Report provides a comprehensive picture of the scenario input, you may find it useful to keep this report open for reference while reviewing other reports and graphs.

This report presents the scenario data in several tables, which provide the following *types* of information (the specific tables are shown individually below):

- Infrastructure resources (gates, staging areas, berths, interchange yards, and rail spurs)
- General information (drivers, inspectors, stevedores, end ramps, locomotives, and container handling equipment)
- Force information
- Ship information
- Operational information
- Arrival profile parameters (general and detailed)
- Timing parameters (helicopter, residual equipment, watercraft, vehicle, flatbed, container, railcar, and ship).

8.4.5.3 Report Description

The following illustrations show the tables that are displayed in the default layout of the PORTSIM Scenario Information Report. For some tables, you must select one of multiple instances of a resource to be displayed. In the illustrations, tables for which this option is available are indicated by the phrase "[select <resource name> from list box]."

PORTSIM Detailed Scenario Information Report

General Port Information	
Port Name	Savannah (Garden City Terminal)
Number of Locomotives at Port	2
Number of Truck End Ramps at Port	4
Number of Rail End Ramps at Port	3
Number of Drivers at Port	75
Number of Inspectors at Port	100
Number of Stevedores at Port	30
Number of Transport Unloading CHE	6
Number of Ship Loading CHE	0

PORTSIM Detailed Scenario Information Report, General Port Information (CHE = container handling equipment)

PORTSIM Gate Characteristics Table

Gate 1

Gate Name	Gate 1
Available for Military Use	Yes
Convoy Vehicles Accepted	No
Flatbed Trucks Accepted	Yes

PORTSIM Gate Characteristics Table [select gate from list box]

PORTSIM Staging Area Characteristics Table

Stage 1

Staging Area Name	Stage 1
Available for Military Use	No
Vehicles Require Inspection	Yes
Overall Staging Area Capacity (sq ft)	833,105.00
Capacity for Military Use (sq ft)	833,105.00
Percent Usable for Staging (Lane Factor)	60.00
Capacity Available (With Lane Factor Applied)	499,863.00
Container Stacking Height	3
Handles Wheeled Vehicle Cargo	Yes
Handles Tracked Vehicle Cargo	Yes
Handles Container Cargo	Yes
Maximum Length (ft)	0
Maximum Width (ft)	0
Maximum Height (ft)	0
Maximum Weight (lbs)	0

PORTSIM Staging Area Characteristics Table
[select staging area from list box]

PORTSIM Berth Characteristics Table

Berth 1

Berth Name	Berth 1
Available for Military Use	No
Accepts RORO	Yes
Accepts Container	Yes
Accepts Breakbulk	Yes
Accepts Barge	Yes
Length (ft)	842.00
Depth Alongside At Mean Low Water (ft)	42.00
Deck Strength (psf)	1,000.00
Apron Width (ft)	110.00
Apron Height Above Mean Low Water (ft)	15.00
Apron Length Served By Rail (ft)	842
Number of Cranes	1
Maximum Call Forward	1
Deck Construction	Concrete
Fendering	Wood

PORTSIM Berth Characteristics Table
[select berth from list box]

PORTSIM Interchange Yard Characteristics Table

Interchange Yard 1	
Interchange Yard Name	Interchange Yard 1
Available For Military Use	No
Capacity (Number of Railcars)	208.00
Percentage Usable	0.60
Capacity Available	124.00
Flatcars Switched To Open Storage	Yes
Boxcars Switched To Covered Storage	Yes

PORTSIM Interchange Yard Characteristics Table [select interchange yard from list box]

PORTSIM Rail Spur Characteristics Table

Spur 1	
Rail Spur Name	Spur 1
Available For Military Use	No
Spur Type	OPEN STAGING
Tangent Length (ft)	1416
Spur Ordering	Vehicles/Unit Equipment Then Containers
Offloading Vehicle Using	End Ramp

PORTSIM Rail Spur Characteristics Table [select rail spur from list box]

Force Information

General Force Information	
Force Name	..\data\force\Armored_cmr.lst
Commercial Rail Transport Mode	Yes
Commercial Highway Transport Mode	Yes
Convoy Transport Mode	Yes
Timing Mode	stochastic

Force Information

Ship Information

Algol	
Ship Name	Algol
Trip Number	1
Stow Factor	0.82
Draft (ft)	37.00
Accepts Vehicles	Y
Accepts Containers	Y
Accepts Pallets	Y
Accepts Helicopters	Y
Accepts Residual Equipment	Y
Accepts Watercraft	Y
Breakbulk Capacity (MTONS)	0.00
Container Capacity (sqft)	34,860.00
RORO Capacity (sqft)	188,820.00
Maximum Wait Without Loading (hrs.)	6.00
Vehicle RORO Loading Time (minutes)	3.50
Vehicle RORO Loading Time One-Half Range (+/-)	1.00
Vehicle LOLO Loading Time (minutes)	3.50
Vehicle LOLO Loading Time One-Half Range (+/-)	1.00
Vehicle Containers Loading Time (minutes)	4.00
Vehicle Containers Loading Time One-Half Range (+/-)	1.00
Vehicle Helicopters Loading Time (minutes)	150.00
Vehicle Helicopters Loading Time One-Half Range (+/-)	30.00
Vehicle Watercraft Loading Time (minutes)	420.00
Vehicle Watercraft Loading Time One-Half Range (+/-)	50.00
Vehicle Residual Equipment Loading Time (minutes)	210.00
Vehicle Residual Equipment Loading Time One-Half Range (+/-)	30.00
Vehicle Pallets Loading Time (minutes)	3.00
Vehicle Pallets Loading Time One-Half Range (+/-)	1.00
User Assigned Berth (Model Override When Appropriate)	Berth 3
	Berth 4

Ship Information [select ship from list box]

Operational Information

General Operational Information	
Amount of Time To Simulate (Hrs)	500.00
Ship Arrival Mode	User Specifies Arrival Rate

Operational Information

General Arrival Profile Parameters

General Arrival Profile Information	
Number of Vehicles Per Convoy Arriving	3
Number of Flatbeds Per Group Arriving	10
Number of Ships Per Group Arriving	3
Number of Railcars Per Train Arriving	65
Number of Helicopters Per Group Arriving	1
Number of Residual Equipment Per Group Arriving	1
Number of Watercraft Per Group Arriving	1

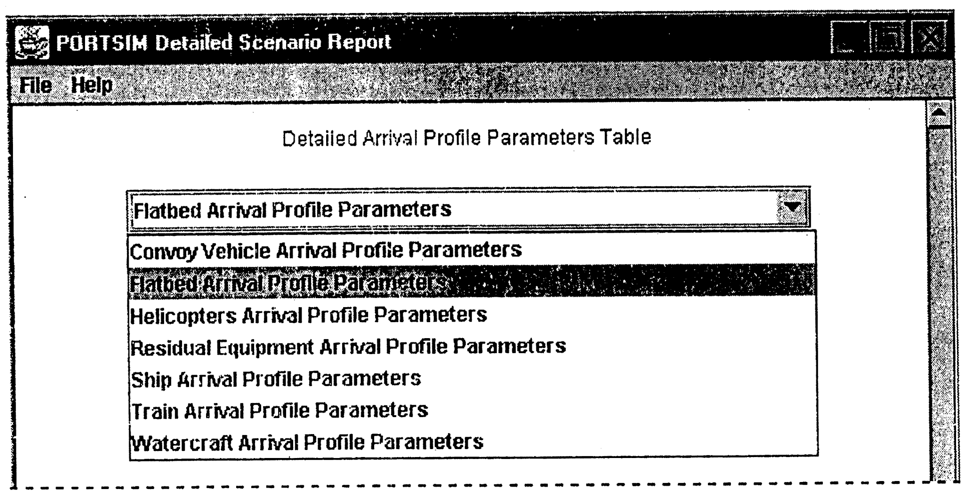
General Arrival Profile Parameters

Detailed Arrival Profile Parameters Table

Convoy Vehicle Arrival Profile Parameters

Name	Convoy Vehicle Arrival Profile Parameters
Time to Begin Simulating Arrivals	0.00
Average Time Between Arrivals	5.00
Number of Vehicles Per Convoy Arriving	3

Detailed Arrival Profile Parameters Table
[select arrival parameter from list box; see next illustration]



Detailed Arrival Profile Parameters List Box

Helicopter Timing Parameters		
Process Name	Mean Time (minutes)	One-Half Range (+/-)
Dwell Time	3600.00	0.00

Helicopter Timing Parameters

Residual Equipment Timing Parameters		
Process Name	Mean Time (minutes)	One-Half Range (+/-)
Dwell Time	3600.00	0.00

Residual Equipment Timing Parameters

Watercraft Timing Parameters		
Process Name	Mean Time (minutes)	One-Half Range (+/-)
Dwell Time	3600.00	0.00

Watercraft Timing Parameters

Vehicle Timing Parameters		
Process Name	Mean Time (minutes)	One-Half Range (+/-)
Gate Processing	3.00	1.00
Transit Vehicle Gate To Open Staging	1.50	0.50
Transit Vehicle Rail End Ramp To Open Staging	1.50	0.50
Transit Vehicle Truck End Ramp To Open Staging	1.50	0.50
Open Staging Inspection	25.00	5.00
Open Staging Parking	5.00	1.00
Transit Vehicle To Berth	2.00	1.00
Required Dwell Time In Open Staging	1440.00	0.00
Stevedore Process On Ship	2.00	0.50

Vehicle Timing Parameters

Flatbed Timing Parameters		
Process Name	Mean Time (minutes)	One-Half Range (+/-)
Gate Processing Time	3.50	1.50
Transit To End Ramps	2.00	0.50
Transit To Container Handlers	2.50	0.50
Remove Flatbed Tiedowns	3.00	0.50
Offload Vehicle At End Ramp	3.00	1.00
Offload Vehicle With Crane	5.00	1.00
Offload Container at Container Handler	5.00	1.00

Flatbed Timing Parameters

Container Timing Parameters		
Process Name	Mean Time (minutes)	One-Half Range (+/-)
Open Staging Parking	4.00	1.00
Transit Container To Berth	2.00	0.50
Required Dwell Time In Open Staging	1440.00	0.00

Container Timing Parameters

Railcar Timing Parameters		
Process Name	Mean Time (minutes)	One-Half Range (+/-)
Processing At Interchange Yard	120.00	30.00
Couple At Interchange Yard	5.00	1.00
Uncoupe At Spur	10.00	2.00
Switch Interchange Yard To Berth	8.00	2.00
Switch Spur To Interchange Yard	8.00	2.00
Switch Interchange Yard To Spur	8.00	2.00
Switch Interchange Yard To Dock	8.00	2.00
Remove Flatcar Tiedowns	5.00	1.00
Discharge Vehicle Using End Ramp	3.00	1.00
Discharge Vehicle Using Crane	5.00	1.00
Discharge Container At Spur	5.00	2.00
Uncouple At Interchange Yard	10.00	2.00
Couple At Spur	5.00	1.00
Switch Dock To Interchange Yard	8.00	2.00
Switch Berth To Interchange Yard	9.00	2.00

Railcar Timing Parameters

Ship Timing Parameters		
Process Name	Mean Time (minutes)	One-Half Range (+/-)
Ship Berthing Time	180.00	60.00
Ship Deberthing Time	180.00	60.00

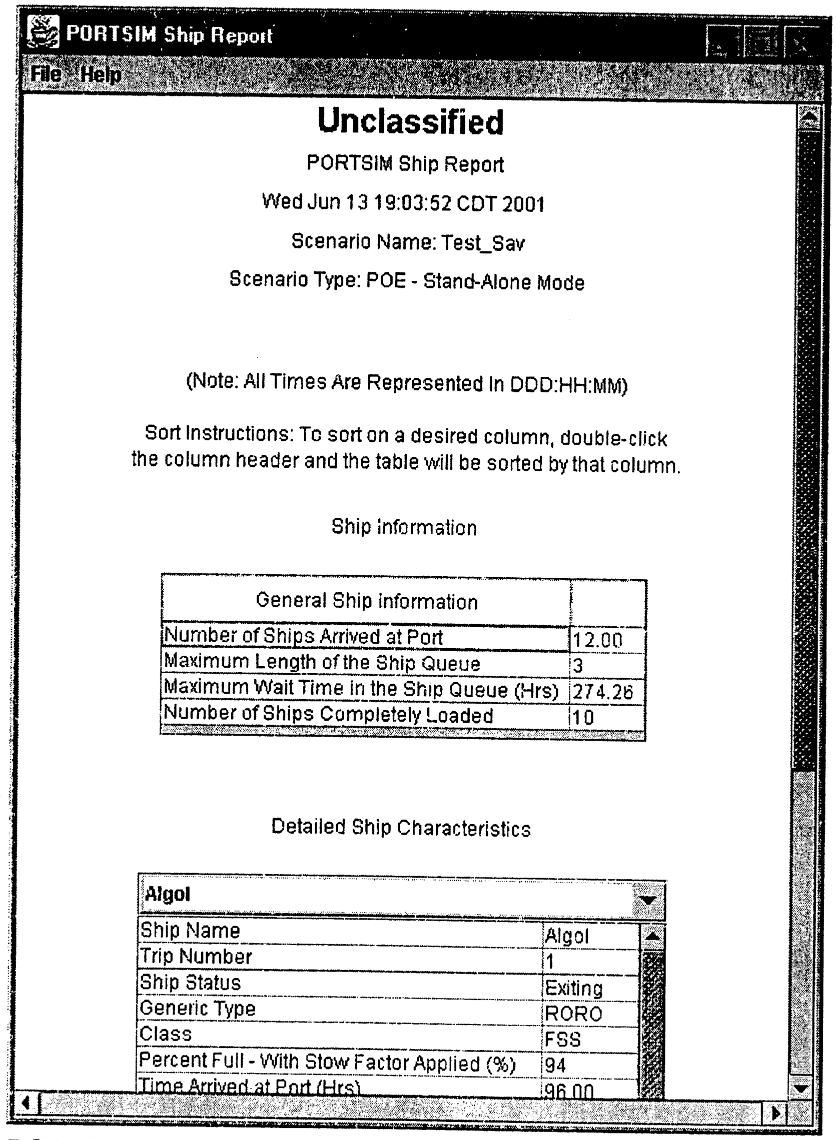
Ship Timing Parameters

8.4.6 Ship Report

Use the Ship Report command to display simulation results for ships

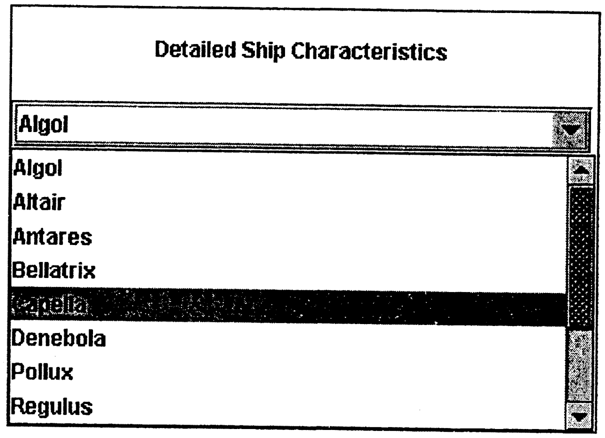
8.4.6.1 Procedure to Display Report

1. On the Simulate window, select Results, then Generate Reports, then Ship Report. The PORTSIM Ship Report window is displayed.



PORTSIM Ship Report Window

2. **Select ship.** The default layout displays data for a single ship. To display data for a different ship, select that ship in the list box at the top of the Detailed Ship Characteristics table. You may need to scroll down the list to locate the ship you want. You can also modify the appearance of the report so that data for several ships are displayed. (For details on displaying reports, see Section 8.4.1).



Detailed Ship Characteristics List Box
[selected ship highlighted]

3. **Review data.** You may need to scroll down in the Detailed Ship Characteristics table to see all the data for the selected ship.

4. **Display all data.** To get a comprehensive display, printout, or file including all ship results, use the pagination, printing, and exporting options available by right-clicking (see Section 8.4.1, Working with Reports). For example, the Show All Pages option allows you to display all ships individually in separate tables within the PORTSIM Ship Report.

8.4.6.2 Report Description

The following two illustrations show the results that are displayed in the PORTSIM Ship Report. Times are given in hours.

Ship Information

General Ship Information	
Number of Ships Arrived at Port	12.00
Maximum Length of the Ship Queue	3
Maximum Wait Time in the Ship Queue (Hrs)	274.26
Number of Ships Completely Loaded	10

Ship Information

Detailed Ship Characteristics
Algol

Ship Name	Algol
Trip Number	1
Ship Status	Exiting
Generic Type	RORO
Class	FSS
Percent Full - With Stow Factor Applied (%)	94
Time Arrived at Port (Hrs)	96.00
Time Waited In Ship Queue (Hrs)	0.00
Time Needed to Dock at Berth (Hrs)	3.98
Time Arrived at Berth (Hrs)	99.98
Berth Arrived At	Berth 3
Total Service Time (Hrs)	16.07
Time Left Berth (Hrs)	121.31
Total Number of Cargo Items	1130
Total Number of Vehicles	1022
Total Number of Containers	108
Total Number of Helicopters	9
Total Number of Residual Equipment	0
Total Number of Watercraft	0
Total Number of Pallets	0
Total Square Feet	169247
Total Short TONS (STONs)	12039
Total Measurement TONS (MTONs)	31395

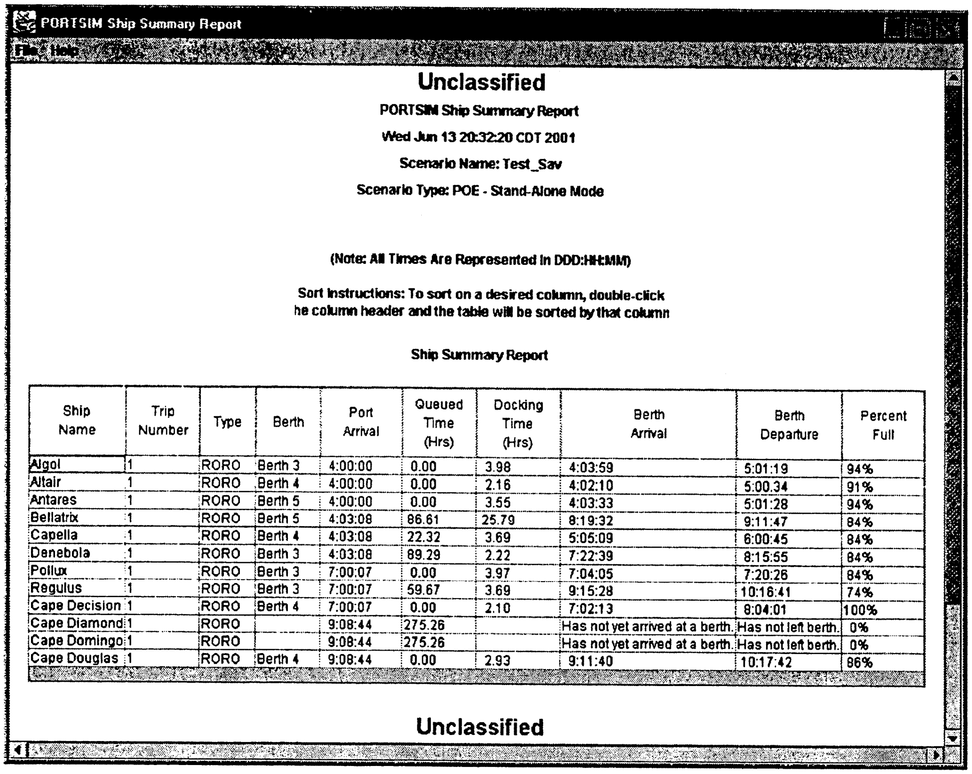
Detailed Ship Characteristics

8.4.7 Ship Summary Report

Use the Ship Summary Report command to display a summary of ship activity during the embarkation operation.

On the Simulate window, select Results, then Generate Reports, then Ship Summary Report. The PORTSIM Ship Summary Report window is displayed.

This report can be used in conjunction with the Ship Report to provide a convenient overview of the timing of ship movements.



PORTSIM Ship Summary Report

Unclassified

PORTSIM Ship Summary Report

Wed Jun 13 20:32:20 CDT 2001

Scenario Name: Test_Sav

Scenario Type: POE - Stand-Alone Mode

(Note: All Times Are Represented In DDD:HH:MM)

Sort Instructions: To sort on a desired column, double-click
he column header and the table will be sorted by that column

Ship Summary Report

Ship Name	Trip Number	Type	Berth	Port Arrival	Queued Time (Hrs)	Docking Time (Hrs)	Berth Arrival	Berth Departure	Percent Full
Algol	1	RORO	Berth 3	4:00:00	0.00	3.98	4:03:59	5:01:19	94%
Altair	1	RORO	Berth 4	4:00:00	0.00	2.16	4:02:10	5:00.34	91%
Antares	1	RORO	Berth 5	4:00:00	0.00	3.55	4:03:33	5:01:28	94%
Bellatrix	1	RORO	Berth 5	4:03:08	86.61	25.79	8:19:32	9:11:47	84%
Capella	1	RORO	Berth 4	4:03:08	22.32	3.69	5:05:09	6:00:45	84%
Denebola	1	RORO	Berth 3	4:03:08	89.29	2.22	7:22:39	8:15:55	84%
Pollux	1	RORO	Berth 3	7:00:07	0.00	3.97	7:04:05	7:20:26	84%
Regulus	1	RORO	Berth 3	7:00:07	59.67	3.69	9:15:28	10:16:41	74%
Cape Decision	1	RORO	Berth 4	7:00:07	0.00	2.10	7:02:13	8:04:01	100%
Cape Diamond	1	RORO		9:08:44	275.26		Has not yet arrived at a berth.	Has not left berth.	0%
Cape Domingo	1	RORO		9:08:44	275.26		Has not yet arrived at a berth.	Has not left berth.	0%
Cape Douglas	1	RORO	Berth 4	9:08:44	0.00	2.93	9:11:40	10:17:42	86%

Unclassified

PORTSIM Ship Summary Report

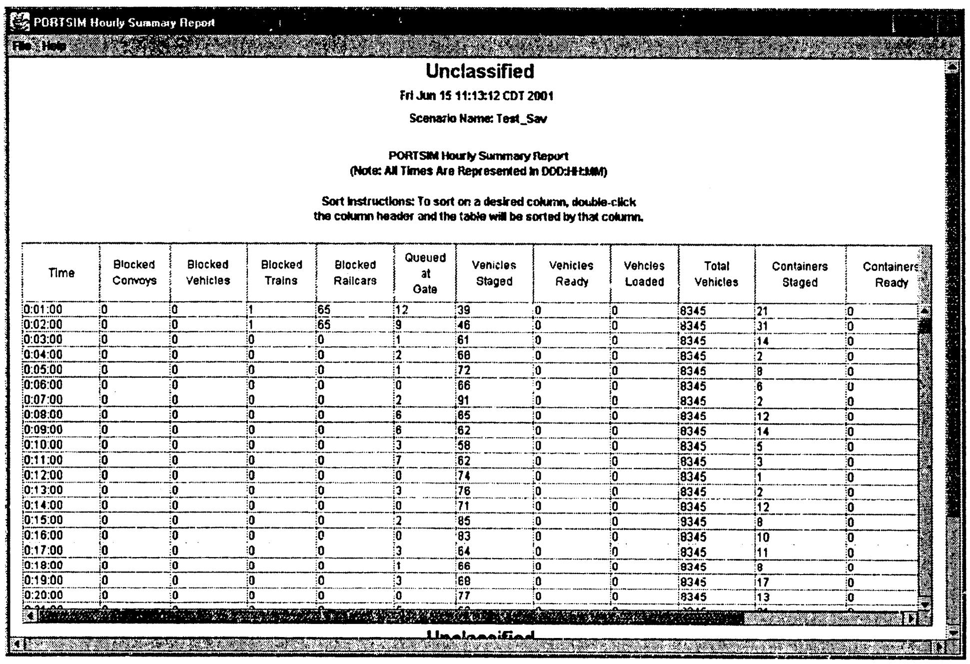
8.4.8 Hourly Summary Report

Use the Hourly Summary Report command to display summary data on the processing and loading of cargo.

8.4.8.1 Procedure to Display Report

1. On the Simulate window, select Results, then Generate Reports, then Hourly Summary Report. The PORTSIM Hourly Summary Report window is displayed.

2. View data. You may need to scroll horizontally to see all the columns. The second illustration below shows all of the columns available on this report. Depending on the length of the simulation, this report may take up many pages. You may want to use the Print Preview command to locate and print only the pages of interest (see Section 8.4.1, Working with Reports).



PORTSIM Hourly Summary Report

File Help

Unclassified

Fri Jun 15 11:13:12 CDT 2001

Scenario Name: Test_Sav

PORTSIM Hourly Summary Report
(Note: All Times Are Represented In DDD:HH:MM)

Sort Instructions: To sort on a desired column, double-click the column header and the table will be sorted by that column.

Time	Blocked Convoys	Blocked Vehicles	Blocked Trains	Blocked Railcars	Queued at Gate	Vehicles Staged	Vehicles Ready	Vehcles Loaded	Total Vehicles	Containers Staged	Containers Ready
0:01:00	0	0	1	65	12	39	0	0	8345	21	0
0:02:00	0	0	1	65	9	46	0	0	8345	31	0
0:03:00	0	0	0	0	1	61	0	0	8345	14	0
0:04:00	0	0	0	0	2	68	0	0	8345	2	0
0:05:00	0	0	0	0	1	72	0	0	8345	8	0
0:06:00	0	0	0	0	0	66	0	0	8345	6	0
0:07:00	0	0	0	0	2	91	0	0	8345	2	0
0:08:00	0	0	0	0	6	65	0	0	8345	12	0
0:09:00	0	0	0	0	6	62	0	0	8345	14	0
0:10:00	0	0	0	0	3	58	0	0	8345	5	0
0:11:00	0	0	0	0	7	62	0	0	8345	3	0
0:12:00	0	0	0	0	0	74	0	0	8345	1	0
0:13:00	0	0	0	0	3	76	0	0	8345	2	0
0:14:00	0	0	0	0	0	71	0	0	8345	12	0
0:15:00	0	0	0	0	2	85	0	0	9345	8	0
0:16:00	0	0	0	0	0	83	0	0	8345	10	0
0:17:00	0	0	0	0	3	64	0	0	8345	11	0
0:18:00	0	0	0	0	1	66	0	0	8345	8	0
0:19:00	0	0	0	0	3	68	0	0	8345	17	0
0:20:00	0	0	0	0	0	77	0	0	8345	13	0

PORTSIM Hourly Summary Report

	"Snapshot" Transport Data					"Hourly" Vehicle Data				"Hourly" Container Data			
Time	Blocked Convoys	Blocked Vehicles	Blocked Trains	Blocked Railcars	Queued at Gate	Vehicles Staged	Vehicles Ready	Vehicles Loaded	Total Vehicles	Containers Staged	Containers Ready	Containers Loaded	Total Containers
0:01:00	0	0	1	65	12	40	0	0	8345	20	0	0	294
0:02:00	0	0	1	65	9	45	0	0	8345	32	0	0	294
0:03:00	0	0	0	0	1	61	0	0	8345	15	0	0	294
0:04:00	0	0	0	0	2	69	0	0	8345	1	0	0	294
0:05:00	0	0	0	0	1	71	0	0	8345	8	0	0	294
0:06:00	0	0	0	0	0	62	0	0	8345	7	0	0	294

All Data Fields in Hourly Summary Report

8.4.8.2 Report Description

The Hourly Summary Report includes two kinds of data fields: "snapshot" fields, which capture the simulation state at the *end* of each hour, and "hourly" fields, which reflect total activity over the previous hour. The two types of fields are labeled on the preceding illustration.

The following definitions apply.

- Time —The hour for which results are reported; e.g., 0:02:00 represents simulation time 0:01:00 up to 0:02:00 (in days, hours and minutes [DDD:HH:MM]).

The snapshot fields are interpreted as follows:

- Blocked [Convoys, Vehicles, Trains, Railcars] — The number of each transport asset waiting outside the port at the end of the hour period because space is not available in staging areas or interchange yards.

- Queued at Gate — The number of each transport asset waiting to be processed at the end of the hour period (space is available in staging area).

The hourly fields are interpreted as follows for vehicles (the fields for containers have the same meanings):

- Vehicles Staged — The number of vehicles that enter a staging area during the hour.

- Vehicles Ready — The number of vehicles in staging that became available to load during the hour.

- Vehicles Loaded — The number of vehicles that moved out of staging and were loaded onto a ship during the hour.

- Total Vehicles — The total number of vehicles involved in the entire embarkation operation during the hour.

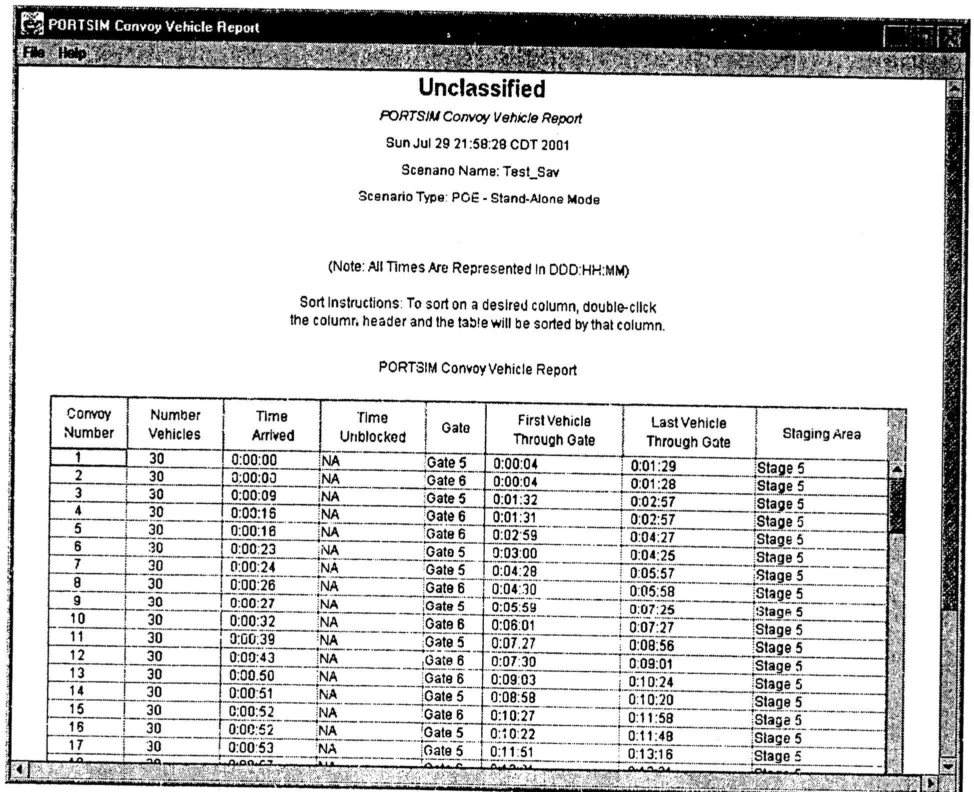
8.4.9 Convoy Summary Report

Use the Convoy Summary Report command to display summary data on the processing of convoyed vehicles into staging.

8.4.9.1 Procedure to Display Report

On the Simulate window, select Results, then Generate Reports, then Convoy Summary Report. The PORTSIM Convoy Vehicle Report window is displayed.

Depending on the length and complexity of the simulation, this report may take up many pages. If necessary, you can use the Print Preview command to locate and print only the pages of interest. You can also sort the data and modify the sequence of columns (see Section 8.4.1, Working with Reports).


PORTSIM Convoy Vehicle Report
File Help

Unclassified

PORTSIM Convoy Vehicle Report

Sun Jul 29 21:58:28 CDT 2001

Scenario Name: Test_Sav

Scenario Type: POE - Stand-Alone Mode

(Note: All Times Are Represented In DDD:HH:MM)

Sort Instructions: To sort on a desired column, double-click the column header and the table will be sorted by that column.

PORTSIM Convoy Vehicle Report

Convoy Number	Number Vehicles	Time Arrived	Time Unblocked	Gate	First Vehicle Through Gate	Last Vehicle Through Gate	Staging Area
1	30	0:00:00	NA	Gate 5	0:00:04	0:01:29	Stage 5
2	30	0:00:00	NA	Gate 6	0:00:04	0:01:28	Stage 5
3	30	0:00:09	NA	Gate 5	0:01:32	0:02:57	Stage 5
4	30	0:00:16	NA	Gate 6	0:01:31	0:02:57	Stage 5
5	30	0:00:16	NA	Gate 6	0:02:59	0:04:27	Stage 5
6	30	0:00:23	NA	Gate 5	0:03:00	0:04:25	Stage 5
7	30	0:00:24	NA	Gate 5	0:04:28	0:05:57	Stage 5
8	30	0:00:26	NA	Gate 6	0:04:30	0:05:58	Stage 5
9	30	0:00:27	NA	Gate 5	0:05:59	0:07:25	Stage 5
10	30	0:00:32	NA	Gate 6	0:06:01	0:07:27	Stage 5
11	30	0:00:39	NA	Gate 5	0:07:27	0:08:56	Stage 5
12	30	0:00:43	NA	Gate 6	0:07:30	0:09:01	Stage 5
13	30	0:00:50	NA	Gate 6	0:09:03	0:10:24	Stage 5
14	30	0:00:51	NA	Gate 5	0:08:58	0:10:20	Stage 5
15	30	0:00:52	NA	Gate 6	0:10:27	0:11:58	Stage 5
16	30	0:00:52	NA	Gate 5	0:10:22	0:11:48	Stage 5
17	30	0:00:53	NA	Gate 5	0:11:51	0:13:16	Stage 5

PORTSIM Convoy Vehicle Report

8.4.9.2 Report Description

The Convoy Vehicle Report provides the following data on each convoy:

- Convoy number.
- Number [of] vehicles.
- Time Arrived in days, hours, and minutes (DDD:HH:MM).
- Time Unblocked: time in days, hours, and minutes (DDD:HH:MM) that the convoy was assigned space in the staging area. A value of NA indicates the convoy was assigned space immediately and was never blocked.
- Gate to which the convoy was assigned.
- First Vehicle Through Gate: time in days, hours, and minutes (DDD:HH:MM).
- Last Vehicle Through Gate: time in days, hours, and minutes (DDD:HH:MM).
- Staging Area to which convoy was assigned.

If you abort the simulation, the Convoy Vehicle Report shows only the convoys that had already arrived at the time the simulation was stopped.

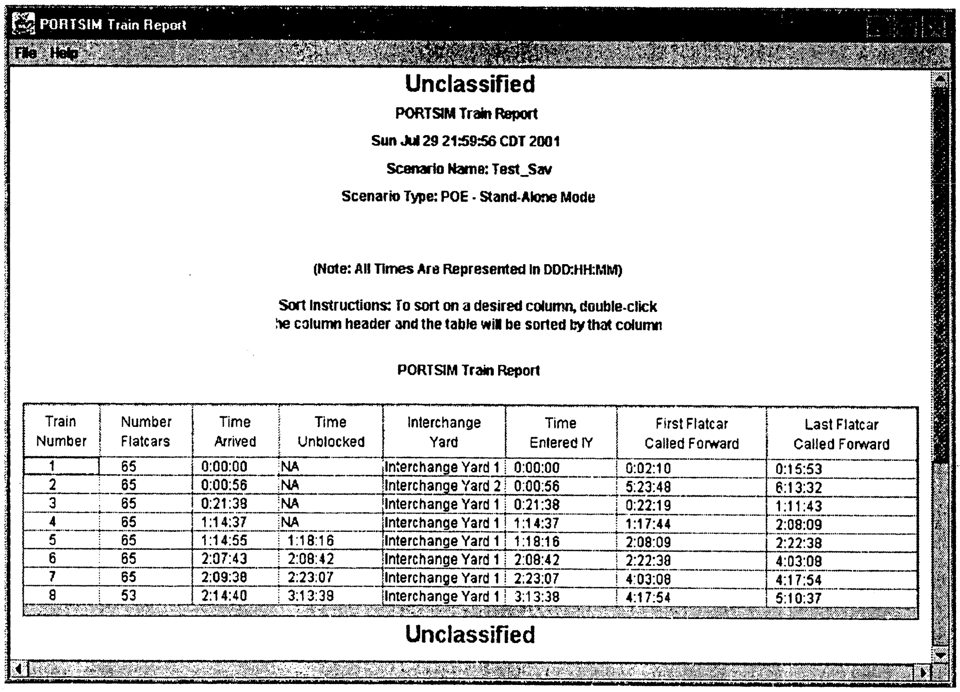
8.4.10 Train Summary Report

Use the Train Summary Report command to display summary data on the processing of railcars into interchange yards.

8.4.10.1 Procedure to Display Report

On the Simulate window, select Results, then Generate Reports, then Train Summary Report. The PORTSIM Train Report window is displayed.

Depending on the length or complexity of the simulation, this report may take up many pages. You may want to use the Print Preview command to locate and print only the pages of interest (see Section 8.4.1, Working with Reports).



PORTSIM Train Report

File Help

Unclassified

PORTSIM Train Report

Sun Jul 29 21:59:56 CDT 2001

Scenario Name: Test_Sav

Scenario Type: POE - Stand-Alone Mode

(Note: All Times Are Represented In DDD:HH:MM)

Sort Instructions: To sort on a desired column, double-click the column header and the table will be sorted by that column

PORTSIM Train Report

Train Number	Number Flatcars	Time Arrived	Time Unblocked	Interchange Yard	Time Entered IY	First Flatcar Called Forward	Last Flatcar Called Forward
1	65	0:00:00	NA	Interchange Yard 1	0:00:00	0:02:10	0:15:53
2	65	0:00:56	NA	Interchange Yard 2	0:00:56	5:23:48	6:13:32
3	65	0:21:38	NA	Interchange Yard 1	0:21:38	0:22:19	1:11:43
4	65	1:14:37	NA	Interchange Yard 1	1:14:37	1:17:44	2:08:09
5	65	1:14:55	1:18:16	Interchange Yard 1	1:18:16	2:08:09	2:22:38
6	65	2:07:43	2:08:42	Interchange Yard 1	2:08:42	2:22:38	4:03:08
7	65	2:09:38	2:23:07	Interchange Yard 1	2:23:07	4:03:08	4:17:54
8	53	2:14:40	3:13:38	Interchange Yard 1	3:13:38	4:17:54	5:10:37

Unclassified

PORTSIM Train Report

8.4.10.2 Report Description

The Train Report provides the following data on each train:

- Train Number
- Number [of] flatcars.
- Time Arrived in days, hours, and minutes (DDD:HH:MM).
- Time Unblocked: time in days, hours, and minutes (DDD:HH:MM) that the train was assigned space in the interchange yard. A value of NA indicates the train was assigned space immediately and was never blocked.
- Interchange Yard (IY) to which the train was assigned.
- Time Entered IY in days, hours, and minutes (DDD:HH:MM).
- First Flatcar Called Forward: time in days, hours, and minutes (DDD:HH:MM).
- Last Flatcar Called Forward: time in days, hours, and minutes (DDD:HH:MM).

If you abort the simulation, the Train Report shows only the trains that had already arrived at the time the simulation was stopped.

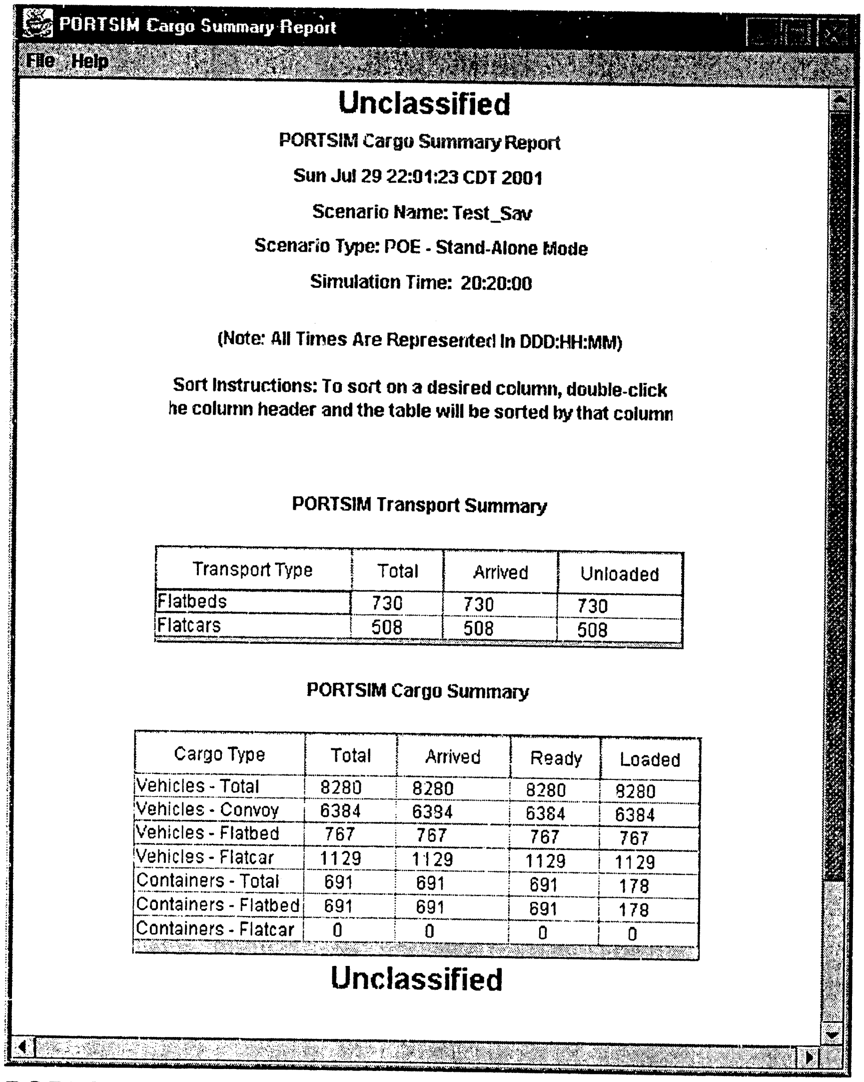
8.4.11 Cargo Summary Report

Use the Cargo Summary Report command to display summary data on the processing and loading of cargo.

8.4.11.1 Procedure to Display Report

On the Simulate window, select Results, then Generate Reports, then Cargo Summary Report. The PORTSIM Cargo Summary Report window is displayed.

Depending on the length of the simulation, this report may take up many pages. You may want to use the Print Preview command to locate and print only the pages of interest (see Section 8.4.1, Working with Reports).



PORTSIM Cargo Summary Report

File Help

Unclassified

PORTSIM Cargo Summary Report

Sun Jul 29 22:01:23 CDT 2001

Scenario Name: Test_Sav

Scenario Type: POE - Stand-Alone Mode

Simulation Time: 20:20:00

(Note: All Times Are Represented In DDD:HH:MM)

Sort Instructions: To sort on a desired column, double-click he column header and the table will be sorted by that column

PORTSIM Transport Summary

Transport Type	Total	Arrived	Unloaded
Flatbeds	730	730	730
Flatcars	508	508	508

PORTSIM Cargo Summary

Cargo Type	Total	Arrived	Ready	Loaded
Vehicles - Total	8280	8280	8280	8280
Vehicles - Convoy	6384	6384	6384	6384
Vehicles - Flatbed	767	767	767	767
Vehicles - Flatcar	1129	1129	1129	1129
Containers - Total	691	691	691	178
Containers - Flatbed	691	691	691	178
Containers - Flatcar	0	0	0	0

Unclassified

PORTSIM Cargo Summary Report

8.4.11.2 Report Description

The data displayed by the Cargo Summary Report are a subset of the data displayed by the Current Status Report (see Section 8.2). The Cargo Summary Report provides two types of data:

1. A transport summary, giving the number of flatbeds and flatcars in each status (total, arrived, and unloaded).

PORTSIM Transport Summary

Transport Type	Total	Arrived	Unloaded
Flatbeds	730	730	730
Flatcars	508	508	508

2. A cargo summary, giving totals in each status (total, arrived, ready, and loaded) for each cargo type (vehicle or container), as well as a breakdown of each type by transport mode (convoy, flatbed, or flatcar).

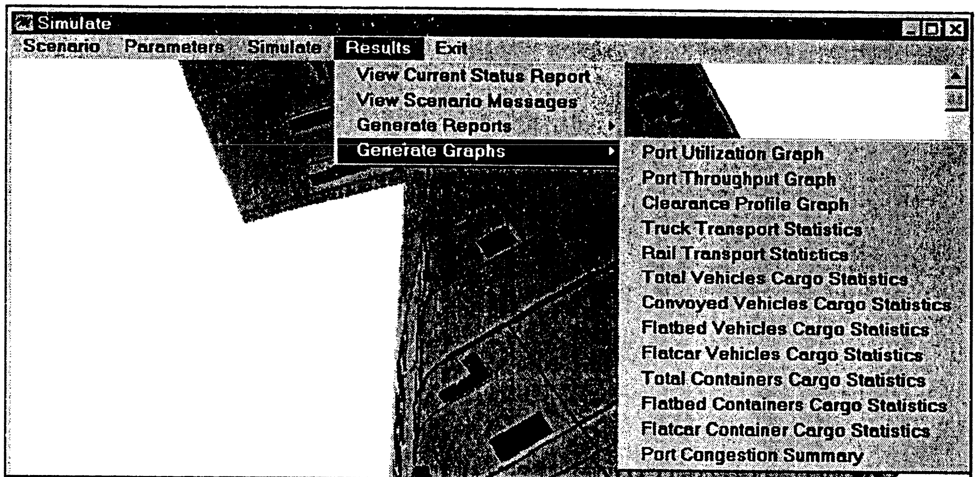
PORTSIM Cargo Summary

Cargo Type	Total	Arrived	Ready	Loaded
Vehicles - Total	8280	8280	8280	8280
Vehicles - Convoy	6384	6384	6384	6384
Vehicles - Flatbed	767	767	767	767
Vehicles - Flatcar	1129	1129	1129	1129
Containers - Total	691	691	691	178
Containers - Flatbed	691	691	691	178
Containers - Flatcar	0	0	0	0

8.5 Results / Generate Graphs

> **Note:** Before you can use the Generate Graphs command, you must first create a scenario (see Section 5.2) or open a scenario (see Section 5.3), and run the scenario simulation (see Section 7.2.1).

Currently, 13 different graphs can be generated from the scenario simulation. This section describes these graphs, how to work with them, and how to use the Results / Generate Graphs command. If a scenario simulation has not been run, the Generate Graphs command is grayed out (i.e., it is not available for use). Refer to Section 8.5.1 for a description of how to work with these graphs. Refer to Sections 8.5.2 through 8.5.14 for a detailed description of each graph.



Generate Graphs Submenu

8.5.1 Working with Graphs

> **Note 1:** Before you can work with a graph, you must first display the graph. Refer to Sections 8.5.2 through 8.5.14 for descriptions of how to display each graph.

> **Note 2:** The Import and Delete Item commands are not intended to be used for graphs.

Accessing Display and Output Commands

The commands for working with graphs can be accessed by two methods. The options available and their output differ slightly depending on which method you choose. To access display and output commands,

- Click on the File menu, at top left of each graph window. This action displays the File commands. These commands act upon the graph as a whole.

  OR

- Right-click within a graph image. This action displays the pop-up commands. These commands act only upon the information in the image from which they were displayed.

The following sections describe how these commands are used to (1) change the appearance of a graph, (2) print a graph, and (3) save a graph.

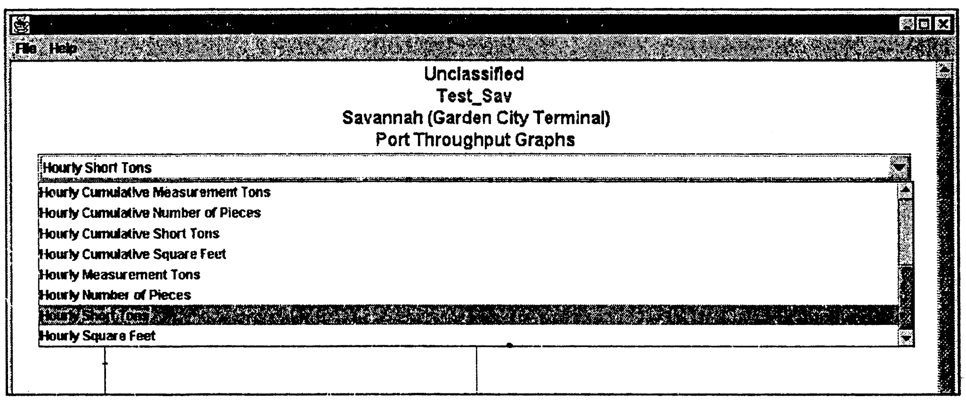
> **Note:** The commands for working with graphs refer to "items." An *item* a single graph image. An item can be printed and saved independently from the graph as a whole.

8.5.1.1 Changing the Appearance of a Graph

When a graph is generated, it is displayed in its default format (e.g., bar graph or area graph) and paginated. Several options are available for changing the appearance of a graph: you can select a different unit of measurement or time interval, expand or collapse the amount of information displayed, change the graph type, and select a detail area. This section describes these options.

Select Unit of Measurement and Time Interval

A drop-down list/scroll box is displayed at the top of the graph when the graph is first generated. The items in this box identify the various levels of detail at which the scenario simulation results can be presented on the graph (e.g., hourly, hourly cumulative, daily, daily cumulative, etc.). This box initially displays in the default format for the chosen graph.



Drop-down List/Scroll Box

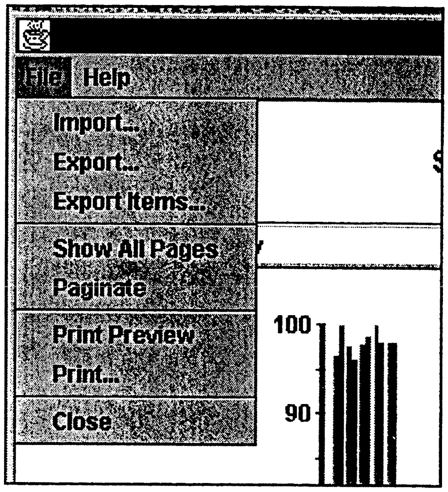
Use the following procedure to use the drop-down list/scroll box to change the units of measurements or time interval.

1. Click the list/scroll box ▼. A drop-down list is displayed.

2. Click the desired item. The drop-down list closes, the selected item is displayed in the drop-down list/scroll box, and a new graph is displayed.

Expand and Collapse Display

Use the Show All Pages and Paginate commands on the the File menu to change the amount of data displayed simultaneously.



File Commands

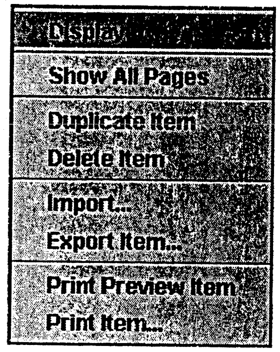
Show All Pages Command. This command is tied directly to the items in the drop-down list/scroll box at the top of each graph. Each item in the drop-down list/scroll box represents a different page of the graph. That is, if the drop-down list/scroll box contains four items, four different graphs are displayed when File / Show All Pages is selected.

Paginate Command: This command is tied directly to the items in the drop-down list/scroll box at the top of each graph. Each item in the drop-down list/scroll box represents a different page of the graph. That is, if the drop-down list/scroll box contains four items and the window contains a graph for each of these items, the graph selected in the drop-down list/scroll box is displayed when File / Paginate is selected.

Change Graph Type

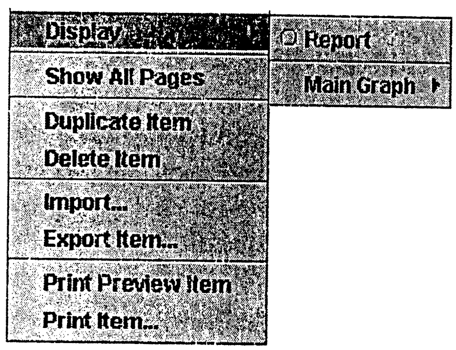
Use the pop-up commands to quickly change the graph from one type to another (i.e., bar graph, pie graph, line graph, and so forth). Use the following procedure to display the scenario simulation results using a different graph type.

1. Right-click anywhere within the graph image area. The pop-up commands window opens.



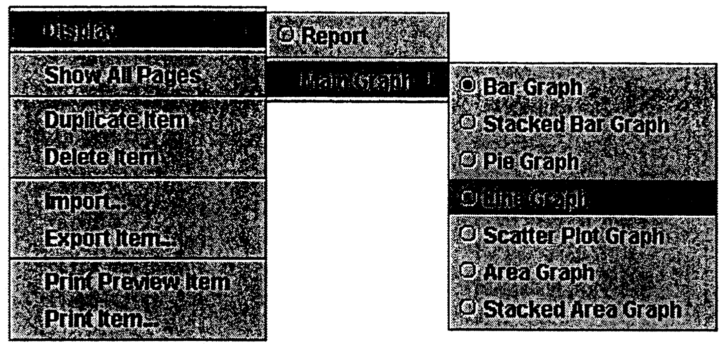
Pop-up Commands

2. Select the Display command. The Report/Main Graph options are displayed.



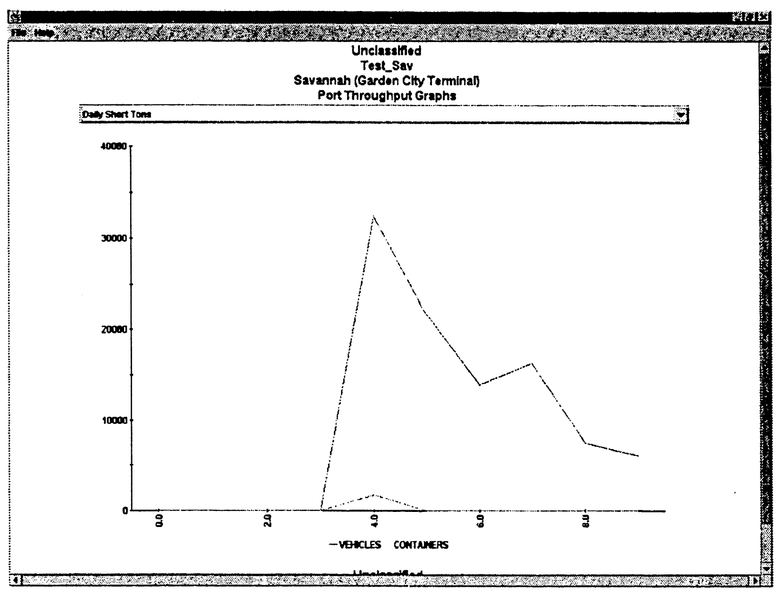
Report/Main Graph Options

3. Select Main Graph. The list of graph types is displayed.



Graph Types

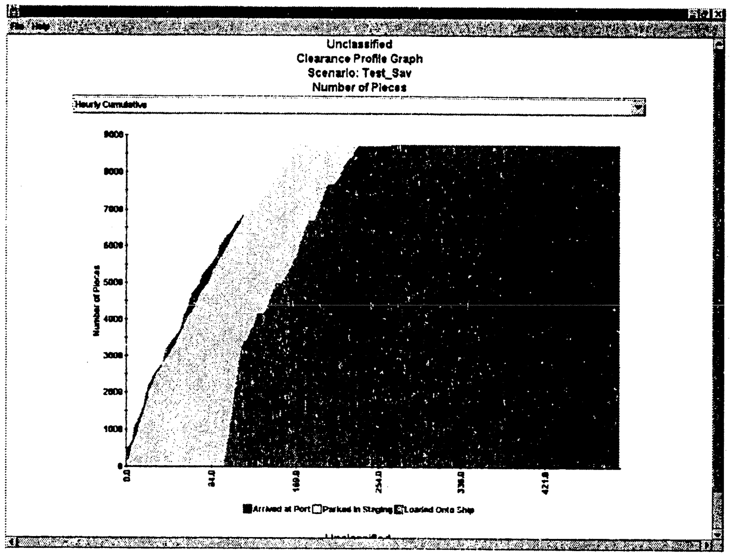
4. Select the type of graph to be displayed. The pop-up commands window closes and the graph is plotted using the new type (e.g., line graph).



Line Graph

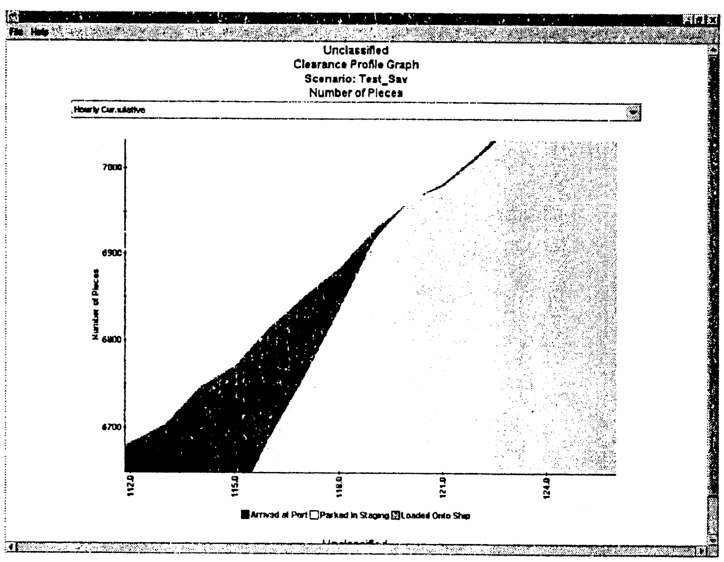
Select Detail Area

A graph displayed for a large scenario or a long-running simulation may not show the detail you want.



Normal Image

To show more detail, place the mouse pointer at the desired location and left-click the mouse. The image is enlarged to show greater detail. Repeat this step to enlarge the image again or press the Enter key to return to the normal-size image.



Enlarged Image

8.5.1.2 Printing Graphs

The graph(s) generated from the scenario simulation results can be printed. Two methods are available for printing graphs:

- Through the File menu Print... command.
- Through the pop-up window Print Item... command.

When the Paginate command is active, only the graph image currently displayed is printed. When the Show All Pages command is active, all data are printed. To display the graph as it will appear on the page before it is printed, select either the Print Preview command on the File menu, or the Print Preview Item command on the pop-up window.

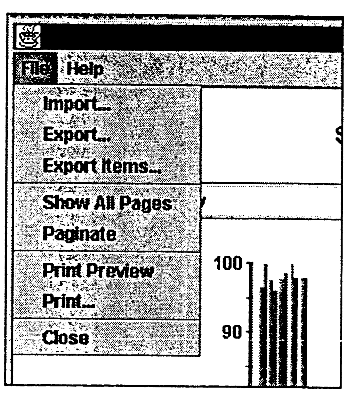
8.5.1.3 Saving Graphs

After a graph has been generated, it can be saved by exporting it in a different file format. Four methods are available for exporting a graph. Two are through the File menu commands, and the other two are through the pop-up commands. This section describes these four methods.

Save Via File Commands

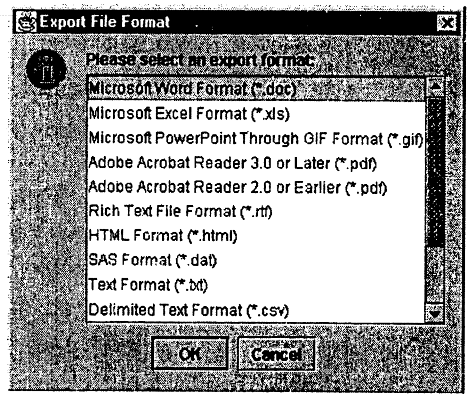
The File menu on each graph window contains two commands that allow you to export a graph. These commands are Export and Export Items... . When saving a graph, the same procedure is used regardless of which command is used. A graph exported using the Export command contains all the graph images and the graph header information. Use the following procedure to export a graph.

> **Note:** A graph exported using the Export Items... command does NOT contain the graph header information, e.g., classification level.



File Commands

1. Click the Export... or Export Items... command. The Export File Format window opens.

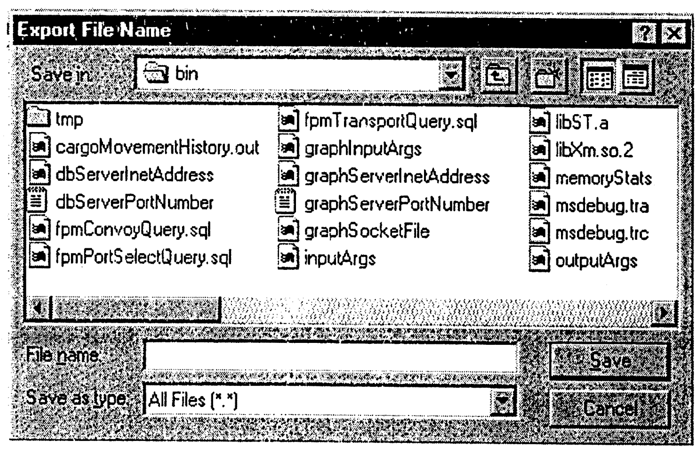


Export File Format Window

2. Scroll down the list box on the Export File Format window until the name of the desired file format is displayed.

3. Click the name of the selected file format. The file format name is highlighted when selected.

4. Click OK. The Export File Name window opens.



Export File Name Window

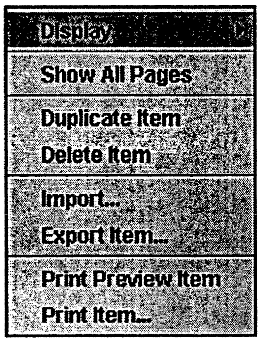
5. Select a "saving location" for the graph. That is, identify the location on your computer or network where the file is to be saved and enter it in the Save in: text box on the Export File Name window.

6. Enter a name for this graph in the File name: text box.

7. Click Save. The Export File Name window closes and the file is saved to the designated location.

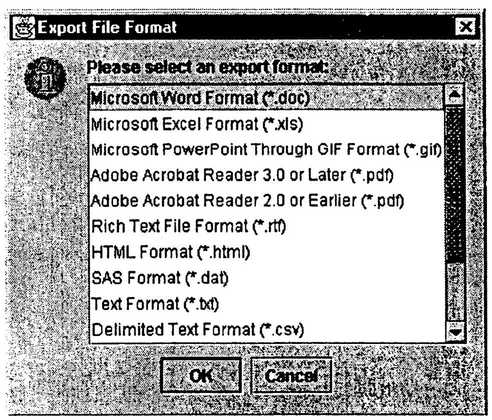
Save Via Pop-up Commands

Click anywhere in the graph image area to display the pop-up window of commands. The pop-up window contains the Export Item... command that allows you to export a graph. Use the following procedure to export a graph.



Pop-up Commands

1. Click the Export Item... command. The Export File Format window opens.

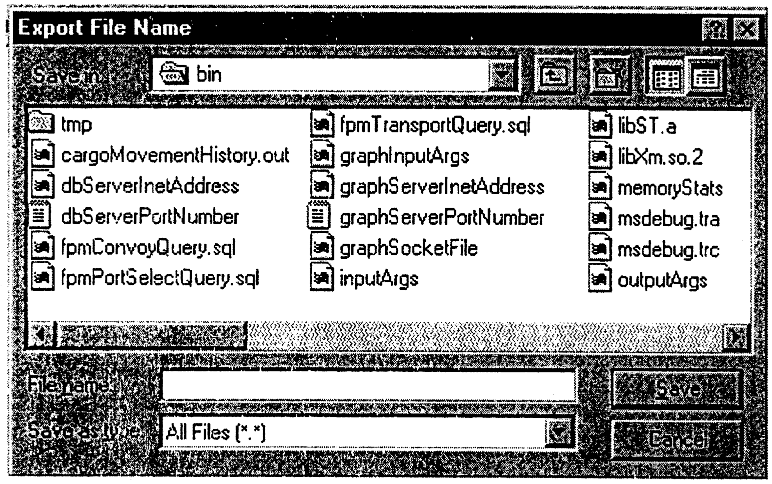


Export File Format Window

2. Scroll down the list box on the Export File Format window until the name of the desired file format is displayed.

3. Click the name of the selected file format. The file format name is highlighted when selected.

4. Click OK. The Export File Name window opens.



Export File Name Window

5. Select a "saving location" for the graph. That is, identify the location on your computer or network where the file is to be saved and enter it in the Save in: text box on the Export File Name window.

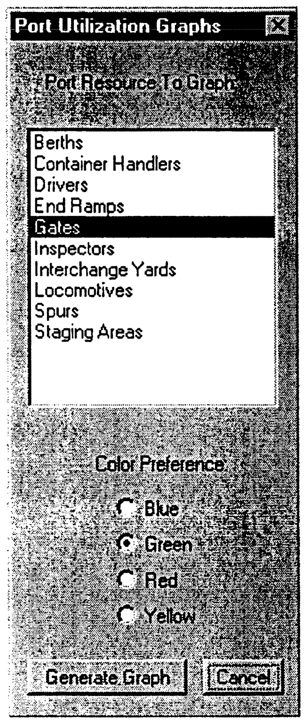
6. Enter a name for this graph in the File name: text box.

7. Click Save. The Export File Name window closes and the file is saved to the designated location.

8.5.2 Port Utilization Graph

A Port Utilization Graph shows when the usage occurs and the percent of usage for a selected port resource (i.e., berths, container handlers, drivers, and so forth). These graphs supplement the information contained in the Port Utilization Report (see Section 8.4.4).

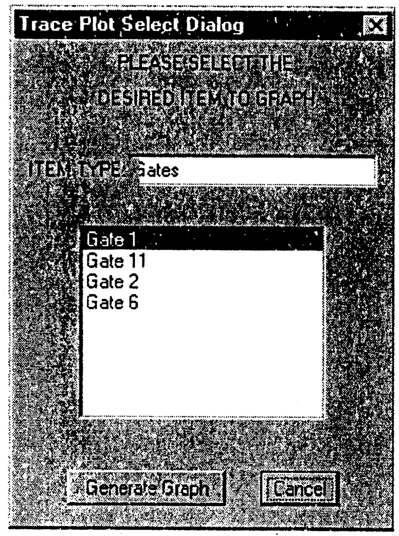
1. **Display the Port Utilization Graphs window.** On the Simulate window, select Results, then Generate Graphs, then Port Utilization Graph. The Port Utilization Graphs window opens. If at any time you want to discontinue generating this graph, click on Cancel.



Port Utilization Graphs Window

2. **Select a port resource and graph color.** On the Port Utilization Graphs window, select the port resource to be graphed (the item is highlighted when selected) and the color it is to be when displayed on the graph.

3. **Generate the graph.** Click the button labeled Generate Graph on the Port Utilization Graphs window. When a port has more than one of the same resource (e.g., berths, gates, staging areas, and so forth), the Trace Plot Select Dialog window opens (continue with Step 4). Otherwise, a window containing the graph opens (skip to Step 5).

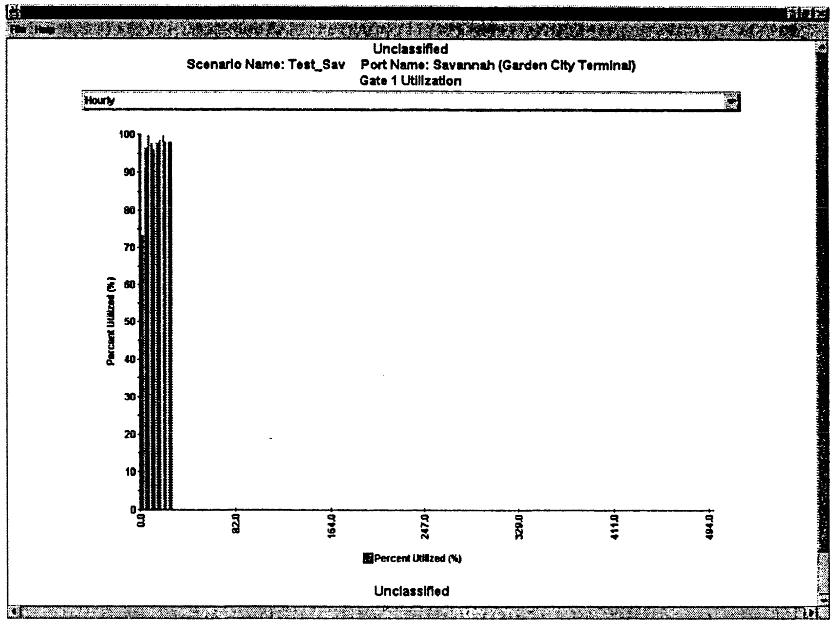


Trace Plot Select Dialog Window

4. **Select a specific port resource.** On the Trace Plot Select Dialog window, select the specific resource to be graphed (the item is highlighted when selected).

5. **View or generate the graph.** Perform one of the following:

   - If the graph is displayed, no action is necessary.
   - If the Trace Plot Select Dialog window is displayed, click the button labeled Generate Graph. The Port Utilization Graph for the selected resource opens in a new window.

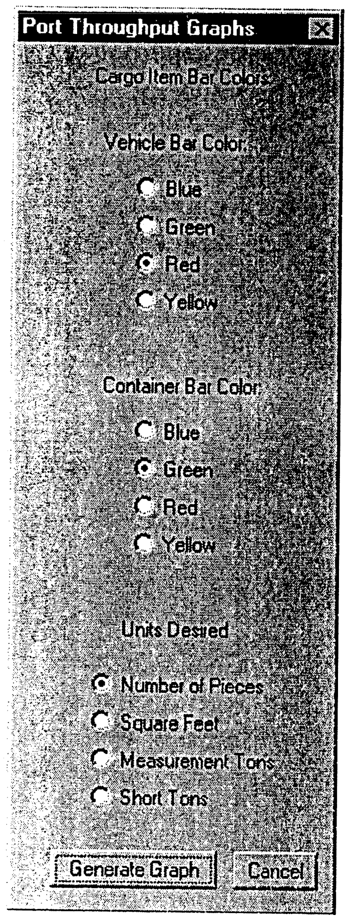


Utilization Graph of a Selected Port Resource (Gate 1)

8.5.3 Port Throughput Graph

The Port Throughput Graph displays the quantity of vehicles and containers that were loaded onto ships during each hour or day. The quantity can be displayed as number of pieces, square feet, measurement tons, or short tons.

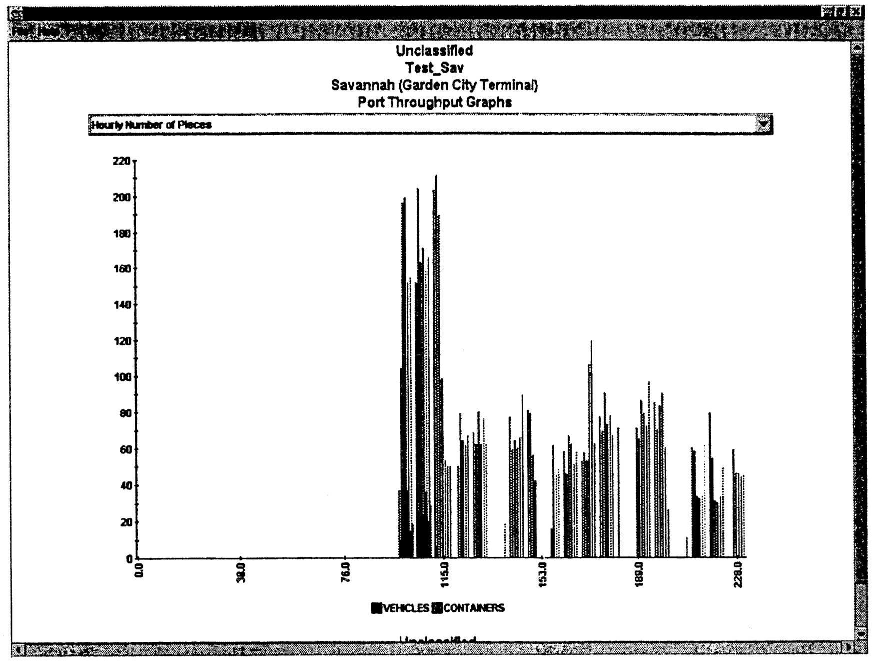
1. **Display the Port Throughput Graphs window.** On the Simulate window, select Results, then Generate Graphs, then Port Throughput Graph. The Port Throughput Graphs window opens. If at any time you want to discontinue generating this graph, click on Cancel.



Port Throughput Graphs Window

2. **Select display colors and units of measure.** On the Port Throughput Graphs window, select the colors you want the vehicles and containers to be and the unit of measure for these items when displayed on the graph.

3. **Generate the graph.** On the Port Throughput Graphs window, click the Generate Graph button. The Port Throughput Graph opens in a new window.



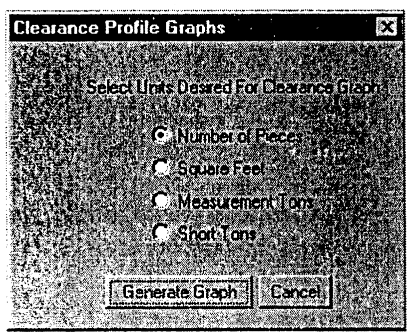
Port Throughput Graph

4. **Select resolution.** In the drop-down list/scroll box, select the level of detail you want to display.

8.5.4 Clearance Profile Graph

The Clearance Profile Graph displays how much cargo has arrived at port, how much has been parked in a staging area, and how much has been loaded onto a ship. This information is displayed for every unit of time. For example, at approximately 145 hours into the simulation, all the cargo had arrived at port, about 4500 pieces of cargo had been loaded on a ship, and about 3300 pieces of cargo remained in a staging area (see the example on the next page).

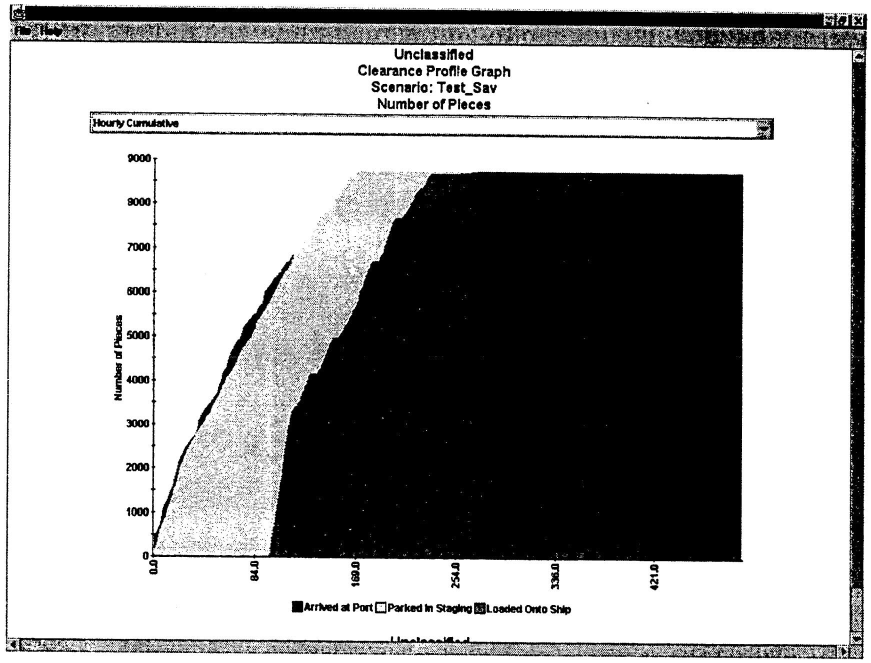
1. **Display the Clearance Profile Graphs window.** On the Simulate window, select Results, then Generate Graphs, then Clearance Profile Graph. The Clearance Profile Graphs window opens. If at any time you want to discontinue generating this graph, click on Cancel.



Clearance Profile Graphs Window

2. **Select the units of measure.** On the Clearance Profile Graphs window, select the units of measure to be used for this graph.

3. **Generate the graph.** On the Clearance Profile Graphs window, click the Generate Graph button. The Clearance Profile Graph opens in a new window.



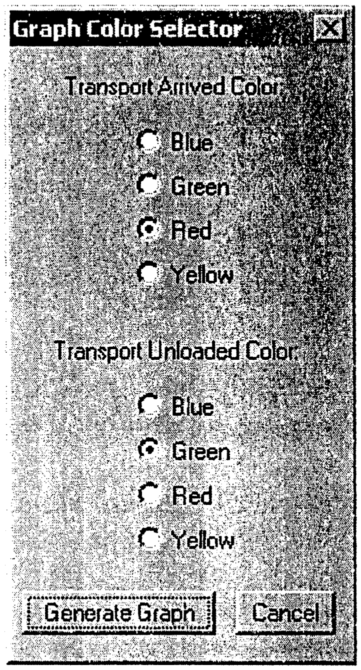
Clearance Profile Graph Window

4. **Select resolution.** In the drop-down list/scroll box, select the level of detail you want to display.

8.5.5 Truck Transport Statistics

The Truck Transport Statistics graph displays how many flatbed trucks arrived and were unloaded during each hour (day) of the simulation.

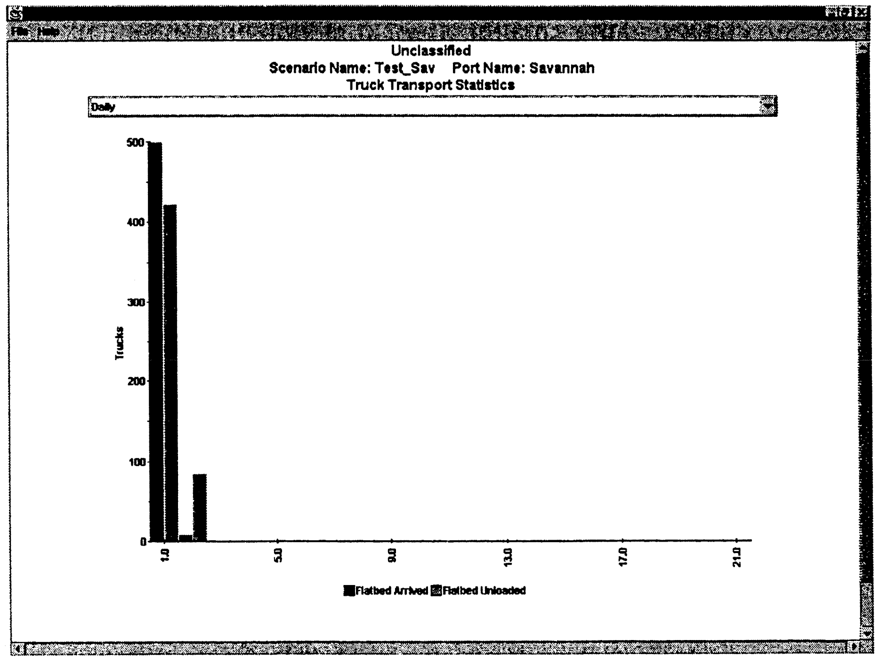
1. **Display the Graph Color Selector window.** On the Simulate window, select Results, then Generate Graphs, then Truck Transport Statistics. The Graph Color Selector window opens. If at any time you want to discontinue generating this graph, click on Cancel.



Graph Color Selector Window

2. **Select display colors.** On the Graph Color Selector window, select the colors you want the arrived and unloaded transports to be when displayed on the graph.

3. **Generate the graph.** On the Graph Color Selector window, click the Generate Graph button. The Truck Transport Statistics graph opens in a new window.



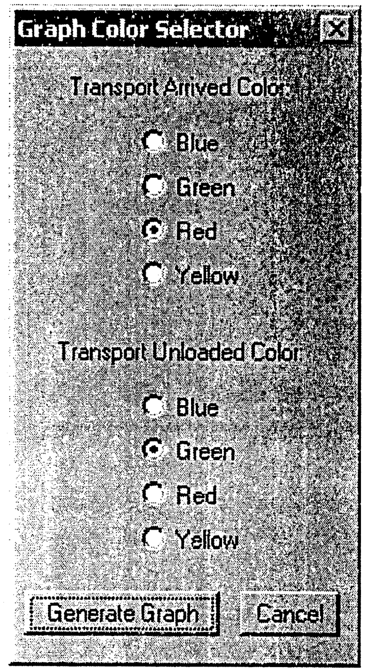
Truck Transport Statistics Graph

4. **Select resolution.** In the drop-down list/scroll box, select the level of detail you want to display.

8.5.6 Rail Transport Statistics

The Rail Transport Statistics graph displays how many railcars arrived and were unloaded during each hour (day) of the simulation.

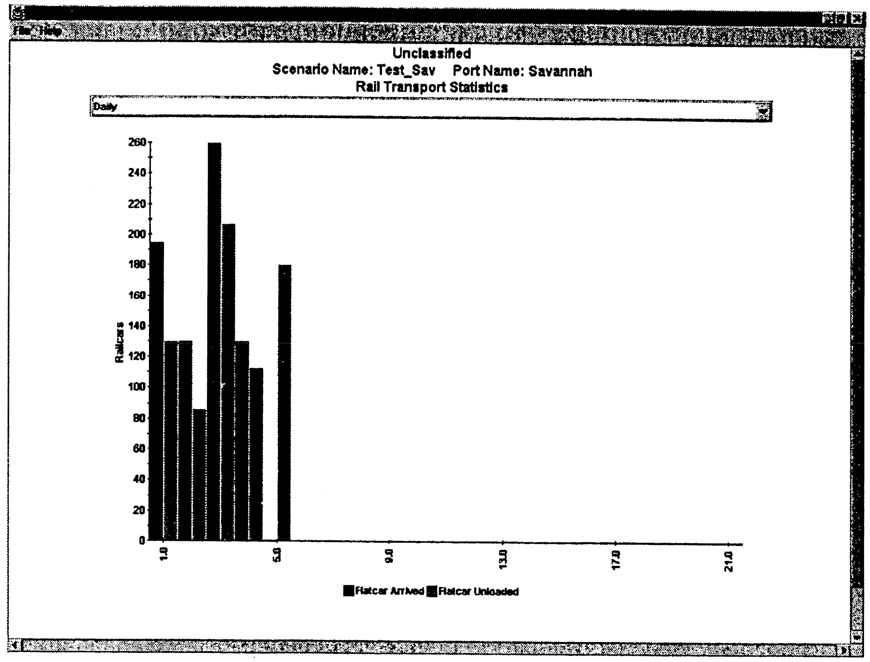
1. **Display the Graph Color Selector window.** On the Simulate window, select Results, then Generate Graphs, then Rail Transport Statistics. The Graph Color Selector window opens. If at any time you want to discontinue generating this graph, click on Cancel.



Graph Color Selector Window

2. **Select display colors.** On the Graph Color Selector window, select the colors you want the arrived and unloaded transports to be when displayed on the graph.

3. **Generate the graph.** On the Graph Color Selector window, click the Generate Graph button. The Rail Transport Statistics graph opens in a new window.



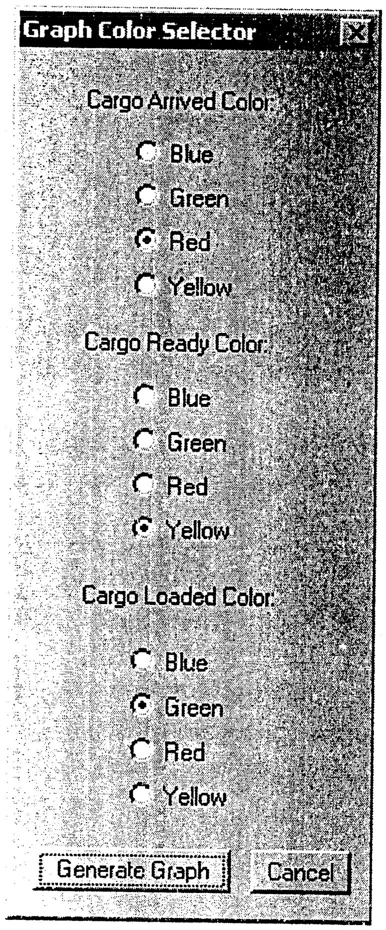
Rail Transport Statistics Graph

4. **Select resolution.** In the drop-down list/scroll box, select the level of detail you want to display.

8.5.7 Total Vehicles Cargo Statistics

The Total Vehicles Cargo Statistics graph displays how many vehicles arrived, became ready to load, and were loaded during each hour (or day) of the simulation. The graphs shows data for all vehicles, regardless of how they arrived.

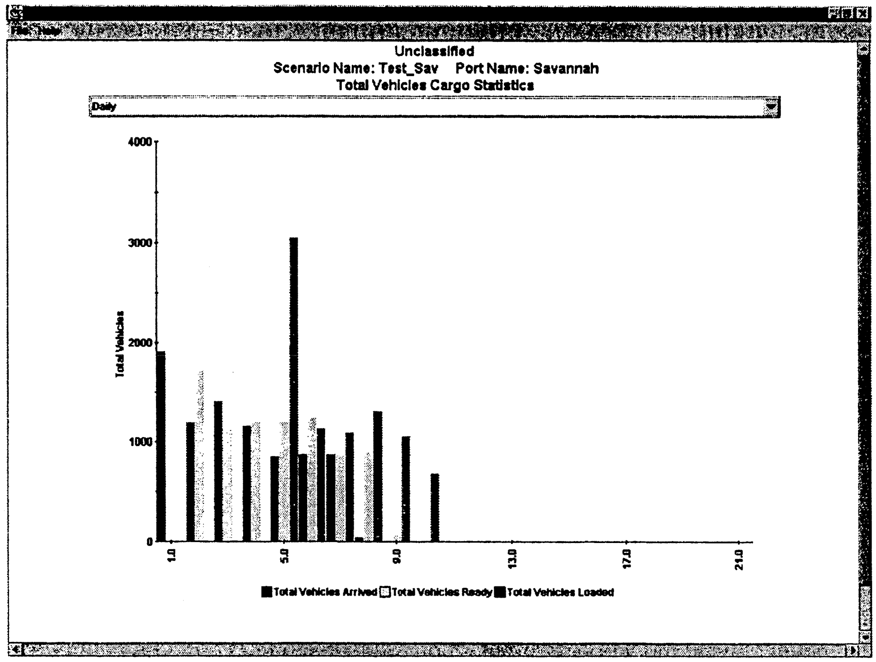
1. **Display the Graph Color Selector window.** On the Simulate window, select Results, then Generate Graphs, then Total Vehicles Cargo Statistics. The Graph Color Selector window opens. If at any time you want to discontinue generating this graph, click on Cancel.



Graph Color Selector Window

2. **Select display colors.** On the Graph Color Selector window, select the colors you want the arrived, ready, and loaded cargo items to be when displayed on the graph.

3. **Generate the graph.** On the Graph Color Selector window, click the Generate Graph button. The Total Vehicles Cargo Statistics graph opens in a new window.



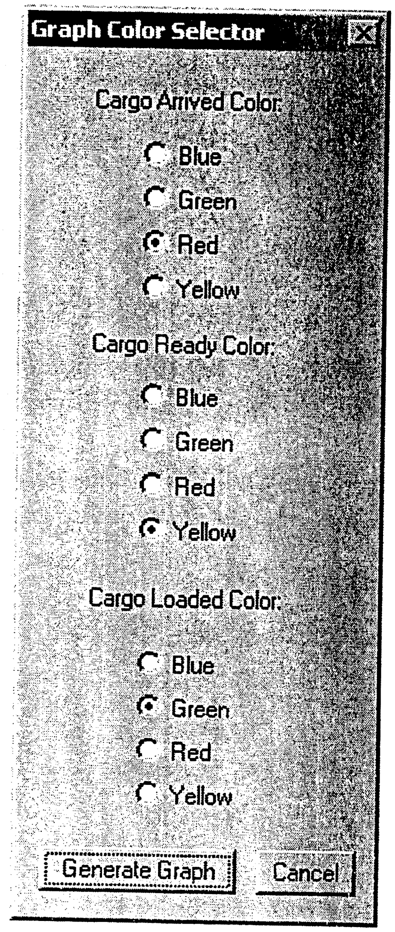
Total Vehicles Cargo Statistics Graph

4. **Select resolution.** In the drop-down list/scroll box, select the level of detail you want to display.

8.5.8 Convoyed Vehicles Cargo Statistics

For vehicular cargo arriving by convoy, the Convoyed Vehicles Cargo Statistics graph displays how many vehicles arrived, became ready to load, and were loaded during each hour (or day) of the simulation.

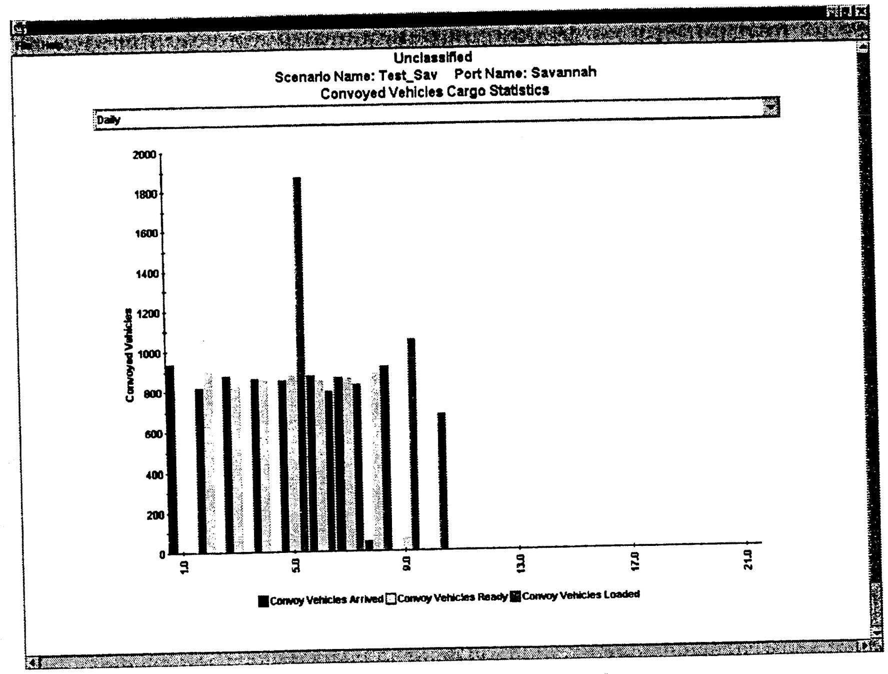
1. **Display the Graph Color Selector window.** On the Simulate window, select Results, then Generate Graphs, then Convoyed Vehicles Cargo Statistics. The Graph Color Selector window opens. If at any time you want to discontinue generating this graph, click on Cancel.



Graph Color Selector Window

2. **Select display colors.** On the Graph Color Selector window, select the colors you want the arrived, ready, and loaded cargo items to be when displayed on the graph.

3. **Generate the graph.** On the Graph Color Selector window, click the Generate Graph button. The Convoyed Vehicles Cargo Statistics graph opens in a new window.



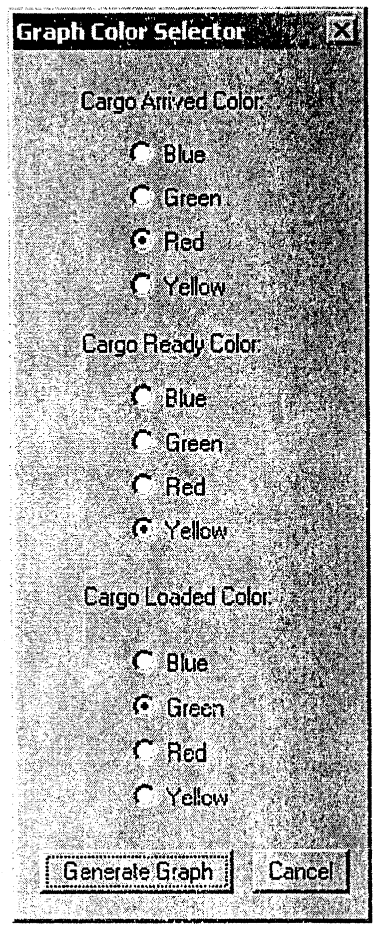
Convoyed Vehicles Cargo Statistics Graph

4. **Select resolution.** In the drop-down list/scroll box, select the level of detail you want to display.

8.5.9 Flatbed Vehicles Cargo Statistics

For vehicular cargo arriving by flatbed truck, the Flatbed Vehicles Cargo Statistics graph displays how many vehicles arrived, became ready to load, and were loaded during each hour (or day) of the simulation.

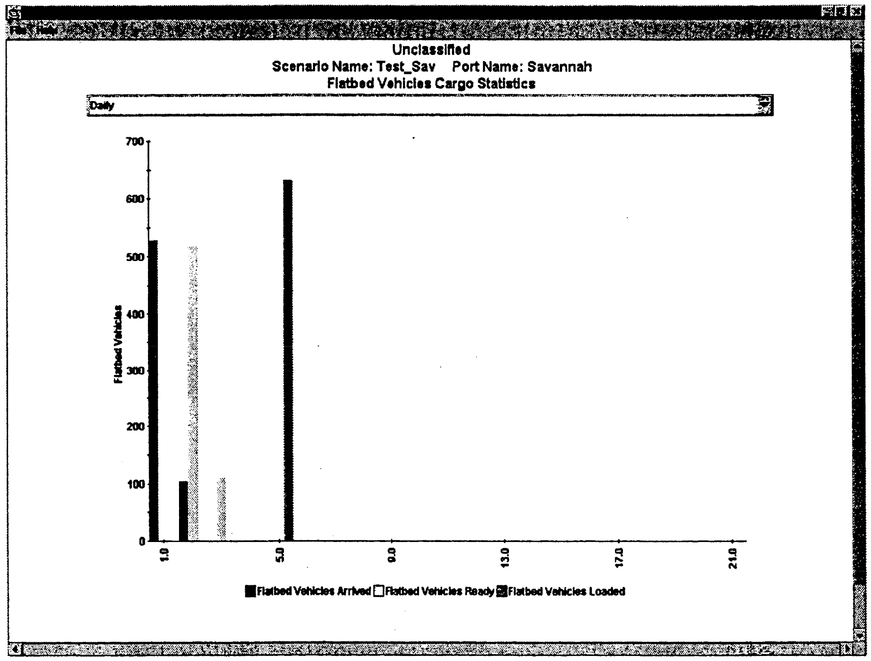
1. **Display the Graph Color Selector window.** On the Simulate window, select Results, then Generate Graphs, then Flatbed Vehicles Cargo Statistics. The Graph Color Selector window opens. If at any time you want to discontinue generating this graph, click on Cancel.



Graph Color Selector Window

2. **Select display colors.** On the Graph Color Selector window, select the colors you want the arrived, ready, and loaded cargo items to be when displayed on the graph.

3. **Generate the graph.** On the Graph Color Selector window, click the Generate Graph button. The Flatbed Vehicles Cargo Statistics graph opens in a new window.



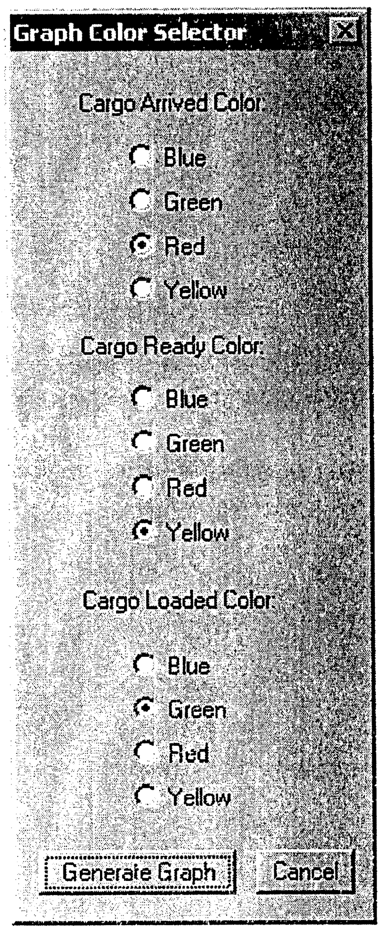
Flatbed Vehicles Cargo Statistics Graph

4. **Select resolution.** In the drop-down list/scroll box, select the level of detail you want to display.

8.5.10 Flatcar Vehicles Cargo Statistics

For vehicular cargo arriving by rail, the Flatcar Vehicles Cargo Statistics graph displays how many vehicles arrived, became ready to load, and were loaded during each hour (or day) of the simulation.

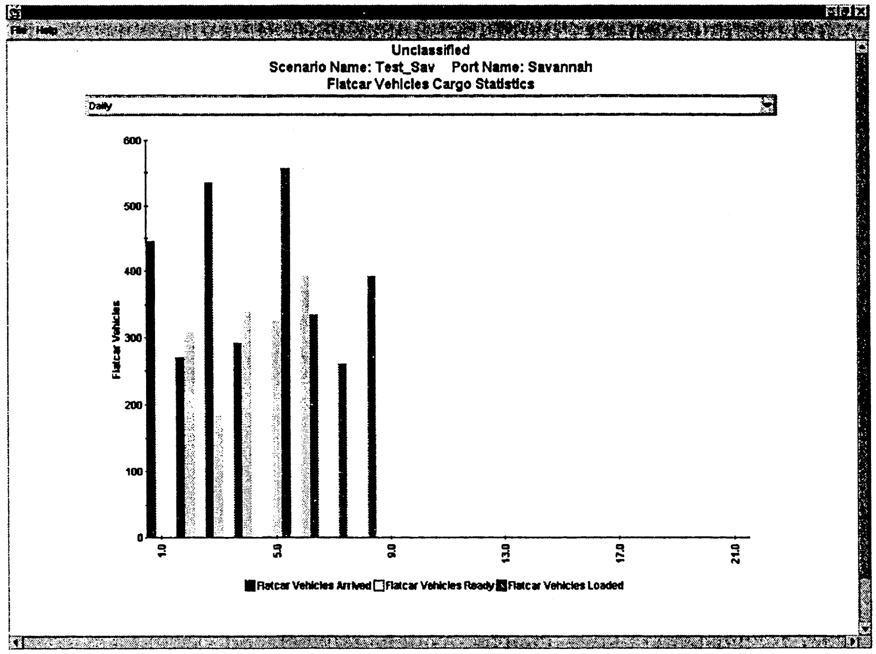
1. **Display the Graph Color Selector window.** On the Simulate window, select Results, then Generate Graphs, then Flatcar Vehicles Cargo Statistics. The Graph Color Selector window opens. If at any time you want to discontinue generating this graph, click on Cancel.



Graph Color Selector Window

2. **Select graph colors**. On the Graph Color Selector window, select the colors you want the arrived, ready, and loaded cargo items to be when displayed on the graph.

3. **Generate the graph**. On the Graph Color Selector window, click the Generate Graph button. The Flatcar Vehicles Cargo Statistics graph opens in a new window.



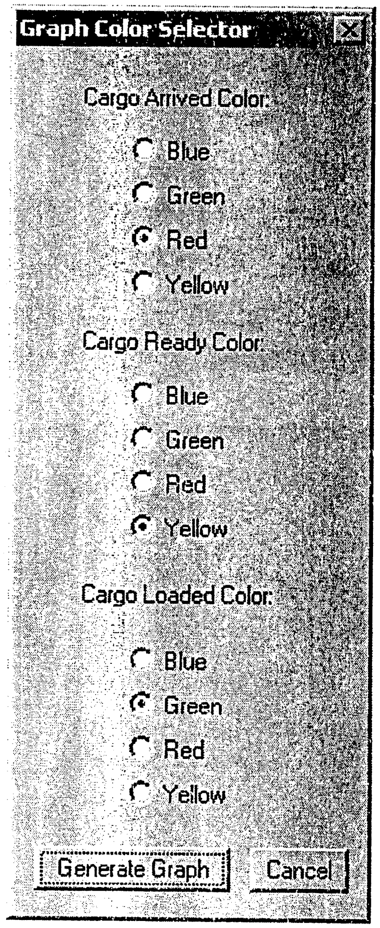
Flatcar Vehicles Cargo Statistics Graph

4. **Select resolution.** In the drop-down list/scroll box, select the level of detail you want to display.

8.5.11 Total Containers Cargo Statistics

The Total Containers Cargo Statistics graph displays how many containers arrived, became ready to load, and were loaded during each hour (or day) of the simulation. The graphs shows data for all containers, regardless of how they arrived.

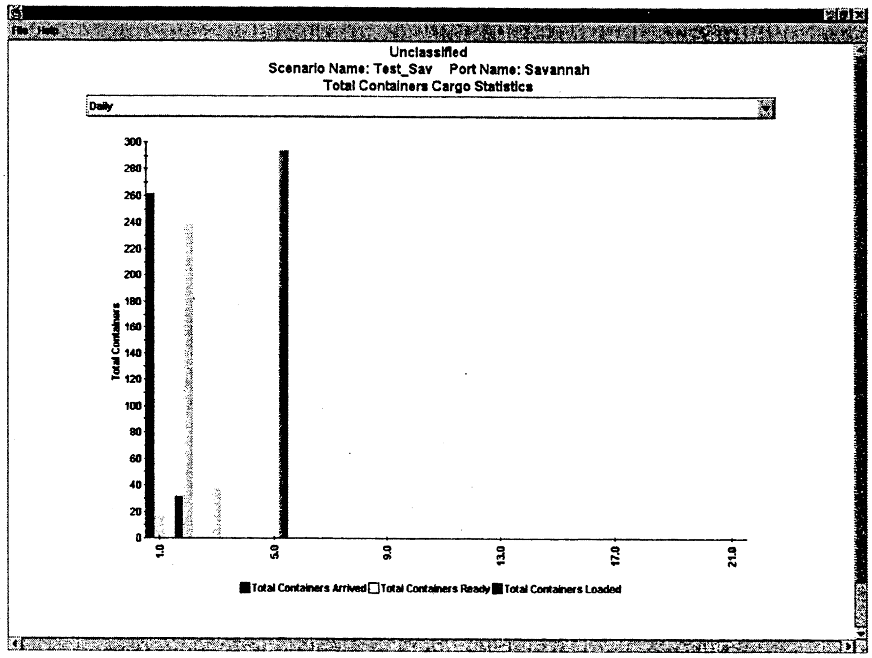
1. **Display the Graph Color Selector window.** On the Simulate window, select Results, then Generate Graphs, then Total Containers Cargo Statistics. The Graph Color Selector window opens. If at any time you want to discontinue generating this graph, click on Cancel.



Graph Color Selector Window

2. **Select display colors.** On the Graph Color Selector window, select the colors you want the arrived, ready, and loaded cargo items to be when displayed on the graph.

3. **Generate the graph.** On the Graph Color Selector window, click the Generate Graph button. The Total Containers Cargo Statistics graph opens in a new window.



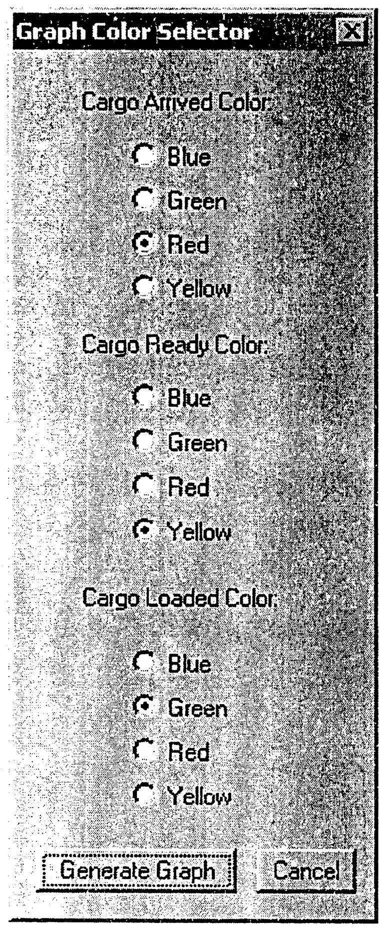
Total Containers Cargo Statistics Graph

4. **Select resolution.** In the drop-down list/scroll box, select the level of detail you want to display.

8.5.12 Flatbed Containers Cargo Statistics

For container cargo arriving by flatbed truck, the Flatbed Containers Cargo Statistics graph displays how many containers arrived, became ready to load, and were loaded during each hour (or day) of the simulation.

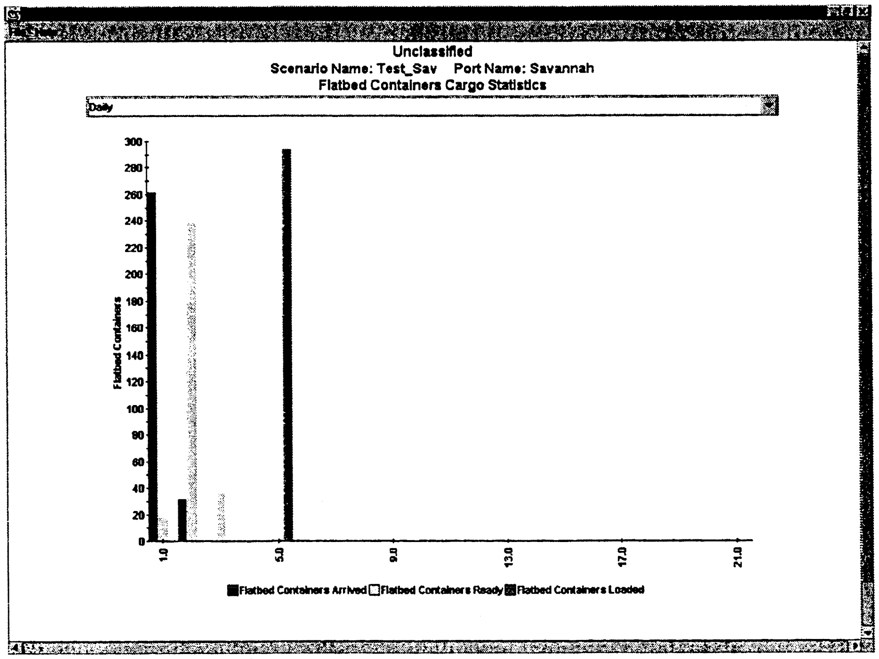
1. **Display the Graph Color Selector window.** On the Simulate window, select Results, then Generate Graphs, then Flatbed Containers Cargo Statistics. The Graph Color Selector window opens. If at any time you want to discontinue generating this graph, click on Cancel.



Graph Color Selector Window

2. **Select display colors.** On the Graph Color Selector window, select the colors you want the arrived, ready, and loaded cargo items to be when displayed on the graph.

3. **Generate the graph**. On the Graph Color Selector window, click the Generate Graph button. The Flatbed Containers Cargo Statistics graph opens in a new window.



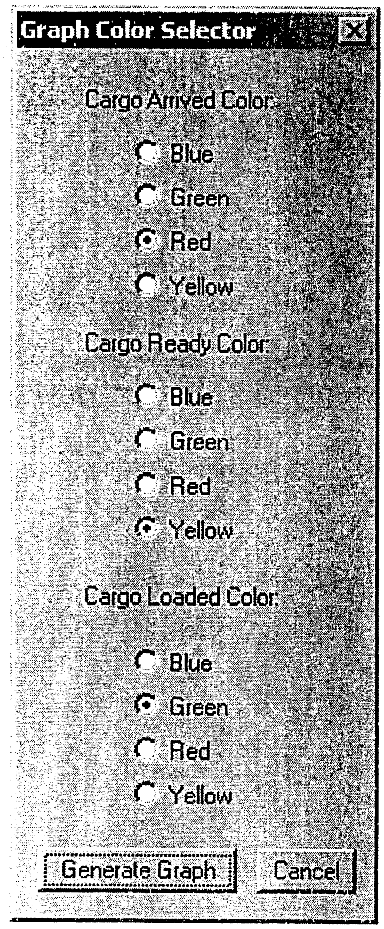
Flatbed Containers Cargo Statistics Graph

4. **Select resolution.** In the drop-down list/scroll box, select the level of detail you want to display.

8.5.13 Flatcar Containers Cargo Statistics

For containers arriving by rail, the Flatcar Containers Cargo Statistics graph displays how many containers arrived, became ready to load, and were loaded during each hour (or day) of the simulation.

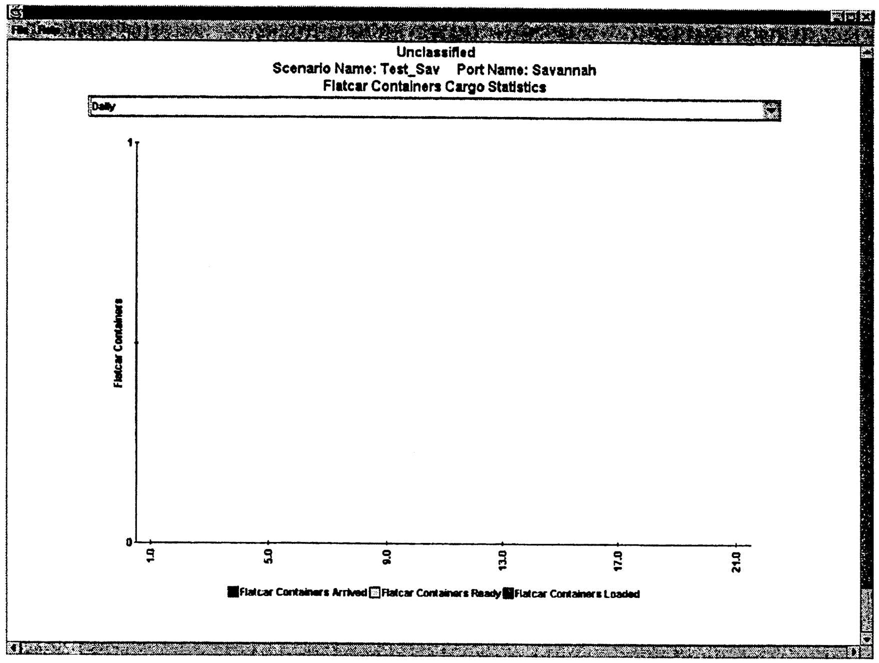
1. **Display the Graph Color Selector window.** On the Simulate window, select Results, then Generate Graphs, then Flatcar Containers Cargo Statistics. The Graph Color Selector window opens. If at any time you want to discontinue generating this graph, click on Cancel.



Graph Color Selector Window

2. **Select display colors.** On the Graph Color Selector window, select the colors you want the arrived, ready, and loaded cargo items to be when displayed on the graph.

3. On the Graph Color Selector window, click the Generate Graph button. The Flatcar Containers Cargo Statistics graph opens in a new window.



Flatcar Containers Cargo Statistics Graph

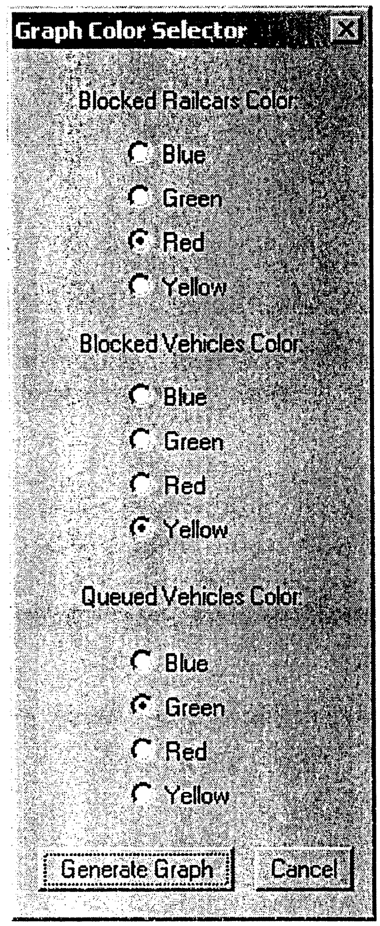
> **Note:** The scenario used in this example does not include containers transported by flatcars. So, the graph shown above is blank, which is appropriate for this scenario.

4. **Select resolution.** In the drop-down list/scroll box, select the level of detail you want to display.

8.5.14 Port Congestion Summary

The Port Congestion Summary graph displays how many railcars and vehicles (or how many entire trains or convoys) were blocked and queued at each hour (or day) of the simulation.

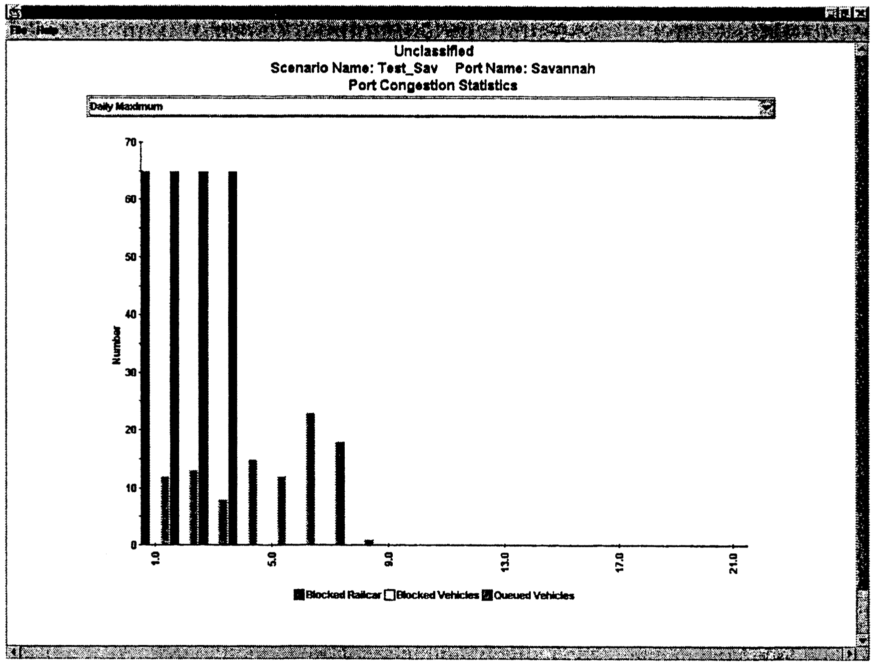
1. **Display the Graph Color Selector window.** On the Simulate window, select Results, then Generate Graphs, then Port Summary Congestion. The Graph Color Selector window opens. If at any time you want to discontinue generating this graph, click on Cancel.



Graph Color Selector Window

2. **Select display colors**. On the Graph Color Selector window, select the colors you want the blocked railcars, blocked vehicles, and queued vehicles cargo items to be when displayed on the graph.

3. **Generate the graph**. On the Graph Color Selector window, click the Generate Graph button. The Port Congestion Statistics graph opens in a new window.



Port Congestion Statistics Graph

4. **Select resolution.** In the drop-down list/scroll box, select the level of detail you want to display.

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Appendix A

Note: Some of the windows shown in Appendix A were slightly modified after this appendix had been finalized for publication. While these changes affected parts of the screen content and formatting, the selections highlighted in red on the following pages are still accurate. Likewise, the guidance in this appendix for implementing stochastic and deterministic model choices is also correct.

The windows whose appearance has changed are listed below, with the associated figure numbers shown in parentheses.

- Force Selection window (Figures 1, 3, 5, 7, 9, and 11).
- Vehicle Timing Parameters window, now named Process Timing Parameters with the heading VEHICLES (Figures 13 and 14).
- Ship Parameters window (Figure 16).
- Ship Timing Parameters window, now named Process Timing Parameters with the heading SHIP (Figures 17 and 22).

Appendix A
Deterministic and Stochastic Options

A.1 Overview

The controls for running a PORTSIM scenario deterministically or stochastically are not located in a single master switch but rather are divided among the following three categories of operations:

- Cargo arrival
- Port operations
- Ship arrival.

Each of these categories can be independently set up to run deterministically or stochastically. As a result, you have significant flexibility in choosing the combinations most appropriate to issues of interest.

> **Note:** All arrival distributions are exponentially distributed, and all timing parameters are uniformly distributed.

A.2 Cargo Arrival Options

A.2.1 *Deterministic* Cargo Arrival

There are three ways to set up a deterministic cargo arrival. Choose one of them and skip to the appropriate section below.

1. Specify a fixed arrival *rate* for cargo arrivals (Section A.2.1.1).

2. Use specific arrival *times* for each cargo item as contained in the second-to-the-last field in the TARGET-generated force file (Section A.2.1.2). These times are taken from a TPFDD and are called the available to load date (ALD) data. ALD data taken directly from TPFDD will specify only a date; a time of day can be specified by using the editing capabilities within TARGET.

3. Use an alternate set of specific arrival *times* for each cargo item as contained in the last field in the TARGET-generated force file (Section A.2.1.3). These times have been generated from another model and are called the projected ALD (PALD). Depending on which model generated the PALD, this data may contain only date information, or it may contain both date and time of day information.

A.2.1.1 Deterministic cargo arrival based on a fixed arrival rate

1. When creating a new scenario or modifying an existing scenario, make the following series of choices on the PORTSIM menus and windows (Figure 1):

   Scenario >
   [New Scenario **OR** Modify Loaded Scenario] >
   Select Force >
   Timing Mode Desired For Arrival Profiles: >
   User Specifies Arrival Rates (*click radio button*)

2. Set up arrivals of cargo for convoy vehicles, flatbeds, trains, helicopters, residual equipment, watercraft. Make the following series of choices on the PORTSIM menu:

   Parameters >
   Modify Arrival Mode Time Parameters >
   [Convoy Vehicles **OR** Flatbeds **OR** Trains **OR** Helicopters **OR** Residual Equipment **OR** Watercraft]

   The Arrival Mode Time Parameters window opens. Provide the following information (Figure 2):

   - Number of Vehicles Per Convoy **OR** Flatbeds Per Group **OR** Railcars Per Train **OR** Helicopters Per Group **OR** Residual Equipment Per Group **OR** Watercraft Per Group:
   - Time to Begin Simulating Arrivals:
   - Time Between Arrivals:
   - **Deterministic Arrivals - fixed arrival interval** (*click radio button*)

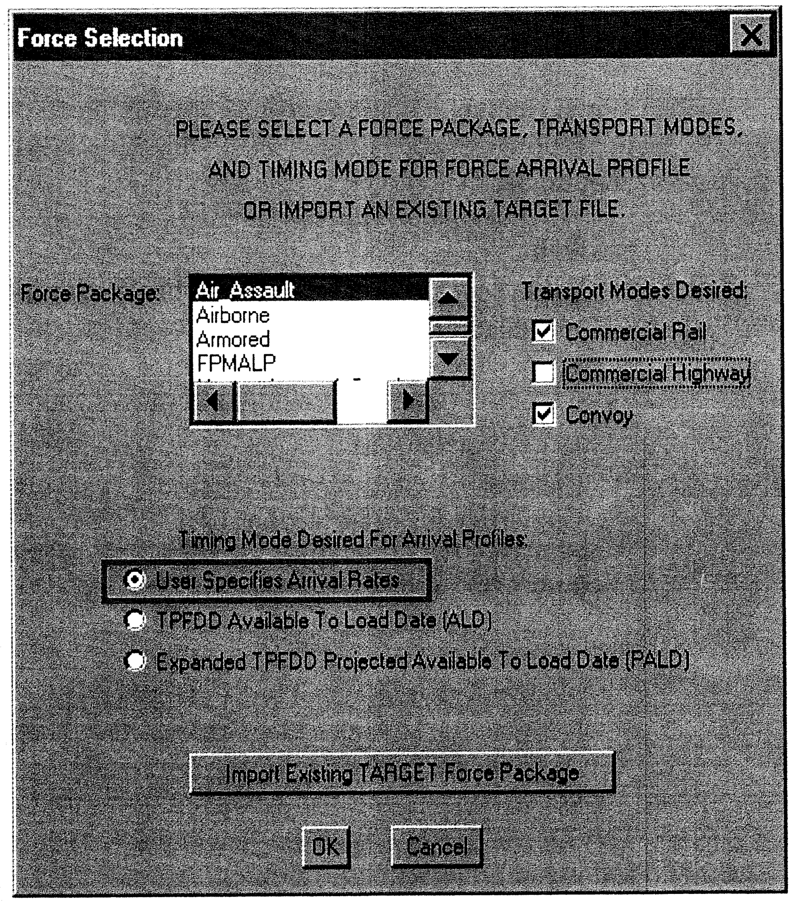

Figure 1: Deterministic Cargo Arrival — Option 1 Screen 1 of 2

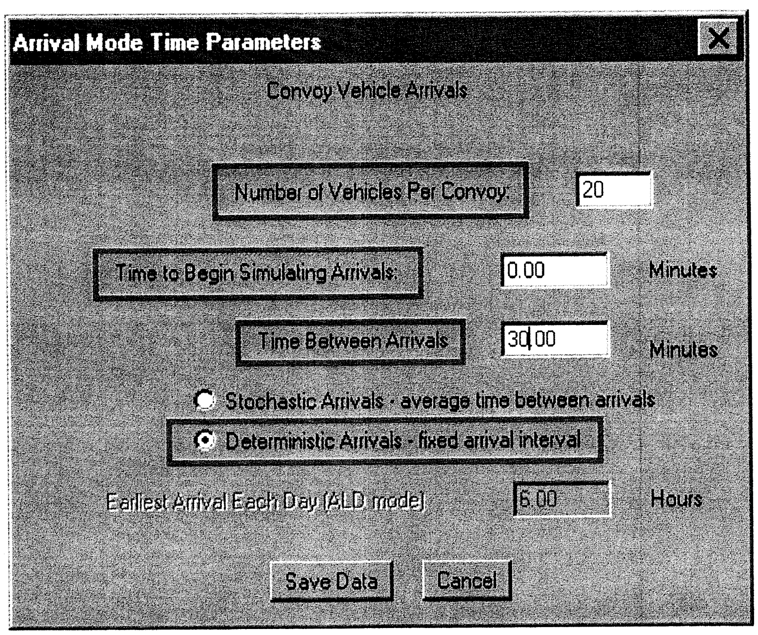

Figure 2: Deterministic Cargo Arrival — Option 1 Screen 2 of 2

A.2.1.2 Deterministic cargo arrival based on TARGET-generated force file with exact times for each cargo item (ALD)

1. When creating a new scenario or modifying an existing scenario, make the following series of choices on the PORTSIM menus and windows (Figure 3):

   Scenario >
   [New Scenario **OR** Modify Loaded Scenario] >
   Select Force >
   Timing Mode Desired For Arrival Profiles: >
   TPFDD Available To Load Data (ALD) (*click radio button*)

2. Set up arrivals of cargo for convoy vehicles, flatbeds, trains, helicopters, residual equipment, watercraft. Make the following series of choices on the PORTSIM menus:

   Parameters >
   Modify Arrival Mode Time Parameters >
   [Convoy Vehicles **OR** Flatbeds **OR** Trains **OR** Helicopters **OR** Residual Equipment **OR** Watercraft]

   The Arrival Mode Time Parameters window opens. Provide the following information (Figure 4):

   - Number of Vehicles Per Convoy **OR** Flatbeds Per Group **OR** Railcars Per Train **OR** Helicopters Per Group **OR** Residual Equipment Per Group **OR** Watercraft Per Group:
   - Time Between Arrivals:
   - **Deterministic Arrivals - fixed arrival interval** (*click radio button*)
   - Earliest Arrival Each Day (ALD mode):

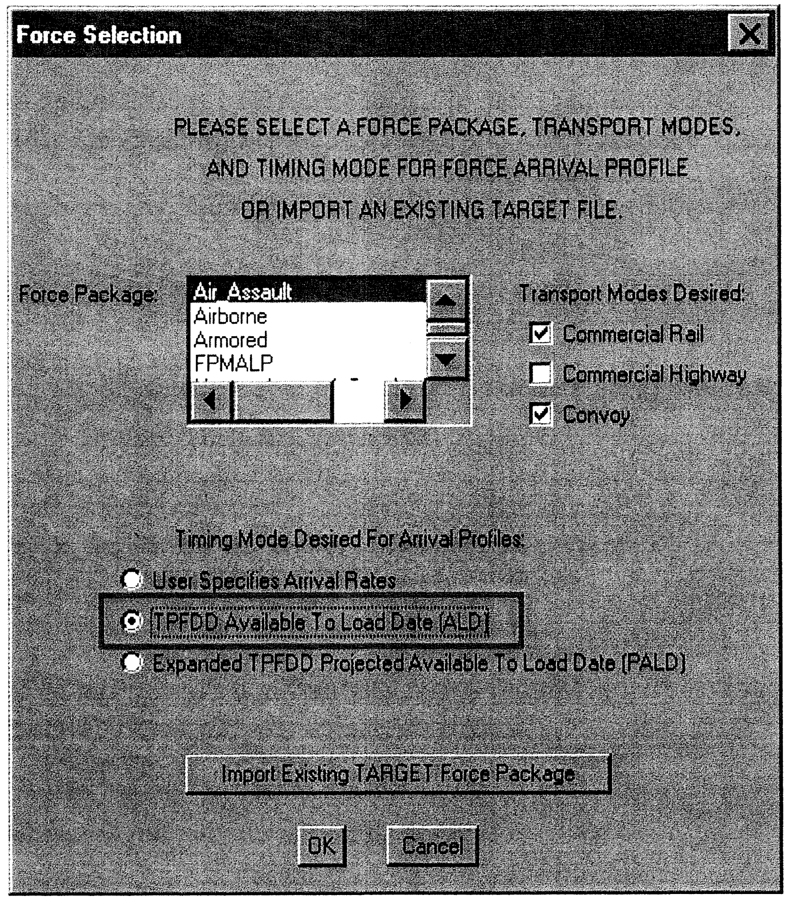

Figure 3: Deterministic Cargo Arrival — Option 2 Screen 1 of 2

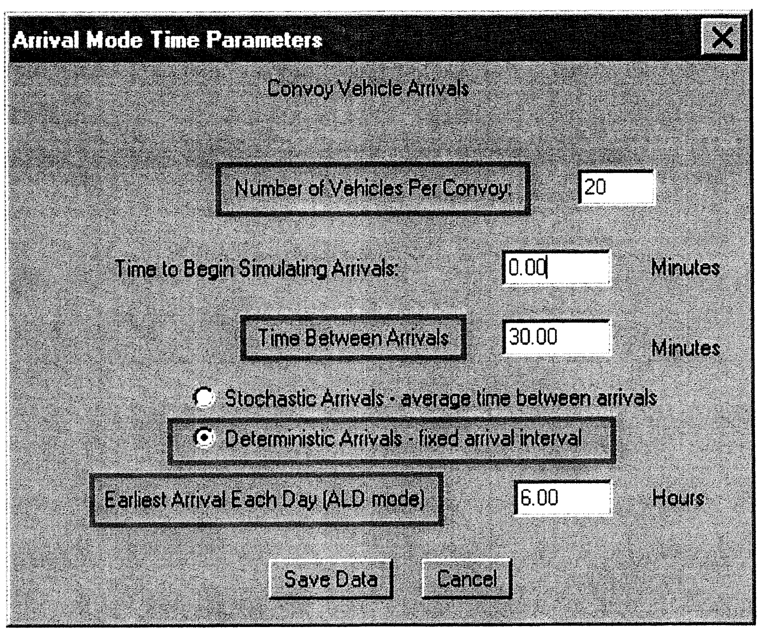

Figure 4: Deterministic Cargo Arrival — Option 2 Screen 2 of 2

A.2.1.3 Deterministic cargo arrival based on TARGET-generated force file with exact times for each cargo item (PALD)

1. When creating a new scenario or modifying an existing scenario, make the following series of choices on the PORTSIM menus and windows (Figure 5):

   Scenario >
   [New Scenario **OR** Modify Loaded Scenario] >
   Select Force >
   Timing Mode Desired For Arrival Profiles: >
   Expanded TPFDD Projected Available To Load Data (PALD) (*click radio button*)

2. Set up arrivals of cargo for convoy vehicles, flatbeds, trains, helicopters, residual equipment, watercraft. Make the following series of choices on the PORTSIM menu:

   Parameters >
   Modify Arrival Mode Time Parameters >
   [Convoy Vehicles **OR** Flatbeds **OR** Trains **OR** Helicopters **OR** Residual Equipment **OR** Watercraft]

   The Arrival Mode Time Parameters window opens. Provide the following information (Figure 6):

   - Number of Vehicles Per Convoy **OR** Flatbeds Per Group **OR** Railcars Per Train **OR** Helicopters Per Group **OR** Residual Equipment Per Group **OR** Watercraft Per Group:
   - Time Between Arrivals:
   - **Deterministic Arrivals - fixed arrival interval** (*click radio button*)
   - Earliest Arrival Each Day (ALD mode):

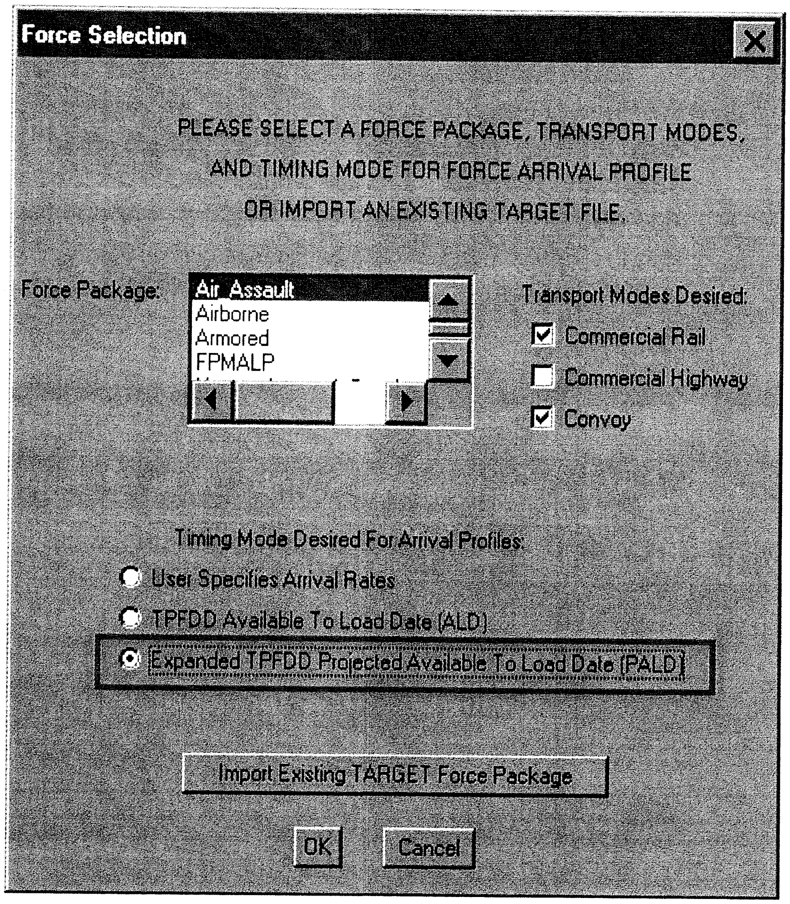

Figure 5: Deterministic Cargo Arrival — Option 3 Screen 1 of 2

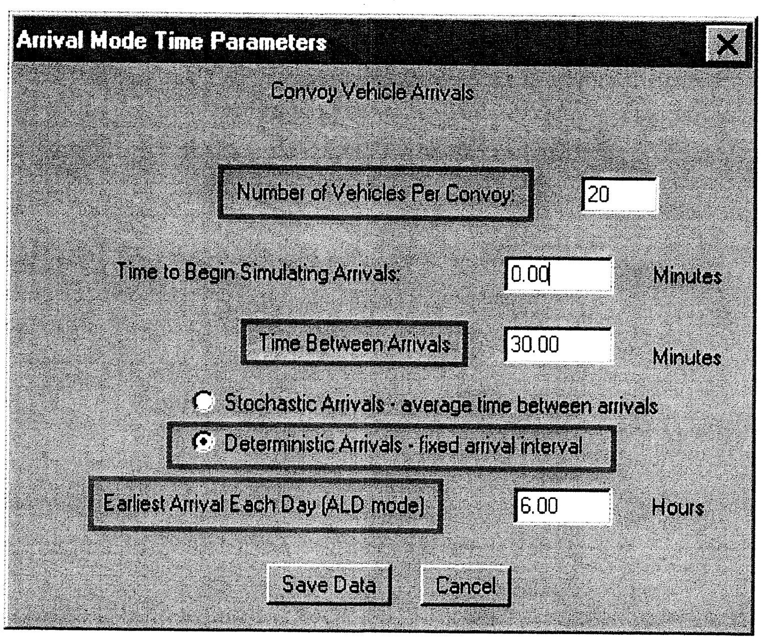

Figure 6: Deterministic Cargo Arrival — Option 3 Screen 2 of 2

A.2.2 *Stochastic* Cargo Arrival (Exponential Distributions)

There are three ways to set up a stochastic cargo arrival, which parallel the three deterministic ways described above (see Section A.2.1). The main difference is that the stochastic options involve selecting the Stochastic Arrivals - average time between arrivals radio button on the Arrival Mode Time Parameters window. For options two and three, note that the *time* of day for cargo arrival is stochastic, but the actual *day* is known. Choose one of the three to enable stochastic cargo arrival.

A.2.2.1 Stochastic cargo arrival based on an exponential distribution

1. When creating a new scenario or modifying an existing scenario, make the following series of choices on the PORTSIM menus and windows (Figure 7):

   Scenario >
       [New Scenario **OR** Modify Loaded Scenario] >
           Select Force >
               Timing Mode Desired For Arrival Profiles: >
                   User Specifies Arrival Rates (*click radio button*)

2. Set up exponential arrivals of cargo for convoy vehicles, flatbeds, trains, helicopters, residual equipment, watercraft. Make the following series of choices on the PORTSIM menus:

   Parameters >
       Modify Arrival Mode Time Parameters >
           [Convoy Vehicles **OR** Flatbeds **OR** Trains **OR** Helicopters **OR** Residual Equipment **OR** Watercraft]

   The Arrival Mode Time Parameters window opens. Provide the following information (Figure 8):

   - Number of Vehicles Per Convoy **OR** Flatbeds Per Group **OR** Railcars Per Train **OR** Helicopters Per Group **OR** Residual Equipment Per Group **OR** Watercraft Per Group:
   - Time to Begin Simulating Arrivals:
   - Time Between Arrivals:
   - **Stochastic Arrivals – average time between arrivals** (*click radio button*)

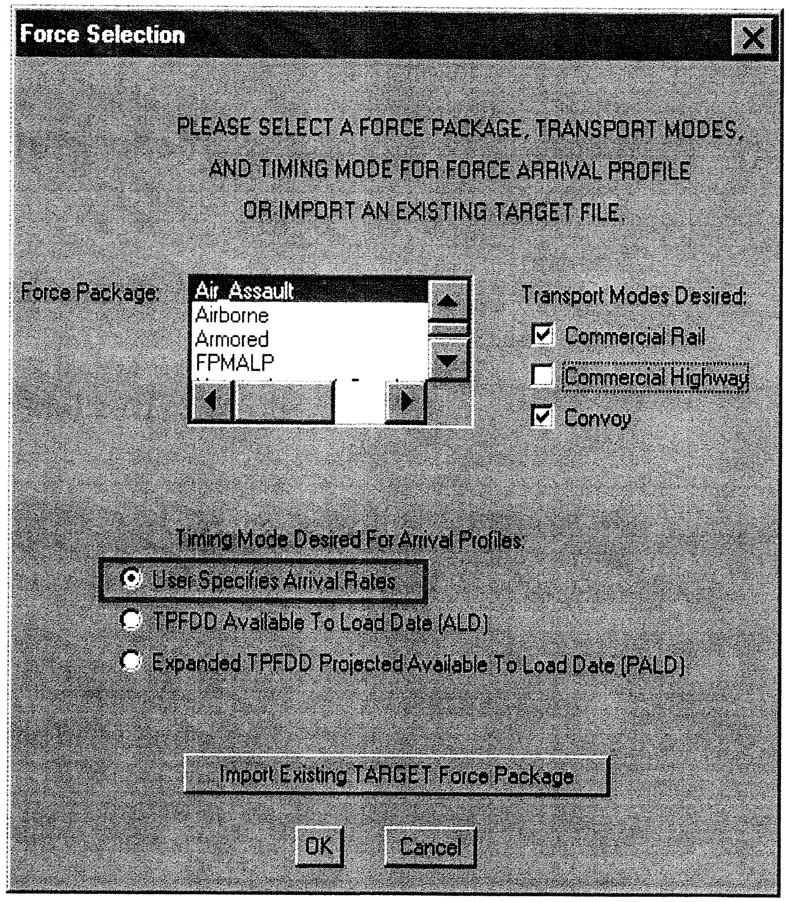

Figure 7: Stochastic Cargo Arrival — Option 1 Screen 1 of 2

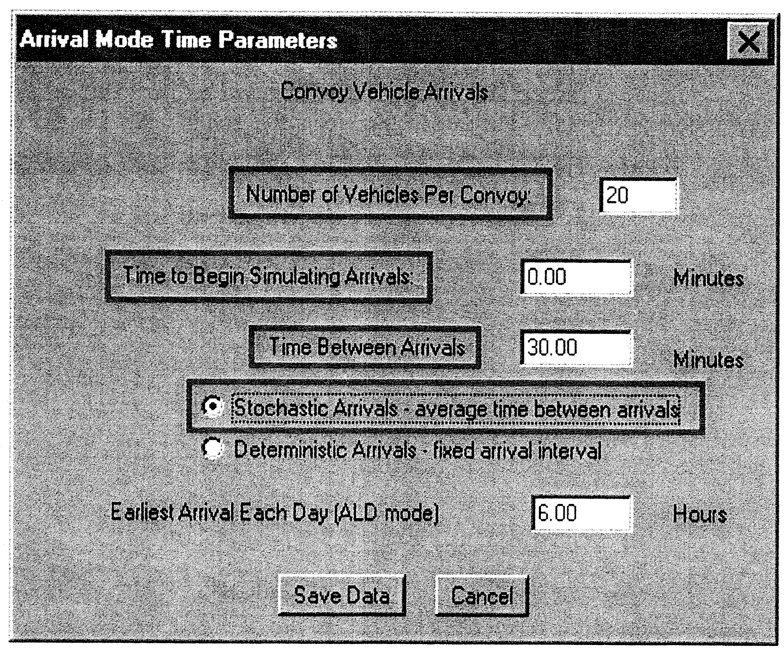

Figure 8: Stochastic Cargo Arrival — Option 1 Screen 2 of 2

A.2.2.2 Stochastic cargo arrival based on TARGET-generated force file (ALD)

1. When creating a new scenario or modifying an existing scenario, make the following series of choices on the PORTSIM menus and windows (Figure 9):

   Scenario >
   [New Scenario **OR** Modify Loaded Scenario] >
   Select Force >
   Timing Mode Desired For Arrival Profiles: >
   TPFDD Available To Load Data (ALD) (*click radio button*)

2. Set up exponential arrivals of cargo for convoy vehicles, flatbeds, trains, helicopters, residual equipment, watercraft. Make the following series of choices on the PORTSIM menus:

   Parameters >
   Modify Arrival Mode Time Parameters >
   [Convoy Vehicles **OR** Flatbeds **OR** Trains **OR** Helicopters **OR** Residual Equipment **OR** Watercraft]

   The Arrival Mode Time Parameters window opens. Provide the following information (Figure 10):

   - Number of Vehicles Per Convoy **OR** Flatbeds Per Group **OR** Railcars Per Train **OR** Helicopters Per Group **OR** Residual Equipment Per Group **OR** Watercraft Per Group:
   - Time Between Arrivals:
   - **Stochastic Arrivals – average time between arrivals** (*click radio button*)
   - Earliest Arrival Each Day (ALD mode):

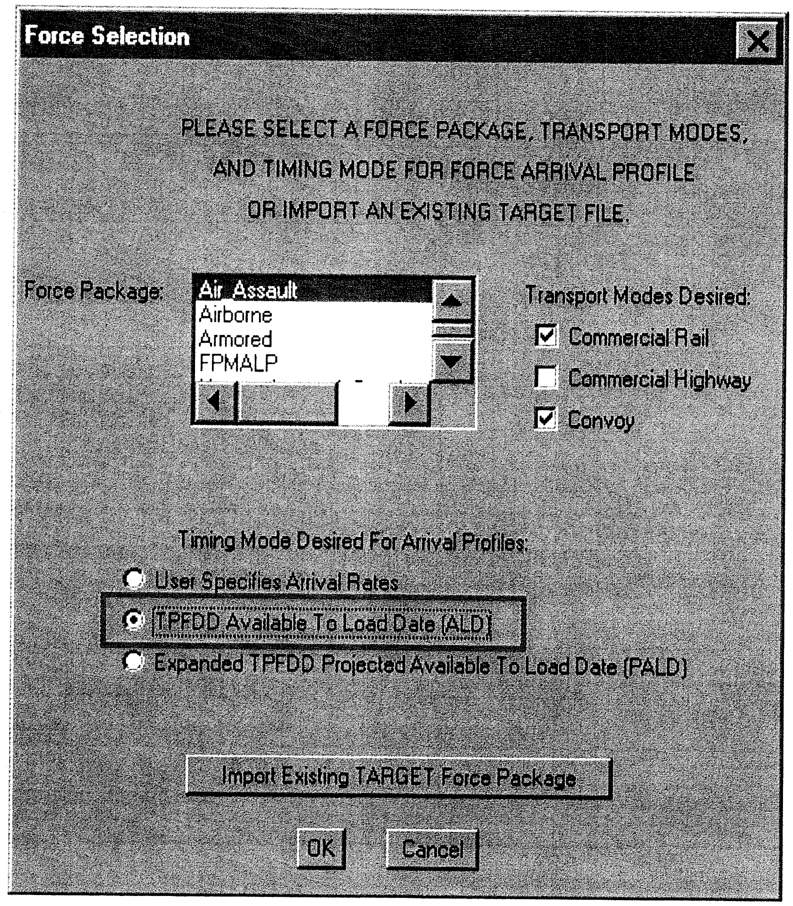

Figure 9: Stochastic Cargo Arrival — Option 2 Screen 1 of 2

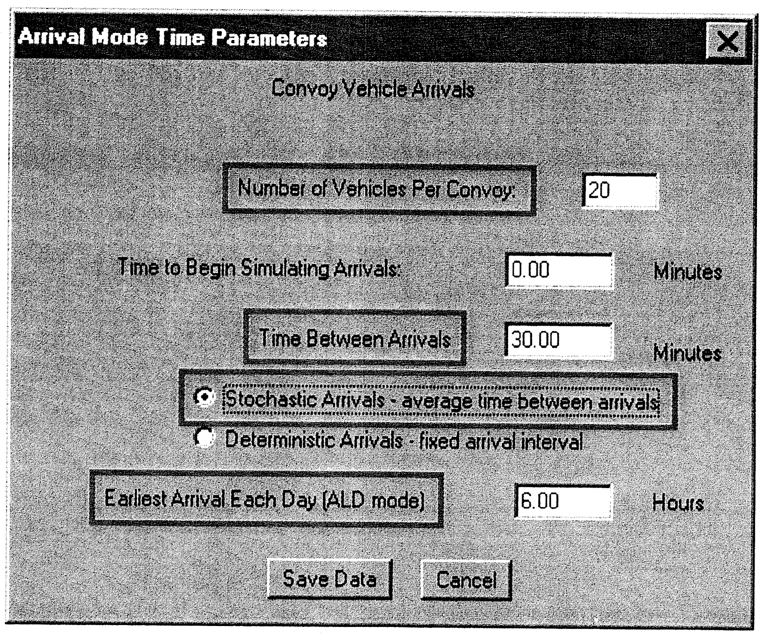

Figure 10: Stochastic Cargo Arrival — Option 2 Screen 2 of 2

A.2.2.3 Stochastic cargo arrival based on TARGET-generated force file (PALD)

1. When creating a new scenario or modifying an existing scenario, make the following series of choices on the PORTSIM menus and windows (Figure 11):

   Scenario >
   [New Scenario **OR** Modify Loaded Scenario] >
   Select Force >
   Timing Mode Desired For Arrival Profiles: >
   Expanded TPFDD Projected Available To Load Data (PALD) (*click radio button*)

2. Set up exponential arrivals of cargo for convoy vehicles, flatbeds, trains, helicopters, residual equipment, watercraft. Make the following series of choices on the PORTSIM menus:

   Parameters >
   Modify Arrival Mode Time Parameters >
   [Convoy Vehicles **OR** Flatbeds **OR** Trains **OR** Helicopters **OR** Residual Equipment **OR** Watercraft]

   The Arrival Mode Time Parameters window opens. Provide the following information (Figure 12):

   - Number of Vehicles Per Convoy **OR** Flatbeds Per Group **OR** Railcars Per Train **OR** Helicopters Per Group **OR** Residual Equipment Per Group **OR** Watercraft Per Group:
   - Time Between Arrivals:
   - **Stochastic Arrivals – average time between arrivals** (*click radio button*)
   - Earliest Arrival Each Day (ALD mode):

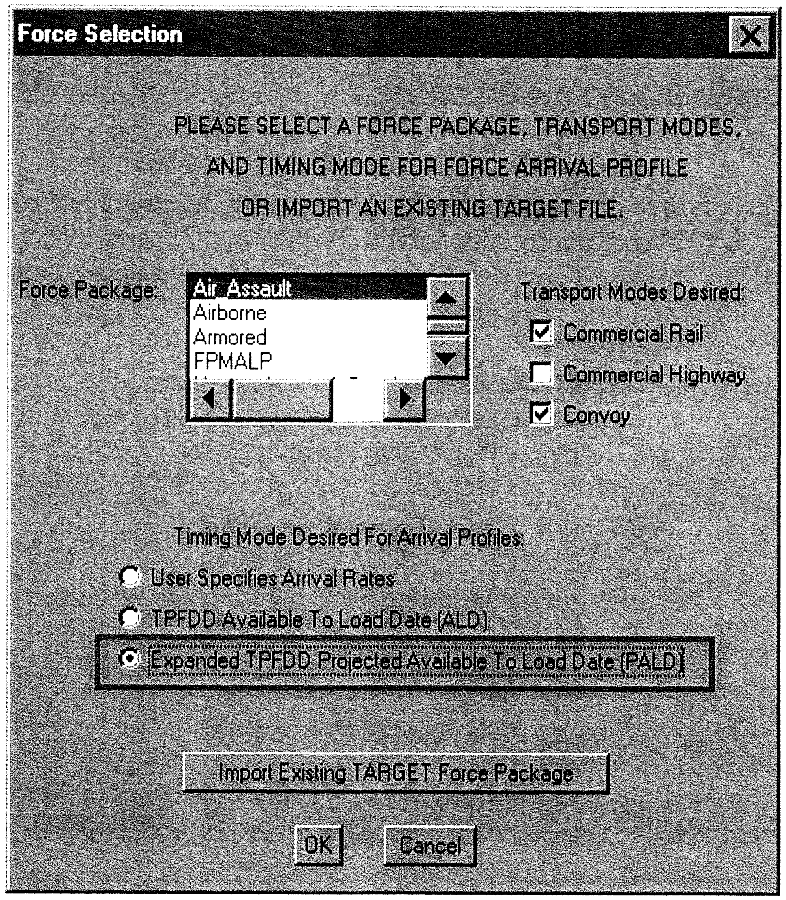

Figure 11: Stochastic Cargo Arrival — Option 3 Screen 1 of 2

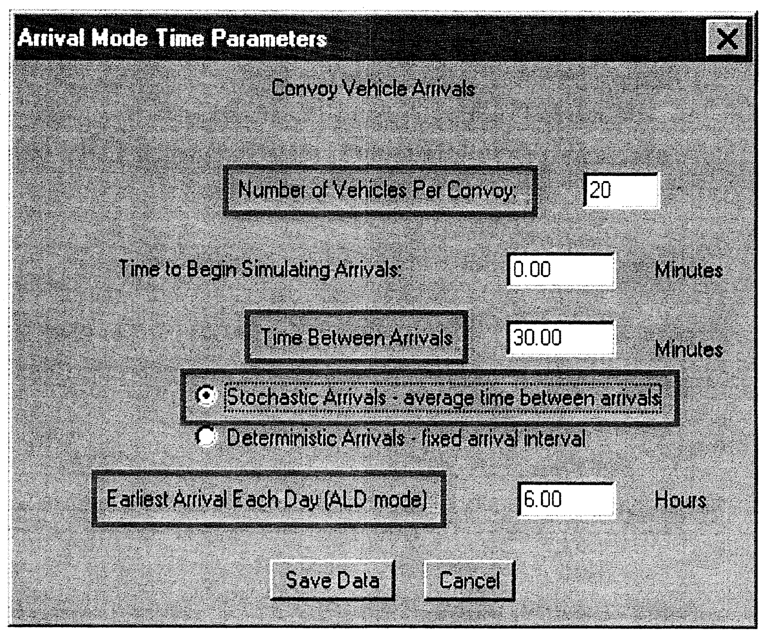

Figure 12: Stochastic Cargo Arrival — Option 3 Screen 2 of 2

A.3 Port Operations Options

A.3.1 *Deterministic* Port Operations

The mode of port operations for various sets of timing parameters is specified separately for each type of cargo item or transport resource. For each type for which *deterministic* operation is desired, make the following series of choices on the PORTSIM menus and windows:

Parameters >
  Modify Process Timing Parameters >
    [Vehicle **OR** Container **OR** Railcar **OR** Flatbed **OR** Ship Loading Times **OR** Cargo Dwell Times]

The Timing Parameter window opens.

For all timing parameters for the cargo or resource type (Figure 13):

- Set Time to the desired value.
- Set One Half Range (+/–) to ***zero***.

A.3.2 *Stochastic* Port Operations (Uniform Distributions)

The mode of port operations for various sets of timing parameters is specified separately for each type of cargo item or transport resource. For each type for which *stochastic* operation is desired, make the following series of choices on the PORTSIM menus and windows:

Parameters >
  Modify Process Timing Parameters >
    [Vehicle **OR** Container **OR** Railcar **OR** Flatbed **OR** Ship Loading Times **OR** Cargo Dwell Times]

The Timing Parameter window opens.

For all timing parameters for the cargo or resource type (Figure 14):

- Set Time to the desired value.
- Set One Half Range (+/–) to ***a nonzero value***.

> **Note:** In stochastic port operations, the timing parameters are uniformly distributed, so what you are really inputting is the *range of the uniform distribution*, which is defined by the Time minus One Half Range (+/–) to the Time plus One Half Range (+/–).

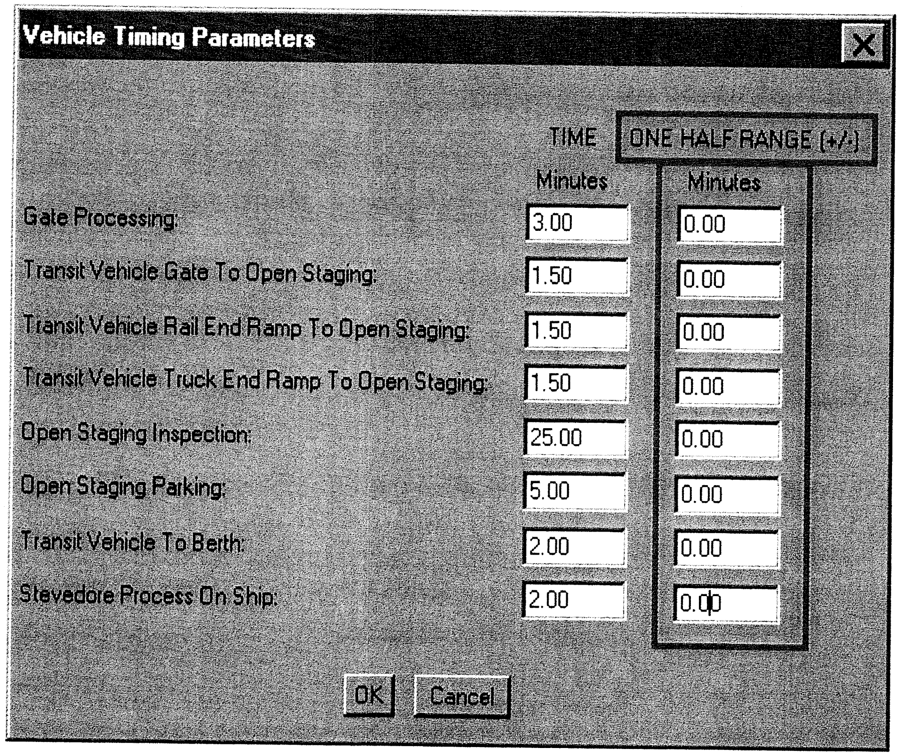

Figure 13: Deterministic Port Operations [note zero values]

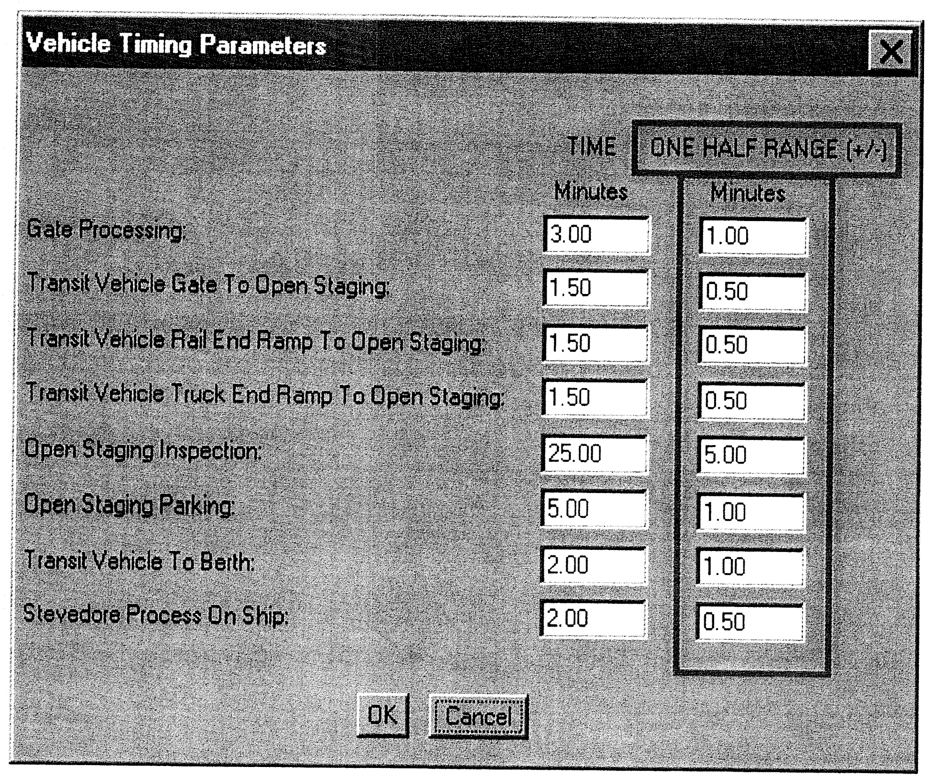

Figure 14: Stochastic Port Operations [note *non*zero values]

A.4 Ship Arrival Options

A.4.1 *Deterministic* Ship Arrival

There are two ways to set up a deterministic ship arrival. Choose one and skip to the appropriate section below.

1. Specify an exact arrival time for each ship.

2. Specify a fixed arrival rate. This rate is the time interval between each arriving ship.

A.4.1.1. Deterministic ship arrival based on exact times

1. When creating a new scenario or modifying an existing scenario, make the following series of choices on the PORTSIM menus and windows (Figure 15):

   Scenario >
   [New Scenario **OR** Modify Loaded Scenario] >
   Ship Arrival Mode >
   User Specifies Exact Arrival Times (*click radio button*)

2. Set each ship's arrival time. Make the following series of choices on the PORTSIM menus and windows (Figure 16):

   Parameters >
   Modify Ship Parameters >
   Ship Arrival Time To Port In Hours (User Specifies Exact Arrival Time Mode):

3. Set One Half Range (+/–) for the ship berthing and deberthing times to zero. Make the following choices on the PORTSIM menus and windows:

   Parameters >
   Modify Process Timing Parameters >
   Ship

   The Timing Parameter window opens (Figure 17). For Ship Berthing Time and Ship Deberthing Time:

   - Set Time to the desired value.

   - Set One Half Range (+/–) to ***zero***.

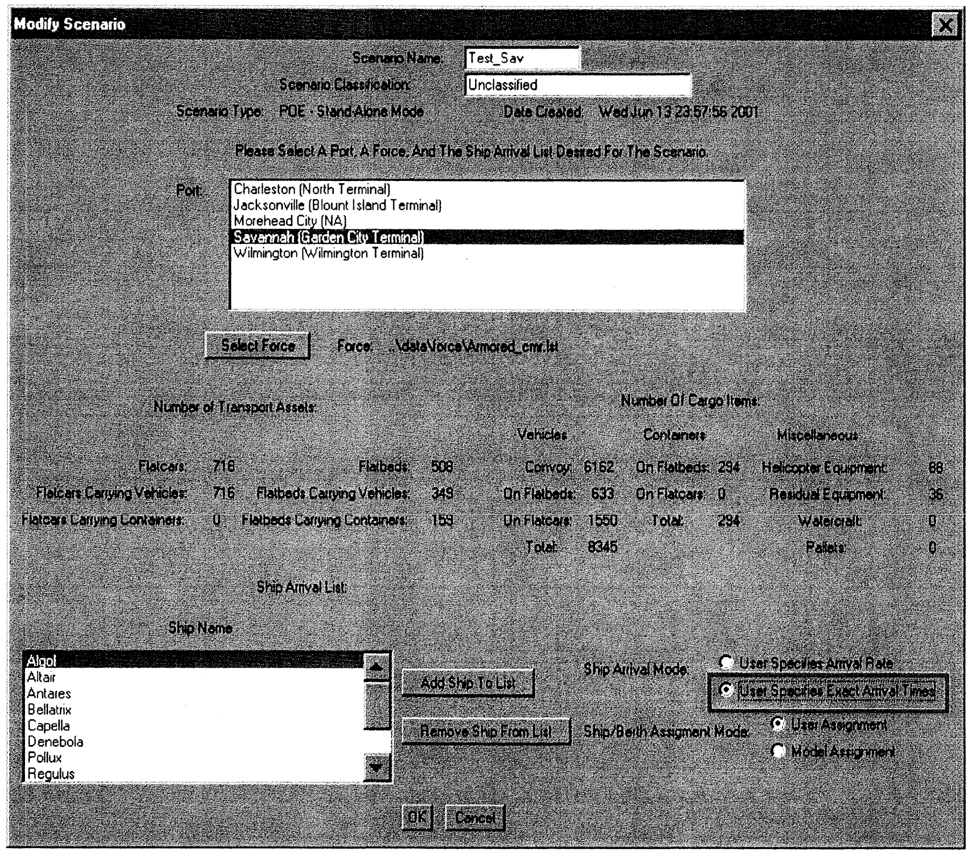

Figure 15: Deterministic Ship Arrival — Option 1 Screen 1 of 3

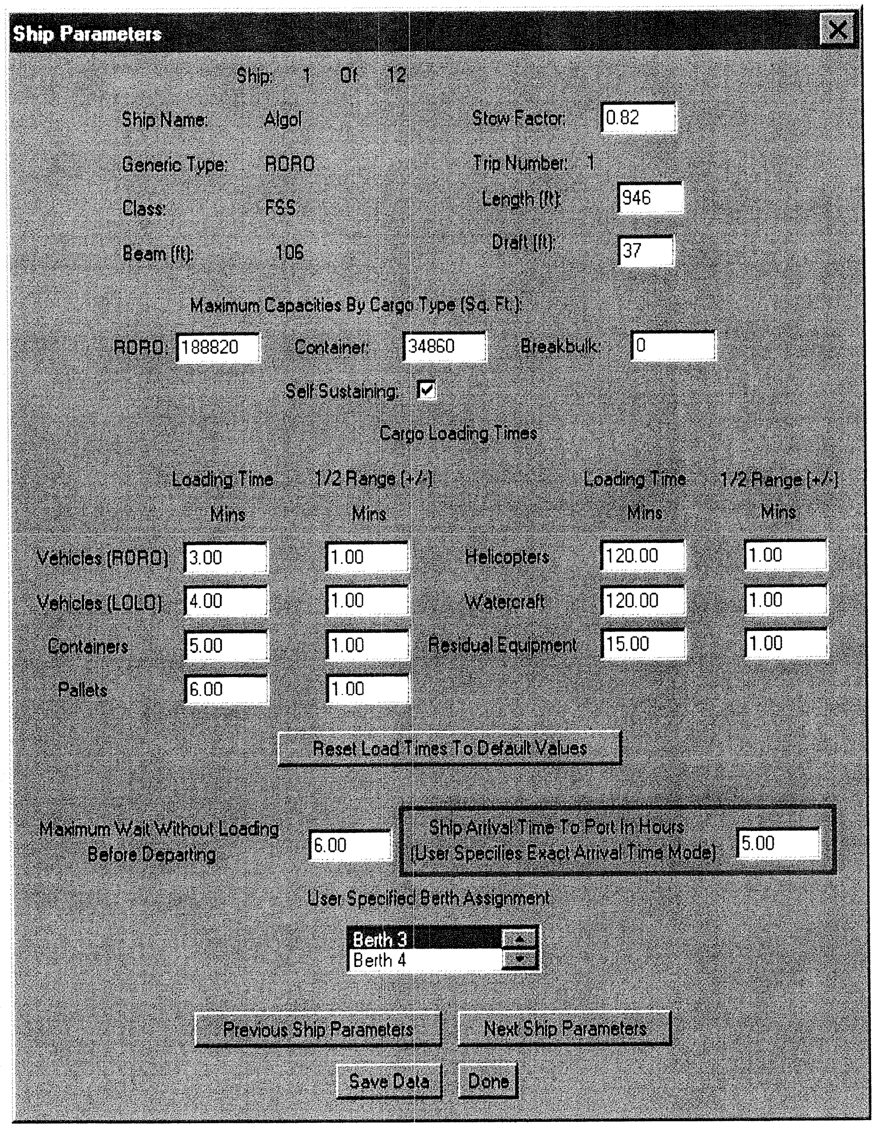

Figure 16: Deterministic Ship Arrival — Option 1 Screen 2 of 3

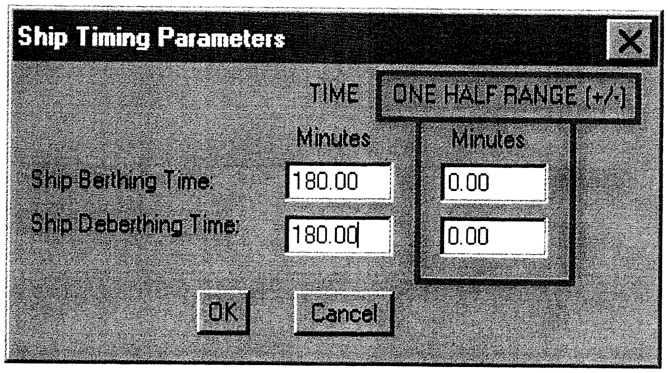

Figure 17: Deterministic Ship Arrival — Option 1 Screen 3 of 3 [note zero values]

A.4.1.2. Deterministic ship arrival based on a fixed rate

1. When creating a new scenario or modifying an existing scenario, make the following series of choices on the PORTSIM menus and windows (Figure 18):

   Scenario >
       [New Scenario **OR** Modify Loaded Scenario] >
           Ship Arrival Mode >
               User Specifies Arrival Rate (*click radio button*)

2. Set up arrivals of ships to the port. Make the following series of choices on the PORTSIM menus and windows:

   Parameters >
       Modify Arrival Mode Time Parameters >
           Ships

   The Arrival Mode Time Parameters window opens. Provide the following information (Figure 19):

   - Number of Ships Per Group:
   - Time to Begin Simulating Arrivals:
   - Time Between Arrivals:
   - **Deterministic Arrivals - fixed arrival interval** (*click radio button*). This option uses the Time Between Arrivals value as the fixed interval between ship arrivals.

3. Set One Half Range (+/–) for the ship berthing and deberthing times to zero. Make the following choices on the PORTSIM menus and windows:

   Parameters >
       Modify Process Timing Parameters >
           Ship

   The Timing Parameter window opens. For Ship Berthing Time and Ship Deberthing Time:

   - Set Time to the desired value.
   - Set One Half Range (+/–) to ***zero***.

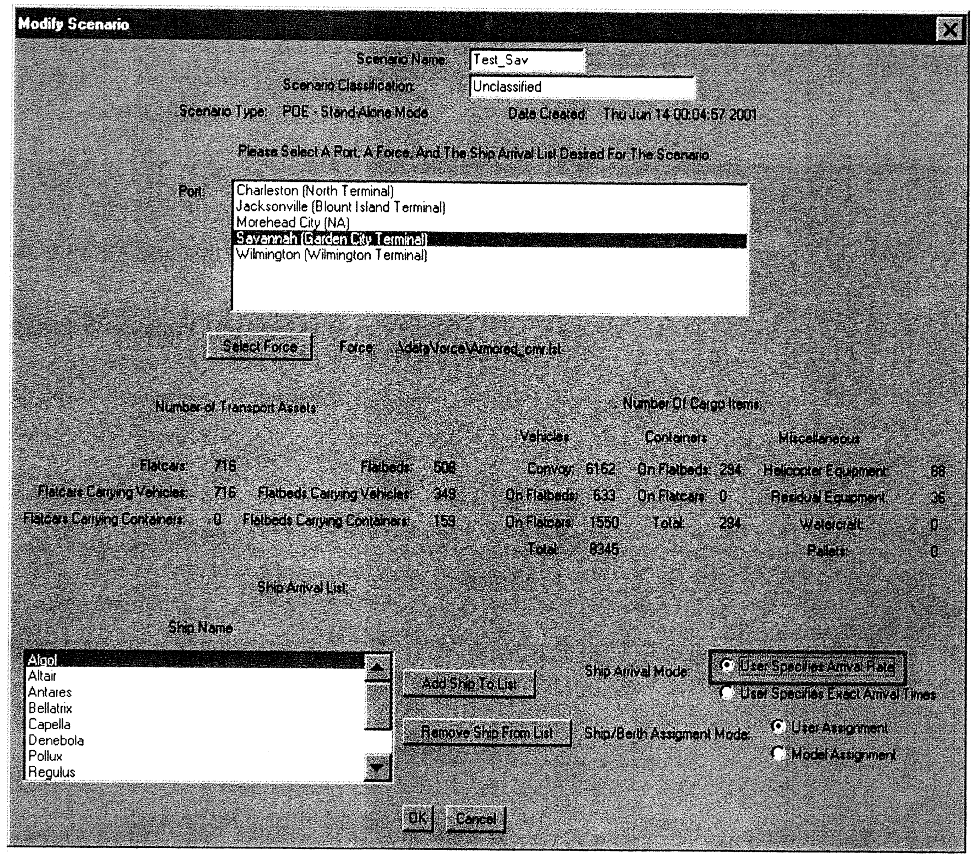

Figure 18: Deterministic Ship Arrival— Option 2 Screen 1 of 2

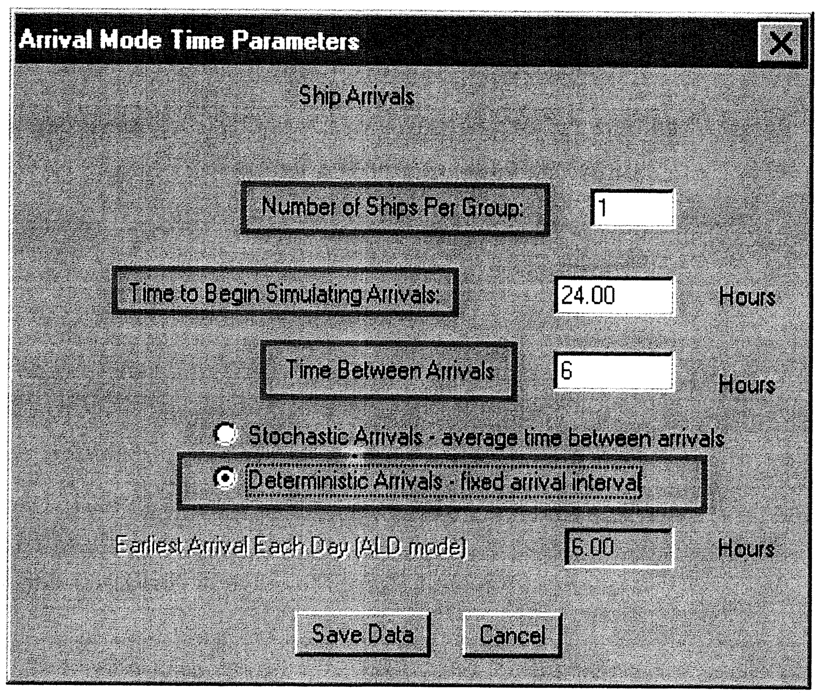

Figure 19: Deterministic Ship Arrival — Option 2 Screen 2 of 2

A.4.2 *Stochastic* Ship Arrival (Exponential Distributions)

1. When creating a new scenario or modifying an existing scenario, make the following series of choices on the PORTSIM menus and windows (Figure 20):

   Scenario >
   [New Scenario **OR** Modify Loaded Scenario] >
   Ship Arrival Mode >
   User Specifies Arrival Rate (*click radio button*):

2. Set up exponential arrivals of ships to the port. Make the following series of choices on the PORTSIM menus and windows:

   Parameters >
   Modify Arrival Mode Time Parameters >
   Ships

   The Arrival Mode Time Parameters window opens. Provide the following information (Figure 21):

   - Number of Ships Per Group:
   - Time to Begin Simulating Arrivals:
   - Time Between Arrivals:
   - **Stochastic Arrivals – average time between arrivals** (*click radio button*). This option uses the Time Between Arrivals value in an exponential distribution to determine time between ship arrivals.

3. Set One Half Range (+/–) for ship berthing and deberthing times to a nonzero value. Make the following choices on the PORTSIM menus and windows:

   Parameters >
   Modify Process Timing Parameters >
   Ship

   The Timing Parameter window opens (Figure 22). For Ship Berthing Time and Ship Deberthing Time:

   - Set Time to the desired value.
   - Set One Half Range (+/–) to ***a nonzero value***.

Note: In stochastic ship berthing and deberthing, the timing parameters are uniformly distributed, so what you are really inputting is the *range of the uniform distribution*, which is defined by the Time minus One Half Range (+/–) to the Time plus One Half Range (+/–). This is not to be confused with the stochastic ship arrivals to port, which are exponentially distributed.

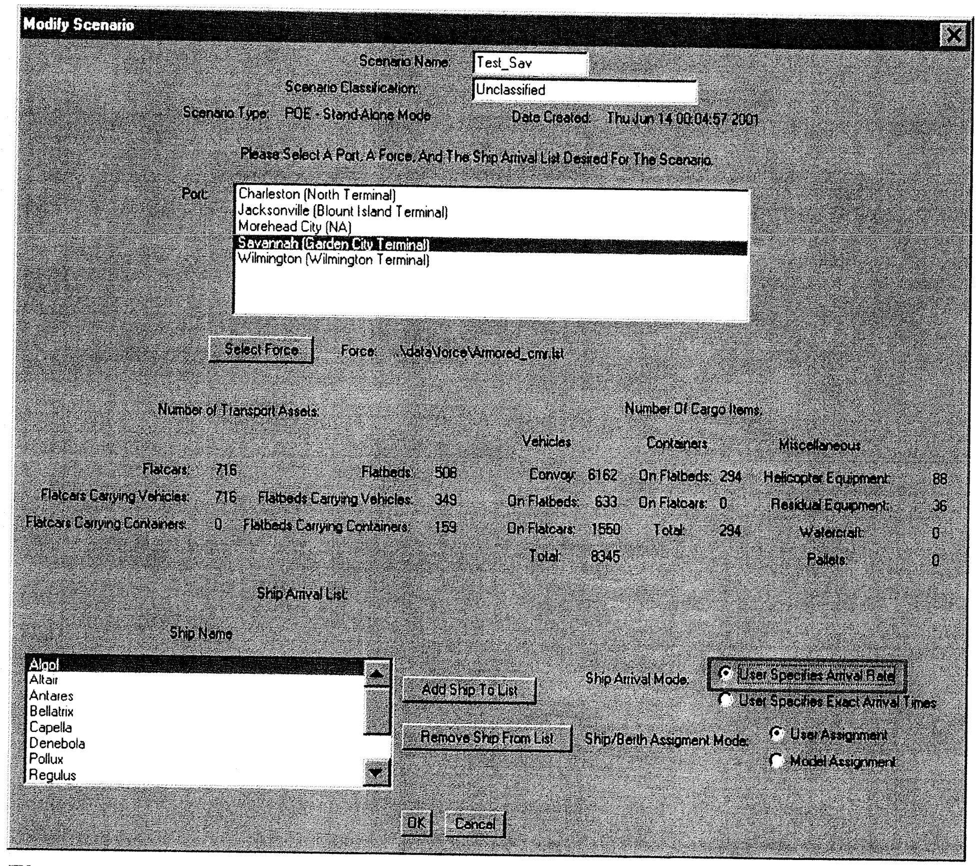

Figure 20: Stochastic Ship Arrival Screen 1 of 3

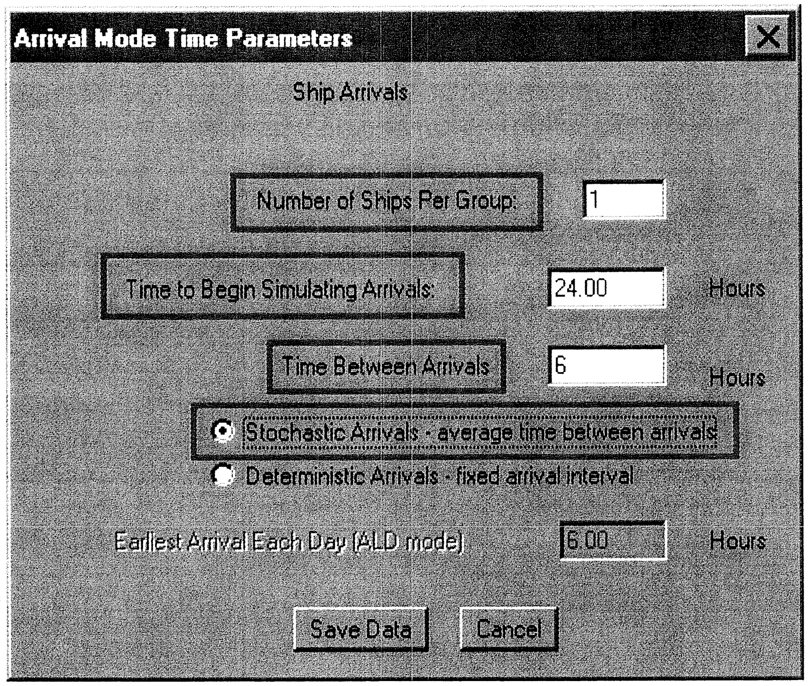

Figure 21: Stochastic Ship Arrival
Screen 2 of 3

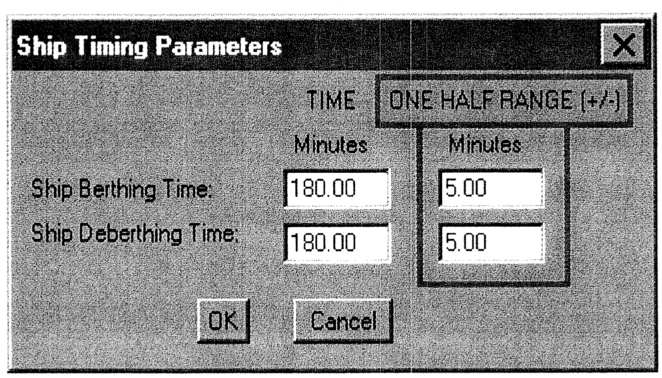

Figure 22: Stochastic Ship Arrival
Screen 3 of 3 [note nonzero values]

Appendix B

Appendix B
PORTSIM Verification Findings: Vehicles Via Convoys

This appendix is one in a series of three appendixes that contain previously released reports summarizing PORTSIM verification efforts. The emphasis in these reports was on verifying and correcting internal logic, processes, and interfaces. The work included reviews of model inputs, computations, and outputs. Findings from these reports aided in debugging PORTSIM and also yielded step-by-step guidelines for understanding details of the Cargo Report. Patterns in timing milestones (displayed in Cargo Reports) have been traced, verified, and summarized in the individual verification reports of this appendix.

To put these efforts in the context of other relevant work and literature, the following excerpts from four papers are included here for reference. Hartley (1997) defines verification as "The process of determining that a model implementation accurately represents the developer's conceptual description and specifications." Or more simply put, "Does it do what they said?" According to Sargent (1999), "Model verification is often defined as 'ensuring that the computer program of the computerized model and its implementation are correct.'" Additionally, "The primary techniques used to determine that the model has been programmed correctly are structured walk-throughs and traces." Balci (1997) says, "Model verification is substantiating that the model is transformed from one form into another, as intended, with sufficient accuracy. Model verification deals with building the model *right*. The accuracy of transforming a problem formulation into a model specification or the accuracy of converting a model representation in micro flowchart form to an executable computer program is evaluated in model verification." Finally, Kleijnen (1995) states, "Verification is determining that a simulation computer program performs as intended, i.e., debugging the computer program."

The efforts reported in Appendixes B, C, and D follow the themes and definitions of these citations. The objective was to verify that the software functioned as designed, based on methodical reviews and testing with scenarios having predictable outcomes. As a by-product of the reviews, mathematical patterns and relationships in cargo timing results were quantified and are reported in the Appendixes. These relationships may prove helpful to the user in confirming and verifying outcomes from new scenarios and assumptions.

The three PORTSIM verification reports cover each of the following categories of cargo types and transportation modes:

- Appendix B: Vehicles Via Convoys (completed May 19, 2000),
- Appendix C: Vehicles Via Flatcars (completed Dec. 20, 2000), and
- Appendix D: Containers Via Flatbed Trucks (completed April 13, 2001).

Three additional reports are being prepared to address the remaining cargo/transportation options, namely, Containers Via Flatcars, Vehicles Via Flatbed Trucks, and Other (Helicopter, Residual Equipment, and Watercraft). The last two of these reports will be brief, as the modeling components for most of the processing mechanisms will have already been verified in the previous efforts.

Because the analyses and reports were developed over a period of approximately a year, there are subtle differences among the reports. These differences are due in part to changes in the PORTSIM model itself (new version releases, updates, and upgrades over the study period). In addition, some formatting conventions evolved as the analysis progressed. And finally, each report was customized to fit the model reports corresponding to the cargo/transportation option under investigation.

References

Balci, O. 1997. "Principles of simulation model validation, verification and testing." *Transactions of the Society for Computer Simulation*, 14(1), 3-12.

Hartley, D. S., III. 1997. "Verification and validation in military simulations." In *Proceedings of the 1997 Winter Simulation Conference*, ed. S. Andradottir, K. J. Healy, D. H. Withers, and B. L. Nelson, pp. 925-932.

Kleijnen, J. P. C. 1995. "Verification and validation of simulation models." *European Journal of Operational Research*, 82(1995), 145-162.

Sargent, R. G. 1999. "Validation and verification of simulation models." In *Proceedings of the 1999 Winter Simulation Conference*, ed. P. A. Farrington, H. B. Newbhard, D. T. Sturrock, and G. W. Evans, pp. 39-48.

INTERIM PORTSIM VERIFICATION FINDINGS

by

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May 19, 2000

Interim PORTSIM Verification Findings

This interim report describes recent progress in the task of systematically verifying internal PORTSIM logic and processes. The efforts are focusing on examining, confirming and correcting the internal consistency and accuracy of model inputs, computations and outputs.

Approach
For the initial investigations, a small scenario, **basecv.rd**, and a small force file, **convoy1.lst**, have been created and implemented to facilitate verification of basic queuing logic. The scenario was set up in PORTSIM v3.6.1 to use one gate, one staging area and one berth at the Port of Savannah (Garden City Terminal). The force file contains 100 identical convoy vehicles. To simplify the analysis, initial tests treated (all) variables deterministically (e.g., timing parameters and ship arrival) with the exception of cargo arrival at the port which currently can only be set up stochastically. See Summary of Test Scenario Inputs: basecv.rd (attachment) for more details on the scenario setup.

The Cargo Report (see attached copy) contains the most complete source of event history data for PORTSIM. For that reason, verifications focused on confirming the timing details (for individual vehicles) contained in the Cargo Report. The Cargo Report includes information on when: cargo arrives at port, clears the gate, parks in staging, is available to load and loads on ships. It also includes the corresponding loading rate for cargo loaded onto the ships.

Using the scenario **basecv.rd,** with force file **convoy1.lst**, the 100 convoy vehicles were tracked through the port from the time they arrived at the port to the time they were loaded onto a RORO ship.

To verify the event history data found in the Cargo Report, the patterns and logic used to compute each of the five event history data pieces found in the Cargo Report were identified and quantified. These patterns and logic were then formulated into equations (see Tracking Sequence for basecv.rd). Findings were reviewed with PORTSIM program developer (MB) and it was confirmed that the conclusions matched with intended PORTSIM simulation structuring and logic.

Findings
Using the patterns and equations we have been able to track the flow of cargo through the port and confirm that each cargo piece was exactly in the right place at the right time for each of the five event history data pieces in the Cargo Report (for the **basecv.rd** scenario using the **convoy1.lst** force file).

The results confirm the fundamental accuracy of the Cargo Report with only one minor exception (Time Loaded becomes untraceable when Ship Berthing Time = 0 and Ship Arrival Time to Port = 0). The verification process did reveal a number of input labeling conventions (especially with regard to definitions and conventions for stochastic parameters) that will be modified for clearer and more accurate descriptions of the parameters and how they are used in the simulations.

The findings and materials developed for verification processes provide added benefits for use as instructional materials and user guides. Insights gained from the verifications are also adding to the foundation for ongoing and future metamodeling activities.

Supporting Documents (Attachments):

1. **Summary of Test Scenario Inputs: basecv.rd**: a summary of the inputs used in the scenario **basecv.rd**
2. **PORTSIM Menu Inputs for basecv.rd**: the menu choices/path to the windows were you enter input values that are used to compute the Cargo Report
3. **Tracking Sequence for basecv.rd**: the equations and logic that reproduce the results of the Cargo Report
4. **Screen Capture of Input Windows for basecv.rd**: the screen capture of the input windows of those inputs used to compute the Cargo Report
5. **Cargo Report Output for basecv.rd**: the complete Cargo Report of the scenario **basecv.rd** using the force file **convoy1.lst**

Future Tasks

Tasks to follow will include: verifying other output tables and graphs (other then the Cargo Report), verifying stochastic elements (timing parameters' distributions and arrival distributions) and implementing bug fixes and notational corrections. In addition, the next tasks will build from the foundation established with **basecv.rd** and will be extended to other modes of transportation and cargo types and larger scenarios.

Summary of Test Scenario Inputs: basecv.rd

This document contains a summary of the inputs used in the scenario **basecv.rd**.

Scenario Name: basecv.rd
Force File Name: convoy1.lst (100 identical convoy vehicles)

Run time: 500 hours

Locomotives: 1
End ramps: 1
Docks: 6
Inspectors: 200
Drivers: 200
Container handlers: 1

Gates: #1, only one available for military use
    Inbound lanes: 2
    Outbound lanes: 2
    Gate can accept: all types (convoys vehicle, flatbed trucks, vans)

Berths: #4, only one available for military use
    Length: 1200 feet
    Container cranes: 1
    Wharf cranes: 1

Open staging: #1, only one available for military use
    Capacity of military use: 833,105 square feet
    Percent usable for staging: 60% (499,863 square feet)
    Stacking height: 3
    Type of cargo handled: all types (wheeled vehicles, tracked vehicles, containers)

Interchange yard: #1, only one available for military use
    Capacity: 208 railcars
    percent usable: 60% (125)

Spurs: #1, only one available for military use
    Type: open staging
    Tangent length: 1,416
    Offloading method: end ramps
    Loading method: end ramps

Process timing parameters: all times set to integers >= 1

Vehicle: SD = 0	*(deterministic port operations)*
Container: SD = 0	*(deterministic port operations)*
Railcar: SD = 0	*(deterministic port operations)*
Pallets: SD = 0	*(deterministic port operations)*
Ship: SD = 0	*(deterministic port operations)*
Flatbed: SD = 0	*(deterministic port operations)*
Van: SD = 0	*(deterministic port operations)*

Arrival mode time parameters:

Convoy vehicles: Exponential	20 per convoy/0 start arriving/30 min. between arrival	*(stochastic cargo arrival)*
Flatbeds: Exponential	20/0/40 min.	
Vans: Exponential	20/0/80 min.	
Ships: Exponential	-/-/-	*(deterministic ship arrival)*
Trains: Exponential	50/0/5 hours	

Sizes of groups for clearing the port:
- Vehicles per convoy: 25
- Commercial highway – number of flatbeds per group: 1
- Commercial highway – number of vans per group: 1
- Commercial rail – number of railcars per train: 50

Ship 1: Adm Wm M Callaghan
- Length: 694 feet
- Maximum capacities by cargo type:
  - Breakbulk: 0
  - Container: 0
  - RORO: 168,000
- Maximum wait without loading/offloading: 6 hours
- Ship arrival time to port: 5 hours *(deterministic ship arrival)*

Ship 2: Adabella Lykes
- Length: 660 feet
- Maximum capacities by cargo type:
  - Breakbulk: 0
  - Container: 7,155 square feet
  - RORO: 0
- Maximum wait without loading/offloading: 6 hours
- Ship arrival time to port: 5 hours *(deterministic ship arrival)*

PORTSIM Menu Inputs for basecv.rd

This document describes the menu choices/paths to the windows for entering input values. These inputs are used in computing the Cargo Report for the **basecv.rd** scenario (and, in general, for convoy vehicles loaded to a RORO ship). The order presented below follows the order of the Cargo Report columns from left to right. The letters a...k are labels for the input variables as shown in the screen captures (see Screen Capture of Input Windows for basecv.rd).

Time Arrived at Port
Parameter > Modify Arrival Mode Time Parameters > Convoy Vehicles
Number of Vehicles Per Convoy = _a_
Time to Begin Simulation Arrival = _b_
Average Time Between Arrival = _c_

Time Cleared Gate
Parameter > Modify Process Timing Parameters > Vehicle
Gate Processing = _d_

Time Parked in Staging
Parameter > Modify Process Timing Parameters > Vehicle
Transit Vehicle Gate to Open Staging = _e_
Open Staging Parking = _f_

Time Available to Load
Parameter > Modify Process Timing Parameters > Vehicle
Open Staging Inspection = _g_

Time Loaded
Parameter > Modify Process Timing Parameters > Vehicle
Transit Vehicle to Berth = _h_
Load Vehicle at RORO Berth = _i_

Parameter > Modify Process Timing Parameters > Ship
Ship Berthing Time = _j_

Parameter > Modify ship parameters
Ship Arrival Time to Port = _k_

*Time Loaded becomes untraceable when Ship Berthing Time = 0 and Ship Arrival Time to Port = 0.

Other Factors Affecting Time Loaded (Depth)
Parameter > Modify Port Parameters > Berth > Detailed Berth Parameters > "Maximum Call Forward:" _1_

Maximum Call Forward is the number of drivers available at a time to drive convoy vehicles from the staging area to the berth. It affects the Time Loaded by loading the convoy vehicle in groups equal to the Maximum Call Forward. For example, if Maximum Call Forward = 15, then convoy vehicles get loaded in the following groups 1-15, 16-30, 31-45,... and the Time Loaded is separated by the Load Rate time.

Between the 15th and 16th convoy vehicle, the 30th and 31st convoy vehicle, the 45th and 46th convoy vehicle, etc...., the gap in Time Loaded changes to the sum of the Transit Vehicle to Berth time plus Load Vehicle at RORO Berth time plus five minutes. This is the time needed to bus the drivers from the berth back to the staging area.

Load Rate
Parameter > Modify Process Timing Parameters > Vehicle
Load Vehicle at RORO Berth = _i_

Tracking Sequence for basecv.rd

This document presents the equations and logic that reproduce the results of the Cargo Report for the **basecv.rd** scenario using the **convoy1.lst** force file. First is a short list of notations used. Following the list are the equations and logic for computing the Cargo Report. The order presented follows the order of the Cargo Report columns from left to right.

Here is an example of computing the first and second vehicles' Time Cleared Gate (TCG) from the Cargo Report. The first vehicle's TCG is equal to the time it arrived at port plus the time for gate processing for vehicles. The second vehicle's TCG is equal to the previous results plus the time for gate processing for vehicles. The document, Screen Capture of Input Windows for basecv.rd, contains a screen capture of the window for setting gate processing for vehicles and all other defined input variables a…k used in this document.

Projections for formulating the event history data for larger scenarios are also included. In general, with large and/or more complex scenarios, TCG and TL would change the most, while the other parameters (TAP, TPS, TAL, and LR) would mostly remain stable.

Notation
n = total number of cargo pieces in the force
$m \in 1,2\ldots n$
a…k = input variables used in PORTSIM
^ = results from previous step

Time Arrived at Port = TAP = *f*(a,b,c)
a = Number of Vehicles Per Convoy
b = Time to Begin Simulating Arrivals
c = Average Time Between Arrivals

For large scenarios, we project the TAP is the same or similar even when many convoys arrive at the port at the same or about the same time.

Time Cleared Gate = TCG = *f*(TAP, d)
d = Gate Processing

$TCG_1 = TAP_1 + d$
$TCG_2 = \wedge + d$
$TCG_3 = \wedge + d \ldots$

Except for instances where $TAP_{m+1} > TCG_m$ occur (i.e., waiting times between the last vehicle of a convoy clearing the gate and the next convoy arriving) then
$TCG_{m+1} = TAP_{m+1} + d$
$TCG_{m+2} = \wedge + d$
$TCG_{m+3} = \wedge + d \ldots$

For example, between the second and third convoy in the **basecv.rd** scenario where $TAP_{41} > TCG_{40}$ and d = :01,
$TCG_{41} = TAP_{41} + d = :54 + :01 = :55$

For large scenarios, we project that TCG could experience delays, because cargo is not allowed to go through the gate unless there is enough space in the staging areas to accommodate the cargo.

In the case of convoys, all vehicles in a convoy get processed together. If there is only room in staging to accommodate half the vehicles in the convoy, those half do not proceed through the gate, but must wait until there is room for the whole convoy. Other types of vehicles are allowed to process through the gate even when a convoy is waiting for room for the entire convoy.

<u>Time Parked in Staging = TPS = *f*(TCG,e,f)</u>
e = Transit Vehicle Gate To Open Staging
f = Open Staging Parking

$TPS_1 = TCG_1 + e + f$
$TPS_2 = TCG_2 + e + f \ldots$
$TPS_n = TCG_n + e + f$

For large scenarios, we project that TPS will remain the same or similar.

<u>Time Available to Load = TAL = *f*(TPS, g)</u>
g = Open Staging Inspection

$TAL_1 = TPS_1 + g$
$TAL_2 = TPS_2 + g \ldots$
$TAL_n = TPS_n + g$

For large scenarios, we project that TAL will experience delays when there is a wait for inspection of cargo (e.g., for small number of inspectors).

<u>Time Loaded = TL = *f*(TAL, h, i, j, k)</u>
h = Transit Vehicle To Berth
i = Load Vehicle At RORO berth
j = Ship Berthing Time
k = Ship Arrival Time To Port

For $TAL_1 <= j + k$
$TL_1 = h + i + j + k$
$TL_2 = \wedge + i$
$TL_3 = \wedge + i \ldots$

<u>Other Factors Affecting Time Loaded (Depth)</u>
l = Maximum Call Forward, this is the number of drivers available at a time to drive convoy vehicles from the staging area to the berth. It affects the Time Loaded by loading the convoy vehicles in groups equal to the Maximum Call Forward.

h + i + 5 = the time needed to bus drivers from berth to staging area every l (Maximum Call Forward) convoy vehicles.

* Time Loaded becomes untraceable when Ship Berthing Time = 0 and Ship Arrival Time to Port = 0.

For large scenarios, we project that TL could be different due to several possible conditions: e.g., waiting for RORO ship to berth, loading more then one ship at a time, force file containing a mixture of cargo (convoys and containers), cargo arriving through more then one gate, etc.

After conversations with MB, examples for changing Time Loaded are being retested and re-examined.

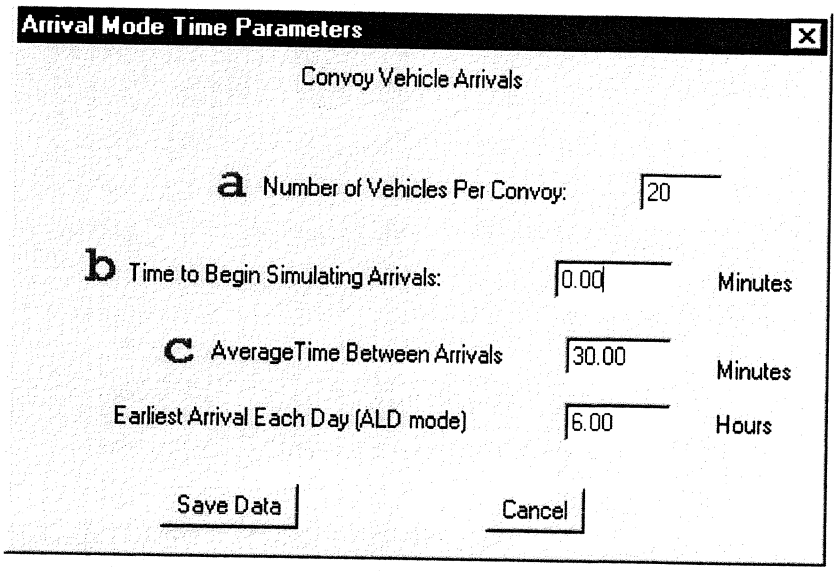
<u>Loading Rate = LR = *f*(i)</u>
i = Load Vehicle At RORO berth

$LR_1 = i$
$LR_2 = i \ldots$
$LR_n = i$

For large scenarios, we project that LR will change depending on the type of ship that is being loaded; however, even with different ship types in the scenario, Loading Rate will still be very easy to compute.

Screen Capture of Input Windows for basecv.rd

This document includes the screen captures of the input windows of those inputs used to compute the Cargo Report for the **basecv.rd** scenario. The inputs used are identified by the letters a…k, and these also correspond to labels used in the equations presented in <u>Tracking Sequence for basecv.rd</u>.


Arrival Mode Time Parameters
Convoy Vehicle Arrivals
a Number of Vehicles Per Convoy: 20
b Time to Begin Simulating Arrivals: 0.00 Minutes
c AverageTime Between Arrivals 30.00 Minutes
Earliest Arrival Each Day (ALD mode) 6.00 Hours
Save Data
Cancel

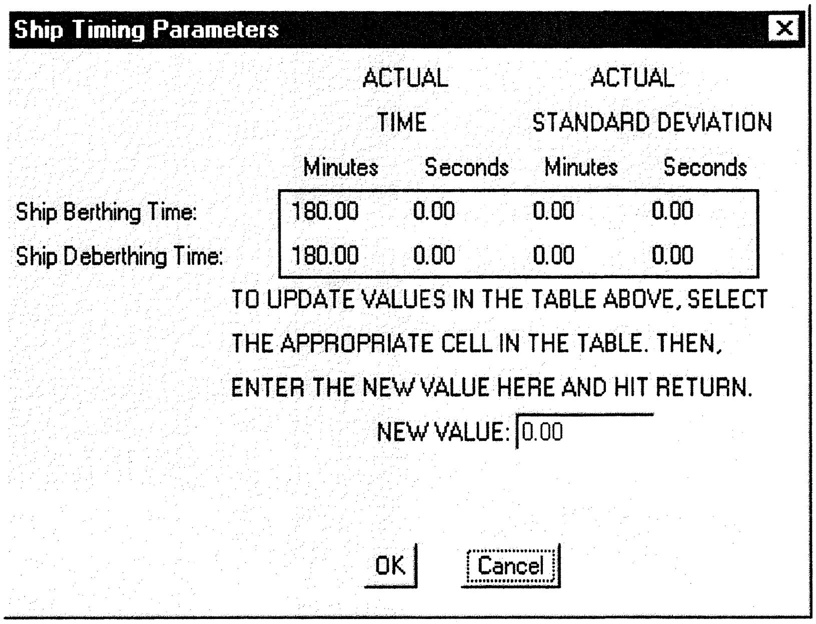
Vehicle Timing Parameters

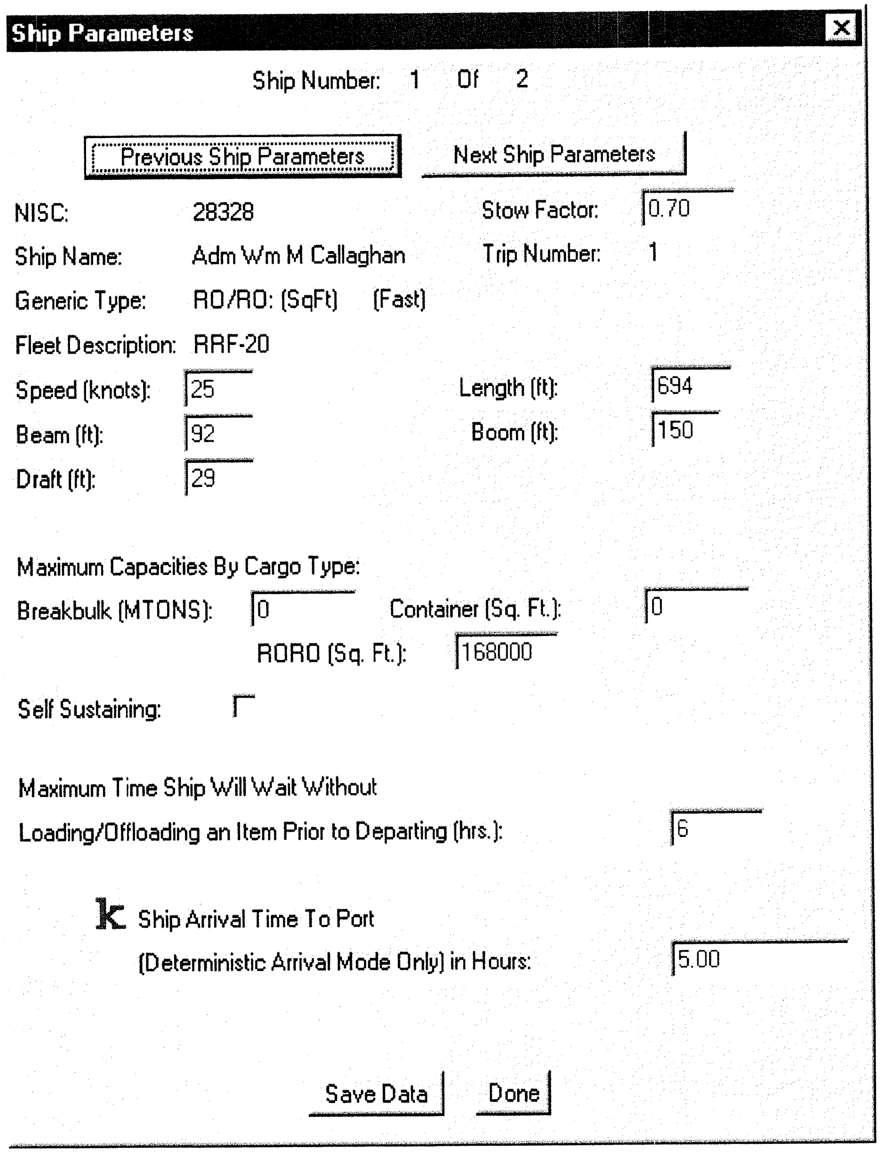
		ACTUAL TIME		ACTUAL STD. DEVIATION		FIXED COST	VARIABLE COST
		Minutes	Seconds	Minutes	Seconds	($)	($/Hour)
d	Gate Processing:	1.00	0.00	0.00	0.00	3.00	1.00
e	Transit Vehicle Gate To Open Staging:	2.00	0.00	0.00	0.00	0.50	0.25
	Transit Vehicle Rail End Ramp To Open Staging:	2.00	0.00	0.00	0.00	0.50	0.25
	Transit Vehicle Truck End Ramp To Open Staging:	2.00	0.00	0.00	0.00	0.50	0.25
g	Open Staging Inspection:	25.00	0.00	0.00	0.00	10.00	3.00
f	Open Staging Parking:	5.00	0.00	0.00	0.00	7.00	3.50
h	Transit Vehicle To Berth:	2.00	0.00	0.00	0.00	0.50	0.25
i	Load Vehicle At RORO Berth:	4.00	0.00	0.00	0.00	8.00	5.00
	Load Vehicle At Container Berth:	4.00	0.00	0.00	0.00	12.00	5.00
	Load Vehicle At Breakbulk Berth:	12.00	0.00	0.00	0.00	21.00	8.00
	Offload Vehicle From Ship Using RORO Ramp:	2.00	0.00	0.00	0.00	8.00	5.00
	Offload Vehicle From Ship Using Crane:	5.00	0.00	0.00	0.00	12.00	5.00
	Vehicle Computer Data Scanning:	2.00	0.00	0.00	0.00	3.00	1.00
	Transit Vehicle Berth To Staging:	4.00	0.00	0.00	0.00	0.50	0.25
	Transit Vehicle Berth To Rail Loading Site:	4.00	0.00	0.00	0.00	0.50	0.25
	Transit Vehicle Berth To Highway Loading Site:	4.00	0.00	0.00	0.00	0.50	0.25
	Transit Convoy Staging Area To Gate:	5.00	0.00	0.00	0.00	0.50	0.25
	Load Vehicle Onto Flatbed:	3.00	0.00	0.00	0.00	6.00	1.50
	Required Dwell Time In Open Staging:	0.00	0.00	0.00	0.00	1.00	1.00

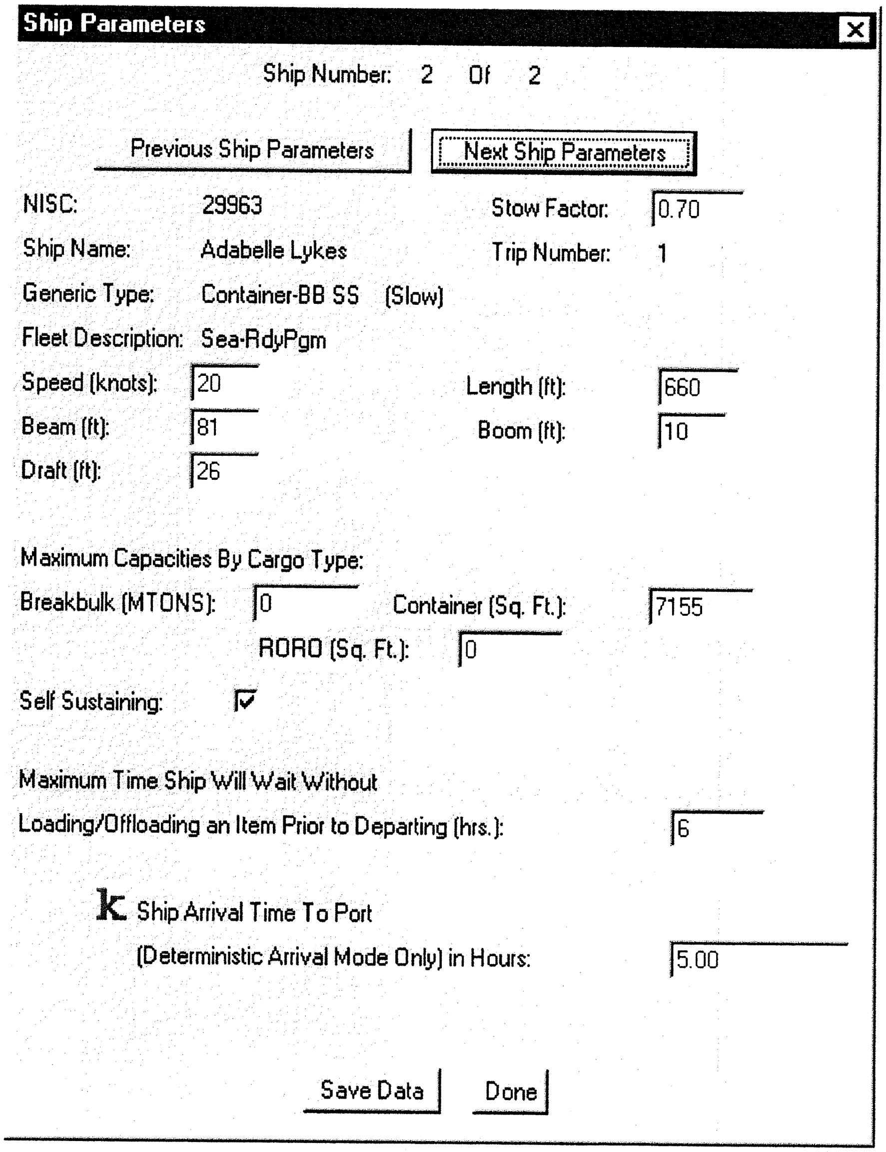
TO UPDATE VALUES IN THE TABLE ABOVE, SELECT THE APPROPRIATE CELL IN THE TABLE. THEN, ENTER THE NEW VALUE HERE AND HIT RETURN.

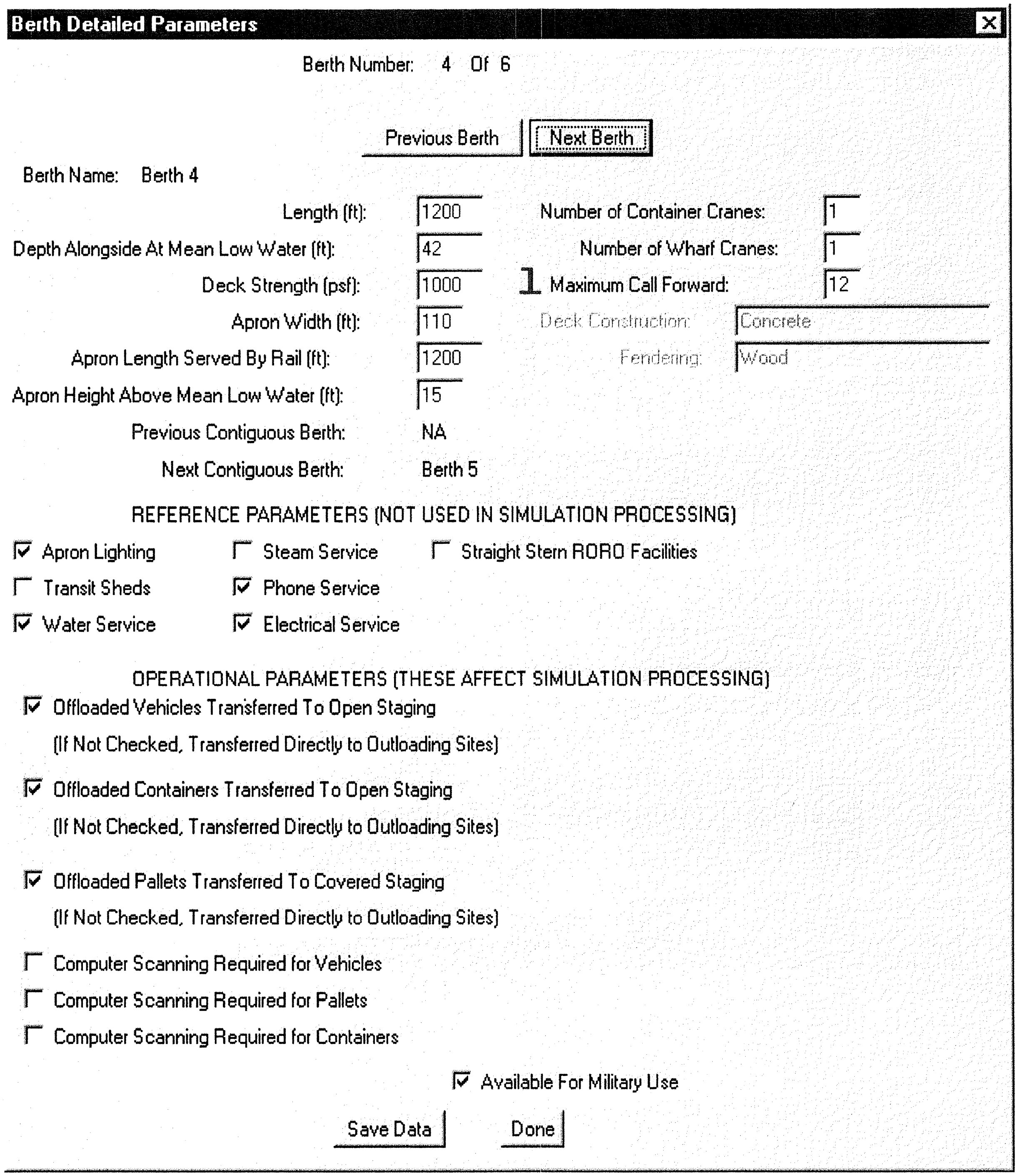
NEW VALUE: 0.00

OK Cancel


Ship Timing Parameters
ACTUAL TIME
ACTUAL STANDARD DEVIATION
Minutes Seconds Minutes Seconds
Ship Berthing Time: 180.00 0.00 0.00 0.00
Ship Deberthing Time: 180.00 0.00 0.00 0.00
TO UPDATE VALUES IN THE TABLE ABOVE, SELECT THE APPROPRIATE CELL IN THE TABLE. THEN, ENTER THE NEW VALUE HERE AND HIT RETURN.
NEW VALUE: 0.00
OK
Cancel


Ship Parameters
Ship Number: 1 Of 2
Previous Ship Parameters
Next Ship Parameters
NISC: 28328
Stow Factor: 0.70
Ship Name: Adm Wm M Callaghan
Trip Number: 1
Generic Type: RO/RO: (SqFt) (Fast)
Fleet Description: RRF-20
Speed (knots): 25
Length (ft): 694
Beam (ft): 92
Boom (ft): 150
Draft (ft): 29
Maximum Capacities By Cargo Type:
Breakbulk (MTONS): 0
Container (Sq. Ft.): 0
RORO (Sq. Ft.): 168000
Self Sustaining:
Maximum Time Ship Will Wait Without
Loading/Offloading an Item Prior to Departing (hrs.): 6
Ship Arrival Time To Port
(Deterministic Arrival Mode Only) in Hours: 5.00
Save Data
Done


Ship Parameters
Ship Number: 2 Of 2
Previous Ship Parameters
Next Ship Parameters
NISC: 29963
Stow Factor: 0.70
Ship Name: Adabelle Lykes
Trip Number: 1
Generic Type: Container-BB SS (Slow)
Fleet Description: Sea-RdyPgm
Speed (knots): 20
Length (ft): 660
Beam (ft): 81
Boom (ft): 10
Draft (ft): 26
Maximum Capacities By Cargo Type:
Breakbulk (MTONS): 0
Container (Sq. Ft.): 7155
RORO (Sq. Ft.): 0
Self Sustaining:
Maximum Time Ship Will Wait Without
Loading/Offloading an Item Prior to Departing (hrs.): 6
Ship Arrival Time To Port
(Deterministic Arrival Mode Only) in Hours: 5.00
Save Data
Done


Berth Detailed Parameters
Berth Number: 4 Of 6
Previous Berth
Next Berth
Berth Name: Berth 4
Length (ft): 1200
Depth Alongside At Mean Low Water (ft): 42
Deck Strength (psf): 1000
Apron Width (ft): 110
Apron Length Served By Rail (ft): 1200
Apron Height Above Mean Low Water (ft): 15
Previous Contiguous Berth: NA
Next Contiguous Berth: Berth 5
Number of Container Cranes: 1
Number of Wharf Cranes: 1
Maximum Call Forward: 12
Deck Construction: Concrete
Fendering: Wood
REFERENCE PARAMETERS (NOT USED IN SIMULATION PROCESSING)
Apron Lighting
Steam Service
Straight Stern RORO Facilities
Transit Sheds
Phone Service
Water Service
Electrical Service
OPERATIONAL PARAMETERS (THESE AFFECT SIMULATION PROCESSING)
Offloaded Vehicles Transferred To Open Staging
(If Not Checked, Transferred Directly to Outloading Sites)
Offloaded Containers Transferred To Open Staging
(If Not Checked, Transferred Directly to Outloading Sites)
Offloaded Pallets Transferred To Covered Staging
(If Not Checked, Transferred Directly to Outloading Sites)
Computer Scanning Required for Vehicles
Computer Scanning Required for Pallets
Computer Scanning Required for Containers
Available For Military Use
Save Data
Done

Cargo Report Output for basecv.rd

This document is a print out of the Cargo Report for the **basecv.rd** scenario using the **convoy1.lst** force file. The equations from Tracking Sequence for basecv.rd are written in some of the cells of the Cargo Report.

PORTSIM Detailed Cargo Report
(Note: All Times Are Represented In DDD:HH:MM)

Sort Instructions: To sort on a desired column, double-click the column header and the table will be sorted by that column.

LIN ID	TAP Time Arrived At Port	TCG Time Cleared Gate	TPS Time Parked In Staging	TAL Time Available To Load	TL Time Loaded	LR Loading Rate (Mins)	Ship Loaded Onto
KNICK 1VE00000001	0:00:00 TAP_1	0:00:01 TAP_1+d	0:00:08 TCG_1+e+f	0:00:33 TPS_1+g	**0:08:06** h+i+j+k	4	Adm Wm M Callaghan
KNICK 1VE00000002	0:00:00 TAP_2	0:00:02 ^+d	0:00:09 TCG_2+e+f	0:00:34 TPS_2+g	**0:08:10** ^+i	4	Adm Wm M Callaghan
KNICK 1VE00000003	0:00:00 TAP_3	0:00:03 ^+d	0:00:10 TCG_3+e+f	0:00:35 TPS_3+g	**0:08:14** ^+i	4	Adm Wm M Callaghan
KNICK 1VE00000004	0:00:00	0:00:04	0:00:11	0:00:36	**0:08:18**	4	Adm Wm M Callaghan
KNICK 1VE00000005	0:00:00	0:00:05	0:00:12	0:00:37	**0:08:22**	4	Adm Wm M Callaghan
KNICK 1VE00000006	0:00:00	0:00:06	0:00:13	0:00:38	**0:08:26**	4	Adm Wm M Callaghan
KNICK 1VE00000007	0:00:00	0:00:07	0:00:14	0:00:39	**0:08:30**	4 i	Adm Wm M Callaghan
KNICK 1VE00000008	0:00:00	0:00:08	0:00:15	0:00:40	**0:08:34**	4	Adm Wm M Callaghan
KNICK 1VE00000009	0:00:00	0:00:09 b	0:00:16	0:00:41	**0:08:38**	4	Adm Wm M Callaghan
KNICK 1VE00000010	0:00:00	0:00:10	0:00:17	0:00:42	**0:08:42**	4	Adm Wm M Callaghan
KNICK 1VE00000011	0:00:00	0:00:11	0:00:18	0:00:43	**0:08:46**	4	Adm Wm M Callaghan
KNICK 1VE00000012	0:00:00	0:00:12	0:00:19	0:00:44	**0:08:50**	4 h+i+5	Adm Wm M Callaghan
KNICK 1VE00000013	0:00:00	0:00:13	0:00:20	0:00:45	0:09:01	4	Adm Wm M Callaghan
KNICK 1VE00000014	0:00:00	0:00:14	0:00:21	0:00:46	0:09:05	4	Adm Wm M Callaghan
KNICK 1VE00000015	0:00:00	0:00:15	0:00:22	0:00:47	0:09:09	4	Adm Wm M Callaghan
KNICK 1VE00000016	0:00:00	0:00:16	0:00:23	0:00:48	0:09:13	4	Adm Wm M Callaghan
KNICK 1VE00000017	0:00:00	0:00:17	0:00:24	0:00:49	0:09:17	4	Adm Wm M Callaghan
KNICK 1VE00000018	0:00:00	0:00:18	0:00:25	0:00:50	0:09:21	4	Adm Wm M Callaghan
KNICK 1VE00000019	0:00:00	0:00:19	0:00:26	0:00:51	0:09:25	4 i	Adm Wm M Callaghan
KNICK 1VE00000020	0:00:00	0:00:20 c	0:00:27	0:00:52	0:09:29	4	Adm Wm M Callaghan
KNICK 1VE00000021	0:00:02	0:00:21	0:00:28	0:00:53	0:09:33	4	Adm Wm M Callaghan
KNICK 1VE00000022	0:00:02	0:00:22	0:00:29	0:00:54	0:09:37	4	Adm Wm M Callaghan
KNICK 1VE00000023	0:00:02	0:00:23	0:00:30	0:00:55	0:09:41	4	Adm Wm M Callaghan
KNICK 1VE00000024	0:00:02	0:00:24	0:00:31	0:00:56	0:09:45	4 h+i+5	Adm Wm M Callaghan
KNICK 1VE00000025	0:00:02	0:00:25	0:00:32	0:00:57	**0:09:56**	4	Adm Wm M Callaghan
KNICK 1VE00000026	0:00:02	0:00:26	0:00:33	0:00:58	**0:10:00**	4	Adm Wm M Callaghan
KNICK 1VE00000027	0:00:02	0:00:27	0:00:34	0:00:59	**0:10:04**	4	Adm Wm M Callaghan
KNICK 1VE00000028	0:00:02	0:00:28	0:00:35	0:01:00	**0:10:08**	4	Adm Wm M Callaghan
KNICK 1VE00000029	0:00:02	0:00:29	0:00:36	0:01:01	**0:10:12**	4	Adm Wm M Callaghan
KNICK 1VE00000030	0:00:02	0:00:30	0:00:37	0:01:02	**0:10:16**	4	Adm Wm M Callaghan

KNICK 1VE00000031	0:00:02		0:00:31		0:00:38	0:01:03	**0:10:20**	4	I	Adm Wm M Callaghan
KNICK 1VE00000032	0:00:02		0:00:32		0:00:39	0:01:04	**0:10:24**	4		Adm Wm M Callaghan
KNICK 1VE00000033	0:00:02		0:00:33		0:00:40	0:01:05	**0:10:28**	4		Adm Wm M Callaghan
KNICK 1VE00000034	0:00:02		0:00:34		0:00:41	0:01:06	**0:10:32**	4		Adm Wm M Callaghan
KNICK 1VE00000035	0:00:02		0:00:35		0:00:42	0:01:07	**0:10:36**	4		Adm Wm M Callaghan
KNICK 1VE00000036	0:00:02		0:00:36		0:00:43	0:01:08	**0:10:40**	4	h+i+5	Adm Wm M Callaghan
KNICK 1VE00000037	0:00:02		0:00:37		0:00:44	0:01:09	0:10:51	4		Adm Wm M Callaghan
KNICK 1VE00000038	0:00:02		0:00:38		0:00:45	0:01:10	0:10:55	4		Adm Wm M Callaghan
KNICK 1VE00000039	0:00:02		0:00:39		0:00:46	0:01:11	0:10:59	4		Adm Wm M Callaghan
KNICK 1VE00000040	0:00:02		0:00:40 c		0:00:47	0:01:12	0:11:03	4		Adm Wm M Callaghan
KNICK 1VE00000041	0:00:54	TAP_{41}	0:00:55	TAP_{41}+d	0:01:02	0:01:27	0:11:07	4		Adm Wm M Callaghan
KNICK 1VE00000042	0:00:54		0:00:56	^+d	0:01:03	0:01:28	0:11:11	4		Adm Wm M Callaghan
KNICK 1VE00000043	0:00:54		0:00:57	^+d	0:01:04	0:01:29	0:11:15	4	I	Adm Wm M Callaghan
KNICK 1VE00000044	0:00:54		0:00:58		0:01:05	0:01:30	0:11:19	4		Adm Wm M Callaghan
KNICK 1VE00000045	0:00:54		0:00:59		0:01:06	0:01:31	0:11:23	4		Adm Wm M Callaghan
KNICK 1VE00000046	0:00:54		0:01:00		0:01:07	0:01:32	0:11:27	4		Adm Wm M Callaghan
KNICK 1VE00000047	0:00:54		0:01:01		0:01:08	0:01:33	0:11:31	4		Adm Wm M Callaghan
KNICK 1VE00000048	0:00:54		0:01:02		0:01:09	0:01:34	0:11:35	4	h+i+5	Adm Wm M Callaghan
KNICK 1VE00000049	0:00:54		0:01:03		0:01:10	0:01:35	**0:11:46**	4		Adm Wm M Callaghan
KNICK 1VE00000050	0:00:54		0:01:04		0:01:11	0:01:36	**0:11:50**	4		Adm Wm M Callaghan
KNICK 1VE00000051	0:00:54		0:01:05		0:01:12	0:01:37	**0:11:54**	4		Adm Wm M Callaghan
KNICK 1VE00000052	0:00:54		0:01:06		0:01:13	0:01:38	**0:11:58**	4		Adm Wm M Callaghan
KNICK 1VE00000053	0:00:54		0:01:07		0:01:14	0:01:39	**0:12:02**	4		Adm Wm M Callaghan
KNICK 1VE00000054	0:00:54		0:01:08		0:01:15	0:01:40	**0:12:06**	4		Adm Wm M Callaghan
KNICK 1VE00000055	0:00:54		0:01:09		0:01:16	0:01:41	**0:12:10**	4	I	Adm Wm M Callaghan
KNICK 1VE00000056	0:00:54		0:01:10		0:01:17	0:01:42	**0:12:14**	4		Adm Wm M Callaghan
KNICK 1VE00000057	0:00:54		0:01:11		0:01:18	0:01:43	**0:12:18**	4		Adm Wm M Callaghan
KNICK 1VE00000058	0:00:54		0:01:12		0:01:19	0:01:44	**0:12:22**	4		Adm Wm M Callaghan
KNICK 1VE00000059	0:00:54		0:01:13		0:01:20	0:01:45	**0:12:26**	4		Adm Wm M Callaghan
KNICK 1VE00000060	0:00:54		0:01:14 c		0:01:21	0:01:46	**0:12:30**	4	h+i+5	Adm Wm M Callaghan
KNICK 1VE00000061	0:01:37		0:01:38		0:01:45	0:02:10	0:12:41	4		Adm Wm M Callaghan
KNICK 1VE00000062	0:01:37		0:01:39		0:01:46	0:02:11	0:12:45	4		Adm Wm M Callaghan
KNICK 1VE00000063	0:01:37		0:01:40		0:01:47	0:02:12	0:12:49	4		Adm Wm M Callaghan
KNICK 1VE00000064	0:01:37		0:01:41		0:01:48	0:02:13	0:12:53	4		Adm Wm M Callaghan
KNICK 1VE00000065	0:01:37		0:01:42		0:01:49	0:02:14	0:12:57	4		Adm Wm M Callaghan
KNICK 1VE00000066	0:01:37		0:01:43		0:01:50	0:02:15	0:13:01	4		Adm Wm M Callaghan
KNICK 1VE00000067	0:01:37		0:01:44		0:01:51	0:02:16	0:13:05	4	I	Adm Wm M Callaghan
KNICK 1VE00000068	0:01:37		0:01:45		0:01:52	0:02:17	0:13:09	4		Adm Wm M Callaghan
KNICK 1VE00000069	0:01:37		0:01:46		0:01:53	0:02:18	0:13:13	4		Adm Wm M Callaghan
KNICK 1VE00000070	0:01:37		0:01:47		0:01:54	0:02:19	0:13:17	4		Adm Wm M Callaghan
KNICK 1VE00000071	0:01:37		0:01:48		0:01:55	0:02:20	0:13:21	4		Adm Wm M Callaghan

KNICK 1VE00000072	0:01:37	0:01:49	0:01:56	0:02:21	0:13:25	4	h+i+5	Adm Wm M Callaghan
KNICK 1VE00000073	0:01:37	0:01:50	0:01:57	0:02:22	**0:13:36**	4		Adm Wm M Callaghan
KNICK 1VE00000074	0:01:37	0:01:51	0:01:58	0:02:23	**0:13:40**	4		Adm Wm M Callaghan
KNICK 1VE00000075	0:01:37	0:01:52	0:01:59	0:02:24	**0:13:44**	4		Adm Wm M Callaghan
KNICK 1VE00000076	0:01:37	0:01:53	0:02:00	0:02:25	**0:13:48**	4		Adm Wm M Callaghan
KNICK 1VE00000077	0:01:37	0:01:54	0:02:01	0:02:26	**0:13:52**	4		Adm Wm M Callaghan
KNICK 1VE00000078	0:01:37	0:01:55	0:02:02	0:02:27	**0:13:56**	4		Adm Wm M Callaghan
KNICK 1VE00000079	0:01:37	0:01:56	0:02:03	0:02:28	**0:14:00**	4	i	Adm Wm M Callaghan
KNICK 1VE00000080	0:01:37	0:01:57 c	0:02:04	0:02:29	**0:14:04**	4		Adm Wm M Callaghan
KNICK 1VE00000081	0:01:37	0:01:58	0:02:05	0:02:30	**0:14:08**	4		Adm Wm M Callaghan
KNICK 1VE00000082	0:01:37	0:01:59	0:02:06	0:02:31	**0:14:12**	4		Adm Wm M Callaghan
KNICK 1VE00000083	0:01:37	0:02:00	0:02:07	0:02:32	**0:14:16**	4		Adm Wm M Callaghan
KNICK 1VE00000084	0:01:37	0:02:01	0:02:08	0:02:33	**0:14:20**	4	h+i+5	Adm Wm M Callaghan
KNICK 1VE00000085	0:01:37	0:02:02	0:02:09	0:02:34	0:14:31	4		Adm Wm M Callaghan
KNICK 1VE00000086	0:01:37	0:02:03	0:02:10	0:02:35	0:14:35	4		Adm Wm M Callaghan
KNICK 1VE00000087	0:01:37	0:02:04	0:02:11	0:02:36	0:14:39	4		Adm Wm M Callaghan
KNICK 1VE00000088	0:01:37	0:02:05	0:02:12	0:02:37	0:14:43	4		Adm Wm M Callaghan
KNICK 1VE00000089	0:01:37	0:02:06	0:02:13	0:02:38	0:14:47	4		Adm Wm M Callaghan
KNICK 1VE00000090	0:01:37	0:02:07	0:02:14	0:02:39	0:14:51	4		Adm Wm M Callaghan
KNICK 1VE00000091	0:01:37	0:02:08	0:02:15	0:02:40	0:14:55	4	i	Adm Wm M Callaghan
KNICK 1VE00000092	0:01:37	0:02:09	0:02:16	0:02:41	0:14:59	4		Adm Wm M Callaghan
KNICK 1VE00000093	0:01:37	0:02:10	0:02:17	0:02:42	0:15:03	4		Adm Wm M Callaghan
KNICK 1VE00000094	0:01:37	0:02:11	0:02:18	0:02:43	0:15:07	4		Adm Wm M Callaghan
KNICK 1VE00000095	0:01:37	0:02:12	0:02:19	0:02:44	0:15:11	4	h+i+5	Adm Wm M Callaghan
KNICK 1VE00000096	0:01:37	0:02:13	0:02:20	0:02:45	**0:15:15**	4		Adm Wm M Callaghan
KNICK 1VE00000097	0:01:37	0:02:14	0:02:21	0:02:46	**0:15:26**	4		Adm Wm M Callaghan
KNICK 1VE00000098	0:01:37	0:02:15	0:02:22	0:02:47	**0:15:30**	4		Adm Wm M Callaghan
KNICK 1VE00000099	0:01:37	0:02:16	0:02:23	0:02:48	**0:15:34**	4		Adm Wm M Callaghan
KNICK 1VE00000100	0:01:37	0:02:17	0:02:24	0:02:49	**0:15:38**	4		Adm Wm M Callaghan

Appendix C

Appendix C
PORTSIM Verification Findings: Vehicles via Flatcars

This appendix is one in a series of three appendixes that contain previously released reports summarizing PORTSIM verification efforts. The emphasis in these reports was on verifying and correcting internal logic, processes, and interfaces. The work included reviews of model inputs, computations, and outputs. Findings from these reports aided in debugging PORTSIM and also yielded step-by-step guidelines for understanding details of the Cargo Report. Patterns in timing milestones (displayed in Cargo Reports) have been traced, verified, and summarized in the individual verification reports of this appendix.

To put these efforts in the context of other relevant work and literature, the following excerpts from four papers are included here for reference. Hartley (1997) defines verification as "The process of determining that a model implementation accurately represents the developer's conceptual description and specifications." Or more simply put, "Does it do what they said?" According to Sargent (1999), "Model verification is often defined as 'ensuring that the computer program of the computerized model and its implementation are correct.'" Additionally, "The primary techniques used to determine that the model has been programmed correctly are structured walk-throughs and traces." Balci (1997) says, "Model verification is substantiating that the model is transformed from one form into another, as intended, with sufficient accuracy. Model verification deals with building the model *right*. The accuracy of transforming a problem formulation into a model specification or the accuracy of converting a model representation in micro flowchart form to an executable computer program is evaluated in model verification." Finally, Kleijnen (1995) states, "Verification is determining that a simulation computer program performs as intended, i.e., debugging the computer program."

The efforts reported in Appendixes B, C, and D follow the themes and definitions of these citations. The objective was to verify that the software functioned as designed, based on methodical reviews and testing with scenarios having predictable outcomes. As a by-product of the reviews, mathematical patterns and relationships in cargo timing results were quantified and are reported in the Appendixes. These relationships may prove helpful to the user in confirming and verifying outcomes from new scenarios and assumptions.

The three PORTSIM verification reports cover each of the following categories of cargo types and transportation modes:

- Appendix B: Vehicles Via Convoys (completed May 19, 2000),
- Appendix C: Vehicles Via Flatcars (completed Dec. 20, 2000), and
- Appendix D: Containers Via Flatbed Trucks (completed April 13, 2001).

Three additional reports are being prepared to address the remaining cargo/transportation options, namely, Containers Via Flatcars, Vehicles Via Flatbed Trucks, and Other (Helicopter, Residual Equipment, and Watercraft). The last two of these reports will be brief, as the modeling components for most of the processing mechanisms will have already been verified in the previous efforts.

Because the analyses and reports were developed over a period of approximately a year, there are subtle differences among the reports. These differences are due in part to changes in the PORTSIM model itself (new version releases, updates, and upgrades over the study period). In addition, some formatting conventions evolved as the analysis progressed. And finally, each report was customized to fit the model reports corresponding to the cargo/transportation option under investigation.

References

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Kleijnen, J. P. C. 1995. "Verification and validation of simulation models." *European Journal of Operational Research*, 82(1995), 145-162.

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PORTSIM VERIFICATION FINDINGS: VEHICLES VIA FLATCARS

by

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December 20, 2000

PORTSIM VERIFICATION FINDINGS: VEHICLES VIA FLATCARS

This report describes recent progress in the task of systematically verifying internal PORTSIM logic and processes. The efforts are focusing on examining, confirming and correcting the internal consistency and accuracy of model inputs, computations and outputs. This report represents the second in a series of four reports to be prepared on this subject, including Vehicles via Convoys (completed May 19, 2000), Vehicles via Flatcars (this report), Containers via Flatbed Trucks (future), and Containers via Flatcars (future).

1 APPROACH

A small scenario, **basecvr.rd**, and a small force file, **cvrail1.lst**, have been created and implemented to facilitate verification of basic queuing logic. The scenario was set up in PORTSIM v4.0 to use one gate, one staging area and one berth at the Port of Savannah (Garden City Terminal). The force file contains 100 identical vehicles to be transported via 50 60-foot flatcars. To simplify the analysis, initial tests treated (all) variables deterministically (e.g., timing parameters and ship arrival) with the exception of cargo arrival at the port which currently can only be set up stochastically. See Attachment 1 for more details on the scenario setup.

The Cargo Report, supplemented by the Rail Timing File, (see Attachment 5) contain the most complete sources of vehicle timing data for PORTSIM. For that reason, verification focused on confirming the timing details (for individual vehicles) contained in these two reports. The Cargo Report includes information on when: cargo arrives at port, clears the gate, parks in staging, is available to load, and loads on ships. It also includes the corresponding loading rate for cargo loaded onto the ships. The Rail Timing File provides added information for tracking flatcar movements at 10 additional checkpoints, beginning with flatcar arrivals at port, continuing through operations in the interchange yard, vehicle unloading events at the rail spur, and return of flatcars to the interchange yard.

Using the scenario **basecvr.rd,** with force file **cvrail1.lst**, the 100 vehicles were tracked through the port from the time they arrived at the port to the time they were loaded onto a RORO ship.

To verify the timing data found in the Cargo Report and Rail Timing File, the patterns and logic used to compute each of the 15 fields of timing data for these two reports were identified and quantified. These relationships were then formulated into equations (see Attachment 3). Findings were reviewed with PORTSIM program developer (MB) and it was confirmed that the conclusions matched with the intended PORTSIM simulation structure and logic.

2 FINDINGS

Results confirmed that the flow of cargo (vehicles via flatcars) through the port matched with reported timing values. That is, each piece of cargo was reported in the right place at the right time for each of the 15 fields of timing data in the Cargo Report and Rail Timing File (for the **basecvr.rd** scenario using the **cvrail1.lst** force file).

The results confirm the fundamental accuracy of the Cargo Report and Rail Timing File. The verification process did reveal a number of input labeling conventions that will be modified for clearer and more accurate descriptions of the parameters and how they are used in the simulations. It also uncovered a stochastic element used in computing Time Loaded from the Cargo Report. Future versions of PORTSIM will incorporate a switch so that the user can choose that element to be stochastic or deterministic.

The findings and materials developed for verification processes provide added benefits for augmenting user guides and for supporting analytical efforts. Insights gained from the verifications are also adding to the foundation for ongoing and future metamodeling activities.

3 FUTURE TASKS

Tasks to follow will include: verifying other output tables and graphs (other than the Cargo Report and Rail Timing File), verifying stochastic elements (timing parameters) and implementing bug fixes and notational corrections. In addition, the next tasks will cover the remaining cargo types and modes of transportation (Containers via Flatbed Trucks, and Containers via Flatcars) and will also address larger scenarios.

4 SUPPORTING DOCUMENTS

The supporting documents are contained in the following attachments.

1. Attachment 1, Summary of Test Scenario Inputs for basecvr.rd, a summary of the inputs used in the scenario **basecvr.rd**
2. Attachment 2, PORTSIM Menu Inputs for basecvr.rd, the menu choices/path to the windows where users enter input values (used to compute the Cargo Report and Rail Timing File)
3. Attachment 3, Tracking Sequence for basecvr.rd, the equations and logic that reproduce the results of the Cargo Report and Rail Timing File
4. Attachment 4, Screen Capture of Input Windows for basecvr.rd, the screen capture of the input windows (inputs used to compute the Cargo Report and Rail Timing File)
5. Attachment 5, Cargo Report and Rail Timing File Output for basecvr.rd, the complete Cargo Report and Rail Timing File of the scenario **basecvr.rd** using the force file **cvrail1.lst** (annotated to identify the timing patterns)

ATTACHMENT 1: SUMMARY OF TEST SCENARIO INPUTS FOR BASECVR.RD (VEHICLES VIA FLATCARS)

This attachment contains a summary of the inputs used in the scenario **basecvr.rd**.

Scenario Name: basecvr.rd
Force File Name: cvrail1.lst (100 identical convoy vehicles on 50 60-foot flatcars)

Run time: 50 hours

Locomotives: 1
Docks: 6
End ramps: 1
Drivers: 200
Inspectors: 200
Stevedores: 30
Container handlers: 1

Gates: #1, only one available for military use
  Gate can accept: all types (convoys vehicle, flatbed trucks, vans)

Open staging: #1, only one available for military use
  Capacity of military use: 833,105 square feet
  Percent usable for staging: 60% (499,863 square feet)
  Stacking height: 3
  Type of cargo handled: all types (wheeled vehicles, tracked vehicles, containers)

Berths: #4, only one available for military use
  Length: 1200 feet
  Container cranes: 1
  Wharf cranes: 1
  Maximum call forward: 12

Interchange yard: #1, only one available for military use
  Capacity: 208 railcars
  percent usable: 60% (125)

Spurs: #1, only one available for military use
  Type: open staging
  Tangent length: 1,416
  Vehicle Offloading method: end ramps

Process timing parameters: all times set to integers >= 1
  Vehicle: Range = 0 *(deterministic port operations)*

Railcar: Range = 0 *(deterministic port operations)*
Ship: Range = 0 *(deterministic port operations)*
Arrival mode time parameters:
Ships: Exponential *(deterministic ship arrival)*
Trains: Exponential *(stochastic cargo arrival)*

Ship 1: Adm Wm M Callaghan
Length: 694 feet
Maximum capacities by cargo type:
Breakbulk: 0
Container: 0
RORO: 168,000
Maximum wait without loading/offloading: 6 hours
Ship arrival time to port: 5 hours *(deterministic ship arrival)*

Ship 2: Adabella Lykes
Length: 660 feet
Maximum capacities by cargo type:
Breakbulk: 0
Container: 7,155 square feet
RORO: 0
Maximum wait without loading/offloading: 6 hours
Ship arrival time to port: 5 hours *(deterministic ship arrival)*

ATTACHMENT 2: PORTSIM MENU INPUTS FOR BASECVR.RD

This attachment describes the menu choices/paths to the windows for entering input values. These inputs are used in computing the Cargo Report and the Rail Timing File for the **basecvr.rd** scenario (and, in general, for convoy vehicles via flatcars loaded to a RORO ship). The order presented starts with the Time Arrived At Port which is common to both the Cargo Report and the Rail Timing File. The order then follows the ten timing data, left to right, from the Rail Timing File and then picks up with the Cargo Report's Time Parked In Staging, left to right, ending with the Loading Rate. The Cargo Report entries are shaded in gray. The letters a...u are labels for the input variables as shown in the screen captures (see Attachment 4).

Time Arrived At Port
Parameter > Modify Arrival Mode Time Parameters > Trains
Number Of Railcars Per Train = _a_
Time To Begin Simulating Arrivals = _b_
Average Time Between Arrival = _c_

Arrived At Interchange Yard
Parameter > Modify Arrival Mode Time Parameters > Trains
Number Of Railcars Per Train = _a_
Time To Begin Simulating Arrivals = _b_
Average Time Between Arrival = _c_

Completed Interchange Yard Process
Parameters > Modify Process Timing Parameters > Railcar Timing Parameters
Processing At Interchange Yard = _d_

Coupled Locomotive At Interchange Yard
Parameters > Modify Process Timing Parameters > Railcar Timing Parameters
Switch Spur To Interchange Yard = _k_
Couple At Interchange Yard = _e_

Arrived At Spur
Parameters > Modify Process Timing Parameters > Railcar Timing Parameters
Switch Interchange Yard To Spur = _f_

Uncoupled Locomotive At Spur
Parameters > Modify Process Timing Parameters > Railcar Timing Parameters
Uncouple At Spur = _g_

Removed Tiedown
Parameters > Modify Process Timing Parameters > Railcar Timing Parameters
Remove Flatcar Tiedowns = _h_

Discharged From Flatcar
Parameters > Modify Process Timing Parameters > Railcar Timing Parameters
Discharge Vehicle Using End Ramp = _i_

Coupled Locomotive At Spur
Parameters > Modify Process Timing Parameters > Railcar Timing Parameters
Switch Interchange Yard To Spur = _f_
Couple At Spur = _j_

Arrived At Interchange Yard From Spur
Parameters > Modify Process Timing Parameters > Railcar Timing Parameters
Switch Spur To Interchange Yard = _k_

Uncoupled Locomotive At Interchange Yard
Parameters > Modify Process Timing Parameters > Railcar Timing Parameters
Uncouple At Interchange Yard = _l_

Time Parked In Staging
Parameter > Modify Process Timing Parameters > Vehicle
Transit Vehicle Rail End Ramp To Open Staging = _m_
Open Staging Parking = _o_

Time Available To Load
Parameter > Modify Process Timing Parameters > Vehicle
Open Staging Inspection = _n_

Time Loaded
Parameter > Modify Process Timing Parameters > Vehicle
Transit Vehicle To Berth = _p_
Stevedore Process On Ship = _q_

Parameter > Modify Process Timing Parameters > Ship
Ship Berthing Time = _r_

Parameter > Modify Ship Parameters
Vehicle Loading Time = _s_
Ship Arrival Time To Port = _t_

Parameter > Modify Port Parameters > Berth Parameters
Maximum Call Forward = _u_

Load Rate
Parameter > Modify Ship Parameters
Vehicle Loading Time = _s_

ATTACHMENT 3:
TRACKING SEQUENCE FOR BASECVR.RD

This attachment presents the equations and logic that reproduce the results of the Cargo Report and the Rail Timing File for the **basecvr.rd** scenario using the **cvrail1.lst** force file. First is a short list of notations used. Following the list are the equations and logic for computing the Cargo Report and the Rail Timing File. The order presented starts with the Time Arrived At Port which is common to both the Cargo Report and the Rail Timing File. The order then follows the ten timing data, left to right, from the Rail Timing File and then picks up with the Cargo Report's Time Parked In Staging, left to right, ending with the Loading Rate. The Cargo Reports entries are shaded in gray.

Here is an example of computing the first and second vehicles' Remove Tiedown (RT6) from the Rail Timing File. The first vehicle's RT6 is equal to the time it took to uncouple the locomotive at the spur plus the time to remove the tiedowns. The second vehicle's RT6 is equal to the previous results plus the time it takes to remove the tiedowns. Attachment 4 contains a screen capture of all the defined input variables a...u used below.

Notation
N = total number of cargo pieces in the force
a...u = input variables used in PORTSIM
^ = results from previous step

Time Arrived At Port = TAP = *f*(a,b,c)
a = Number Of Railcars Per Train
b = Time To Begin Simulating Arrivals
c = Average Time Between Arrivals

Arrived At Interchange Yard = RT1 = *f*(a,b,c)
a = Number Of Railcars Per Train
b = Time To Begin Simulating Arrivals
c = Average Time Between Arrivals

Only entire trains can enter the interchange yard. If there is not sufficient space in the interchange yard for the entire train, the train is blocked from entering until sufficient space becomes available. If this occurs, the Arrived At Interchange Yard will have a later time then the Time Arrived At Port. If a train is not blocked, then Time Arrived At Port will be the same as Arrived At Interchange Yard.

Once the train arrives in the interchange yard, the concept of a "train" is replaced by a "string of flatcars." A "string of flatcars" is a collections of flatcars possibly from multiple trains as a result of processing at the interchange yard.

With the **basecvr.rd** test scenario and the **cvrail1.lst** force file, the "string of flatcars" size (20 flatcars) is the same as the "train" size (20 flatcars). In general, this will not happen. Instead, the number of flatcars in a string, which can vary in an execution, is the minimum of the number of flatcars accepted at the spur and the number of flatcars that have completed the interchange process (RT2).

Completed Interchange Yard Process = RT2 = f(d)
d = Processing At Interchange Yard

$RT2_i = RT1_i + d$
i [1, N]

Coupled Locomotive At Interchange Yard = RT3 = f(k,e)
k = Switch Spur To Interchange Yard
e = Couple At Interchange Yard

First string of flatcars:
$RT3_i = RT2_i + k + e$
i [1,2a]

Next string of flatcars:
$RT3_j = RT10_{2a} + k + e$
j [2a + 1, 4a]

Next string of flatcars:
$RT3_k = RT10_{4a} + k + e$
k [4a + 1, N]

The equations above hold for the **basecvr.rd** scenario. Two exceptions which may occur when using different input variables are described as follows.

If the locomotive is done (Uncouple Locomotive At Interchange Yard From Spur) with the previous string of flatcars before the next string of flatcars is ready to get coupled to the locomotive (Complete Interchange Yard Process), the locomotive waits until that string of flatcars completes its interchange yard processes. When this occurs, use the equation for the first string of flatcars as noted below.

> If $RT10_{2a} < RT2_{2a+1}$, then use the "First string of flatcars" equation.
> If $RT10_{4a} < RT2_{4a+1}$, then use the "First string of flatcars" equation.

When the number of flatcars called to the spur exceeds the number of flatcars per train, then flatcars from multiple trains will be grouped together into a string provided enough flatcars are ready (RT2). An example of this is seen in **basecvr.rd** when the number of railcars per train is reduced to five. Cargo items 71-80 arrive on one train, cargo items 81-90 on another train, yet all cargo items 71-90 are coupled together at the interchange yard (RT3) at the same time. Note also, cargo items 81-90 arrive at port 54 minutes later then cargo items 71-80.

<u>Arrived At Spur = RT4 = *f*(f)</u>
f = Switch Interchange Yard To Spur

$RT4_i = RT3_i + f$
$i \quad [1, N]$

<u>Uncoupled Locomotive At Spur = RT5 = *f*(g)</u>
g = Uncouple At Spur

$RT5_i = RT4_i + g$
$i \quad [1, N]$

<u>Removed Tiedown = RT6 = *f*(h)</u>
h = Remove Flatcar Tiedowns

First string of flatcars:
$RT6_1 = RT5_1 + h$
$RT6_2 = \wedge + h$ ...
$RT6_{2a} = \wedge + h$

Next string of flatcars:
$RT6_{2a+1} = RT5_{2a+1} + h$
$RT6_{2a+2} = \wedge + h$ ...
$RT6_{4a} = \wedge + h$

Next string of flatcars:
$RT6_{4a+1} = RT5_{4a+1} + h$
$RT6_{4a+2} = \wedge + h$ ...
$RT6_N = \wedge + h$

<u>Discharged From Flatcar = RT7 = *f*(i)</u>
i = Discharge Vehicle Using End Ramp

First string of flatcars:
$RT7_1 = RT6_{2a} + i$
$RT7_2 = \wedge + i$ ...
$RT7_{2a} = \wedge + i$

Next string of flatcars:
$RT7_{2a+1} = RT6_{4a} + i$
$RT7_{2a+2} = \wedge + i$ ...
$RT7_{4a} = \wedge + i$

Next string of flatcars:
$RT7_{4a+1} = RT6_n + i$
$RT7_{4a+2} = \wedge + i$ ...
$RT7_N = \wedge + i$

Tie downs are removed from the entire string of flatcars before the vehicles are discharged.

Coupled Locomotive At Spur = RT8 = *f*(f,j)
f = Switch Interchange Yard To Spur
j = Couple At Spur

First string of flatcars:
$RT8_i = RT7_{2a} + f + j$
i [1,2a]

Next string of flatcars:
$RT8_j = RT7_{4a} + f + j$
j [2a + 1, 4a]

Next string of flatcars:
$RT8_k = RT7_N + f + j$
k [4a + 1, N]

Arrived At Interchange Yard From Spur = RT9 = *f*(k)
k = Switch Spur To Interchange Yard

$RT9_i = RT8_i + k$
i [1, N]

Uncoupled Locomotive At Interchange Yard = RT10 = *f*(l)
l = Uncouple At Interchange Yard

$RT10_i = RT9_i + l$
i [1, N]

Time Parked In Staging = TPS = *f*(TCG,m,o)

m = Transit Vehicle Rail End Ramp To Open Staging
o = Open Staging Parking

$TPS_i = RT7_i + m + o$
i [1, N]

Time Available To Load = TAL = *f*(TPS, n)

n = Open Staging Inspection

$TAL_i = TPS_i + n$
i [1, N]

* Note: Required Dwell Time In Open Staging (located on page 15 immediately following item "q") was set to zero for **basecvr.rd**. If Required Dwell Time In Open Staging is set to a nonzero value, the value would be added to each TAL.

Time Loaded = TL = *f*(t,r,p,s,q,u)

t = Ship Arrival Time To Port
r = Ship Berthing Time
p = Transit Vehicle To Berth
s = Vehicle Loading Time
q = Stevedore Process On Ship
u = Maximum Call Forward

$TL_1 = t + r + p + s + q$
$TL_2 = \wedge + s$ ...
$TL_N = \wedge + s$

Currently, there is a stochastic element that is used in computing Time Loaded. For simplification, the entire logic of the stochastic element is not presented here. However, Time Loaded has been verified and was found to be correct. The results can be replicated. In versions to follow, a switch will be added so this can be treated deterministically.

Time Loaded is also affected by the Maximum Call Forward. Maximum Call Forward is a berth characteristic that limits the maximum number of cargo items that can be called forward at one time. It affects the Time Loaded by loading the convoy vehicles in groups equal to the Maximum Call Forward. For example, if Maximum Call Forward = 15, then convoy vehicles get loaded in the following groups 1-15, 16-30, 31-45,... and the Time Loaded is separated by the Vehicle Loading Time.

Between the 15th and 16th convoy vehicle, the 30th and 31st convoy vehicle, the 45th and 46th convoy vehicle, etc...., the gap in Time Loaded changes to the sum of the Transit Vehicle To Berth time plus Vehicle Loading Time plus five minutes. This sum is the time needed to bus the drivers from the berth back to the staging area.

p + s + 5 = the time needed to bus drivers from berth to staging area every "u" (Maximum Call Forward) convoy vehicles.

* Note: Required Dwell Time In Open Staging (located on page 15 immediately following item "q") was set to zero for **basecvr.rd**. If Required Dwell Time In Open Staging is set to a nonzero value, the value would be added to TL.

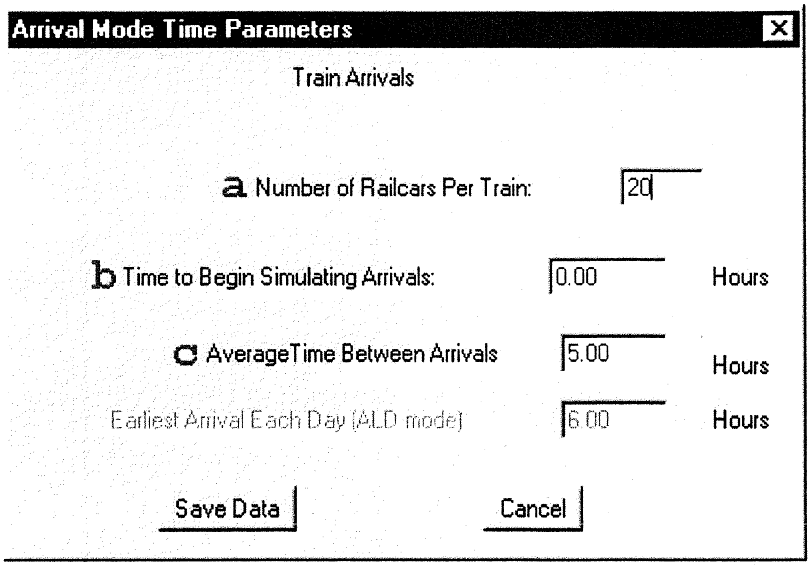
Loading Rate = LR = *f*(s)

s = Vehicle Loading Time

$LR_i = s$
$i \quad [1, N]$

ATTACHMENT 4:
SCREEN CAPTURE OF INPUT WINDOWS FOR BASECVR.RD

This attachment includes the screen captures of the input windows of those inputs used to compute the Cargo Report and Rail Timing File for the **basecvr.rd** scenario. The inputs used are identified by the letters a...u, and these also correspond to labels used in the equations presented in Attachment 3.


Arrival Mode Time Parameters
Train Arrivals
a Number of Railcars Per Train:
20
b Time to Begin Simulating Arrivals:
0.00
Hours
c AverageTime Between Arrivals
5.00
Hours
Earliest Arrival Each Day (ALD mode)
6.00
Hours
Save Data
Cancel

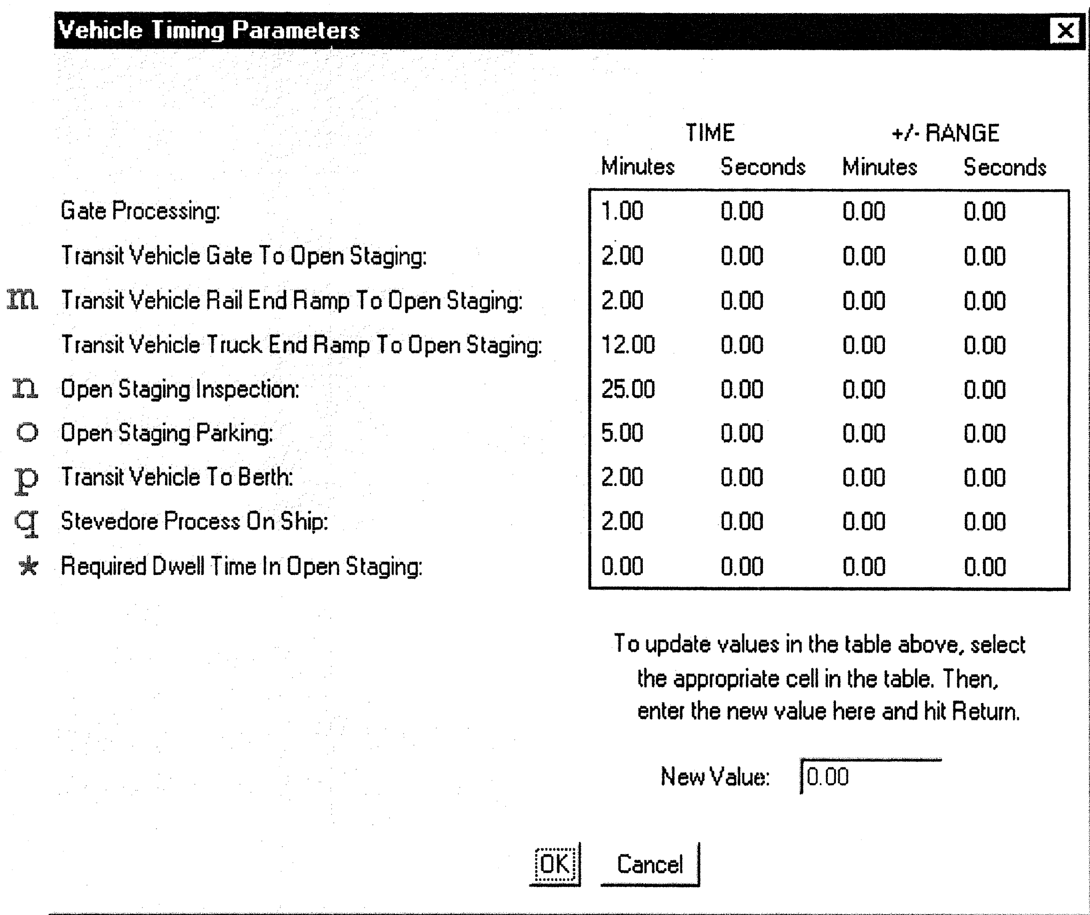
Railcar Timing Parameters

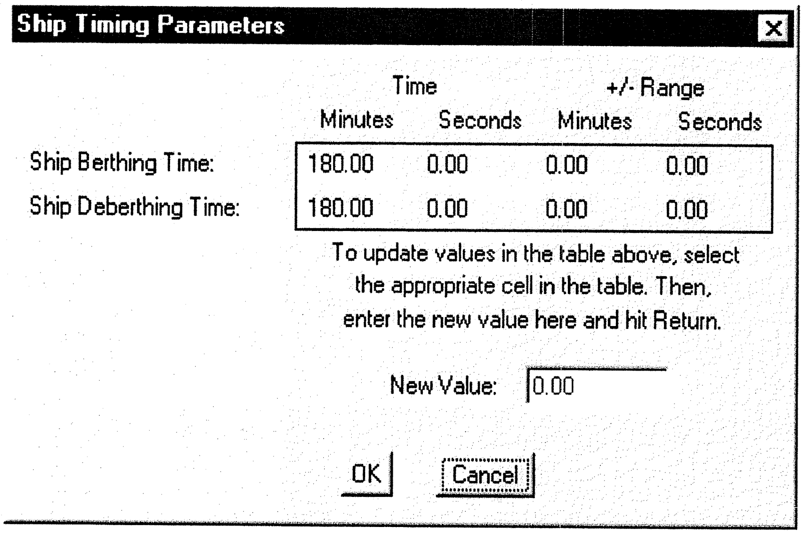
		TIME		+/- RANGE	
		Minutes	Seconds	Minutes	Seconds
d	Processing at Interchange Yard:	120.00	0.00	0.00	0.00
e	Couple at Interchange Yard:	5.00	0.00	0.00	0.00
f	Switch Interchange Yard To Spur:	8.00	0.00	0.00	0.00
	Switch Interchange Yard To Berth:	8.00	0.00	0.00	0.00
	Switch Interchange Yard To Dock:	8.00	0.00	0.00	0.00
g	Uncouple At Spur:	10.00	0.00	0.00	0.00
h	Remove Flatcar Tiedowns:	5.00	0.00	0.00	0.00
i	Discharge Vehicle Using End Ramp:	3.00	0.00	0.00	0.00
	Discharge Vehicle Using Crane:	5.00	0.00	0.00	0.00
	Discharge Container At Spur:	0.00	0.00	0.00	0.00
j	Couple At Spur:	5.00	0.00	0.00	0.00
k	Switch Spur To Interchange Yard:	8.00	0.00	0.00	0.00
	Switch Berth To Interchange Yard:	9.00	0.00	0.00	0.00
	Switch Dock To Interchange Yard:	8.00	0.00	0.00	0.00
l	Uncouple At Interchange Yard:	10.00	0.00	0.00	0.00

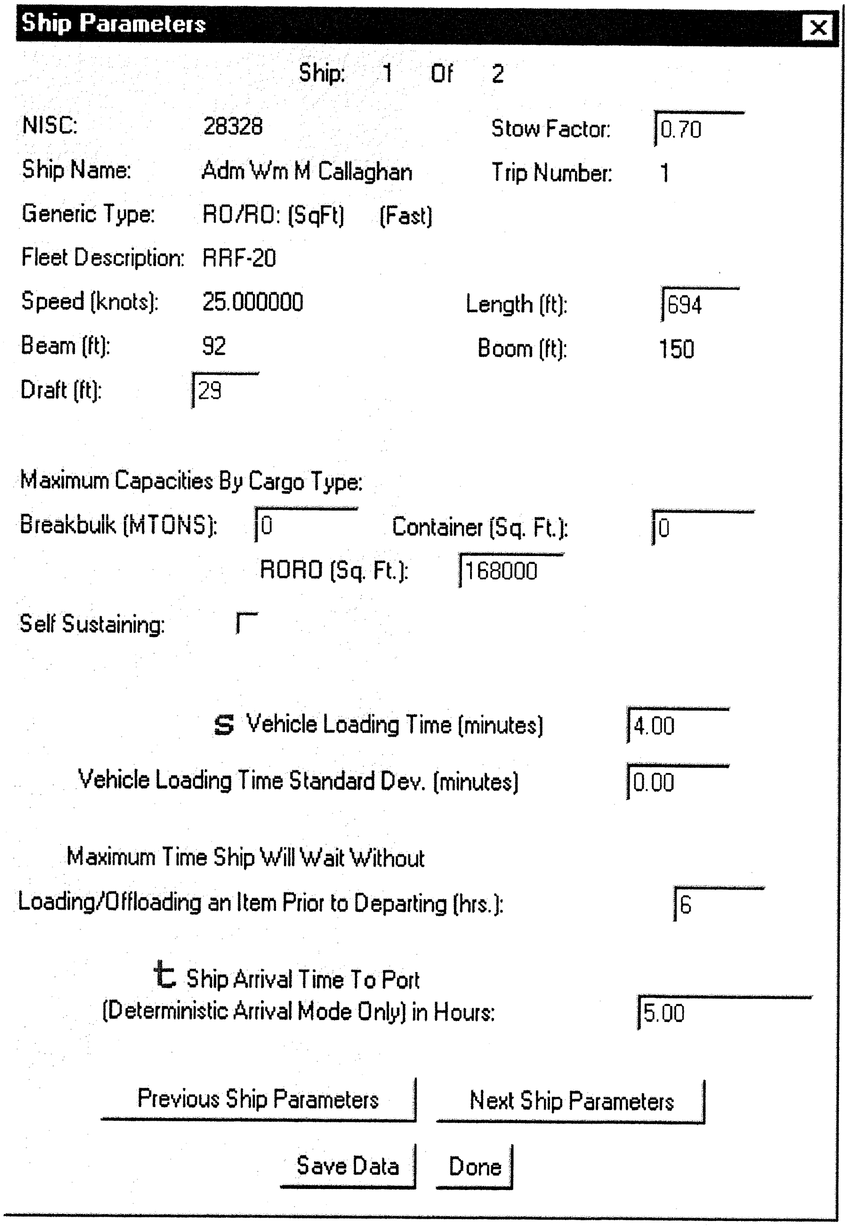
To update values in the above table, select the appropriate cell in the table. Then, enter the new value here and hit Return.

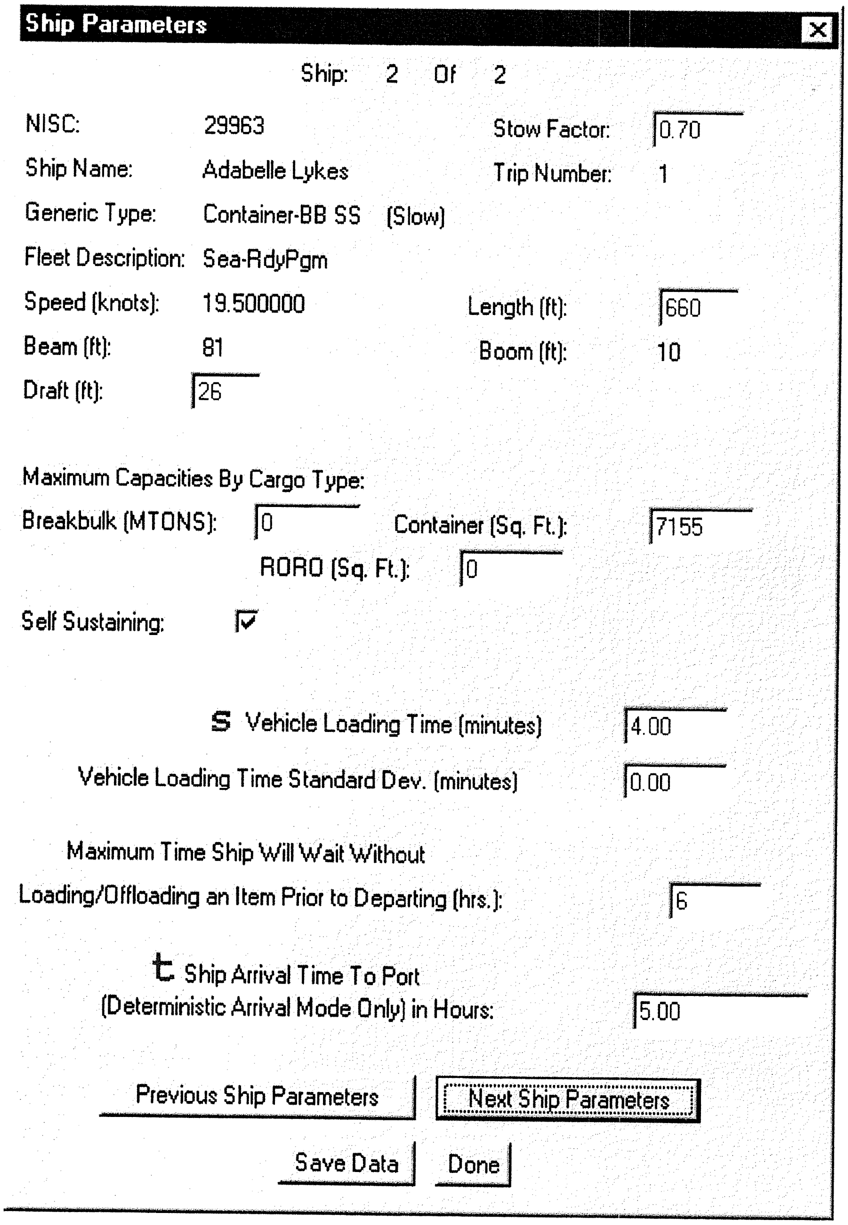
New value: 0.00

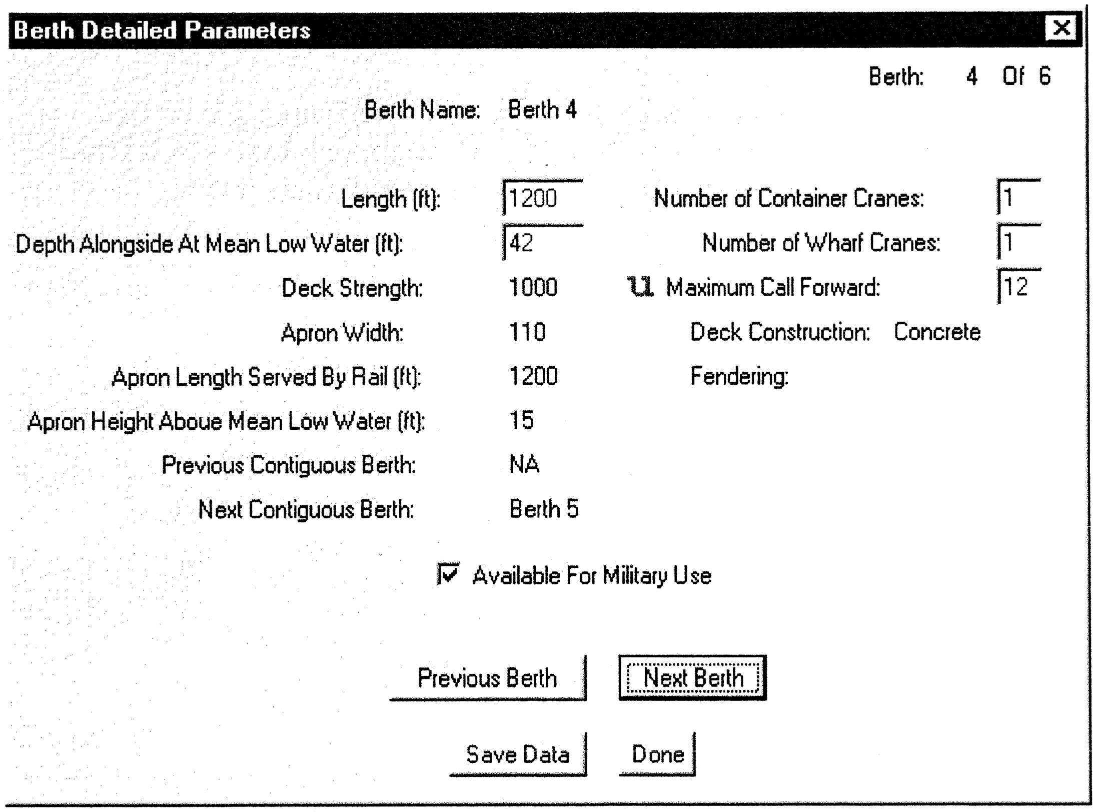
OK Cancel


Vehicle Timing Parameters
TIME
+/- RANGE
Minutes Seconds Minutes Seconds
Gate Processing: 1.00 0.00 0.00 0.00
Transit Vehicle Gate To Open Staging: 2.00 0.00 0.00 0.00
m Transit Vehicle Rail End Ramp To Open Staging: 2.00 0.00 0.00 0.00
Transit Vehicle Truck End Ramp To Open Staging: 12.00 0.00 0.00 0.00
n Open Staging Inspection: 25.00 0.00 0.00 0.00
o Open Staging Parking: 5.00 0.00 0.00 0.00
p Transit Vehicle To Berth: 2.00 0.00 0.00 0.00
q Stevedore Process On Ship: 2.00 0.00 0.00 0.00
* Required Dwell Time In Open Staging: 0.00 0.00 0.00 0.00
To update values in the table above, select the appropriate cell in the table. Then, enter the new value here and hit Return.
New Value: 0.00
OK
Cancel


Ship Timing Parameters
Time
+/- Range
Minutes
Seconds
Minutes
Seconds
Ship Berthing Time:
180.00 0.00 0.00 0.00
Ship Deberthing Time:
180.00 0.00 0.00 0.00
To update values in the table above, select the appropriate cell in the table. Then, enter the new value here and hit Return.
New Value:
0.00
OK
Cancel


Ship Parameters
Ship: 1 Of 2
NISC: 28328
Stow Factor: 0.70
Ship Name: Adm Wm M Callaghan
Trip Number: 1
Generic Type: RO/RO: (SqFt) (Fast)
Fleet Description: RRF-20
Speed (knots): 25.000000
Length (ft): 694
Beam (ft): 92
Boom (ft): 150
Draft (ft): 29
Maximum Capacities By Cargo Type:
Breakbulk (MTONS): 0
Container (Sq. Ft.): 0
RORO (Sq. Ft.): 168000
Self Sustaining:
S Vehicle Loading Time (minutes) 4.00
Vehicle Loading Time Standard Dev. (minutes) 0.00
Maximum Time Ship Will Wait Without
Loading/Offloading an Item Prior to Departing (hrs.): 6
t Ship Arrival Time To Port
(Deterministic Arrival Mode Only) in Hours: 5.00
Previous Ship Parameters
Next Ship Parameters
Save Data
Done


Ship Parameters
Ship: 2 Of 2
NISC: 29963
Stow Factor: 0.70
Ship Name: Adabelle Lykes
Trip Number: 1
Generic Type: Container-BB SS (Slow)
Fleet Description: Sea-RdyPgm
Speed (knots): 19.500000
Length (ft): 660
Beam (ft): 81
Boom (ft): 10
Draft (ft): 26
Maximum Capacities By Cargo Type:
Breakbulk (MTONS): 0
Container (Sq. Ft.): 7155
RORO (Sq. Ft.): 0
Self Sustaining:
S Vehicle Loading Time (minutes) 4.00
Vehicle Loading Time Standard Dev. (minutes) 0.00
Maximum Time Ship Will Wait Without
Loading/Offloading an Item Prior to Departing (hrs.): 6
t Ship Arrival Time To Port
(Deterministic Arrival Mode Only) in Hours: 5.00
Previous Ship Parameters
Next Ship Parameters
Save Data
Done


Berth Detailed Parameters
Berth: 4 Of 6
Berth Name: Berth 4
Length (ft): 1200
Number of Container Cranes: 1
Depth Alongside At Mean Low Water (ft): 42
Number of Wharf Cranes: 1
Deck Strength: 1000
Maximum Call Forward: 12
Apron Width: 110
Deck Construction: Concrete
Apron Length Served By Rail (ft): 1200
Fendering:
Apron Height Aboue Mean Low Water (ft): 15
Previous Contiguous Berth: NA
Next Contiguous Berth: Berth 5
Available For Military Use
Previous Berth
Next Berth
Save Data
Done

ATTACHMENT 5:
CARGO REPORT AND RAIL TIMING FILE OUTPUT FOR BASECVR.RD

This attachment is a print out of the Cargo Report and the Rail Timing File for the **basecvr.rd** scenario using the **cvrail1.lst** force file. The equations from Attachment 3 are written in some of the cells of the Cargo Report and the Rail Timing File.

PORTSIM Detailed Cargo Report
(Note: All Times Are Represented In DDD:HH:MM)

Sort Instructions: To sort on a desired column, double-click the column header and the table will be sorted by that column.

2a

LIN ID	TAP Time Arrived At Port	TCG Time Cleared Gate	TPS Time Parked In Staging	TAL Time Available To Load	TL Time Loaded	LR Loading Rate (Minutes)	Ship Loaded Onto
KNICK 1VE00000001	0:00:00 TAP_1	NA	0:06:01 $RT7_1+m+o$	0:06:26 TPS_1+n	0:08:08 $t+r+p+s+q$	4 s	Adm Wm M Callaghan
KNICK 1VE00000002	0:00:00 TAP_2	NA	0:06:04 $RT7_2+m+o$	0:06:29 TPS_2+n	0:08:12 $\wedge+s$	4 s	Adm Wm M Callaghan
KNICK 1VE00000003	0:00:00 TAP_3	NA	0:06:07 $RT7_3+m+o$	0:06:32 TPS_3+n	0:08:16 $\wedge+s$	4 s	Adm Wm M Callaghan
KNICK 1VE00000004	0:00:00	NA	0:06:10	0:06:35	0:08:20	4	Adm Wm M Callaghan
KNICK 1VE00000005	0:00:00	NA	0:06:13	0:06:38	0:08:24	4	Adm Wm M Callaghan
KNICK 1VE00000006	0:00:00	NA	0:06:16	0:06:41	0:08:28	4	Adm Wm M Callaghan
KNICK 1VE00000007	0:00:00	NA	0:06:19	0:06:44	0:08:32	4	Adm Wm M Callaghan
KNICK 1VE00000008	0:00:00	NA	0:06:22	0:06:47	0:08:36	4	Adm Wm M Callaghan
KNICK 1VE00000009	0:00:00	NA	0:06:25	0:06:50	0:08:40	4	Adm Wm M Callaghan
KNICK 1VE00000010	0:00:00	NA	0:06:28	0:06:53	0:08:44	4	Adm Wm M Callaghan
KNICK 1VE00000011	0:00:00	NA	0:06:31	0:06:56	0:08:48	4	Adm Wm M Callaghan
KNICK 1VE00000012	0:00:00	NA	0:06:34	0:06:59	0:08:52	4	Adm Wm M Callaghan
KNICK 1VE00000013	0:00:00	NA	0:06:37	0:07:02	0:09:03	4	Adm Wm M Callaghan
KNICK 1VE00000014	0:00:00	NA	0:06:40	0:07:05	0:09:07	4	Adm Wm M Callaghan
KNICK 1VE00000015	0:00:00	NA	0:06:43	0:07:08	0:09:11	4	Adm Wm M Callaghan
KNICK 1VE00000016	0:00:00	NA b	0:06:46	0:07:11	0:09:15	4	Adm Wm M Callaghan
KNICK 1VE00000017	0:00:00	NA	0:06:49	0:07:14	0:09:19	4	Adm Wm M Callaghan
KNICK 1VE00000018	0:00:00	NA	0:06:52	0:07:17	0:09:23	4	Adm Wm M Callaghan
KNICK 1VE00000019	0:00:00	NA	0:06:55	0:07:20	0:09:27	4	Adm Wm M Callaghan
KNICK 1VE00000020	0:00:00	NA	0:06:58	0:07:23	0:09:31	4	Adm Wm M Callaghan
KNICK 1VE00000021	0:00:00	NA	0:07:01	0:07:26	0:09:35	4	Adm Wm M Callaghan
KNICK 1VE00000022	0:00:00	NA	0:07:04	0:07:29	0:09:39	4	Adm Wm M Callaghan
KNICK 1VE00000023	0:00:00	NA	0:07:07	0:07:32	0:09:43	4	Adm Wm M Callaghan
KNICK 1VE00000024	0:00:00	NA	0:07:10	0:07:35	0:09:47	4	Adm Wm M Callaghan
KNICK 1VE00000025	0:00:00	NA	0:07:13	0:07:38	0:09:58	4	Adm Wm M Callaghan
KNICK 1VE00000026	0:00:00	NA	0:07:16	0:07:41	0:10:02	4	Adm Wm M Callaghan
KNICK 1VE00000027	0:00:00	NA	0:07:19	0:07:44	0:10:06	4	Adm Wm M Callaghan
KNICK 1VE00000028	0:00:00	NA	0:07:22	0:07:47	0:10:10	4	Adm Wm M Callaghan
KNICK 1VE00000029	0:00:00	NA	0:07:25	0:07:50	0:10:14	4	Adm Wm M Callaghan
KNICK 1VE00000030	0:00:00	NA	0:07:28	0:07:53	0:10:18	4	Adm Wm M Callaghan
KNICK 1VE00000031	0:00:00	NA	0:07:31	0:07:56	0:10:22	4	Adm Wm M Callaghan

KNICK 1VE00000032	0:00:00	NA	0:07:34	0:07:59	0:10:26	4	Adm Wm M Callaghan
KNICK 1VE00000033	0:00:00	NA	0:07:37	0:08:02	0:10:30	4	Adm Wm M Callaghan
KNICK 1VE00000034	0:00:00	NA	0:07:40	0:08:05	0:10:34	4	Adm Wm M Callaghan
KNICK 1VE00000035	0:00:00	NA	0:07:43	0:08:08	0:10:38	4	Adm Wm M Callaghan
KNICK 1VE00000036	0:00:00	NA	0:07:46	0:08:11	0:10:42	4	Adm Wm M Callaghan
KNICK 1VE00000037	0:00:00	NA	0:07:49	0:08:14	0:10:53	4	Adm Wm M Callaghan
KNICK 1VE00000038	0:00:00	NA	0:07:52	0:08:17	0:10:57	4	Adm Wm M Callaghan
KNICK 1VE00000039	0:00:00	NA	0:07:55	0:08:20	0:11:01	4	Adm Wm M Callaghan
KNICK 1VE00000040	0:00:00	NA	0:07:58	0:08:23	0:11:05	4	Adm Wm M Callaghan
KNICK 1VE00000041	0:00:24	NA c	0:12:23	0:12:48	0:12:59	4	Adm Wm M Callaghan
KNICK 1VE00000042	0:00:24	NA	0:12:26	0:12:51	0:13:10	4	Adm Wm M Callaghan
KNICK 1VE00000043	0:00:24	NA	0:12:29	0:12:54	0:13:14	4	Adm Wm M Callaghan
KNICK 1VE00000044	0:00:24	NA	0:12:32	0:12:57	0:13:18	4	Adm Wm M Callaghan
KNICK 1VE00000045	0:00:24	NA	0:12:35	0:13:00	0:13:22	4	Adm Wm M Callaghan
KNICK 1VE00000046	0:00:24	NA	0:12:38	0:13:03	0:13:33	4	Adm Wm M Callaghan
KNICK 1VE00000047	0:00:24	NA	0:12:41	0:13:06	0:13:37	4	Adm Wm M Callaghan
KNICK 1VE00000048	0:00:24	NA	0:12:44	0:13:09	0:13:41	4	Adm Wm M Callaghan
KNICK 1VE00000049	0:00:24	NA	0:12:47	0:13:12	0:13:45	4	Adm Wm M Callaghan
KNICK 1VE00000050	0:00:24	NA	0:12:50	0:13:15	0:13:49	4	Adm Wm M Callaghan
KNICK 1VE00000051	0:00:24	NA	0:12:53	0:13:18	0:13:53	4	Adm Wm M Callaghan
KNICK 1VE00000052	0:00:24	NA	0:12:56	0:13:21	0:13:57	4	Adm Wm M Callaghan
KNICK 1VE00000053	0:00:24	NA	0:12:59	0:13:24	0:14:01	4	Adm Wm M Callaghan
KNICK 1VE00000054	0:00:24	NA	0:13:02	0:13:27	0:14:12	4	Adm Wm M Callaghan
KNICK 1VE00000055	0:00:24	NA	0:13:05	0:13:30	0:14:16	4	Adm Wm M Callaghan
KNICK 1VE00000056	0:00:24	NA	0:13:08	0:13:33	0:14:20	4	Adm Wm M Callaghan
KNICK 1VE00000057	0:00:24	NA	0:13:11	0:13:36	0:14:24	4	Adm Wm M Callaghan
KNICK 1VE00000058	0:00:24	NA	0:13:14	0:13:39	0:14:28	4	Adm Wm M Callaghan
KNICK 1VE00000059	0:00:24	NA	0:13:17	0:13:42	0:14:32	4	Adm Wm M Callaghan
KNICK 1VE00000060	0:00:24	NA	0:13:20	0:13:45	0:14:36	4	Adm Wm M Callaghan
KNICK 1VE00000061	0:00:24	NA	0:13:23	0:13:48	0:14:40	4	Adm Wm M Callaghan
KNICK 1VE00000062	0:00:24	NA	0:13:26	0:13:51	0:14:44	4	Adm Wm M Callaghan
KNICK 1VE00000063	0:00:24	NA	0:13:29	0:13:54	0:14:48	4	Adm Wm M Callaghan
KNICK 1VE00000064	0:00:24	NA	0:13:32	0:13:57	0:14:52	4	Adm Wm M Callaghan
KNICK 1VE00000065	0:00:24	NA	0:13:35	0:14:00	0:14:56	4	Adm Wm M Callaghan
KNICK 1VE00000066	0:00:24	NA	0:13:38	0:14:03	0:15:07	4	Adm Wm M Callaghan
KNICK 1VE00000067	0:00:24	NA	0:13:41	0:14:06	0:15:11	4	Adm Wm M Callaghan
KNICK 1VE00000068	0:00:24	NA	0:13:44	0:14:09	0:15:15	4	Adm Wm M Callaghan
KNICK 1VE00000069	0:00:24	NA	0:13:47	0:14:12	0:15:19	4	Adm Wm M Callaghan
KNICK 1VE00000070	0:00:24	NA	0:13:50	0:14:15	0:15:23	4	Adm Wm M Callaghan
KNICK 1VE00000071	0:00:24	NA	0:13:53	0:14:18	0:15:27	4	Adm Wm M Callaghan
KNICK 1VE00000072	0:00:24	NA	0:13:56	0:14:21	0:15:31	4	Adm Wm M Callaghan

KNICK 1VE00000073	0:00:24	NA	0:13:59	0:14:24	0:15:35	4	Adm Wm M Callaghan
KNICK 1VE00000074	0:00:24	NA	0:14:02	0:14:27	0:15:39	4	Adm Wm M Callaghan
KNICK 1VE00000075	0:00:24	NA	0:14:05	0:14:30	0:15:43	4	Adm Wm M Callaghan
KNICK 1VE00000076	0:00:24	NA	0:14:08	0:14:33	0:15:47	4	Adm Wm M Callaghan
KNICK 1VE00000077	0:00:24	NA	0:14:11	0:14:36	0:15:51	4	Adm Wm M Callaghan
KNICK 1VE00000078	0:00:24	NA	0:14:14	0:14:39	0:16:02	4	Adm Wm M Callaghan
KNICK 1VE00000079	0:00:24	NA	0:14:17	0:14:42	0:16:06	4	Adm Wm M Callaghan
KNICK 1VE00000080	0:00:24	~~NA~~ c	0:14:20	0:14:45	0:16:10	4	Adm Wm M Callaghan
KNICK 1VE00000081	0:09:01	~~NA~~	0:17:05	0:17:30	0:17:46	4	Adm Wm M Callaghan
KNICK 1VE00000082	0:09:01	NA	0:17:08	0:17:33	0:17:50	4	Adm Wm M Callaghan
KNICK 1VE00000083	0:09:01	NA	0:17:11	0:17:36	0:17:54	4	Adm Wm M Callaghan
KNICK 1VE00000084	0:09:01	NA	0:17:14	0:17:39	0:18:05	4	Adm Wm M Callaghan
KNICK 1VE00000085	0:09:01	NA	0:17:17	0:17:42	0:18:09	4	Adm Wm M Callaghan
KNICK 1VE00000086	0:09:01	NA	0:17:20	0:17:45	0:18:13	4	Adm Wm M Callaghan
KNICK 1VE00000087	0:09:01	NA	0:17:23	0:17:48	0:18:17	4	Adm Wm M Callaghan
KNICK 1VE00000088	0:09:01	NA	0:17:26	0:17:51	0:18:21	4	Adm Wm M Callaghan
KNICK 1VE00000089	0:09:01	NA	0:17:29	0:17:54	0:18:25	4	Adm Wm M Callaghan
KNICK 1VE00000090	0:09:01	NA	0:17:32	0:17:57	0:18:29	4	Adm Wm M Callaghan
KNICK 1VE00000091	0:09:01	NA	0:17:35	0:18:00	0:18:40	4	Adm Wm M Callaghan
KNICK 1VE00000092	0:09:01	NA	0:17:38	0:18:03	0:18:44	4	Adm Wm M Callaghan
KNICK 1VE00000093	0:09:01	NA	0:17:41	0:18:06	0:18:48	4	Adm Wm M Callaghan
KNICK 1VE00000094	0:09:01	NA	0:17:44	0:18:09	0:18:52	4	Adm Wm M Callaghan
KNICK 1VE00000095	0:09:01	NA	0:17:47	0:18:12	0:18:56	4	Adm Wm M Callaghan
KNICK 1VE00000096	0:09:01	NA	0:17:50	0:18:15	0:19:00	4	Adm Wm M Callaghan
KNICK 1VE00000097	0:09:01	NA	0:17:53	0:18:18	0:19:04	4	Adm Wm M Callaghan
KNICK 1VE00000098	0:09:01	NA	0:17:56	0:18:21	0:19:08	4	Adm Wm M Callaghan
KNICK 1VE00000099	0:09:01	NA	0:17:59	0:18:24	0:19:12	4	Adm Wm M Callaghan
KNICK 1VE00000100	0:09:01	NA	0:18:02	0:18:27	0:19:16	4	Adm Wm M Callaghan

PORTSIM Rail Timing File
All Times Are Represented in DD:HH:MM

LIN ID[a]	TAP Arrived At Port	RT1 Arrived At IY	RT2 Completed IY Process	RT3 Coupled Locomotive At IY	RT4 Arrived At Spur	RT5 Uncoupled Locomotive At Spur	RT6 Removed Tiedown	RT7 Discharged From Flatcar	RT8 Coupled Locomotive At Spur	RT9 Arrived At IY From Spur	RT10 Uncoupled Locomotive At IY
001	0:00:00 TAP_1	0:00:00 $RT1_1$	0:02:00 $RT1_1+d$	0:02:13 $RT2_1+k+e$	0:02:21 $RT3_1+f$	0:02:31 $RT4_1+g$	0:02:36 $RT5_1+h$	0:05:54 $RT6_{40}+i$	0:08:04 $RT7_{40}+f+j$	0:08:12 $RT8_1+k$	0:08:22 $RT9_1+l$
002	0:00:00 TAP_2	0:00:00 $RT1_2$	0:02:00 $RT1_2+d$	0:02:13 $RT2_2+k+e$	0:02:21 $RT3_2+f$	0:02:31 $RT4_2+g$	0:02:41 ^+h	0:05:57 ^+i	0:08:04 .	0:08:12 $RT8_2+k$	0:08:22 $RT9_2+l$
003	0:00:00 TAP_3	0:00:00 $RT1_3$	0:02:00 $RT1_3+d$	0:02:13 $RT2_3+k+e$	0:02:21 $RT3_3+f$	0:02:31 $RT4_3+g$	0:02:46 ^+h	0:06:00 ^+i	0:08:04 .	0:08:12 $RT8_3+k$	0:08:22 $RT9_3+l$
004	0:00:00 .	0:00:00 .	0:02:00 .	0:02:13 .	0:02:21 .	0:02:31 .	0:02:51 .	0:06:03 .	0:08:04 .	0:08:12 .	0:08:22 .
005	0:00:00 .	0:00:00 .	0:02:00 .	0:02:13 .	0:02:21 .	0:02:31 .	0:02:56 .	0:06:06 .	0:08:04	0:08:12 .	0:08:22 .
006	0:00:00 .	0:00:00 .	0:02:00 .	0:02:13 .	0:02:21 .	0:02:31 .	0:03:01 .	0:06:09 .	0:08:04	0:08:12 .	0:08:22 .
007	0:00:00	0:00:00	0:02:00	0:02:13	0:02:21	0:02:31	0:03:06	0:06:12	0:08:04	0:08:12	0:08:22
008	0:00:00	0:00:00	0:02:00	0:02:13	0:02:21	0:02:31	0:03:11	0:06:15	0:08:04	0:08:12	0:08:22
009	0:00:00	0:00:00	0:02:00	0:02:13	0:02:21	0:02:31	0:03:16	0:06:18	0:08:04	0:08:12	0:08:22
010	0:00:00	0:00:00	0:02:00	0:02:13	0:02:21	0:02:31	0:03:21	0:06:21	0:08:04	0:08:12	0:08:22
011	0:00:00	0:00:00	0:02:00	0:02:13	0:02:21	0:02:31	0:03:26	0:06:24	0:08:04	0:08:12	0:08:22
012	0:00:00	0:00:00	0:02:00	0:02:13	0:02:21	0:02:31	0:03:31	0:06:27	0:08:04	0:08:12	0:08:22
013	0:00:00	0:00:00	0:02:00	0:02:13	0:02:21	0:02:31	0:03:36	0:06:30	0:08:04	0:08:12	0:08:22
014	0:00:00	0:00:00	0:02:00	0:02:13	0:02:21	0:02:31	0:03:41	0:06:33	0:08:04	0:08:12	0:08:22
015	0:00:00	0:00:00	0:02:00	0:02:13	0:02:21	0:02:31	0:03:46	0:06:36	0:08:04	0:08:12	0:08:22
016	0:00:00	0:00:00	0:02:00	0:02:13	0:02:21	0:02:31	0:03:51	0:06:39	0:08:04	0:08:12	0:08:22
017	0:00:00	0:00:00	0:02:00	0:02:13	0:02:21	0:02:31	0:03:56	0:06:42	0:08:04	0:08:12	0:08:22
018	0:00:00	0:00:00	0:02:00	0:02:13	0:02:21	0:02:31	0:04:01	0:06:45	0:08:04	0:08:12	0:08:22
019	0:00:00	0:00:00	0:02:00	0:02:13	0:02:21	0:02:31	0:04:06	0:06:48	0:08:04	0:08:12	0:08:22
020	0:00:00	0:00:00	0:02:00	0:02:13	0:02:21	0:02:31	0:04:11	0:06:51	0:08:04	0:08:12	0:08:22
021	0:00:00	0:00:00	0:02:00	0:02:13	0:02:21	0:02:31	0:04:16	0:06:54	0:08:04	0:08:12	0:08:22
022	0:00:00	0:00:00	0:02:00	0:02:13	0:02:21	0:02:31	0:04:21	0:06:57	0:08:04	0:08:12	0:08:22
023	0:00:00	0:00:00	0:02:00	0:02:13	0:02:21	0:02:31	0:04:26	0:07:00	0:08:04	0:08:12	0:08:22
024	0:00:00	0:00:00	0:02:00	0:02:13	0:02:21	0:02:31	0:04:31	0:07:03	0:08:04	0:08:12	0:08:22
025	0:00:00	0:00:00	0:02:00	0:02:13	0:02:21	0:02:31	0:04:36	0:07:06	0:08:04	0:08:12	0:08:22
026	0:00:00	0:00:00	0:02:00	0:02:13	0:02:21	0:02:31	0:04:41	0:07:09	0:08:04	0:08:12	0:08:22
027	0:00:00	0:00:00	0:02:00	0:02:13	0:02:21	0:02:31	0:04:46	0:07:12	0:08:04	0:08:12	0:08:22
028	0:00:00	0:00:00	0:02:00	0:02:13	0:02:21	0:02:31	0:04:51	0:07:15	0:08:04	0:08:12	0:08:22
029	0:00:00	0:00:00	0:02:00	0:02:13	0:02:21	0:02:31	0:04:56	0:07:18	0:08:04	0:08:12	0:08:22
030	0:00:00	0:00:00	0:02:00	0:02:13	0:02:21	0:02:31	0:05:01	0:07:21	0:08:04	0:08:12	0:08:22
031	0:00:00	0:00:00	0:02:00	0:02:13	0:02:21	0:02:31	0:05:06	0:07:24	0:08:04	0:08:12	0:08:22
032	0:00:00	0:00:00	0:02:00	0:02:13	0:02:21	0:02:31	0:05:11	0:07:27	0:08:04	0:08:12	0:08:22

033	0:00:00	0:00:00	0:02:00	0:02:13	0:02:21	0:02:31	0:05:16	0:07:30	0:08:04	0:08:12	0:08:22
034	0:00:00	0:00:00	0:02:00	0:02:13	0:02:21	0:02:31	0:05:21	0:07:33	0:08:04	0:08:12	0:08:22
035	0:00:00	0:00:00	0:02:00	0:02:13	0:02:21	0:02:31	0:05:26	0:07:36	0:08:04	0:08:12	0:08:22
036	0:00:00	0:00:00	0:02:00	0:02:13	0:02:21	0:02:31	0:05:31	0:07:39	0:08:04	0:08:12	0:08:22
037	0:00:00	0:00:00	0:02:00	0:02:13	0:02:21	0:02:31	0:05:36	0:07:42	0:08:04	0:08:12	0:08:22
038	0:00:00	0:00:00	0:02:00	0:02:13	0:02:21	0:02:31	0:05:41	0:07:45	0:08:04	0:08:12	0:08:22
039	0:00:00	0:00:00	0:02:00	0:02:13	0:02:21	0:02:31	0:05:46	0:07:48	0:08:04	0:08:12	0:08:22
040	0:00:00	0:00:00	0:02:00	0:02:13	0:02:21	0:02:31	0:05:51	0:07:51	0:08:04	0:08:12	0:08:22 $RT10_{40}$
041	0:00:24	0:00:24	0:02:24	0:08:35 $RT10_{40}$+e+k	0:08:43	0:08:53	0:08:58 $RT5_{41}$+h	0:12:16 $RT6_{80}$+i	0:14:26 $RT7_{80}$+f+j	0:14:34	0:14:44
042	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:09:03 ^+h	0:12:19 ^+i	0:14:26 ·	0:14:34	0:14:44
043	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:09:08 ^+h	0:12:22 ^+i	0:14:26 ·	0:14:34	0:14:44
044	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:09:13 ·	0:12:25 ·	0:14:26 ·	0:14:34	0:14:44
045	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:09:18 ·	0:12:28 ·	0:14:26	0:14:34	0:14:44
046	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:09:23 ·	0:12:31 ·	0:14:26	0:14:34	0:14:44
047	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:09:28	0:12:34	0:14:26	0:14:34	0:14:44
048	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:09:33	0:12:37	0:14:26	0:14:34	0:14:44
049	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:09:38	0:12:40	0:14:26	0:14:34	0:14:44
050	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:09:43	0:12:43	0:14:26	0:14:34	0:14:44
051	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:09:48	0:12:46	0:14:26	0:14:34	0:14:44
052	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:09:53	0:12:49	0:14:26	0:14:34	0:14:44
053	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:09:58	0:12:52	0:14:26	0:14:34	0:14:44
054	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:10:03	0:12:55	0:14:26	0:14:34	0:14:44
055	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:10:08	0:12:58	0:14:26	0:14:34	0:14:44
056	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:10:13	0:13:01	0:14:26	0:14:34	0:14:44
057	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:10:18	0:13:04	0:14:26	0:14:34	0:14:44
058	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:10:23	0:13:07	0:14:26	0:14:34	0:14:44
059	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:10:28	0:13:10	0:14:26	0:14:34	0:14:44
060	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:10:33	0:13:13	0:14:26	0:14:34	0:14:44
061	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:10:38	0:13:16	0:14:26	0:14:34	0:14:44
062	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:10:43	0:13:19	0:14:26	0:14:34	0:14:44
063	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:10:48	0:13:22	0:14:26	0:14:34	0:14:44
064	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:10:53	0:13:25	0:14:26	0:14:34	0:14:44
065	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:10:58	0:13:28	0:14:26	0:14:34	0:14:44
066	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:11:03	0:13:31	0:14:26	0:14:34	0:14:44
067	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:11:08	0:13:34	0:14:26	0:14:34	0:14:44
068	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:11:13	0:13:37	0:14:26	0:14:34	0:14:44
069	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:11:18	0:13:40	0:14:26	0:14:34	0:14:44
070	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:11:23	0:13:43	0:14:26	0:14:34	0:14:44
071	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:11:28	0:13:46	0:14:26	0:14:34	0:14:44
072	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:11:33	0:13:49	0:14:26	0:14:34	0:14:44

073	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:11:38	0:13:52	0:14:26	0:14:34	0:14:44
074	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:11:43	0:13:55	0:14:26	0:14:34	0:14:44
075	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:11:48	0:13:58	0:14:26	0:14:34	0:14:44
076	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:11:53	0:14:01	0:14:26	0:14:34	0:14:44
077	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:11:58	0:14:04	0:14:26	0:14:34	0:14:44
078	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:12:03	0:14:07	0:14:26	0:14:34	0:14:44
079	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:12:08	0:14:10	0:14:26	0:14:34	0:14:44
080	0:00:24	0:00:24	0:02:24	0:08:35	0:08:43	0:08:53	0:12:13	0:14:13	0:14:26	0:14:34	0:14:44 RT10$_{80}$
081	0:09:01	0:09:01	0:11:01	0:14:57 RT10$_{80}$+e+k	0:15:05	0:15:15	0:15:20 RT5$_{81}$+h	0:16:58 RT6$_{100}$+i	0:18:08 RT7$_{100}$+f+j	0:18:16	0:18:26
082	0:09:01	0:09:01	0:11:01	0:14:57	0:15:05	0:15:15	0:15:25 ^+h	0:17:01 ^+i	0:18:08 ·	0:18:16	0:18:26
083	0:09:01	0:09:01	0:11:01	0:14:57	0:15:05	0:15:15	0:15:30 ^+h	0:17:04 ^+i	0:18:08 ·	0:18:16	0:18:26
084	0:09:01	0:09:01	0:11:01	0:14:57	0:15:05	0:15:15	0:15:35 ·	0:17:07 ·	0:18:08 ·	0:18:16	0:18:26
085	0:09:01	0:09:01	0:11:01	0:14:57	0:15:05	0:15:15	0:15:40 ·	0:17:10 ·	0:18:08	0:18:16	0:18:26
086	0:09:01	0:09:01	0:11:01	0:14:57	0:15:05	0:15:15	0:15:45 ·	0:17:13 ·	0:18:08	0:18:16	0:18:26
087	0:09:01	0:09:01	0:11:01	0:14:57	0:15:05	0:15:15	0:15:50	0:17:16	0:18:08	0:18:16	0:18:26
088	0:09:01	0:09:01	0:11:01	0:14:57	0:15:05	0:15:15	0:15:55	0:17:19	0:18:08	0:18:16	0:18:26
089	0:09:01	0:09:01	0:11:01	0:14:57	0:15:05	0:15:15	0:16:00	0:17:22	0:18:08	0:18:16	0:18:26
090	0:09:01	0:09:01	0:11:01	0:14:57	0:15:05	0:15:15	0:16:05	0:17:25	0:18:08	0:18:16	0:18:26
091	0:09:01	0:09:01	0:11:01	0:14:57	0:15:05	0:15:15	0:16:10	0:17:28	0:18:08	0:18:16	0:18:26
092	0:09:01	0:09:01	0:11:01	0:14:57	0:15:05	0:15:15	0:16:15	0:17:31	0:18:08	0:18:16	0:18:26
093	0:09:01	0:09:01	0:11:01	0:14:57	0:15:05	0:15:15	0:16:20	0:17:34	0:18:08	0:18:16	0:18:26
094	0:09:01	0:09:01	0:11:01	0:14:57	0:15:05	0:15:15	0:16:25	0:17:37	0:18:08	0:18:16	0:18:26
095	0:09:01	0:09:01	0:11:01	0:14:57	0:15:05	0:15:15	0:16:30	0:17:40	0:18:08	0:18:16	0:18:26
096	0:09:01	0:09:01	0:11:01	0:14:57	0:15:05	0:15:15	0:16:35	0:17:43	0:18:08	0:18:16	0:18:26
097	0:09:01	0:09:01	0:11:01	0:14:57	0:15:05	0:15:15	0:16:40	0:17:46	0:18:08	0:18:16	0:18:26
098	0:09:01	0:09:01	0:11:01	0:14:57	0:15:05	0:15:15	0:16:45	0:17:49	0:18:08	0:18:16	0:18:26
099	0:09:01	0:09:01	0:11:01	0:14:57	0:15:05	0:15:15	0:16:50	0:17:52	0:18:08	0:18:16	0:18:26
100	0:09:01	0:09:01	0:11:01	0:14:57	0:15:05	0:15:15	0:16:55	0:17:55	0:18:08	0:18:16	0:18:26

a This is an abbreviated LIN ID. The complete LIN ID is preceeded by KNICK 1VE00000 for each entry.

Appendix D

Appendix D
PORTSIM Verification Findings: Containers via Flatbed Trucks

This appendix is one in a series of three appendixes that contain previously released reports summarizing PORTSIM verification efforts. The emphasis in these reports was on verifying and correcting internal logic, processes, and interfaces. The work included reviews of model inputs, computations, and outputs. Findings from these reports aided in debugging PORTSIM and also yielded step-by-step guidelines for understanding details of the Cargo Report. Patterns in timing milestones (displayed in Cargo Reports) have been traced, verified, and summarized in the individual verification reports of this appendix.

To put these efforts in the context of other relevant work and literature, the following excerpts from four papers are included here for reference. Hartley (1997) defines verification as "The process of determining that a model implementation accurately represents the developer's conceptual description and specifications." Or more simply put, "Does it do what they said?" According to Sargent (1999), "Model verification is often defined as 'ensuring that the computer program of the computerized model and its implementation are correct.'" Additionally, "The primary techniques used to determine that the model has been programmed correctly are structured walk-throughs and traces." Balci (1997) says, "Model verification is substantiating that the model is transformed from one form into another, as intended, with sufficient accuracy. Model verification deals with building the model *right*. The accuracy of transforming a problem formulation into a model specification or the accuracy of converting a model representation in micro flowchart form to an executable computer program is evaluated in model verification." Finally, Kleijnen (1995) states, "Verification is determining that a simulation computer program performs as intended, i.e., debugging the computer program."

The efforts reported in Appendixes B, C, and D follow the themes and definitions of these citations. The objective was to verify that the software functioned as designed, based on methodical reviews and testing with scenarios having predictable outcomes. As a by-product of the reviews, mathematical patterns and relationships in cargo timing results were quantified and are reported in the Appendixes. These relationships may prove helpful to the user in confirming and verifying outcomes from new scenarios and assumptions.

The three PORTSIM verification reports cover each of the following categories of cargo types and transportation modes:

- Appendix B: Vehicles Via Convoys (completed May 19, 2000),
- Appendix C: Vehicles Via Flatcars (completed Dec. 20, 2000), and
- Appendix D: Containers Via Flatbed Trucks (completed April 13, 2001).

Three additional reports are being prepared to address the remaining cargo/transportation options, namely, Containers Via Flatcars, Vehicles Via Flatbed Trucks, and Other (Helicopter, Residual Equipment, and Watercraft). The last two of these reports will be brief, as the modeling components for most of the processing mechanisms will have already been verified in the previous efforts.

Because the analyses and reports were developed over a period of approximately a year, there are subtle differences among the reports. These differences are due in part to changes in the PORTSIM model itself (new version releases, updates, and upgrades over the study period). In addition, some formatting conventions evolved as the analysis progressed. And finally, each report was customized to fit the model reports corresponding to the cargo/transportation option under investigation.

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PORTSIM VERIFICATION FINDINGS: CONTAINERS VIA FLATBED TRUCKS

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PORTSIM VERIFICATION FINDINGS: CONTAINERS VIA FLATBED TRUCKS

This report describes recent progress in the task of systematically verifying internal PORTSIM logic and processes. The efforts are focusing on examining, confirming and correcting the internal consistency and accuracy of model inputs, computations and outputs. This report represents the third in a series of four reports to be prepared on this subject, including Vehicles via Convoys (completed May 19, 2000), Vehicles via Flatcars (completed December 20, 2000), Containers via Flatbed Trucks (this report), and Containers via Flatcars (future).

1 APPROACH

A small scenario, **basecont_truck.rd**, and a small force file, **cont_truck.lst**, have been created and implemented to facilitate verification of basic queuing logic. The scenario was set up in PORTSIM v4.2 to use one gate, one staging area and one berth at the Port of Savannah (Garden City Terminal). The force file contains 100 identical containers to be transported via 50 40-foot flatbed trucks. To simplify the analysis, initial tests treated (all) variables deterministically (e.g., cargo arrival, timing parameters and ship arrival). See Attachment 1 for more details on the scenario setup.

The Cargo Report (see Attachment 5) contains the most complete source of container timing data for PORTSIM. For that reason, verification focused on confirming the timing details (for individual containers) contained in this report. The Cargo Report includes information on when: cargo arrives at port, clears the gate, parks in staging, is available to load, and loads on ships. It also includes the corresponding loading rate for cargo loaded onto the ships.

Using the scenario **basecont_truck.rd,** with force file **cont_truck.lst**, the 100 containers were tracked through the port from the time they arrived at the port to the time they were loaded onto a container ship.

To verify the timing data found in the Cargo Report, the patterns and logic used to compute each of the 6 fields of timing data for this report were identified and quantified. These relationships were then formulated into equations (see Attachment 3). Findings were reviewed with PORTSIM program developer (MB) and it was confirmed that the conclusions matched with the intended PORTSIM simulation structure and logic.

2 FINDINGS

Results confirmed that the flow of cargo (containers via flatbed trucks) through the port matched with reported timing values. That is, each piece of cargo was reported in the right place at the right time for each of the five fields of timing data in the Cargo Report (for the **basecont_truck.rd** scenario using the **cont_truck.lst** force file).

The results confirm the fundamental accuracy of the Cargo Report. The verification process did reveal a minor anomaly in the computation of the Time Parked in Staging that was corrected. It also revealed an unusual ordering of the cargo pieces in the Cargo Report. This ordering is presented in Figure 1 of Attachment 3.

The findings and materials developed for verification processes provide added benefits for augmenting user guides and for supporting analytical efforts. Insights gained from the verifications are also adding to the foundation for ongoing and future metamodeling activities.

3 FUTURE TASKS

Tasks to follow will include: verifying other output tables and graphs (other than the Cargo Report), verifying stochastic elements (timing parameters) and implementing bug fixes and notational corrections. In addition, the next tasks will cover the remaining cargo type and mode of transportation (Containers via Flatcars) and will also address larger scenarios.

4 SUPPORTING DOCUMENTS

The supporting documents are contained in the following attachments.

1. Attachment 1, Summary of Test Scenario Inputs for basecont_truck.rd, a summary of the inputs used in the scenario **basecont_truck.rd**
2. Attachment 2, PORTSIM Menu Inputs for basecont_truck.rd, the menu choices/path to the windows where users enter input values (used to compute the Cargo Report)
3. Attachment 3, Tracking Sequence for basecont_truck.rd, the equations and logic that reproduce the results of the Cargo Report
4. Attachment 4, Screen Capture of Input Windows for basecont_truck.rd, the screen capture of the input windows (inputs used to compute the Cargo Report)
5. Attachment 5, Cargo Report Output for basecont_truck.rd, the complete Cargo Report of the scenario **basecont_truck.rd** using the force file **cont_truck.lst** (annotated to identify the timing patterns)

ATTACHMENT 1: SUMMARY OF TEST SCENARIO INPUTS FOR BASECONT_TRUCK.RD (CONTAINERS VIA FLATBED TRUCK)

This attachment contains a summary of the inputs used in the scenario **basecont_truck.rd**.

Scenario name: basecont_truck.rd
Force file name: cont_truck.lst (100 identical containers on 50 40-foot flatbed trucks)

Time to simulate: 50 hours

Locomotives: 1
Docks: 6
End ramps: 1
Drivers: 200
Inspectors: 200
Stevedores: 30
Container handlers: 30

Gates: #1, only one available for military use
    Gate can accept: all types (convoy vehicles and flatbed trucks)

Open staging: #1, only one available for military use
    Capacity of military use: 833,105 square feet
    Percent usable for staging: 60% (499,863 square feet)
    Stacking height: 3
    Type of cargo handled: all types (wheeled vehicles, tracked vehicles, containers)

Berths: #4, only one available for military use
    Length: 1,200 feet
    Container cranes: 1
    Wharf cranes: 1
    Maximum call forward: 12

Interchange yard: #1, only one available for military use
    Capacity: 208 railcars
    Percent usable: 60% (125)

Spurs: #1, only one available for military use
    Type: open staging
    Tangent length: 1,416 feet
    Vehicle offloading method: end ramps

Process timing parameters: all times set to integers >= 1

Containers: range = 0	*(deterministic port operations)*
Flatbeds: range = 0	*(deterministic port operations)*
Ship: range = 0	*(deterministic port operations)*

Arrival mode time parameters:

Flatbeds: fixed arrival rate, 20 flatbeds per group every 40 minutes	*(deterministic cargo arrival)*

Ship 1: Chesapeake Bay
- Length: 663 feet
- Maximum capacities by cargo type:
  - Breakbulk: 0
  - Container: 345,075 square feet
  - RORO: 0
- Maximum wait without loading/offloading: 6 hours
- Ship arrival time to port: 5 hours *(deterministic ship arrival)*

ATTACHMENT 2:
PORTSIM MENU INPUTS FOR BASECONT_TRUCK.RD

This attachment describes the menu choices/paths to the windows for entering input values. These inputs are used in computing the Cargo Report for the **basecont_truck.rd** scenario (and, in general, for containers via flatbed trucks loaded on a container ship). The order presented starts with the Time Arrived At Port, Time Parked In Staging, left to right, ending with the Loading Rate. The letters a…m are labels for the input variables as shown in the screen captures (see Attachment 4).

Time Arrived At Port
Parameters > Modify Arrival Mode Time Parameters > Flatbeds
Number Of Flatbeds Per Group = _a_
Time To Begin Simulating Arrivals = _b_
Time Between Arrivals = _c_

Time Cleared Gate
Parameters > Modify Process Timing Parameters > Flatbed
Gate Processing = _d_

Time Parked In Staging
Parameters > Modify Process Timing Parameters > Flatbed
Transit To Container Handlers = _e_
Offload Container At Container Handler = _f_

Parameters > Modify Process Timing Parameters > Container
Open Staging Parking = _g_

Time Available To Load
Parameters > Modify Process Timing Parameters > Container
Required Dwell Time In Open Staging = _h_

Time Loaded
Parameters > Modify Ship Parameters
Ship Arrival Time To Port = _i_

Parameters > Modify Process Timing Parameters > Ship
Ship Berthing Time = _j_

Parameters > Modify Process Timing Parameters > Container
Transit Container To Berth = _k_
Load Container At Container Berth = _l_

Parameters > Modify Port Parameters > Berth Parameters
Maximum Call Forward = _m_

Load Rate
Parameters > Modify Process Timing Parameters > Container
Load Container At Container Berth = _1_

ATTACHMENT 3: TRACKING SEQUENCE FOR BASECONT_TRUCK.RD

This attachment presents the equations and logic that reproduce the results of the Cargo Report for the **basecont_truck.rd** scenario using the **cont_truck.lst** force file (refer to Attachment 5). First is a short list of notations used. Following the list are the equations and logic for computing the Cargo Report. The order presented follows the order of the Cargo Report columns from left to right.

As an example of computing the first, second and third containers' Time Cleared Gate (TCG): the first container's TCG is equal to the time for the first container to arrive at port plus the gate processing time. The second container's TCG is the same as the first container since they both are on the same flatbed. The third container's time is equal to the second container's TCG plus the gate processing time. Attachment 4 contains a screen capture of all the defined input variables a…m used below.

Notation
N = total number of cargo pieces in the force file
n 1,2,...N
a…m = input variables used in PORTSIM
^ = results from previous step, i.e., from the previous cargo item within the same column of the Cargo Report

Time Arrived At Port = TAP = *f*(a,b,c)
a = Number Of Flatbeds Per Group
b = Time To Begin Simulating Arrivals
c = Time Between Arrivals

The flatbed trucks arrive at the port in groups of "a" trucks with the first group arriving at time "b." The time separation between groups of flatbed trucks is equal to a fixed interval of "c" minutes. All cargo items arriving in the same group are assigned the same Time Arrived At Port.

Time Cleared Gate = TCG = *f*(TAP,d)
d = Gate Processing

Each flatbed truck used in the force file, **cont_truck.lst**, holds two containers. For this reason, each pair of containers per flatbed truck will have the same Time Cleared Gate time.

$TCG_1 = TAP_i + d$
$TCG_2 = TCG_1$
$TCG_3 = \wedge + d$
$TCG_4 = TCG_3$ ...
$TCG_{N-1} = \wedge + d$

$TCG_N = TCG_{N-1}$

The equations above hold for the **basecont_truck.rd** scenario. An exception to this formulation occurs when $TAP_{n+1} > TCG_n$. That is, the previous group of flatbeds have all cleared the gate before the next group of flatbeds arrive to port, resulting in a forced wait time between the groups. When this occurs use the following formulations as noted below.

$TCG_{n+1} = TAP_{n+1} + d$
$TCG_{n+2} = TCG_{n+1}$
$TCG_{n+3} = \wedge + d$
$TCG_{n+4} = TCG_{n+3} \ldots$

<u>Time Parked In Staging = TPS = *f*(TCG,e,f,g)</u>
e = Transit To Container Handler
f = Offload Container At Container Handler
g = Open Staging Parking

The two containers per flatbed truck share the Transit To Container Handler time since they are both on the same truck; however, the containers are offloaded one at a time. While the first container is offloaded, the second container waits, hence the 2f found in TPS_2, TPS_4 ... TPS_N formulations.

$TPS_1 = TCG_1 + e + f + g$
$TPS_2 = TCG_1 + e + 2f + g$
$TPS_3 = TCG_3 + e + f + g$
$TPS_4 = TCG_3 + e + 2f + g \ldots$

$TPS_{N-1} = TCG_{N-1} + e + f + g$
$TPS_N = TCG_{N-1} + e + 2f + g$

<u>Time Available To Load = TAL = *f*(TPS,h)</u>
h = Required Dwell Time In Open Staging

$TAL_1 = TPS_1 + h$
$TAL_2 = TPS_2 + h \ldots$
$TAL_N = TPS_N + h$

<u>Time Loaded = TL = *f*(i,j,k,l,m)</u>
i = Ship Arrival Time To Port
j = Ship Berthing Time
k = Transit Container To Berth
l = Load Container At Container Berth
m = Maximum Call Forward

Call Forward Group Lag Time = [.25(m - 1)]

The following equations are listed in order of Time Loaded instead of LIN ID.
$TL_1 = i + j + k + l + CEIL[.25(m - 1)]$
$TL_3 = \wedge + 1$
$TL_2 = \wedge + 1$
$TL_5 = \wedge + 1$
$TL_4 = \wedge + 1$
$TL_7 = \wedge + 1$
$TL_6 = \wedge + 1 \ldots$
$TL_N = \wedge + 1$

Note: The arrows in the figure below indicate the ordering as sorted by Time Loaded (instead of LIN ID).

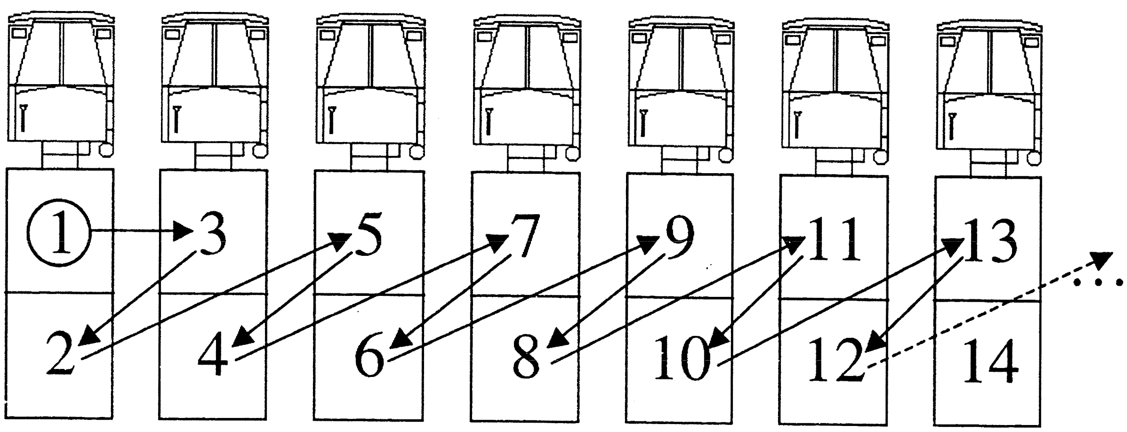


Figure 1 Time Loaded (TL) Order

The Call Forward Group Lag Time is hard wired but also determined in part by the Maximum Call Forward value. For the **basecont_truck.rd** scenario, the Maximum Call Forward is 12. Twelve cargo items are instantaneously called forward. The lag time between each item is .25 minutes. The first item starts traveling (from the staging area to the berth) at time zero, and the next eleven items which complete the call forward produce a total lag time of 2.75 minutes, the Call Forward Group Lag Time. Loading of the first item in the call forward group does not begin until the last item in the call forward group reaches the berth. The Cargo Report reports time only to the minute and will always round up (CEIL function), therefore, converting the 2.75 minutes to 3 minutes for computing TL_1.

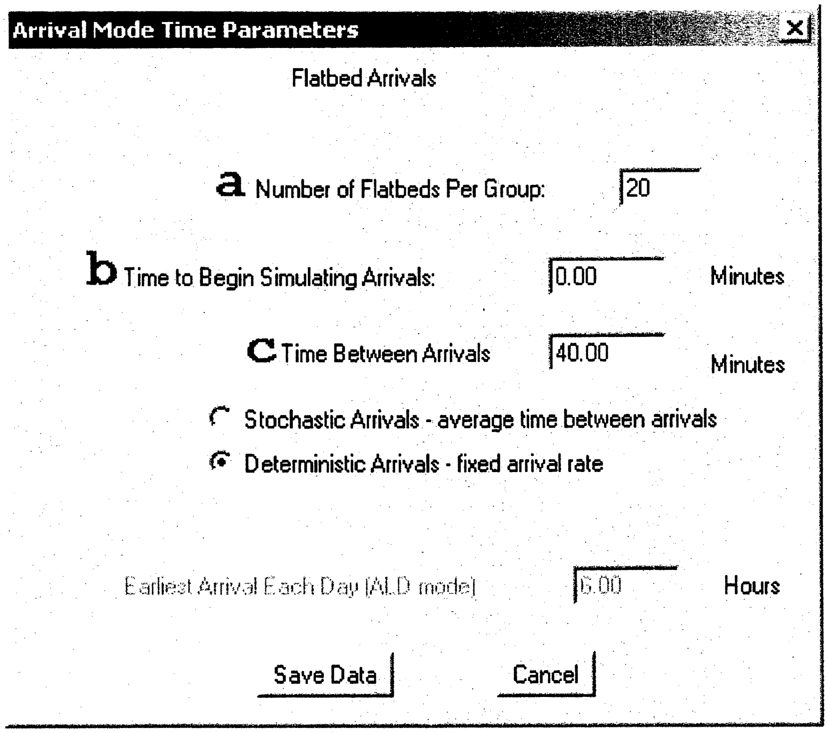
The Call Forward Group Lag Time also effects the gap in time between each call forward group, every 12 items for the **basecont_truck.rd** scenario. The formulation of the gap between the call forward groups is equal to the Transit Container To Berth plus the Load Container At Container Berth plus the ceiling on the Call Forward Group Lag Time, $k + l + CEIL[.25(m - 1)]$. Due to rounding up, the gaps between call forward groups may be 7 or 8 minutes. The last gap is smaller because the call forward contains less than 12 cargo items.

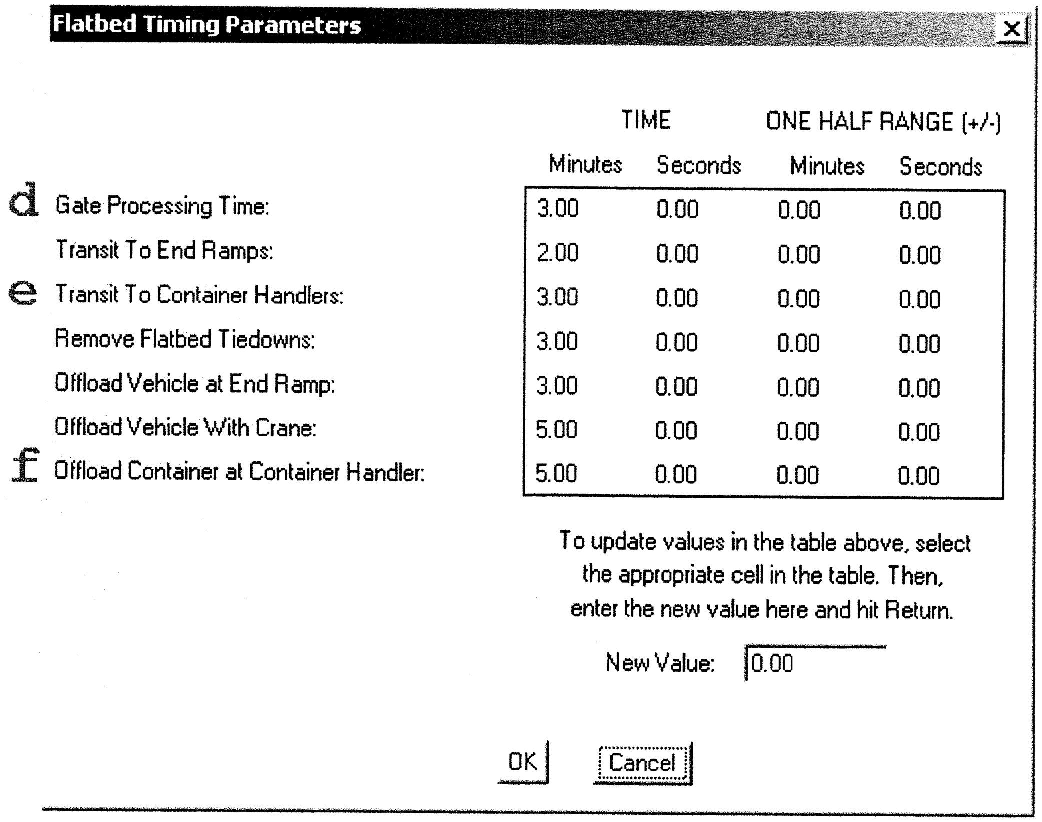
<u>Loading Rate = LR = *f*(l)</u>
l = Load Container At Container Berth

$LR_1 = l$
$LR_2 = l \ldots$
$LR_N = l$

ATTACHMENT 4:
SCREEN CAPTURE OF INPUT WINDOWS FOR BASECONT_TRUCK.RD

This attachment includes the screen captures of the input windows of those inputs used to compute the Cargo Report for the **basecont_truck.rd** scenario. The inputs used are identified by the letters a…m, and these also correspond to labels used in the equations presented in Attachment 3.


Arrival Mode Time Parameters
Flatbed Arrivals
a Number of Flatbeds Per Group:
20
b Time to Begin Simulating Arrivals:
0.00
Minutes
C Time Between Arrivals
40.00
Minutes
Stochastic Arrivals - average time between arrivals
Deterministic Arrivals - fixed arrival rate
Earliest Arrival Each Day (ALD mode)
6.00
Hours
Save Data
Cancel



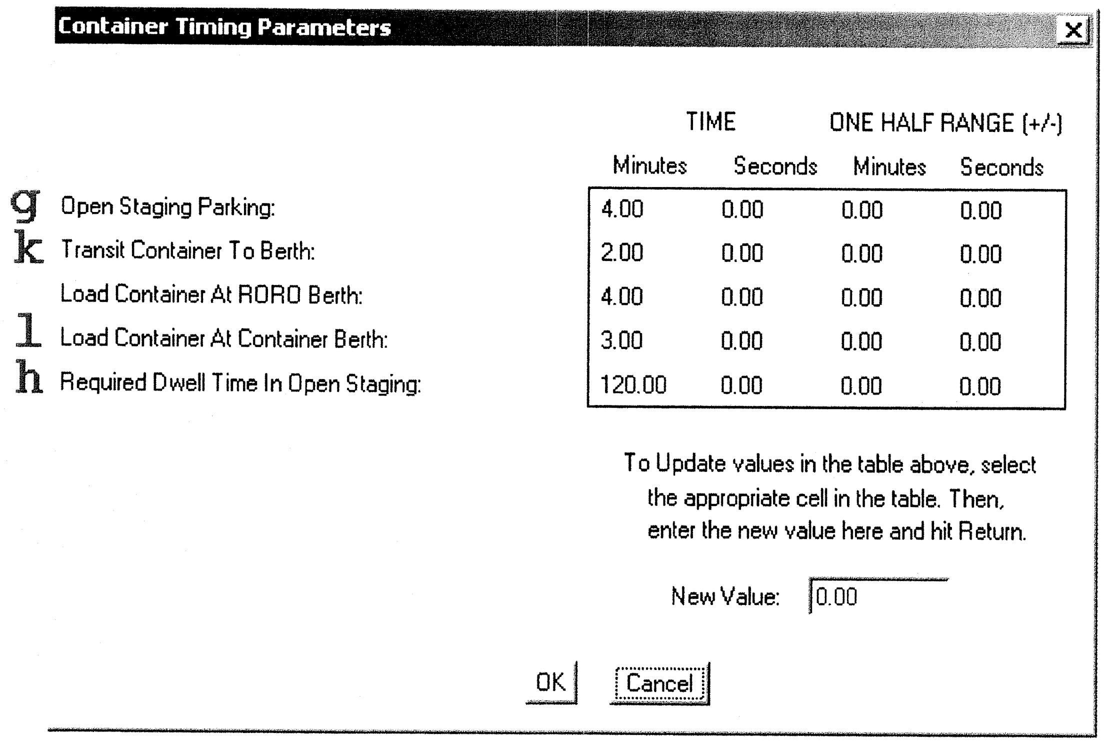
Flatbed Timing Parameters

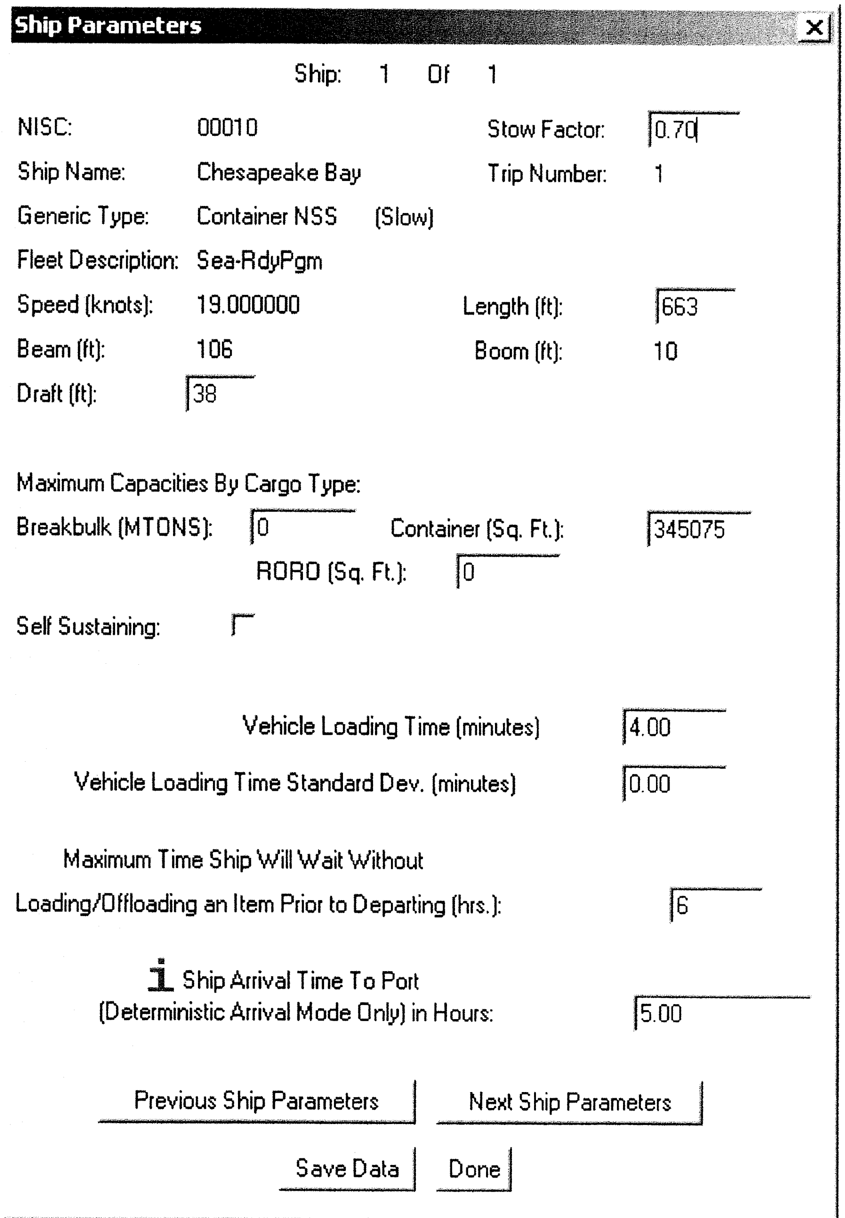
	TIME		ONE HALF RANGE (+/-)	
	Minutes	Seconds	Minutes	Seconds
d Gate Processing Time:	3.00	0.00	0.00	0.00
Transit To End Ramps:	2.00	0.00	0.00	0.00
e Transit To Container Handlers:	3.00	0.00	0.00	0.00
Remove Flatbed Tiedowns:	3.00	0.00	0.00	0.00
Offload Vehicle at End Ramp:	3.00	0.00	0.00	0.00
Offload Vehicle With Crane:	5.00	0.00	0.00	0.00
f Offload Container at Container Handler:	5.00	0.00	0.00	0.00

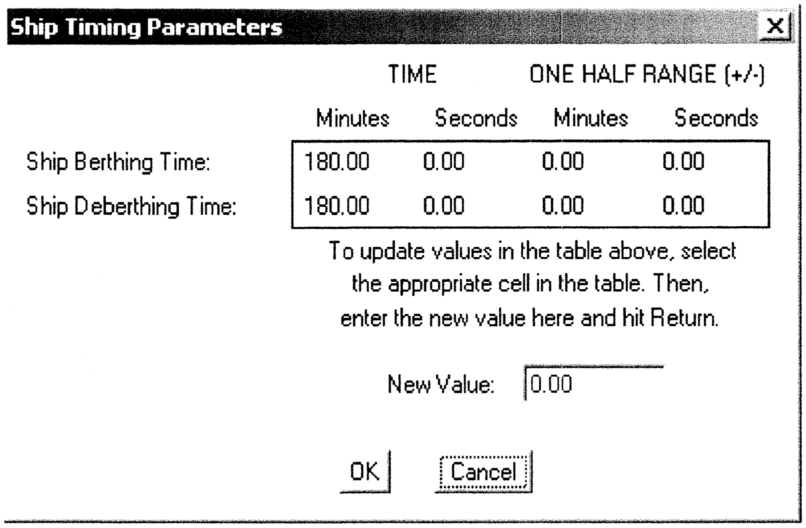
To update values in the table above, select the appropriate cell in the table. Then, enter the new value here and hit Return.

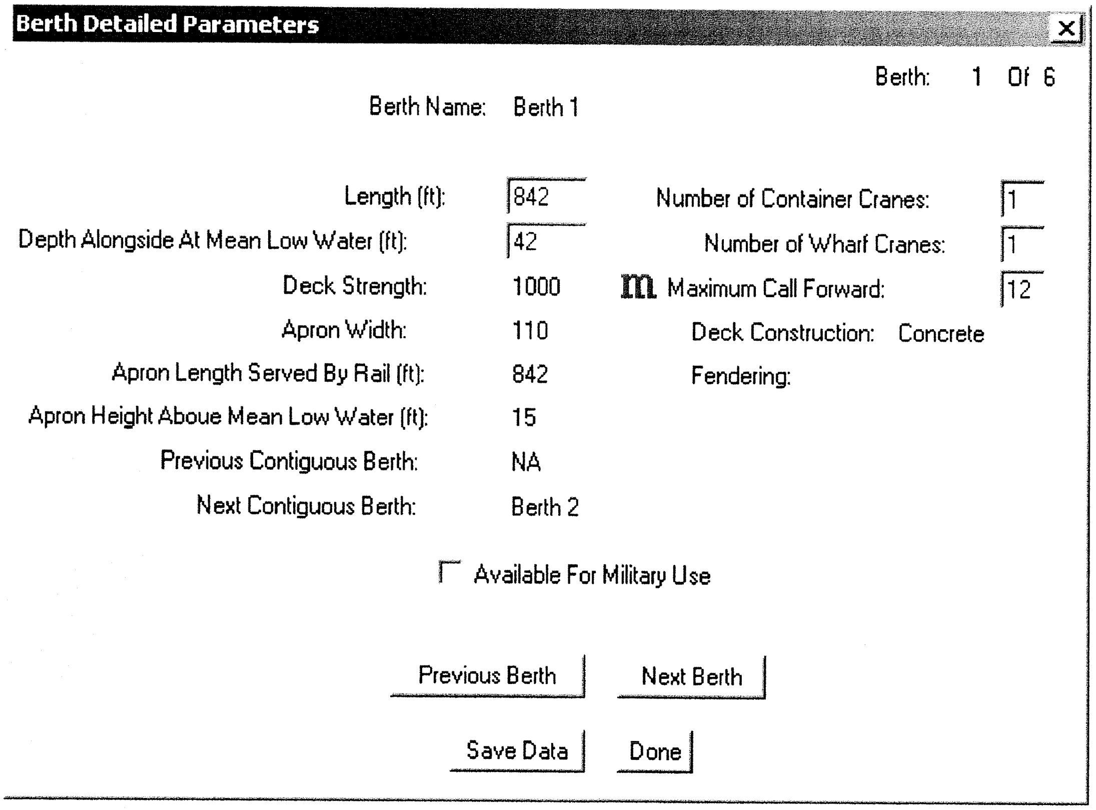
New Value: 0.00

OK Cancel


Container Timing Parameters
TIME
ONE HALF RANGE (+/-)
Minutes Seconds Minutes Seconds
g Open Staging Parking: 4.00 0.00 0.00 0.00
k Transit Container To Berth: 2.00 0.00 0.00 0.00
Load Container At RORO Berth: 4.00 0.00 0.00 0.00
l Load Container At Container Berth: 3.00 0.00 0.00 0.00
h Required Dwell Time In Open Staging: 120.00 0.00 0.00 0.00
To Update values in the table above, select
the appropriate cell in the table. Then,
enter the new value here and hit Return.
New Value: 0.00
OK
Cancel


Ship Parameters
Ship: 1 Of 1
NISC: 00010
Stow Factor: 0.70
Ship Name: Chesapeake Bay
Trip Number: 1
Generic Type: Container NSS (Slow)
Fleet Description: Sea-RdyPgm
Speed (knots): 19.000000
Length (ft): 663
Beam (ft): 106
Boom (ft): 10
Draft (ft): 38
Maximum Capacities By Cargo Type:
Breakbulk (MTONS): 0
Container (Sq. Ft.): 345075
RORO (Sq. Ft.): 0
Self Sustaining:
Vehicle Loading Time (minutes) 4.00
Vehicle Loading Time Standard Dev. (minutes) 0.00
Maximum Time Ship Will Wait Without
Loading/Offloading an Item Prior to Departing (hrs.): 6
Ship Arrival Time To Port
(Deterministic Arrival Mode Only) in Hours: 5.00
Previous Ship Parameters
Next Ship Parameters
Save Data
Done


Ship Timing Parameters
TIME
ONE HALF RANGE (+/-)
Minutes
Seconds
Minutes
Seconds
Ship Berthing Time:
180.00 0.00 0.00 0.00
Ship Deberthing Time:
180.00 0.00 0.00 0.00
To update values in the table above, select the appropriate cell in the table. Then, enter the new value here and hit Return.
New Value:
0.00
OK
Cancel


Berth Detailed Parameters
Berth: 1 Of 6
Berth Name: Berth 1
Length (ft): 842
Depth Alongside At Mean Low Water (ft): 42
Deck Strength: 1000
Apron Width: 110
Apron Length Served By Rail (ft): 842
Apron Height Aboue Mean Low Water (ft): 15
Previous Contiguous Berth: NA
Next Contiguous Berth: Berth 2
Number of Container Cranes: 1
Number of Wharf Cranes: 1
Maximum Call Forward: 12
Deck Construction: Concrete
Fendering:
Available For Military Use
Previous Berth
Next Berth
Save Data
Done

ATTACHMENT 5:
CARGO REPORT OUTPUT FOR BASECONT_TRUCK.RD

This attachment is a print out of the Cargo Report for the **basecont_truck.rd** scenario using the **cont_truck.lst** force file. Two copies of the Cargo Report are included: the first is sorted by the LIN ID and the second is sorted by the Time Loaded. The equations from Attachment 3 are written in some of the cells of the two Cargo Reports.

PORTSIM Detailed Cargo Report
(Note: All Times Are Represented In DDD:HH:MM)

Sorted by LIN ID

Sort Instructions: To sort on a desired column, double-click the column header and the table will be sorted by that column.

	LIN ID	TAP Time Arrived At Port	TCG Time Cleared Gate	TPS Time Parked In Staging	TAL Time Available To Load	TL Time Loaded	LR Loading Rate (Minutes)	Ship Loaded Onto
	KMOTXT1C 00000001	0:00:00 TAP_1	0:00:03 TAP_1+d	0:00:15 $TCG_1+e+f+g$	0:02:15 TPS_1+h	0:08:08	3	Chesapeake Bay
	KMOTXT1C 00000002	0:00:00 TAP_2	0:00:03 TCG_1	0:00:20 $TCG_1+e+2f+g$	0:02:20 TPS_2+h	0:08:14	3	Chesapeake Bay
	KMOTXT1C 00000003	0:00:00 TAP_3	0:00:06 ^ + d	0:00:18 $TCG_3+e+f+g$	0:02:18 TPS_3+h	0:08:11	3	Chesapeake Bay
	KMOTXT1C 00000004	0:00:00	0:00:06	0:00:23 $TCG_3+e+2f+g$	0:02:23	0:08:20	3	Chesapeake Bay
	KMOTXT1C 00000005	0:00:00	0:00:09	0:00:21	0:02:21	0:08:17	3	Chesapeake Bay
	KMOTXT1C 00000006	0:00:00	0:00:09	0:00:26	0:02:26	0:08:26	3	Chesapeake Bay
	KMOTXT1C 00000007	0:00:00	0:00:12	0:00:24	0:02:24	0:08:23	3	Chesapeake Bay
	KMOTXT1C 00000008	0:00:00	0:00:12	0:00:29	0:02:29	0:08:32	3	Chesapeake Bay
	KMOTXT1C 00000009	0:00:00	0:00:15	0:00:27	0:02:27	0:08:29	3	Chesapeake Bay
	KMOTXT1C 00000010	0:00:00	0:00:15	0:00:32	0:02:32	0:08:38	3	Chesapeake Bay
	KMOTXT1C 00000011	0:00:00	0:00:18	0:00:30	0:02:30	0:08:35	3	Chesapeake Bay
	KMOTXT1C 00000012	0:00:00	0:00:18	0:00:35	0:02:35	0:08:49	3	Chesapeake Bay
	KMOTXT1C 00000013	0:00:00	0:00:21	0:00:33	0:02:33	0:08:41	3	Chesapeake Bay
	KMOTXT1C 00000014	0:00:00	0:00:21	0:00:38	0:02:38	0:08:55	3	Chesapeake Bay
	KMOTXT1C 00000015	0:00:00	0:00:24	0:00:36	0:02:36	0:08:52	3	Chesapeake Bay
	KMOTXT1C 00000016	0:00:00	0:00:24 b	0:00:41	0:02:41	0:09:01	3	Chesapeake Bay
	KMOTXT1C 00000017	0:00:00	0:00:27	0:00:39	0:02:39	0:08:58	3	Chesapeake Bay
	KMOTXT1C 00000018	0:00:00	0:00:27	0:00:44	0:02:44	0:09:07	3	Chesapeake Bay
	KMOTXT1C 00000019	0:00:00	0:00:30	0:00:42	0:02:42	0:09:04	3	Chesapeake Bay
	KMOTXT1C 00000020	0:00:00	0:00:30	0:00:47	0:02:47	0:09:13	3	Chesapeake Bay
	KMOTXT1C 00000021	0:00:00	0:00:33	0:00:45	0:02:45	0:09:10	3	Chesapeake Bay
	KMOTXT1C 00000022	0:00:00	0:00:33	0:00:50	0:02:50	0:09:19	3	Chesapeake Bay
2a	KMOTXT1C 00000023	0:00:00	0:00:36	0:00:48	0:02:48	0:09:16	3	Chesapeake Bay
	KMOTXT1C 00000024	0:00:00	0:00:36	0:00:53	0:02:53	0:09:29	3	Chesapeake Bay
	KMOTXT1C 00000025	0:00:00	0:00:39	0:00:51	0:02:51	0:09:22	3	Chesapeake Bay
	KMOTXT1C 00000026	0:00:00	0:00:39	0:00:56	0:02:56	0:09:35	3	Chesapeake Bay
	KMOTXT1C 00000027	0:00:00	0:00:42	0:00:54	0:02:54	0:09:32	3	Chesapeake Bay
	KMOTXT1C 00000028	0:00:00	0:00:42	0:00:59	0:02:59	0:09:41	3	Chesapeake Bay
	KMOTXT1C 00000029	0:00:00	0:00:45	0:00:57	0:02:57	0:09:38	3	Chesapeake Bay
	KMOTXT1C 00000030	0:00:00	0:00:45	0:01:02	0:03:02	0:09:47	3	Chesapeake Bay
	KMOTXT1C 00000031	0:00:00	0:00:48	0:01:00	0:03:00	0:09:44	3	Chesapeake Bay

KMOTXT1C 00000032	0:00:00	0:00:48	0:01:05	0:03:05	0:09:53	3	Chesapeake Bay
KMOTXT1C 00000033	0:00:00	0:00:51	0:01:03	0:03:03	0:09:50	3	Chesapeake Bay
KMOTXT1C 00000034	0:00:00	0:00:51	0:01:08	0:03:08	0:09:59	3	Chesapeake Bay
KMOTXT1C 00000035	0:00:00	0:00:54	0:01:06	0:03:06	0:09:56	3	Chesapeake Bay
KMOTXT1C 00000036	0:00:00	0:00:54	0:01:11	0:03:11	0:10:10	3	Chesapeake Bay
KMOTXT1C 00000037	0:00:00	0:00:57	0:01:09	0:03:09	0:10:02	3	Chesapeake Bay
KMOTXT1C 00000038	0:00:00	0:00:57	0:01:14	0:03:14	0:10:16	3	Chesapeake Bay
KMOTXT1C 00000039	0:00:00	0:01:00	0:01:12	0:03:12	0:10:13	3	Chesapeake Bay
KMOTXT1C 00000040	0:00:00	0:01:00 c	0:01:17	0:03:17	0:10:22	3	Chesapeake Bay
KMOTXT1C 00000041	0:00:40	0:01:03	0:01:15	0:03:15	0:10:19	3	Chesapeake Bay
KMOTXT1C 00000042	0:00:40	0:01:03	0:01:20	0:03:20	0:10:28	3	Chesapeake Bay
KMOTXT1C 00000043	0:00:40	0:01:06	0:01:18	0:03:18	0:10:25	3	Chesapeake Bay
KMOTXT1C 00000044	0:00:40	0:01:06	0:01:23	0:03:23	0:10:34	3	Chesapeake Bay
KMOTXT1C 00000045	0:00:40	0:01:09	0:01:21	0:03:21	0:10:31	3	Chesapeake Bay
KMOTXT1C 00000046	0:00:40	0:01:09	0:01:26	0:03:26	0:10:40	3	Chesapeake Bay
KMOTXT1C 00000047	0:00:40	0:01:12	0:01:24	0:03:24	0:10:37	3	Chesapeake Bay
KMOTXT1C 00000048	0:00:40	0:01:12	0:01:29	0:03:29	0:10:51	3	Chesapeake Bay
KMOTXT1C 00000049	0:00:40	0:01:15	0:01:27	0:03:27	0:10:43	3	Chesapeake Bay
KMOTXT1C 00000050	0:00:40	0:01:15	0:01:32	0:03:32	0:10:57	3	Chesapeake Bay
KMOTXT1C 00000051	0:00:40	0:01:18	0:01:30	0:03:30	0:10:54	3	Chesapeake Bay
KMOTXT1C 00000052	0:00:40	0:01:18	0:01:35	0:03:35	0:11:03	3	Chesapeake Bay
KMOTXT1C 00000053	0:00:40	0:01:21	0:01:33	0:03:33	0:11:00	3	Chesapeake Bay
KMOTXT1C 00000054	0:00:40	0:01:21	0:01:38	0:03:38	0:11:09	3	Chesapeake Bay
KMOTXT1C 00000055	0:00:40	0:01:24	0:01:36	0:03:36	0:11:06	3	Chesapeake Bay
KMOTXT1C 00000056	0:00:40	0:01:24	0:01:41	0:03:41	0:11:15	3	Chesapeake Bay
KMOTXT1C 00000057	0:00:40	0:01:27	0:01:39	0:03:39	0:11:12	3	Chesapeake Bay
KMOTXT1C 00000058	0:00:40	0:01:27	0:01:44	0:03:44	0:11:21	3	Chesapeake Bay
KMOTXT1C 00000059	0:00:40	0:01:30	0:01:42	0:03:42	0:11:18	3	Chesapeake Bay
KMOTXT1C 00000060	0:00:40	0:01:30	0:01:47	0:03:47	0:11:32	3	Chesapeake Bay
KMOTXT1C 00000061	0:00:40	0:01:33	0:01:45	0:03:45	0:11:24	3	Chesapeake Bay
KMOTXT1C 00000062	0:00:40	0:01:33	0:01:50	0:03:50	0:11:38	3	Chesapeake Bay
KMOTXT1C 00000063	0:00:40	0:01:36	0:01:48	0:03:48	0:11:35	3	Chesapeake Bay
KMOTXT1C 00000064	0:00:40	0:01:36	0:01:53	0:03:53	0:11:44	3	Chesapeake Bay
KMOTXT1C 00000065	0:00:40	0:01:39	0:01:51	0:03:51	0:11:41	3	Chesapeake Bay
KMOTXT1C 00000066	0:00:40	0:01:39	0:01:56	0:03:56	0:11:50	3	Chesapeake Bay
KMOTXT1C 00000067	0:00:40	0:01:42	0:01:54	0:03:54	0:11:47	3	Chesapeake Bay
KMOTXT1C 00000068	0:00:40	0:01:42	0:01:59	0:03:59	0:11:56	3	Chesapeake Bay
KMOTXT1C 00000069	0:00:40	0:01:45	0:01:57	0:03:57	0:11:53	3	Chesapeake Bay
KMOTXT1C 00000070	0:00:40	0:01:45	0:02:02	0:04:02	0:12:02	3	Chesapeake Bay
KMOTXT1C 00000071	0:00:40	0:01:48	0:02:00	0:04:00	0:11:59	3	Chesapeake Bay
KMOTXT1C 00000072	0:00:40	0:01:48	0:02:05	0:04:05	0:12:12	3	Chesapeake Bay

KMOTXT1C 00000073	0:00:40	0:01:51	0:02:03	0:04:03	0:12:05	3	Chesapeake Bay
KMOTXT1C 00000074	0:00:40	0:01:51	0:02:08	0:04:08	0:12:18	3	Chesapeake Bay
KMOTXT1C 00000075	0:00:40	0:01:54	0:02:06	0:04:06	0:12:15	3	Chesapeake Bay
KMOTXT1C 00000076	0:00:40	0:01:54	0:02:11	0:04:11	0:12:24	3	Chesapeake Bay
KMOTXT1C 00000077	0:00:40	0:01:57	0:02:09	0:04:09	0:12:21	3	Chesapeake Bay
KMOTXT1C 00000078	0:00:40	0:01:57	0:02:14	0:04:14	0:12:30	3	Chesapeake Bay
KMOTXT1C 00000079	0:00:40	0:02:00	0:02:12	0:04:12	0:12:27	3	Chesapeake Bay
KMOTXT1C 00000080	0:00:40	0:02:00 c	0:02:17	0:04:17	0:12:36	3	Chesapeake Bay
KMOTXT1C 00000081	0:01:20	0:02:03	0:02:15	0:04:15	0:12:33	3	Chesapeake Bay
KMOTXT1C 00000082	0:01:20	0:02:03	0:02:20	0:04:20	0:12:42	3	Chesapeake Bay
KMOTXT1C 00000083	0:01:20	0:02:06	0:02:18	0:04:18	0:12:39	3	Chesapeake Bay
KMOTXT1C 00000084	0:01:20	0:02:06	0:02:23	0:04:23	0:12:53	3	Chesapeake Bay
KMOTXT1C 00000085	0:01:20	0:02:09	0:02:21	0:04:21	0:12:45	3	Chesapeake Bay
KMOTXT1C 00000086	0:01:20	0:02:09	0:02:26	0:04:26	0:12:59	3	Chesapeake Bay
KMOTXT1C 00000087	0:01:20	0:02:12	0:02:24	0:04:24	0:12:56	3	Chesapeake Bay
KMOTXT1C 00000088	0:01:20	0:02:12	0:02:29	0:04:29	0:13:05	3	Chesapeake Bay
KMOTXT1C 00000089	0:01:20	0:02:15	0:02:27	0:04:27	0:13:02	3	Chesapeake Bay
KMOTXT1C 00000090	0:01:20	0:02:15	0:02:32	0:04:32	0:13:11	3	Chesapeake Bay
KMOTXT1C 00000091	0:01:20	0:02:18	0:02:30	0:04:30	0:13:08	3	Chesapeake Bay
KMOTXT1C 00000092	0:01:20	0:02:18	0:02:35	0:04:35	0:13:17	3	Chesapeake Bay
KMOTXT1C 00000093	0:01:20	0:02:21	0:02:33	0:04:33	0:13:14	3	Chesapeake Bay
KMOTXT1C 00000094	0:01:20	0:02:21	0:02:38	0:04:38	0:13:23	3	Chesapeake Bay
KMOTXT1C 00000095	0:01:20	0:02:24	0:02:36	0:04:36	0:13:20	3	Chesapeake Bay
KMOTXT1C 00000096	0:01:20	0:02:24	0:02:41	0:04:41	0:13:32	3	Chesapeake Bay
KMOTXT1C 00000097	0:01:20	0:02:27	0:02:39	0:04:39	0:13:26	3	Chesapeake Bay
KMOTXT1C 00000098	0:01:20	0:02:27	0:02:44	0:04:44	0:13:38	3	Chesapeake Bay
KMOTXT1C 00000099	0:01:20	0:02:30	0:02:42	0:04:42	0:13:35	3	Chesapeake Bay
KMOTXT1C 00000100	0:01:20	0:02:30	0:02:47	0:04:47	0:13:41	3	Chesapeake Bay

PORTSIM Detailed Cargo Report
(Note: All Times Are Represented In DDD:HH:MM)

Sorted by Time Loaded

Sort Instructions: To sort on a desired column, double-click
the column header and the table will be sorted by that column.

LIN ID	TAP Time Arrived At Port	TCG Time Cleared Gate	TPS Time Parked In Staging	TAL Time Available To Load	TL Time Loaded		LR Loading Rate (Minutes)	Ship Loaded Onto
KMOTXT1C 00000001	0:00:00	0:00:03	0:00:15	0:02:15	0:08:08	i+j+k+l+CEIL[.25(m-1)]	3	Chesapeake Bay
KMOTXT1C 00000003	0:00:00	0:00:06	0:00:18	0:02:18	0:08:11	^ + l	3	Chesapeake Bay
KMOTXT1C 00000002	0:00:00	0:00:03	0:00:20	0:02:20	0:08:14	^ + l	3	Chesapeake Bay
KMOTXT1C 00000005	0:00:00	0:00:09	0:00:21	0:02:21	0:08:17	.	3	Chesapeake Bay
KMOTXT1C 00000004	0:00:00	0:00:06	0:00:23	0:02:23	0:08:20	.	3	Chesapeake Bay
KMOTXT1C 00000007	0:00:00	0:00:12	0:00:24	0:02:24	0:08:23	.	3	Chesapeake Bay
KMOTXT1C 00000006	0:00:00	0:00:09	0:00:26	0:02:26	0:08:26		3	Chesapeake Bay
KMOTXT1C 00000009	0:00:00	0:00:15	0:00:27	0:02:27	0:08:29		3	Chesapeake Bay
KMOTXT1C 00000008	0:00:00	0:00:12	0:00:29	0:02:29	0:08:32		3	Chesapeake Bay
KMOTXT1C 00000011	0:00:00	0:00:18	0:00:30	0:02:30	0:08:35		3	Chesapeake Bay
KMOTXT1C 00000010	0:00:00	0:00:15	0:00:32	0:02:32	0:08:38		3	Chesapeake Bay
KMOTXT1C 00000013	0:00:00	0:00:21	0:00:33	0:02:33	0:08:41		3	Chesapeake Bay
KMOTXT1C 00000012	0:00:00	0:00:18	0:00:35	0:02:35	0:08:49		3	Chesapeake Bay
KMOTXT1C 00000015	0:00:00	0:00:24	0:00:36	0:02:36	0:08:52		3	Chesapeake Bay
KMOTXT1C 00000014	0:00:00	0:00:21	0:00:38	0:02:38	0:08:55		3	Chesapeake Bay
KMOTXT1C 00000017	0:00:00	0:00:27	0:00:39	0:02:39	0:08:58		3	Chesapeake Bay
KMOTXT1C 00000016	0:00:00	0:00:24	0:00:41	0:02:41	0:09:01		3	Chesapeake Bay
KMOTXT1C 00000019	0:00:00	0:00:30	0:00:42	0:02:42	0:09:04		3	Chesapeake Bay
KMOTXT1C 00000018	0:00:00	0:00:27	0:00:44	0:02:44	0:09:07		3	Chesapeake Bay
KMOTXT1C 00000021	0:00:00	0:00:33	0:00:45	0:02:45	0:09:10		3	Chesapeake Bay
KMOTXT1C 00000020	0:00:00	0:00:30	0:00:47	0:02:47	0:09:13		3	Chesapeake Bay
KMOTXT1C 00000023	0:00:00	0:00:36	0:00:48	0:02:48	0:09:16		3	Chesapeake Bay
KMOTXT1C 00000022	0:00:00	0:00:33	0:00:50	0:02:50	0:09:19		3	Chesapeake Bay
KMOTXT1C 00000025	0:00:00	0:00:39	0:00:51	0:02:51	0:09:22		3	Chesapeake Bay
KMOTXT1C 00000024	0:00:00	0:00:36	0:00:53	0:02:53	0:09:29		3	Chesapeake Bay
KMOTXT1C 00000027	0:00:00	0:00:42	0:00:54	0:02:54	0:09:32		3	Chesapeake Bay
KMOTXT1C 00000026	0:00:00	0:00:39	0:00:56	0:02:56	0:09:35		3	Chesapeake Bay
KMOTXT1C 00000029	0:00:00	0:00:45	0:00:57	0:02:57	0:09:38		3	Chesapeake Bay
KMOTXT1C 00000028	0:00:00	0:00:42	0:00:59	0:02:59	0:09:41		3	Chesapeake Bay
KMOTXT1C 00000031	0:00:00	0:00:48	0:01:00	0:03:00	0:09:44		3	Chesapeake Bay
KMOTXT1C 00000030	0:00:00	0:00:45	0:01:02	0:03:02	0:09:47		3	Chesapeake Bay

KMOTXT1C	00000033	0:00:00	0:00:51	0:01:03	0:03:03	0:09:50	3	Chesapeake Bay
KMOTXT1C	00000032	0:00:00	0:00:48	0:01:05	0:03:05	0:09:53	3	Chesapeake Bay
KMOTXT1C	00000035	0:00:00	0:00:54	0:01:06	0:03:06	0:09:56	3	Chesapeake Bay
KMOTXT1C	00000034	0:00:00	0:00:51	0:01:08	0:03:08	0:09:59	3	Chesapeake Bay
KMOTXT1C	00000037	0:00:00	0:00:57	0:01:09	0:03:09	0:10:02	3	Chesapeake Bay
KMOTXT1C	00000036	0:00:00	0:00:54	0:01:11	0:03:11	0:10:10	3	Chesapeake Bay
KMOTXT1C	00000039	0:00:00	0:01:00	0:01:12	0:03:12	0:10:13	3	Chesapeake Bay
KMOTXT1C	00000038	0:00:00	0:00:57	0:01:14	0:03:14	0:10:16	3	Chesapeake Bay
KMOTXT1C	00000041	0:00:40	0:01:03	0:01:15	0:03:15	0:10:19	3	Chesapeake Bay
KMOTXT1C	00000040	0:00:00	0:01:00	0:01:17	0:03:17	0:10:22	3	Chesapeake Bay
KMOTXT1C	00000043	0:00:40	0:01:06	0:01:18	0:03:18	0:10:25	3	Chesapeake Bay
KMOTXT1C	00000042	0:00:40	0:01:03	0:01:20	0:03:20	0:10:28	3	Chesapeake Bay
KMOTXT1C	00000045	0:00:40	0:01:09	0:01:21	0:03:21	0:10:31	3	Chesapeake Bay
KMOTXT1C	00000044	0:00:40	0:01:06	0:01:23	0:03:23	0:10:34	3	Chesapeake Bay
KMOTXT1C	00000047	0:00:40	0:01:12	0:01:24	0:03:24	0:10:37	3	Chesapeake Bay
KMOTXT1C	00000046	0:00:40	0:01:09	0:01:26	0:03:26	0:10:40	3	Chesapeake Bay
KMOTXT1C	00000049	0:00:40	0:01:15	0:01:27	0:03:27	0:10:43	3	Chesapeake Bay
KMOTXT1C	00000048	0:00:40	0:01:12	0:01:29	0:03:29	0:10:51	3	Chesapeake Bay
KMOTXT1C	00000051	0:00:40	0:01:18	0:01:30	0:03:30	0:10:54	3	Chesapeake Bay
KMOTXT1C	00000050	0:00:40	0:01:15	0:01:32	0:03:32	0:10:57	3	Chesapeake Bay
KMOTXT1C	00000053	0:00:40	0:01:21	0:01:33	0:03:33	0:11:00	3	Chesapeake Bay
KMOTXT1C	00000052	0:00:40	0:01:18	0:01:35	0:03:35	0:11:03	3	Chesapeake Bay
KMOTXT1C	00000055	0:00:40	0:01:24	0:01:36	0:03:36	0:11:06	3	Chesapeake Bay
KMOTXT1C	00000054	0:00:40	0:01:21	0:01:38	0:03:38	0:11:09	3	Chesapeake Bay
KMOTXT1C	00000057	0:00:40	0:01:27	0:01:39	0:03:39	0:11:12	3	Chesapeake Bay
KMOTXT1C	00000056	0:00:40	0:01:24	0:01:41	0:03:41	0:11:15	3	Chesapeake Bay
KMOTXT1C	00000059	0:00:40	0:01:30	0:01:42	0:03:42	0:11:18	3	Chesapeake Bay
KMOTXT1C	00000058	0:00:40	0:01:27	0:01:44	0:03:44	0:11:21	3	Chesapeake Bay
KMOTXT1C	00000061	0:00:40	0:01:33	0:01:45	0:03:45	0:11:24	3	Chesapeake Bay
KMOTXT1C	00000060	0:00:40	0:01:30	0:01:47	0:03:47	0:11:32	3	Chesapeake Bay
KMOTXT1C	00000063	0:00:40	0:01:36	0:01:48	0:03:48	0:11:35	3	Chesapeake Bay
KMOTXT1C	00000062	0:00:40	0:01:33	0:01:50	0:03:50	0:11:38	3	Chesapeake Bay
KMOTXT1C	00000065	0:00:40	0:01:39	0:01:51	0:03:51	0:11:41	3	Chesapeake Bay
KMOTXT1C	00000064	0:00:40	0:01:36	0:01:53	0:03:53	0:11:44	3	Chesapeake Bay
KMOTXT1C	00000067	0:00:40	0:01:42	0:01:54	0:03:54	0:11:47	3	Chesapeake Bay
KMOTXT1C	00000066	0:00:40	0:01:39	0:01:56	0:03:56	0:11:50	3	Chesapeake Bay
KMOTXT1C	00000069	0:00:40	0:01:45	0:01:57	0:03:57	0:11:53	3	Chesapeake Bay
KMOTXT1C	00000068	0:00:40	0:01:42	0:01:59	0:03:59	0:11:56	3	Chesapeake Bay
KMOTXT1C	00000071	0:00:40	0:01:48	0:02:00	0:04:00	0:11:59	3	Chesapeake Bay
KMOTXT1C	00000070	0:00:40	0:01:45	0:02:02	0:04:02	0:12:02	3	Chesapeake Bay
KMOTXT1C	00000073	0:00:40	0:01:51	0:02:03	0:04:03	0:12:05	3	Chesapeake Bay

KMOTXT1C	00000072	0:00:40	0:01:48	0:02:05	0:04:05	0:12:12	3	Chesapeake Bay
KMOTXT1C	00000075	0:00:40	0:01:54	0:02:06	0:04:06	0:12:15	3	Chesapeake Bay
KMOTXT1C	00000074	0:00:40	0:01:51	0:02:08	0:04:08	0:12:18	3	Chesapeake Bay
KMOTXT1C	00000077	0:00:40	0:01:57	0:02:09	0:04:09	0:12:21	3	Chesapeake Bay
KMOTXT1C	00000076	0:00:40	0:01:54	0:02:11	0:04:11	0:12:24	3	Chesapeake Bay
KMOTXT1C	00000079	0:00:40	0:02:00	0:02:12	0:04:12	0:12:27	3	Chesapeake Bay
KMOTXT1C	00000078	0:00:40	0:01:57	0:02:14	0:04:14	0:12:30	3	Chesapeake Bay
KMOTXT1C	00000081	0:01:20	0:02:03	0:02:15	0:04:15	0:12:33	3	Chesapeake Bay
KMOTXT1C	00000080	0:00:40	0:02:00	0:02:17	0:04:17	0:12:36	3	Chesapeake Bay
KMOTXT1C	00000083	0:01:20	0:02:06	0:02:18	0:04:18	0:12:39	3	Chesapeake Bay
KMOTXT1C	00000082	0:01:20	0:02:03	0:02:20	0:04:20	0:12:42	3	Chesapeake Bay
KMOTXT1C	00000085	0:01:20	0:02:09	0:02:21	0:04:21	0:12:45	3	Chesapeake Bay
KMOTXT1C	00000084	0:01:20	0:02:06	0:02:23	0:04:23	0:12:53	3	Chesapeake Bay
KMOTXT1C	00000087	0:01:20	0:02:12	0:02:24	0:04:24	0:12:56	3	Chesapeake Bay
KMOTXT1C	00000086	0:01:20	0:02:09	0:02:26	0:04:26	0:12:59	3	Chesapeake Bay
KMOTXT1C	00000089	0:01:20	0:02:15	0:02:27	0:04:27	0:13:02	3	Chesapeake Bay
KMOTXT1C	00000088	0:01:20	0:02:12	0:02:29	0:04:29	0:13:05	3	Chesapeake Bay
KMOTXT1C	00000091	0:01:20	0:02:18	0:02:30	0:04:30	0:13:08	3	Chesapeake Bay
KMOTXT1C	00000090	0:01:20	0:02:15	0:02:32	0:04:32	0:13:11	3	Chesapeake Bay
KMOTXT1C	00000093	0:01:20	0:02:21	0:02:33	0:04:33	0:13:14	3	Chesapeake Bay
KMOTXT1C	00000092	0:01:20	0:02:18	0:02:35	0:04:35	0:13:17	3	Chesapeake Bay
KMOTXT1C	00000095	0:01:20	0:02:24	0:02:36	0:04:36	0:13:20	3	Chesapeake Bay
KMOTXT1C	00000094	0:01:20	0:02:21	0:02:38	0:04:38	0:13:23	3	Chesapeake Bay
KMOTXT1C	00000097	0:01:20	0:02:27	0:02:39	0:04:39	0:13:26	3	Chesapeake Bay
KMOTXT1C	00000096	0:01:20	0:02:24	0:02:41	0:04:41	0:13:32	3	Chesapeake Bay
KMOTXT1C	00000099	0:01:20	0:02:30	0:02:42	0:04:42	0:13:35	3	Chesapeake Bay
KMOTXT1C	00000098	0:01:20	0:02:27	0:02:44	0:04:44	0:13:38	3	Chesapeake Bay
KMOTXT1C	00000100	0:01:20	0:02:30	0:02:47	0:04:47	0:13:41	3	Chesapeake Bay