Port Tariff Evaluation

John H. Arnold

August 1987

Technical Paper

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First Printing August 1987

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John H. Arnold prepared this document while a consultant to the World Bank, Transportation Department.
ACKNOWLEDGMENT

This paper is a derivative, albeit a loose one, from the works of Esra Bennathan, who continues to provide clarity in a subject which shouldn't be as confusing as it is. John Lethbridge, Ports and Aviation Advisor, was responsible for the inclusion of this paper in the Ports Unit's FY87 work program and for seeing it through to publication. Three reviewers contributed to the final form of this document. The comments of Hans Peters and Lance Morrel provided guidance in simplifying and clarifying the presentation. Ian Heggie suggested the overall format for this paper and the companion piece on the PORTARIF program. Errors and omissions remain the responsibility of the author who would be grateful to anyone willing to point them out.
EXECUTIVE SUMMARY

This paper is a continuation of an earlier study on the way in which port managements prepare their tariffs. That study noted that the principal considerations in the tariff design process were the port's overall financial goals, the charges levied in nearby ports, and the discipline provided by competition with other ports, services and routes. The changes in port tariffs over time were observed to be of two types. The first involved a uniform adjustment in the tariff items, usually on a percentage basis, to reflect increases in costs. The second involved a gradual evolution in the format of the tariff through changes in specific items, generally in response to specific market conditions. What appeared to be missing in the tariff design process was a procedure for defining the pricing objectives to be met by individual tariff items (or categories of charges) and for modifying the tariff items to better meet those objectives. This paper attempts to develop such a procedure and a companion paper will present a computer program to assist in implementing this procedure.

While the economic theory of cost-based port pricing is well established, there has been considerable difficulty in putting this theory in to practice, especially the implementation of marginal cost pricing as a basis for setting tariffs. The principal improvement in the port pricing activity over the last two decades has been the widespread introduction of cost-center accounting systems. Although this system tends to aggregate costs by cost center rather than by activity, it provides a much better basis for evaluating costs than the previous departmental accounts. Unfortunately, the additional data provided by these systems have not always been used to improve the design of port tariffs.

This paper seeks to define a procedure for tariff evaluation which takes advantage of the capabilities of cost-center accounting systems while introducing some of the insights from economic theory. This procedure draws on two sources of information in addition to the accounting data and associated financial objectives of the port. The first is the port's operational data which is linked to objectives regarding the use of its facilities and equipment. The second is its marketing data which is linked to the port's objectives concerning the traffic to be attracted to the port.

The integration of the financial, operational and marketing objectives is accomplished through an iterative process in which changes are proposed based on one set of objectives and then reviewed against the other sets of objectives. The procedure begins with changes to individual tariff items so as to meet specific pricing objectives and then integrates these changes to determine their combined effect on cost center or port-wide objectives.

This paper presents an outline of the procedure along with some examples drawn from different ports. The assumptions underlying this procedure are presented in the first chapter. The following chapter describes some of
the more important considerations in developing this procedure. The third chapter presents the procedure as a series of steps in an iterative process of tariff revision and review.

This outline is not meant to produce a definitive procedure. The procedure applied by a specific port would depend very much on the services provided by that port, the sophistication of the accounting, operations and marketing information generations by the port, and the flexibility permitted to the port management when designing its tariff. As such, a unique procedure must be developed by each port management.
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GLOSSARY

1. Port Tariff - the port tariff is a collection of charges which are levied for individual services and resources provided by a port. The Port Tariff can include all of the tariffs levied by a port or tariffs for a specific port facility, e.g. the Container Terminal.

2. Tariff Categories - The different categories of charges in a port tariff e.g. berthage, port dues, wharfage, etc. The tariff categories included in a port tariff depend on the services provided by the port as well as traditional charging practices. Each tariff category can contain one or more tariff items.

3. Tariff Items - the basic components of a port tariff which state how a charge is computed for a specific vessel or cargo, e.g. Port Dues for vessels over 10,000 GRT, Wharfage for baled cotton, Storage for empty containers, etc. A tariff item contains a unit rate and a charging formula, and may also contain a condition formula.

4. Basic rate - a unit rate defined in monetary terms which is used to compute the charge for a specific tariff item.

5. Charging Parameters - The units used when computing the charges levied in the tariff items. These units describe the vessel, the cargo and the amount of service or resource used. Typical charging parameters are GRT, LOA (Length Overall), Berth-hours, Port-Days, FCL containers

6. Charging Formula - The formula contained in a tariff item which is used together with the basic rate to compute the charge for a specific service or resource. The formula may contain one or more charging parameters, e.g. (LOA) x Berth-hours, Cargo tonnes x Days-In-Storage.

7. Condition Formula - Many tariff items are applied only under certain conditions. These conditions are commonly presented as numerical limits on a Charging Parameter or a formula made up of charging parameters, e.g. Days-in-Storage > 3.0 or GRT < 5000.

8. Units of Measure - The units used to measure quantities, volumes, time, etc. The basic units are either metric or English.
CHAPTER I

INTRODUCTION

The design and revision of port tariffs is often performed in an informal and intuitive manner. Although several efforts have been made to develop a more structured approach, these have had only a limited impact. The World Bank has participated in these efforts directly in the context of its lending program for port development and indirectly through a continuing review of port pricing practices.

The design and revision of port tariffs requires four types of information:

1. the costs to the port for providing services,
2. the sensitivity of the port users to changes in port charges,
3. the level of utilization of port resources, and
4. the financial objectives of the port.1

The first of these is obtained from the port’s budgeting and accounting activities. The second is collected informally through the contacts between the port management and the shipping community and in some cases through more formal marketing activities. The third is obtained from the Traffic Department statistics. The fourth is determined by the port management often with the input of the central government.

This paper presents a structured approach for integrating the four types of information into an iterative process of tariff evaluation and revision. This approach allows a port management to modify individual tariff items and to avoid the common expedient of adjusting blocks of the port tariff by a constant percentage. The essential element in this process is the PORTARIF computer program which allows the user to quickly assess the effects of changes in individual port charges on port revenues, at various levels of aggregation.

The structured approach involves three types of analysis: financial, operational and marketing. The first compares the costs of providing port services with the revenues obtained for these services. This analysis incorporates the port’s objectives with regards to the financial performance of the individual port activities and the port as a whole. The second considers the level of use of existing resources and suggests changes in the format and rates so as to promote more efficient use of both over and under-utilized services. The third considers the effects of changes in port charges on the demand for the port’s services. This analysis incorporates the objectives of the port management with regards to maintaining existing traffic and developing new business.

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1 These three types of objectives are discussed in greater detail in a companion paper, Port Tariffs: Current Practices and Trends.
The structured approach involves five steps.

First, it divides the tariff items into groups according to what service is being charged for.

Second, it divides the port's costs into fixed and variable costs. and the port tariff into demand-based and cost-based tariff items.

Third, it compares the charges from these tariff items with the costs to the port of providing the services as well as with the price of competing services.

Fourth, the results of these comparisons are measured against the financial, operational and marketing objectives which the tariff is meant to achieve and recommendations are prepared as to how these tariff items should be modified to better meet these objectives.

Fifth, each tariff item is modified on a trial-and-error basis with different proposals evaluated to determine if they fulfill the objectives for that specific tariff item.

Sixth, the effects of the changes in individual tariff items are integrated to see if they meet the broader revenue objectives for the specific port activities and for the port as a whole.

This approach can be used to prepare the periodic revisions of the port's tariff which are undertaken because of changes in port costs, in the demands for port services and/or in the competitiveness of the market served. The approach can also be used to design tariff items for new services or for new types of demand for existing services.

The PORTARIF computer program which is included as part of this structured approach is a general purpose utility for tariff evaluation. It accepts data on the demand for port services and on the structure of the port tariff and computes the expected revenues. Modifications to the demand or to the structure of the tariff can be introduced through a simple edit procedure and the resulting changes in port revenues are calculated automatically. This program was developed for use on a personal computer and is not meant to supercede the computerized revenue accounting systems currently in use in larger ports. Rather it provides a tariff analysis capability for ports which do not have such a system or which are unable to modify their system to perform the procedures described in this report.
Assumptions

The structured approach presented in the first two chapters of this report is based on some assumptions which are not always accepted by port managements. Since earlier studies have presented arguments in support of these assumptions, this paper will only summarize these assumptions.

The first assumption is that the port is responsible for the design and enforcement of its tariff. In many countries, the central government must approve changes in a port's tariff and may request modifications of specific charges, but it remains the responsibility of the port managements to propose tariff modifications for the approval of the government. In these situations, the structured approach will enable the port management to develop a defendable tariff. In other countries, the Ministry of Transport plays a more active role in the design of port tariffs and, in some cases, prepares a single tariff to be used by all national ports. This paper does not attempt to argue the liabilities of such an approach but it should be noted that a port which does not exercise control over both its costs and its prices is unlikely to achieve efficient use of its resources. The structured approach can be applied in these situations but the data used would have to be aggregated for all ports in the country.

The second assumption is that the demand for port services is sensitive to changes in prices so that ports must consider the reactions of their port users to changes in tariffs. Many port managements consider their traffic as captive in the sense that this traffic does not have alternative facilities or routes. Clearly, a large proportion of port's traffic may be insensitive to changes in port charges assuming that these changes remain within a certain range. However, trading relationships are established assuming certain costs for transportation and the marginal trader will always be sensitive to a change in this cost. Port managements recognize this sensitivity on an informal basis. They usually consult with the shipping community before proposing changes in their tariffs and they are often willing to negotiate an adjustment in rates where a significant part of the shipping community is in opposition. Awareness of this sensitivity is greatest in ports where the management is seeking additional traffic and where there is a high level of interport competition. The structured approach incorporates this sensitivity as part of its marketing analysis.

The third assumption is that the setting of the charges for port services should be related to the costs of providing these services. The arguments for a cost-based tariff have their roots in both economic and management theory. From an economic perspective, the efficient allocation of resources requires a pricing system which ensures that the port users are willing to pay the costs of the resources that they use. From a management perspective, a pricing system which ties costs and prices together requires the management to control its costs while maintaining its level of service if it does not want to increase prices and/or lose market share. While many port managements acknowledge the importance of the concept of cost-based tariffs, few are willing to make the necessary
changes to implement this concept. The structured approach incorporates the cost-based pricing strategy as part of its financial analysis.

The fourth assumption is that the port uses a two-part pricing strategy in which those tariff items levied for the use of specific resources are designed so that the revenues will cover the variable costs of these services while the remaining tariff items are designed to produce sufficient revenues to cover the port's fixed costs. This approach has a distinct advantage over the more commonly used method of designing the tariff items so that the revenues from each service will cover the fully-allocated costs for that service. Because the method of allocating fixed costs to a service is arbitrary, the fully-allocated cost approach produces prices which discourage some port users who can pay for the service but not the overhead charge while allowing other users to pay much less for a service than they would otherwise be willing to pay. The structured approach maintains the separation between the port's fixed and variable costs and the corresponding separation between the tariff items levied for the use of specific services and those levied for access to the port and its facilities. The charges for the service are based solely on the variable cost of providing these services. The charges for access to the port and its facilities are based on the overall revenue objectives of the port and on the sensitivity of different categories of users to changes in these charges.

The fifth assumption is that the port should be self-sufficient. Its revenues should cover its costs to operate, maintain, renew and, when necessary, expand its facilities and equipment. The criterion of self-sufficiency should apply not only to the port as a whole but to the individual activities of the port such as cargo handling, storage, etc. Many ports use a cost-based accounting system in which distinct service centers are set up for each port activity. The costs and revenues allocated to each service center are compared to identify deficit and surplus situations. However, only infrequently are the results used to adjust the tariff items so that the individual activities will be self-sufficient. Instead, cross-subsidies are accepted as a necessary condition of doing business. One reason that cross-subsidies appear unavoidable is that the port managements are making an incorrect comparison between the revenues from a port service and the fully-allocated cost of that service rather than the costs actually incurred in providing the service, i.e. the variable costs. The structured approach assumes that separate tariff items are used to recover the fixed and variable costs, therefore the perception of cross-subsidization is greatly reduced.

The final assumption is that the degree of tariff analysis required for a port will vary with:

1. the diversity of port users,
2. the volume and diversity of traffic handled,
3. the diversity of services provided,
4. the extent of the port management's control over the allocation of resources and the provision of services within the port
5. the level of sophistication of the port’s accounting and budgeting activities, and
6. the degree of competition faced by the port.

This report presents an approach for use by port managements when evaluating and modifying their tariffs. The same approach can be used by Bank project staff in preparing terms of reference for the development of port accounting and management information systems. The accompanying PORTARIF program can be used by the Bank staff to perform the revenue analysis for port investments, especially where tariff revisions are under consideration.

This report describes the structured approach while a companion paper describes a computer program, PORTARIF, for use with this approach. The next chapter describes the basic considerations and activities involved in evaluating alternative port tariffs. The third chapter develops the step-by-step procedure for performing this evaluation. This report is intended to provide guidelines for implementation of this approach. The presentation is relatively detailed and reflects the level of analysis which would be performed by a medium-sized port. The individual procedures can be simplified to meet the needs of smaller ports.

This approach complements the current effort by ESCAP to develop a standard format for port charges. Their effort identifies the appropriate charging units for each port service in an effort to standardize the format of international port tariffs. The structured approach can be used to develop the rates which a port would apply after it has adopted these standard charging units. Also the PORTARIF program allows the user to compare port tariffs in situations where the ESCAP format has not been adopted.

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2 Model Port Tariff Structure, First and Second Interim Reports, ESCAP, Bangkok, 1987
There is no standard procedure for tariff analysis just as there is no standard port. However, there are a common range of issues and objectives which are considered by most port managements when preparing their tariffs. The tariff evaluation procedure developed in this report addresses these issues and objectives in a structured approach. It is presented in outline form to allow for the diversity of the activities and the management structures of the port's in which it would be applied.

The process of tariff design and revision is generally performed at an aggregate level because of the level of effort required to evaluate individual tariff items and because of the lack of a rationale for making these evaluations. The procedures for tariff analysis outlined below provide such a rationale and the PORTARIF computer program presented in Part II reduces the level of effort required.

This approach does not provide a formula for calculating the precise rates to charge, but rather it produces recommendations for adjustments in individual tariff items. These involve not only adjustments in the rates charged but also changes in the parameters used to compute the charges. The individual recommendations can then be tested in different combinations to determine how well they meet the port's objectives. Recommendations are also produced concerning the modifications of the structure of the tariff, i.e. which charges are to be included, combined or eliminated.

This approach can be adjusted to the amount of information and trained staff available for the evaluation. The availability of data depends on three factors: the range and extent of the port's activities, the degree to which that management uses financial, marketing and performance data in controlling its on-going activities and the level of automation of the port's data collection and processing activity. Since the availability of trained staff is invariably a constraint, the PORTARIF program presented in Chapter III has been designed to increase the productivity of that staff when evaluating proposed changes in the tariff.

II.1 Basic Procedure

The techniques for tariff evaluation presented in this report are familiar to most port managements. These techniques are organized around a port's financial, marketing and operational objectives. Although all three types of objectives when evaluating changes in a tariff, the priorities given to these objectives are not always consistent and the evaluation is often visceral rather than analytical.

The goal of this report is to introduce a more structured approach so as to produce more consistent and effective results. The first uses a port's financial objectives to evaluate the differences between the revenues from
the port’s tariff and the expenditures for the port’s operations, maintenance, future investments and other financial obligations. The second analysis uses a port’s operational objectives to appraise the effects of individual tariff items on the level of use and the productivity of the port’s services and resources. It uses a port’s marketing objectives to assess the effects of port charges on the shipping industry behavior as well as on the volume of port traffic. These evaluations are meant to be complementary. The amount of effort spent on each will vary with the type of services offered by a port and the competitive environment in which that port operates. A flowchart for the structured approach is shown in Figure II.1.

II.2 The Two-Part Tariff

The tariff evaluation procedure is based on a two-part pricing strategy, which divides the tariff into two categories: those tariff items which cover the variable costs associated with the use of port services and those which cover the fixed costs associated with general maintenance and operation of the port. This is the most basic pricing strategy. The first category of tariff items levies charges based on the quantity of services used while the second category levies charges based on the characteristics of the vessel or cargo using the port. Despite the simplicity of this concept, the distinction between the two categories has often been lost or obscured as port tariffs have evolved.

The objectives used to evaluate tariff items are different for these two categories. Those tariff items which are levied for the use of specific services should generate revenues equal to the variable costs of providing these resources. In this way, the port users will request only those services for which they are willing to pay the added cost of providing these services. These tariff items will be referred to as cost-based.

The remaining tariff items are levied for access to the port and its services, rather than for the use of specific services. These tariff items should generate sufficient revenues to cover the port’s fixed costs and to meet its financial requirements. They should be designed according to the ability of the user to pay. These tariff items will be referred to as demand-based.

The cost-based tariffs are evaluated by using financial analysis to determine whether the revenues from these tariff items cover the variable costs for the resources being offered. The demand-based tariff items are evaluated using marketing analysis to determine the effect of changes in

3/ The definition of the cost to be used for this first category of tariff items has been a sticking point. Clearly the cost should be based solely on the variable cost rather than on some arbitrary combination of fixed and variable costs defined as the "fully-allocated" cost. From the point of view of economic efficiency, the marginal cost should be used, but the closest approximation that cost accounting systems can produce is the variable cost.
Figure II.1
The Structured Approach to Tariff Evaluation

Original Port Tariff

Projected Demand

PORTARIF program

Revenue Estimates

Financial Objectives

Financial Analysis
- port-wide
- by activity
- by tariff item

Recommended changes in cost-based tariffs items

Port Fixed and Variable Costs

Operational Objectives

Operations Analysis
- congested facilities
- under-utilized facilities

Recommended changes in tariff items affecting operating efficiency

Port Performance Statistics

Marketing Objectives

Marketing Analysis
- local competition
- interport and intermodal competition
- international trade competition

Recommended changes in demand-based tariff items

Expected change in demand

Sensitivity of Port Users to Changes in Costs and Level of Service

Relative Costs for Competitors' Services

Competitors' Level of Service

Recommended changes in demand-based tariff items

Expected change in demand
charges on the demand for these services.

An example of the classification of tariff items into these two categories is shown in table II.1 for a generic port tariff. Some of the services listed in this table have a two-part tariff. For example, Pilotage and Towage have a demand-based GRT charge to cover the fixed cost for access to these services and a cost-based hourly charge to cover the variable costs for the use of the pilots, pilot boats, tugboats, and crews. Other services have a single tariff item which can be used either as a cost-based or a demand-based charge. For example, the LOA-Hour charge for Berth Hire can be used to cover either the fixed costs for the facility or the variable charge associated with congestion. The same applies for the Tonne-Day charges for transit storage and the Area-Day charges for open storage.

II.3 Measuring Variable Costs

The two-part pricing strategy requires the separation of fixed and variable costs. In principle, it is easy to differentiate between costs which vary with the level of activity and those which do not. In practice, most accounting systems fail to make this distinction in a consistent manner. Furthermore it is not possible to make a general catalog of port costs broken down into these two categories since the distinction between fixed and variable costs depends on the extent to which a port controls the resources used to provide services. For example, one port may provide all of the cargo-handling equipment used on the berth while another port may allow the stevedoring companies to provide some or all of this equipment. It also depends on the contractual agreements and marketing constraints limiting the ability of the port to acquire or dispose of resources, including labor. For example, one port may hire labor and equipment on a short term basis and treat them as variable costs while another may contract for the equipment and labor and treat them as a fixed cost in the short run but as a variable cost for periods greater than the life of the contract.

The latter situation raises one of the most basic questions regarding the identification of variable costs - Variable over what period of time? For the current analysis, the period of one month has been chosen to conform with the usual frequency of accounting reports. The variable costs could then be identified on an aggregate level by comparing the costs of providing a service with the level of use of that service on a monthly basis. A more exact method of estimating variable costs would be to identify the individual costs which would increase if the level of use of that service rose by 10%-20% in one month, or alternatively, those costs which would be avoided if the level of use fell by 10%-20%.
## Table II.1

### Breakdown of Typical Tariff Categories

<table>
<thead>
<tr>
<th>Activity</th>
<th>Tariff Category</th>
<th>Charging Parameter</th>
<th>Cost-Based</th>
<th>Demand-Based</th>
</tr>
</thead>
<tbody>
<tr>
<td>Navigation</td>
<td>Conservancy</td>
<td>GRT</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Draft</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Port Dues</td>
<td>GRT</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Pilotage</td>
<td>GRT</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Tug Services</td>
<td>Hours</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Mooring/Unmooring</td>
<td></td>
<td>GRT</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Hours</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Berth</td>
<td>Berth Hire</td>
<td>GRT</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Hours</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>LOA-Hours</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Wharfage</td>
<td>By Commodity</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tonnes</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>TEU</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Utilities</td>
<td>Amount used</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Cargo Operations</td>
<td>Cargo Handling</td>
<td>by Movement</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>&amp; Cargo Form</td>
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<tr>
<td></td>
<td>Tonnes</td>
<td></td>
<td>X</td>
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<tr>
<td></td>
<td>TEU</td>
<td></td>
<td>X</td>
<td></td>
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<tr>
<td></td>
<td>Gang-hours</td>
<td></td>
<td>X</td>
<td></td>
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<tr>
<td></td>
<td>Hours</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Storage Operations</td>
<td>Transit Storage</td>
<td>Tonnes-Days</td>
<td>X</td>
<td>X</td>
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<td></td>
<td>Open Storage</td>
<td>Area-Days</td>
<td>X</td>
<td>X</td>
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<td>Warehousing</td>
<td>Area-Months</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Packing/Unpacking</td>
<td>Tonnes</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Receipt/Delivery</td>
<td>Tonnes</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

Source: basic structure from ESCAP model tariff as revised for purposes of this report
If the latter criteria is applied then cost categories would usually be categorized as fixed and variable as shown below.

<table>
<thead>
<tr>
<th>Cost Category</th>
<th>Variable</th>
<th>Fixed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utilities and Consumables</td>
<td>for vessels, cargo-</td>
<td>for offices</td>
</tr>
<tr>
<td></td>
<td>handling equipment</td>
<td></td>
</tr>
<tr>
<td>Labor (wages, salaries, benefits)</td>
<td>temporary workers</td>
<td>employees</td>
</tr>
<tr>
<td>Cargo-handling equipment</td>
<td>hired</td>
<td>owned</td>
</tr>
<tr>
<td>Facilities</td>
<td>repairs, maintenance</td>
<td>owned, leased</td>
</tr>
<tr>
<td></td>
<td>based on operating hours</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>congestion</td>
<td>security</td>
</tr>
<tr>
<td></td>
<td></td>
<td>debt service</td>
</tr>
</tbody>
</table>

The last item in the variable column, congestion, refers to the costs incurred when facilities or equipment are over-utilized and significant delays are experienced by the users. The incorporation of the congestion costs into the charges levied by the port serves two purposes. First it discriminates against the inefficient port user (or alternatively encourages more efficient use of port services); while second, it generates revenues with which to fund the procurement of the additional resources needed to reduce the congestion. Although congestion costs are difficult to measure, most ports keep records on the delays experienced and on the period of time required to move cargo through the port.

II.4 Demand-Based Pricing

The use of demand-based pricing is commonly associated with the discriminatory pricing strategies which seek to maximize profit. For ports, this pricing strategy has the more limited objective of generating revenues which will be sufficient to meet the port's overall operating costs including an acceptable rate of return on assets. The charges to different categories of port users are based on their sensitivity to changes in port charges. The port users least sensitive to an increase in port charges would have the highest demand-based tariffs and those most sensitive to port charges would have the lowest demand-based tariffs. 4/ 4/ A general approach is that the demand-based charges would be proportional to the port user's inverse elasticity of demand with respect to price.
The sensitivity of users to port charges will depend on the type of vessel calling at the port, the type and volume of cargo handled and the extent to which the ports services are used. These three factors imply that demand-based tariffs should be included for each service and differentiated by vessel type and cargo type. The resulting port tariff would be relatively complex and, as a result, would be expensive to enforce and difficult to evaluate and revise. A simplified set of vessel and commodity categories will therefore be introduced.

II.5 Sampling Demand for Port Services

The structured approach for tariff evaluation requires sufficiently detailed information on the demand for port services to allow the revenues from each tariff item to be estimated separately. The port’s traffic statistics and future traffic projections usually lack this level of detail, therefore more detailed information must be obtained from the ship’s bills and the invoices of the shippers and consignees. In order to simplify this data collection process, a representative sample of port users can be selected by:

First, categorizing the types of ships calling at the port and the types of cargoes moving through the port,
Second, selecting typical ships and cargoes within each category,
Third, identifying those parameters which describe the use of port services by these vessels and cargo, and
Fourth, the number of annual calls made by the vessels and volume of traffic for each cargo category.

The procedure for selecting typical ship’s depends on the accessibility of billing information. Where computerized data processing is available, all the vessels in a category can be represented using either the parameters for the median vessel or the average values for the parameters of all vessels. If manual processing of records is required, then the expertise of the traffic department can be used to select representative vessels in each category.

The representativeness of the resulting vessel sample can be checked by applying the current tariff to this sample and observing whether the estimated revenues agree with the actual income from the services to the vessels. Where they do not, it may be necessary to use a larger sample.

The procedures for selecting typical cargoes is less difficult since the information need be categorized only according to the major commodity groups. These commodity groups should correspond to those used in the port tariff. If parts of the port tariff include a detailed differentiation by commodity type, then it is desirable to aggregate these commodities into a few representative commodity groups. The parameters describing the total volume of each commodity group, their average consignment size and storage time, and other data required to compute the cargo-related charges are obtained from the port’s billing records. Where the organization of the billing information does not permit statistical
analysis to be performed, typical invoices can be selected for the major commodities. Once a sample has been selected, then its representativeness can be tested by estimating the revenues from cargo-related charges and comparing them with the actual revenues.

Once representative samples of the vessels and cargoes have been produced, adjustments can be made to reflect the projected changes in the distribution of vessels calling at the port, in the volumes of the different cargoes passing through the port, and in the other parameters describing the demand for port services. The revised sample can then be used to estimate the change in port revenues resulting from changes in individual tariff items.

II.6 Competition

The competitive environment in which a port operates has an important impact on the design of tariffs. Indeed, the principal focus of the marketing analysis is to measure the effects of this competition on the relationship between port charges and the level of use of port services. Competition arises not only in the competition between ports and in the more general competition associated with international trade, but also in the often-ignored competition between alternative services within a port and between the port and the local private sector.

Interport competition commonly occurs where ports have overlapping hinterlands or where ports compete for direct services rather than feeder services from transhipment ports. The competition for transit cargo is perhaps the most extreme example of interport competition. Its effect on tariffs can be seen in the frequent adjustments in the tariffs of the competing transhipment ports of Singapore, Kaoshiung, and Hong Kong. Only slightly less intense is the interport competition for non-transhipment cargoes which exists among the West European ports and among the Atlantic and Gulf ports in the United States. These ports also evaluate the rates charged at competing ports when proposing changes in their own tariff.

Intra-port competition occurs where comparable services are available within a port but at significantly different prices. For example, the differences in the charges for transferring cargo across the wharf or via lighters in the stream can have a significant impact on the use of a port’s berths. Similarly, the charges for the use of portal cranes can have a significant effect on the use of ship’s gear and the resulting throughput of the berths. Perhaps the most important form of intra-port competition arises where a commodity can be shipped in different forms each with a different handling rate and port charges. The choice of cargo form is not limited to bulk, breakbulk, and containers but may also include pre-slung, palletized, shrink-wrapped, ICB’s, etc. Intra-port competition requires that the adjustments of one set of tariff items takes into account the charges for the competing services within the port.
Competition may also exist where the private sector provides services comparable to those provided by the port. For example, storage and cargo services are frequently provided by private companies operating near to the port. Another example is the provision of hired equipment by the private sector to substitutes for equipment which is provided by the port. In both cases, the prices set by the private sector will have a significant effect on the rates which the port can charge.

The competitiveness of international trade is well known. It is significant for exported commodities where there are a large number of potential suppliers and a limited demand. It is also significant for imported commodities where there are close substitutes available either from domestic sources or through import. The sensitivity of port users to the competitiveness of international trade can limit a port's ability to increase charges.

For each service provided by a port, there is usually some form of competition. The effects of this competition should be treated explicitly when evaluating changes in port charges. The analysis of the port's competitive position must consider not only the relative charges for similar services but also the level of service, e.g. vessel turnaround time and cargo transit time, offered by the competitors. The type of analysis used to evaluate different tariff items is shown in Table II.2 as a function of the type of competition and the category of tariff item.

II.7 An Example of the Tariff Evaluation Procedure

In order to understand how the structured approach incorporates the elements discussed so far, it is instructive to begin with a simple example. Assume that a port handles only one type of cargo at three berths and the only service provided is to transfer the cargo directly between the vessel and land transport. The port tariff includes three charges; port dues, berthing and wharf handling. The Port Dues are $150 per 1000 GRT. The Wharf Handling Charge is $3 per metric ton of cargo. The Berthage is $.025 per GRT per day at the berth.

The structured approach begins with a financial analysis performed by the Accounting Department. The port has two financial objectives:

1. the port should meet all costs, including planned renewals, from its revenues;
2. the individual port services should be self-supporting.

A comparison by the port's accounting department of the port's total revenues with its total costs reveals that an increase in revenues of 25% is required if the port is to continue operating without a subsidy and to maintain its facilities in good working order. Next a comparison is made between the revenues and costs of servicing the vessels which determines that the revenues from berthing and wharfage are not sufficient to cover the costs for the cargo handling labor and equipment as well as the costs of the maintenance of the berth (including provisions for eventual renewal). Finally a more detailed analysis of the costs and revenues
Table II.2

Analysis Used As a Function of the Type of Competition

| Type of Competition with: | Type of Tariff Item
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>local private sector</td>
<td>financial demand-based marketing</td>
</tr>
<tr>
<td>other facilities in port</td>
<td>operational marketing</td>
</tr>
<tr>
<td>other ports and routes</td>
<td>marketing</td>
</tr>
<tr>
<td>other trades and commodities</td>
<td>marketing</td>
</tr>
</tbody>
</table>

associated with wharf handling reveals that the revenues from the wharf handling charge cover only 75% of the variable costs for the labor and equipment used to handle the cargo. As a result of this financial analysis, it is recommended:

a. to increase the wharf handling rate by 1/3 to meet these direct costs.

b. to increase the berthing fee so that the combined revenues of berthing and wharf handling will cover the costs of wharf operations.

Next the Traffic Department conducts an operational analysis to determine the effects of the port tariff on achieving its objective of increasing throughput at the wharf without creating congestion. The analysis reveals several facts. First, the berths are congested and an adjustment of tariffs should be made to increase throughput by providing incentives for greater wharf handling productivity. Second, the larger vessels tend to have higher throughput per hour working at the berth because more hatches are worked simultaneously. Third, the charge per day at berth increases with the GRT but the throughput increases with the length of the ship so that the resulting berthing charge per ton of cargo unloaded is higher for larger vessels. Fourth, many of the vessels do not work the more expensive third shift but instead pay the additional costs for the berthing and for the added time the vessel spends in port. Fifth, an increase in berthing rates is expected to have little impact on the volume of cargo worked in the stream since the productivity at the berth is

5/ In this case, the variable costs include the direct labor costs and the fuel, repair and maintenance costs for the cargo-handling equipment.
significantly higher. As a result of these findings, the following changes are recommended:

c. the berthage charge be levied based on vessel length and hours at berth rather than GRT and days at berth;
d. the berthage rate be set so that the resulting charge is high enough to encourage more vessels to use the third shift.

The berthage charge could be set so that the additional revenue would provide all of the 25% increase in total revenues, but a lower charge would be sufficient to encourage greater use of the third shift.

Finally the port's Commercial Department prepares a marketing analysis. The port's marketing objective is to minimize the reduction in total cargo flow resulting from the increase in the port charges. The marketing analysis reveals that the required 25% increase in the average per-ton charge would reduce the volume of cargo handled through the port by a relatively small percentage since there is relatively little competition from other ports and the port's cargoes are not very sensitive to changes in transport costs. This analysis also indicates that the least reduction in demand would result from a combined increase in berthing and port dues. The analysis further points out that while the increase in wharf handling charge impacts all cargoes equally, the increase in port dues or berthing tends to discourage those larger vessels which carry relatively small consignments. As a result, berth throughput would be increased. Thus the final recommendations are to:

e. to increase the berthage charge the minimum amount required to induce an acceptable percentage of vessels to use the third shift;
f. to increase the port dues to generate the additional revenue required to meet the port's overall financial objectives after the wharf handling and berthage charges have been adjusted.

The port management accepts these recommendations and proposes to increase all three tariff items. A preliminary tariff revision is prepared and then evaluated. First, the expected port revenues are computed and compared with the port-wide costs, the wharf operations costs and the costs for the cargo handling to determine if the financial objectives are met. Second, the change in charges for typical port users are computed to determine what the likely effects would be on port operations. Third, the per-ton revenues are computed to determine the likely effect on the total demand for port services. The results of these examinations are then used to make further adjustments in the three tariff items. This process is repeated until the port management feels that an acceptable tariff has been developed.

Although this example is considerably simpler than the problems faced by port management's when revising their tariffs, it does demonstrate the interaction between the financial, performance and marketing objectives. This example has ignored the reactions of the local shipping and trading community (and of the government officials supporting their interests) to the proposed increases in port tariffs. Clearly this is an important
consideration for public ports. However, the port management should deal with this input only after it has analyzed its own financial and operational requirements and can present a justification for the proposed increases. If, in the final revision, political compromises must be made, then the port management is in a position to state what the cost of these decisions will be in terms of the port’s ability to operate and maintain its facilities.

II.8 Use of PORTARIF program

The PORTARIF program presented in a companion report is used to evaluate the proposed changes in the tariff items. It performs three types of calculations. First it computes individual ship’s bills. Second, it performs sensitivity tests on ship’s bills as a function of changes in the quantity of cargo handled, the productivity at the berth, the use of port resources, etc. Third, it computes revenues on a port-wide and a cost/service center basis for a given mix of vessels and cargo flows.

The calculations of individual ship’s bills are used to compare the revenues from the cost-based tariff items for specific port services with the variable costs for these services. These calculated bills are also used to compare the charges for selective port services with the cost of comparable services in the local private sector and in competing ports. Finally, these estimated ship’s bills are used to compute the per-ton cost for transferring different commodities through the port and to compare this cost with the delivered cost of these commodities.

The sensitivity tests are used to compare the changes in port charges as a result of changes in a typical vessel’s parameters including productivity at the berth. The computation of revenues on a port-wide and a cost/service center basis are used to evaluate the port’s ability to meet its financial objectives as a result of adjustments in individual tariff items.
CHAPTER III

THE PROCEDURE FOR TARIFF EVALUATION

Although the tariff structure in many ports is quite complex, the methods used to evaluate these tariffs tend to be relatively simple. Rather than analyze individual tariff items, port management separates the tariff items into a few categories and makes adjustments to the items in these categories by adding (or subtracting) a uniform percentage. Where adjustments are made in individual tariff items, these are generally introduced in response to specific requests from the port users.

The structured approach presented in this chapter is designed to look at the port tariff in greater detail. This approach involves two procedures, one for tariff evaluation and the other for tariff revision. The former has two phases. The first phase is a relatively standard analysis of the financial performance of the port when using the proposed tariff. The second phase is an evaluation of the individual tariff items which recommends changes in the individual tariff items which are consistent with the port's objectives.

III.1 Tariff Evaluation Procedure - Phase I

Most ports begin with some form of financial analysis as the basis for revising their tariffs. Often this analysis is simply an extension of the preparation of the annual budget, and the tariff adjustments are made to meet forecasted financial requirements. It begins with a breakdown of costs and revenues into specific categories and an evaluation of these costs and revenues according to specific criteria.

The structured approach performs the same type of analysis with two levels of aggregation as follows:

1. a port-wide analysis to determine if the tariff generates sufficient revenues to meet the overall financial objectives of the port and
2. an activity-by-activity analysis to determine the self-sufficiency of the individual port services.

The schematic breakdown of a typical set of accounts for these two levels of aggregation is shown in Figure III.1 for the revenues and in Figure III.2 for the costs.

The projections of the costs and revenues (from the existing tariff) are obtained from the annual budget, however, further analysis may be required to group these budget items according to the port activities and the tariff categories. The data on the services and resources used by the vessels calling at the port and by the cargo moving through the port are obtained from the traffic department for the resources used and from the billing department for the services received.
Figure III.1

Breakdown of Revenue Categories for Financial Analysis

--- PORT-WIDE
REVENUES

Port Dues
Pilotage
Towage
General Charge

--- REVENUES BY
ACTIVITY

Breakbulk Operations
Berthage
Wharfage
Wharf Handling Charges
Cranage

Container Operations
Dry Bulk Operations
Liquid Bulk Operations
Transit Storage
Warehouse Rental
Bunkers
Water, Utilities
Garbage Removal
## Figure III.2

**Breakdown of Cost Categories for Financial Analysis**

<table>
<thead>
<tr>
<th>Administration Department</th>
<th>&lt;--- PORT-WIDE COSTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ship Operations</td>
<td>&lt;--- COSTS/SERVICE</td>
</tr>
<tr>
<td></td>
<td>CENTERS</td>
</tr>
<tr>
<td>Breakbulk</td>
<td></td>
</tr>
<tr>
<td>Container</td>
<td></td>
</tr>
<tr>
<td>Dry Bulk</td>
<td></td>
</tr>
<tr>
<td>Liquid Bulk</td>
<td></td>
</tr>
<tr>
<td>Wharf Gangs</td>
<td></td>
</tr>
<tr>
<td>Breakbulk</td>
<td></td>
</tr>
<tr>
<td>Container</td>
<td></td>
</tr>
<tr>
<td>Dry Bulk</td>
<td></td>
</tr>
<tr>
<td>Liquid Bulk</td>
<td></td>
</tr>
<tr>
<td>Crane Operations</td>
<td>&lt;--- ACTIVITY</td>
</tr>
<tr>
<td>Breakbulk</td>
<td></td>
</tr>
<tr>
<td>Container</td>
<td></td>
</tr>
<tr>
<td>Dry Bulk</td>
<td></td>
</tr>
<tr>
<td>Liquid Bulk</td>
<td></td>
</tr>
<tr>
<td>Yard Operations</td>
<td></td>
</tr>
<tr>
<td>Breakbulk</td>
<td></td>
</tr>
<tr>
<td>Container</td>
<td></td>
</tr>
<tr>
<td>Dry Bulk</td>
<td></td>
</tr>
<tr>
<td>Liquid Bulk</td>
<td></td>
</tr>
<tr>
<td>Engineering Department</td>
<td></td>
</tr>
<tr>
<td>Breakbulk</td>
<td></td>
</tr>
<tr>
<td>Container</td>
<td></td>
</tr>
<tr>
<td>Dry Bulk</td>
<td></td>
</tr>
<tr>
<td>Liquid Bulk</td>
<td></td>
</tr>
<tr>
<td>Marine Services Department</td>
<td></td>
</tr>
<tr>
<td>Finance and Accounting Department</td>
<td></td>
</tr>
</tbody>
</table>
III.1.1 Port-wide Financial Analysis

The port-wide financial analysis is performed with different levels of rigor by all port managements as part of their annual budget review. This analysis determines whether the overall revenue generated by the port is sufficient to meet the port's financial objectives and, if not, how much additional revenue is required.

The port-wide financial objectives are frequently expressed in terms of general performance measures such as rate of return on net fixed assets, operating ratio and earnings before taxes. These are then determined by preparing pro forma Income and Expense statements and Balance Sheets using the existing or proposed tariff. The underlying objective of this effort is to insure that a port be financially self-sustaining.6f

This objective implies that a port's revenues be sufficient to cover:

1. the operating cost associated with providing an acceptable level of service to port users,
2. the costs of maintaining the port's facilities and equipment in good working order,
3. the port's debt service and other financial obligations, and
4. the additional funds needed to expand facilities or renew existing facilities as required to meet future demand.

An evaluation of a port tariff's ability to generate sufficient revenues to cover these costs requires more information than a simple estimate of the net income for the coming year. Because a port tariff is generally in effect for several years, the estimates of costs and revenues should be computed for at least the expected life of the tariff, allowing for the effects of inflation over that period.

Also the expenditures for repair and maintenance should be adjusted so that they are based not on historic averages but on the average annual expenditure required to maintain the port facilities and equipment in good working order.

Finally, and most important, an allowance should be made for future renewals and investments. The cost of renewals are normally accounted for by including the depreciation costs of existing assets, but this has proved to be an unreliable indicator of the costs for future renewals.7f

6 While this is admittedly not the objective of all ports, some form of minimum financial responsibility must be assumed when evaluating their tariffs.

7 Depreciation charges are usually based on the historical prices for assets that have relatively long productive lives and do not reflect the current cost for renewal of these assets. On the other hand, depreciation charges based on replacement costs are significantly higher (and raise
Because of the lumpiness of these investments, it is recommended that the cost for the renewals required over the next five to ten years be estimated in current prices and computed as an average annual cost. This average cost, adjusted for inflation, would then be included in place of the cost of depreciation in the Income and Expense statement.

An alternative to the adjustment of depreciation which has received increasing attention in recent years is the analysis of cash flow. If the schedule of future investments in renewals and new facilities is known, then an analysis of the port's cash flow (sources and applications of funds) can be prepared to determine if the port tariff will generate sufficient revenues to meet the port's debt service, pay its taxes and cover any other financial obligations without a significant decrease in working capital.

III.1.2 Financial Analysis by Activity or Facility

The second step in the financial analysis examines the relationship between the costs and revenues for the different activities performed in the port. These activities are defined to include separable, though not necessarily independent, port functions for which the revenues, expenditures and investments can be readily identified. These activities are usually distinguished by the facility used, by the form of cargo handled, by the nature of the cargo handling operation, or by the type of service provided. For a medium-sized port, these activities might include: pilotage, towage, mooring, berth operations for breakbulk, container, dry bulk and liquid bulk, open and closed transit storage (including receipt and delivery of cargo), warehousing, bunkering, provision of water and utilities and ship repair.

The basic financial objective guiding this stage of the financial analysis is that the revenues generated from each activity should be sufficient to cover the direct operating costs for that activity, to pay for the debt service associated with the equipment and facilities used to perform this activity and, where possible, to generate a surplus. This analysis is normally performed by ports whose accounting systems have cost centers that can be equated with individual activities, such as the system of cost centers shown in Table III.1. Since the more common situation is similar to that depicted in Figure III.2, the expenditures reported within the various cost centers have to be reallocated to determine the direct costs for each activity. While most port cost center accounts have separate cost-based tariffs to unacceptable levels) since they do not take into account technological obsolescence which might prevent these assets from being replaced or productivity gains which might mean that fewer assets need to be replaced to meet a fixed level of demand.

8 The direct operating costs for the activity, including both fixed and variable costs, but not general overhead costs for central administration or for maintenance of the entrance to the port.

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**Table III.1**

**Penang Port Cost/Service Centers**

- **Vessel Services**
  - Pilotage
  - Towage
  - Lighterage
  - Water Boats
- **Cargo Handling Services**
  - Berth Occupancy - by facility
  - Stevedores
  - General Cargo - by facility
  - Bulk Cargo - by facility
  - Containers - by facility
- **Administration**
- **Port Property**
- **Engineering** - by function
- **Ferry Services** - Revenues, Operations
- **Non-Operating** - Revenues, Costs

**Table III.2**

**Recharging System for Port of Karachi**

**Activity Centers**

<table>
<thead>
<tr>
<th>Department</th>
<th>Cargo Handling</th>
<th>Cargo Storage</th>
<th>Ship Movement and Services</th>
<th>Property Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Dep.Conservator</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Chief Engineer</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Chief M &amp; E Eng</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Stores</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Watch &amp; Ward</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Estates</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Planning &amp; Devel.</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Various</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Administrative</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

23
centers for pilotage, towage, mooring, utilities and storage, they frequently do not have separate centers for the different categories of cargo handled across the wharf.

If the port does not have a cost-center accounting system, then the port's activities can only be defined at a very general level such as vessel services, cargo handling, transit storage, warehousing, equipment hire and miscellaneous services. Even this breakdown may require special calculations involving recharging of the port's department-based cost accounts to the activity-based categories. Direct costs for labor and consumables as well as the costs for renewals can usually be reassigned to the individual activities, but the indirect costs for repair and maintenance must be reallocated to the activities using fixed percentages. The system of reallocation (recharging) used in the Port of Karachi is summarized in Table III.2.

Once the port costs have been differentiated according to activity, then the revenues must be similarly differentiated. For most port accounts, this is a relatively straight-forward procedure, but in some ports, the data from the Billing Department records have to be analyzed to perform this differentiation.

The recommendations that result from this stage of the financial analysis concern the adjustments in the block of tariff items pertaining to each activity so as to reduce any deficit. More precise recommendations can be introduced for those port activities which compete with services provided by the local private sector e.g. short-term storage, warehousing and equipment hire. For these services, the financial objective is to set rates which are competitive with the private sector provided that the resulting revenues are equal to or greater than the costs for providing the service.

A review of the rates charged by the private sector will indicate whether the port is pricing their service above, below, or comparable to the private sector. A comparison of the costs and revenues will indicate if each service which competes with the private sector is self-supporting. Finally a review of the utilization of these services will indicate whether there is congestion or surplus capacity at the current price. The recommendations would then be stated in terms of the adjustment of the port charges relative to the private sector prices.

III.1.3 Summary of Results

The first phase of the tariff evaluation accomplishes two things. First, it organizes the cost and revenue data according to the activities performed by the port. Second, it computes the port's revenue requirements for the port as a whole as well as for each of the activities.

While the potential for private sector competition exists for nearly all port services, only certain of these services will actually compete with private sector activities.
provided by the port. This analysis is performed primarily by the finance and accounting departments. The PORTARIF program can be used to estimate the port’s revenues grouped by activity when this information is not available from the port’s accounting and budgeting activities.

Up to this point, the tariff evaluation has followed traditional practices. The distinction between fixed and variable costs has been ignored. The effects of pricing on demand have not been treated explicitly. Most important, no attempt has been made to evaluate individual tariff items. Instead recommendations have been made for adjustments in broad categories of tariff items. These three points will be considered in the second phase of the evaluation.

III.2 Tariff Evaluation Procedure - Phase Two

The second phase of the tariff evaluation begins with the separation of the tariff into cost-based and demand-based tariff items for each service as discussed II.4 and the division of the costs for each port service into fixed and variable costs as discussed in II.3. 10/ Next the cost-based tariffs for specific services are related to the variable costs for those services. This categorization of tariff items and costs is a rather lengthy process. However, once it has been completed, the categorization can be applied with very little variation for tariff evaluations performed in subsequent years.

The breakdown of costs is very much dependent on the type of accounting system used by the port. No port has a pure cost accounting system which would identify fixed and variable costs. The closest to this ideal are those cost-center accounting systems which record costs in sufficient detail that a breakdown can be made into fixed and variable costs. The Penang Port accounts come reasonably close as shown in Table III.3.

Table III.3

<table>
<thead>
<tr>
<th>Fixed and Variable Costs For Each Cost Center - Penang Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salary, Wages, Benefits</td>
</tr>
<tr>
<td>Contract Labor</td>
</tr>
<tr>
<td>Machinery hire</td>
</tr>
<tr>
<td>Supplies</td>
</tr>
<tr>
<td>Depreciation</td>
</tr>
<tr>
<td>Repairs and Maintenance</td>
</tr>
<tr>
<td>Rents Payable</td>
</tr>
<tr>
<td>Other Direct Costs</td>
</tr>
<tr>
<td>Administration Expenses</td>
</tr>
<tr>
<td>Dredging (for Berth Occupancy Only)</td>
</tr>
</tbody>
</table>

10 Whereas the previous phase considered activities which may include one or more services, this phase focuses on individual services
For accounting systems which do not use cost centers or which report cost data in aggregate form, it is necessary to go back to the source documents to identify the fixed and variable costs. Alternatively, it may be possible to estimate the unit variable costs of the various inputs to a service and to multiply these by the quantity of inputs used. An example of this calculation is shown below.

Table III.4

Sample Cost Study For Wharf Handling

<table>
<thead>
<tr>
<th>Performance Data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Men per Gang</td>
<td>$N_1$</td>
</tr>
<tr>
<td>Average Gang Productivity per Shift</td>
<td>$T_1$</td>
</tr>
<tr>
<td>Number of Pieces of Equipment per Gang</td>
<td>$N_2$</td>
</tr>
<tr>
<td>Total Number of Pieces of Equipment</td>
<td>$N_3$</td>
</tr>
<tr>
<td>Projected Total Tonnage</td>
<td>$T_2$</td>
</tr>
</tbody>
</table>

Per Shift Variable Costs

Wages and Benefits per Shift incl. Overtime* | $W$
Equipment Running Cost | $C_1$
Equipment Repair | $C_2$

Equipment Fixed Costs per Piece Per Year

Depreciation | $C_3$
Maintenance | $C_4$
Insurance | $C_5$

Allocated Fixed Costs per Year

Departmental Admin | $C_6$
Central Admin | $C_7$
Property tax | $C_8$

Results

Variable Costs per ton handled

\[ N_1W + N_2(C_1+C_2) \]

\[ \frac{\text{------------------------}}{T_1} \]

Fixed Costs per ton handled

\[ N_3(C_3+C_4+C_5) + (C_6+C_7+C_8) \]

\[ \frac{\text{------------------------}}{T_2} \]

* Cargo-handling laborers are assumed to be regular employees but the assignment of these employees and the amount of overtime varies with the volume of traffic; the labor costs are therefore treated as variable costs.
The ability to estimate the revenues from individual tariff items or from general tariff categories depends on the level of detail in the accounting data. If the revenues cannot be disaggregated to this level, then they must be estimated using typical ship's bills for the ships in the representative vessel sample and typical shipper/consignee invoices for the principal cargoes.\(^\text{11}\)

The interrelation of costs and tariff items according to the type of service follows from the previous breakdown of costs and tariff items by type of service. An example of the relationship between cost centers and tariff categories is shown in Table III.5.

<table>
<thead>
<tr>
<th>Cost Center</th>
<th>Tariff Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilotage</td>
<td>Pilotage</td>
</tr>
<tr>
<td>Towage</td>
<td>Towage</td>
</tr>
<tr>
<td>Lighterage</td>
<td>Lighterage</td>
</tr>
<tr>
<td>Water Boats</td>
<td>Water</td>
</tr>
<tr>
<td>Berth Occupancy</td>
<td>Berth Occupancy</td>
</tr>
<tr>
<td>General Cargo</td>
<td>Wharf Handling - Breakbulk</td>
</tr>
<tr>
<td>Bulk Cargo</td>
<td>Wharf Handling - Bulk</td>
</tr>
<tr>
<td>Containers</td>
<td>Wharf Handling - Containers</td>
</tr>
<tr>
<td>Administration</td>
<td>Harbour Dues, General Charge</td>
</tr>
<tr>
<td>Port Property</td>
<td>Property Rentals</td>
</tr>
<tr>
<td>Ferry Services</td>
<td>Ferry Charges</td>
</tr>
</tbody>
</table>

Once the categorization is complete, then three types of analysis: financial, operational and marketing are used to evaluate the tariff items. The financial analysis is concerned with the port’s cost-based tariff items and variable costs. The operational analysis is concerned with the cost-based and demand-based tariff items but only for those services which are either under-utilized, or utilized to the point of congestion. The marketing analysis is concerned with the port’s demand-based tariff items and its fixed costs. Each analysis generates recommendations for changes in specific tariff items or categories.

\(^{11}\) Alternatively, the PORTARIF program can be used together with the representative sample of vessels and cargo to estimate these revenues.
III.2.1 Financial Analysis by Service

The financial analysis is based on a comparison between the charges levied for a specific tariff category or item and the variable costs for providing the services covered by the tariff item. For example, this analysis would compare the revenues from wharf handling charges with the direct costs for the casual cargo-handling labor on the wharf, for the fuel and other consumables used by the cargo-handling equipment and for the use-related maintenance costs for this equipment. The recommendations would be made based on the financial objective that the charges levied for these tariff items would be set equal to the variable costs. The recommendations which may result are:

1. the rates should be increased for tariff items or categories in which the variable costs of the service exceed the revenues, so that revenues will cover variable costs;
2. the rates should be reduced for tariff items or categories in which the revenues exceed the variable costs of the service; and
3. the charging parameter used in the tariff item should accurately reflect the costs of providing the service.

If the variable costs per unit of service provided are constant, then this comparison can be made between the rate charged in the tariff item and this fixed unit cost. If, however, the variable costs per unit of service vary with the total amount of service provided then it is necessary to estimate the total variable cost and then compute the average per unit of service as a best-estimate of variable costs. At this point, the variable costs would not include any element to reflect congestion. This too would be considered explicitly in the operational analysis.

The financial analysis is performed primarily by the port's accounting department. Since this analysis is concerned with direct comparison between the charges from the tariff item covering a specific service and the variable costs for providing that service, there is little use for PORTARIF program except to determine whether the unit of measure used in a tariff item does, in fact, correlate with the variable costs for providing the service.

III.2.2 Operational Analysis

A port's operational objectives are sufficiently important that they should be included in a separate component of the evaluation process. This component analyzes both cost-based and demand-based tariffs to determine their effects on the level of use of port services for which the fixed resources being used are either congested or underutilized. These fixed resources include structures such as the berths, transit sheds and open storage areas and the larger fixed and mobile cargo-handling

---

12 The average variable costs are used because they are more easily computed than the marginal costs and because they vary less with changes in demand for the service
This analysis is guided by two objectives. The first is to encourage a more efficient use of the congested services. The second is to increase the use of underutilized services. The first will recommend changes in cost-based tariffs to encourage greater throughput from the over-utilized fixed resources. The second will recommend changes in the demand-based tariffs for underutilized services so as to attract additional traffic.

III.2.2.1 Analysis of Congested Port Services

Once the congested services have been identified, then the effect of specific tariff items on the productivity of these services is evaluated. Data on the level of utilization and productivity of the port's fixed resources is obtained from either the port's revenue accounts or the traffic department data. Data about the variation in productivity for different types of users or different combinations of equipment is more difficult to obtain but should be available from the traffic department.

Ship's bills from the representative sample of typical vessels are examined to determine how differences in vessel size and the amount of cargo transferred affect the charges levied per ton of cargo handled. A simplified example of this comparison is presented in Table III.6. In this example, the larger vessels handle more cargo per call and pay less per tonne of cargo. The lower unit charges are primarily a result of higher berth productivity, i.e. using more hatches and gangs and working more shifts per day. In general, the unit charges are more sensitive to changes in cargo handled per vessel call than to the size of the vessel as measured by GRT.

After the ship's bills have been reviewed, then sensitivity analysis is used to determine to what extent higher productivity in the use of fixed resources is rewarded by lower unit charges. An example of this analysis is shown in Table III.7 for a typical 7200 GRT general cargo vessel. In this example, the number of gangs used and the number of shifts worked per day are varied to determine the effect on the unit charges. These tests reveal that the port charges are more sensitive to the number of shifts worked in a day than to the number of gangs per shift.

The scope of the analysis would be determined by the extent of the port's control over the resources used in providing these services. The two examples considered only two resources the berth and the cargo-handling gangs. Stevedoring charges were included to provide a more accurate estimate of the total charges to the port user even though the port does not control the rates charged for this resource. Other resources which could have been included are the type and combination of cargo handling equipment used.

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13 Congested services refer to those services for which the level of use is sufficiently high as to introduce serious queueing delays or to deny access to a significant percentage of the port's users.
Table III.6

Comparison of Charges for Typical Vessels Calling at the Port

A. Sample Tariff

<table>
<thead>
<tr>
<th>Item</th>
<th>Rate</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Berthage</td>
<td>0.7</td>
<td>LOA-hour</td>
</tr>
<tr>
<td>Wharf Handling</td>
<td>2.5</td>
<td>Tonne</td>
</tr>
<tr>
<td>Stevedoring</td>
<td>350.0</td>
<td>Gang-Shift</td>
</tr>
</tbody>
</table>

B. Performance Standards

2 shifts per day -> 125 tonnes per shift
3 shifts per day -> 115 tonnes per shift

C. Characteristics for Typical Vessels

<table>
<thead>
<tr>
<th>GRT</th>
<th>LOA</th>
<th>Cargo</th>
<th>Berth Time</th>
<th>Gangs per Shift</th>
<th>Shifts per Day</th>
<th>Total Gang-Shifts</th>
<th>Charges /Tonne</th>
</tr>
</thead>
<tbody>
<tr>
<td>3000</td>
<td>130</td>
<td>500</td>
<td>22</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>9.3</td>
</tr>
<tr>
<td>5000</td>
<td>145</td>
<td>1000</td>
<td>38</td>
<td>3</td>
<td>2</td>
<td>8</td>
<td>9.2</td>
</tr>
<tr>
<td>6000</td>
<td>150</td>
<td>1500</td>
<td>54</td>
<td>3</td>
<td>2</td>
<td>12</td>
<td>9.1</td>
</tr>
<tr>
<td>7200</td>
<td>165</td>
<td>2000</td>
<td>54</td>
<td>4</td>
<td>2</td>
<td>16</td>
<td>8.4</td>
</tr>
<tr>
<td>9000</td>
<td>175</td>
<td>3000</td>
<td>62</td>
<td>4</td>
<td>3</td>
<td>26</td>
<td>8.1</td>
</tr>
</tbody>
</table>

D. Results

(gangs and shifts as shown in C. using cargo or vessel whichever is lower)

(GRT = 7200)

<table>
<thead>
<tr>
<th>Vessel Cargo</th>
<th>Charge/Tonne</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td>10.4</td>
</tr>
<tr>
<td>1000</td>
<td>9.7</td>
</tr>
<tr>
<td>1500</td>
<td>9.5</td>
</tr>
<tr>
<td>2000</td>
<td>8.4</td>
</tr>
<tr>
<td>3000</td>
<td>8.3</td>
</tr>
</tbody>
</table>

(1500 tonnes per ship)

<table>
<thead>
<tr>
<th>Vessel GRT</th>
<th>Charge/Tonne</th>
</tr>
</thead>
<tbody>
<tr>
<td>3000</td>
<td>10.0</td>
</tr>
<tr>
<td>5000</td>
<td>9.0</td>
</tr>
<tr>
<td>6000</td>
<td>9.1</td>
</tr>
<tr>
<td>7200</td>
<td>8.2</td>
</tr>
<tr>
<td>9000</td>
<td>8.4</td>
</tr>
</tbody>
</table>
Table III.7

Variation in Charges With Vessel Performance

A. Performance Data

<table>
<thead>
<tr>
<th>GRT</th>
<th>7200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gangs/Shift</td>
<td>3</td>
</tr>
<tr>
<td>Shifts/Day</td>
<td>2</td>
</tr>
<tr>
<td>Tonnes/Gang-Shift</td>
<td>125</td>
</tr>
</tbody>
</table>

B. Variation in Performance with CargoHandled

<table>
<thead>
<tr>
<th>Cargo</th>
<th>Berth Time</th>
<th>Total Gang-shifts</th>
<th>Charges/Tonne</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>36</td>
<td>8</td>
<td>9.7</td>
</tr>
<tr>
<td>1500</td>
<td>52</td>
<td>12</td>
<td>9.5</td>
</tr>
<tr>
<td>2000</td>
<td>68</td>
<td>16</td>
<td>9.5</td>
</tr>
<tr>
<td>2500</td>
<td>84</td>
<td>20</td>
<td>9.3</td>
</tr>
<tr>
<td>3000</td>
<td>100</td>
<td>24</td>
<td>9.3</td>
</tr>
</tbody>
</table>

C. Variation with Labor Performance

<table>
<thead>
<tr>
<th>Variation - Gangs per Shift (cargo - 2000 tonnes)</th>
<th>Charges/Tonne</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>11.2</td>
</tr>
<tr>
<td>3</td>
<td>9.5</td>
</tr>
<tr>
<td>4</td>
<td>8.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variation - Shifts per Day (cargo - 2000 tonnes)</th>
<th>Charges/Tonne</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>13.7</td>
</tr>
<tr>
<td>2</td>
<td>10.9</td>
</tr>
<tr>
<td>3</td>
<td>7.6</td>
</tr>
</tbody>
</table>
When evaluating tariff items for port services which are congested, the problem is to increase the tariffs so as to discourage the inefficient vessels while encouraging greater productivity from the remaining vessels. Such an increase would cause the marginal users to select a comparable service from within the port, from the local private sector or from a competing port.14/ Whereas the financial analysis produces recommendations that the cost-based tariff items be set equal to the variable costs, the operational analysis would generate recommendations to increase these tariff items so as to account for the cost of congestion. In addition, it might be recommended that the charging parameters be changed to more accurately measure the scarcity of the congested resource. For example, the time units used for berth could be changed from shifts to half-shifts or hours.

The difficulty with recommending congestion surcharges is that they are a function of the level of use of a service and are generally applied over a limited period of time during which congestion is experienced. Since most ports do not have the option of implementing a surcharge at short notice, it is necessary to provide some facility in the port's tariff to enable management to introduce a surcharge at their discretion subject to provision of adequate advance notice.

A recommendation which produces a similar effect, but may generate less opposition, is to increase the rates while simultaneously introducing a compensating performance rebate which would reward a higher level of throughput. This recommendation requires that a suitable performance measure be identified. An example of such a rebate is the dockage rebate offered by the Port of Singapore which is based on the size of the vessel and the average tonnage handled per day.

Another possible recommendation is to reduce the charges for equipment which, when used with the scarce resource, increase the productivity of the service. For example, if the scarce resource is the berth, then the tariff items levied for the use of cargo-handling equipment in the hold or on the wharf can be reduced so as to encourage higher berth throughput. If the tariff items covering this equipment are already set equal to their average variable costs, then the individual charges for equipment hire can be bundled into the wharf-handling charge. In this way, the vessel would not incur a higher charge by using the equipment required to achieve higher berth productivity.

14 Since no port management likes to discourage existing users, it is important that, if such action is required, the users who are discouraged be those of least benefit to the port in terms of the volume and type of cargo handled
III.2.2.2 Analysis of Underutilized Port Services

A different set of recommendations would be developed for port services which are under-utilized. These would address the problem of attempting to increase the level of use of the service. The analysis focuses on the contribution of the demand-based tariff items to the total charges for these services. A review of ship's bill's for the representative vessel sample would be used to compute the percentage attributable to these tariff items for different classes of users.

The basic recommendation is to reduce the charges levied with the demand-based tariff items. This could be accomplished through a reduction in rates, a modification of the charging parameters, a change in the method of differentiating the charges or the total elimination of the charge. These approaches, especially the latter, are often used when a port is offering a new service or providing new facilities with a relatively large capacity. In these cases, no attempt is made to recover all of the fixed costs until the traffic has been built up to a level where the rates can be increased. For services which are well established but are not fully utilized, temporary waivers of the demand-based tariff items may be used to attract additional traffic.

Two other possible recommendations are to bundle the tariff items for the underutilized service with those for either congested or non-congested services or to introduce annual fees to replace a tariff that is levied per vessel call. This approach would encourage greater use of the service during the year. Table III.8 presents a summary of the recommendations considered in the operational analysis.

The operational analysis should be performed by the traffic department with the assistance of the accounting department in reviewing the ship's bills. The PORTARIF program can be used to automate the sensitivity analyses since it allows the user to quickly generate ship's bills for various levels of performance.

III.2.3 The Marketing Analysis

All port managements incorporate some marketing information into their procedures for evaluating the port tariff. This information is obtained through formal and informal contacts with the shipping community as well as through direct monitoring of the volumes of cargo handled by the port and the level of utilization of port services. In addition, most ports prepare some form of comparison between their tariffs and those of similar, usually competing, ports. Finally, port managements consider the sensitivity of the principal commodities handled in the port to changes in transport costs. Marketing analysis as incorporated into this phase of the tariff evaluation formalizes these three activities by using a combination of comparative pricing and demand analysis to develop recommendations for changes in the demand-based tariff items.
The marketing analysis begins with a statement of the marketing objectives for each service provided by the port. These objectives will vary depending on the extent of the port's involvement in providing these services, the competitive environment for these services and the degree to which the ports competitiveness is constrained by its charter or by government policy. These objectives indicate if the port is trying to:

1. increase the overall level of use for a service,
2. increase the use of that service by a specific segment of the market, or
3. maintain the current level of use or market share.

These objectives lead to recommendations for changes in the demand-based tariffs which will minimize the reduction in level of use of a service due to an increase in tariff rates or maximize the increase in traffic volume resulting from reductions in tariff rates. Underlying both of these objectives is the consideration that any adjustment of tariff items should be based on the ability of the port users to pay for these adjustments.

Table III.8

Recommendations from Operational analysis

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Utilization of Port Service</th>
<th>Type of Tariff Item</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>high (congested)</td>
<td>low (excess capacity)</td>
</tr>
<tr>
<td>change in rates</td>
<td>cost-based</td>
<td>demand-based</td>
</tr>
<tr>
<td></td>
<td>add</td>
<td>increase</td>
</tr>
<tr>
<td></td>
<td>congestion charge</td>
<td></td>
</tr>
<tr>
<td>change in charging</td>
<td>based on scarce resource</td>
<td>traffic-based</td>
</tr>
<tr>
<td>parameters</td>
<td>performance rebate</td>
<td>performance rebate</td>
</tr>
<tr>
<td>incentives or rebates</td>
<td></td>
<td></td>
</tr>
<tr>
<td>bundling charges</td>
<td>for more productive</td>
<td>to encourage combination</td>
</tr>
<tr>
<td></td>
<td>productive combination</td>
<td>with other resources</td>
</tr>
<tr>
<td></td>
<td>of resources</td>
<td></td>
</tr>
</tbody>
</table>
Once the marketing objectives have been identified, a comparative pricing study is performed to identify the alternative services and facilities available to the port users and the relative charges for using these alternatives. The charges are computed from published tariffs, copies of actual ship’s bills and shipper/consignee invoices and other data gathered from port users.

Next, an assessment is made of the sensitivity of port users to changes in the relative costs for competing services. The measurement of this sensitivity is not a precise activity. Instead, it develops a relative measure of sensitivity of demand with respect to price. This measurement takes into account data such as:

1. the number and variety of competing services and facilities,
2. the historical changes in the charges for competing services and facilities, and
3. the trend in the level of use for these services and facilities

as well as the port's marketing experience concerning:

4. previous changes in demand as a result of changes in the level of service or the relevant tariff items,
5. the opinions of the local trading community regarding the sensitivity of their activities to increases in port prices,
6. other information gathered concerning the competition from other ports and transport services

Those services with a large number of competitors, a price which has declined in real terms, and a relatively flat or declining level of use would be categorized as the most price sensitive. Those services with few or no competitors, with constant or rising prices in real terms and with steady growth in level of use would be categorized as the least sensitive to changes in prices.

The scope of analysis will differ depending on the type of competition being considered. The following paragraphs consider three types of competition:

1. the competition with the local private sector services,
2. the competition with competing ports and transport routes,
3. the competition of international trade in selected commodities.

Although the economic concept of elasticity of demand with respect to price is well established, the ability to measure elasticity is limited by the availability of cross-sectional or time-series data which accurately reflects the change in demand in response to a change in price.
III.2.3.1 Competing Services Provided by Local Private Sector

The relative charges for those services provided by both the port and the private sector have already been examined as part of the financial analysis. The marketing analysis identifies the factors other than price which affect the choice among competing services. This information is obtained from discussions with members of the shipping community as well as from a review of the changes in the level of use of the competing services over the past several years. The recommendations from the financial analysis would then be modified to reflect both the marketing objectives and the sensitivity of the port users to changes in these non-price factors.

For example, suppose the financial analysis has recommended increasing the charges for storage in order to match the private sector rates and the port's management has specified its marketing objective as reducing slightly the volume of specific types of cargo passing through the sheds. The marketing analysis would then determine the availability of storage space within the immediate vicinity of the port and the difficulties experienced by consignees in clearing their cargo and moving it to private storage. From this analysis, a revised recommendation would be prepared suggesting changes in the transit storage tariff, including adjustments in the free time, the escalation of rates with time, and the overall level of charges, which would better achieve the marketing objective.

III.2.3.2 Competing Ports and Transport Services

The second application of marketing analysis considers the effects of changes in demand-based tariff items where there is competition from other ports or transport services. At the simplest level, the cost comparison is made between the charges levied for similar services in two or more competing ports. Since there is generally neither a one-to-one correspondence of tariff items nor a common set of charging parameters, this comparison is based on the charges incurred by port users for comparable services. These charges can then be determined from copies of the ship's bill from other ports or by using the PORTARIF program together with the published port tariffs and the representative sample of vessels. A sample of this type of analysis is shown in table III.9 for the container services provided by the ports in the U.S. Gulf Coast. The first section of the table presents the general tariff items. The second section presents the tariff items specifically affecting the container trade. The final section shows the charges for a typical vessel calling at each of these ports assuming that the handling rates at the berth are comparable.

A more detailed analysis of competing ports would consider the full range of costs incurred by the vessel and its cargo when using the port, especially, the cost for the vessel while in port, the charges for stevedoring and the ship agents' fees. The stevedoring costs at the competing port can be determined from published tariffs or from ship's agents. The cost of the vessel in port depends on the turnaround time, which can be determined for the individual ports from the ship's agents and from the
### Table III.9

<table>
<thead>
<tr>
<th>Port</th>
<th>Pilotage</th>
<th>Tugs</th>
<th>Harbor Dues</th>
<th>Docking</th>
<th>Others</th>
</tr>
</thead>
</table>
| NEW ORLEANS   | $29.35/ft. draft + $100.80 | $10/1000 GRT OVER 7000 GRT + $315 | $165/DAY | $51 for LOA 300-500 ft OR $ .003/sq.ft | Preferential + $ |.
| HOUSTON       | $18.37/ft. draft + length x beam charge*** | $650/tug *** | $200/DAY | n.a.                  | none                    |
| MIAMI         | n.a.                      | n.a.          | n.a.       | n.a.                  | none                    |
| SAVANNAH      | $14/foot + $30 per 11000 GRT | $600/tug *** | n.a.       | n.a.                  | none                    |
| CHARLESTON    | $14/foot + $30 per 11000 GRT | $160/hour     | $30/call | $40-$80 for ship under power + $ .00125 x NRT | none                    |

**Notes for Section A**

* Preferential is a fixed annual fee for vessels with a priority for calling at a designated terminal, the rate varies depending on the quality of the terminal. The rates quoted above are for the A class used by the major steamship companies. Assuming typical terminal areas between 200,000 and 500,000 sq.ft., this amount to about $160,000-$400,000 per year or $600-$1500 per vessel call.

** Houston pilotage charge includes a charge based on the LOA x Beam / 100 where the rate per unit is: < 200 = $.000, 201-300 = $.161, 301-400 = $.201, 401-500 = $.241, 501-600 = $.330, 601-700 = $.380, 701-800 = $.430, 801-900 = $.430, 901-1000 = $.527, 1000+ = $.626

*** Use two tugs for a vessel under 700 feet and 3 tugs for a vessel over 700 feet.

**Sources:**

Discussions with the local pilot services in Savannah, Charleston, Houston and New Orleans. Fairplay's "Port Dues and Charges". Selected port tariffs.
B. Container Tariffs

<table>
<thead>
<tr>
<th>Tariff Items</th>
<th>NEW ORLEANS #5 &amp; 6</th>
<th>HOUSTON ** BARBOURS CUT</th>
<th>MIAMI ***</th>
<th>SAVANNAH +</th>
<th>CHARLESTON ++</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wharfage Handling</td>
<td>$1.30/S.T.</td>
<td>$1.70/S.T.</td>
<td>$1/ton</td>
<td>$1.50/S.T.</td>
<td>$1.49/S.T.</td>
</tr>
<tr>
<td>Receiving or Delivering a Box</td>
<td>road $15.75/box</td>
<td>$60/box on wheels or ground (1)</td>
<td>$50/box on wheels or ground</td>
<td>$28.10/box on wheels or ground</td>
<td>$25.15/box</td>
</tr>
<tr>
<td>Receiving or Delivering a Chassis Storage</td>
<td>$4.50/chassis</td>
<td>none</td>
<td>none</td>
<td>none</td>
<td>$13.35/chassis</td>
</tr>
<tr>
<td>Free Storage Allowance</td>
<td>1.8 x average loaded boxes in last 3 calls</td>
<td>1.5 x average loaded boxes in last 3 calls</td>
<td>none</td>
<td>15 days full and 30 days empty</td>
<td>none</td>
</tr>
<tr>
<td>-Free Time Inbound</td>
<td>none</td>
<td>none</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>-Free Time Outbound</td>
<td>none</td>
<td>none</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>-Rate Inbound or Outbound</td>
<td>$1/day/TEU, $5/day/box or $3/day/chassis</td>
<td>$2/day &lt;=20' box or $3/day &gt;20' box</td>
<td>$5.65/box &lt;=20' (2)</td>
<td>$11.30/box &gt;20' (2)</td>
<td></td>
</tr>
<tr>
<td>Gantry Crane</td>
<td>$475/hour #</td>
<td>$428/hour ##</td>
<td>$360/hour #</td>
<td>$470/hour #</td>
<td>$445/hour #</td>
</tr>
<tr>
<td>Tractor &amp; Trailer</td>
<td>$525 overtime</td>
<td>$240/box</td>
<td>$400 overtime</td>
<td>$470/hour overtime</td>
<td>$470/hour overtime</td>
</tr>
<tr>
<td>Yard Handler</td>
<td>$109.75/hour #</td>
<td>$100/hour #</td>
<td>$103.50/hour #</td>
<td>$45/hour #</td>
<td>$103.50/hour #</td>
</tr>
<tr>
<td>Stuffing/Stripping</td>
<td>$11.98-$19.42/S.T.</td>
<td>$190/box &lt;= 20'</td>
<td>$240/box &lt;= 40'</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Free Time Inbound</td>
<td>30 days</td>
<td>30 days</td>
<td>30 days</td>
<td>30 days</td>
<td>30 days</td>
</tr>
<tr>
<td>Free Time Outbound</td>
<td>15 days</td>
<td>15 days</td>
<td>30 days</td>
<td>30 days</td>
<td>30 days</td>
</tr>
<tr>
<td>Storage Rate Inbound</td>
<td>$.12-$1.50/S.T./day</td>
<td>$.40/S.T./day</td>
<td>$1 per S.T. or 40 cu. ft.</td>
<td>same</td>
<td></td>
</tr>
<tr>
<td>Storage Rate Outbound</td>
<td>$.06/S.T./day</td>
<td>$.40/S.T./day</td>
<td>same</td>
<td>same</td>
<td>same</td>
</tr>
</tbody>
</table>

Notes for Section B

* operated by New Orleans Marine Contractors; additional facilities operated by Sealand and PRIMI (RoRo only)
** operated by Barbours Cut Marine Contractors Inc
*** operated by Island Terminal Company
+ operated by Georgia Port Authority
++ operated by South Carolina Port Authority, additional container facilities operated by Maersk Container Services'
+++ also one empty TEU for every 3 full TEU
# includes operator
## excludes cost of operator
### included in other charges
S.T. = short ton

New Orlean's Berths 5 & 6 has special dockage rate for container vessels about 35x of normal rate
Miami dockage rate slightly higher for container vessels - $.08/GRT/day or $.55/ft draft/day whichever is greater
Table III.9  
(continued)

C. Port and Stevedoring Charges For Container Vessels

<table>
<thead>
<tr>
<th>CHARGES</th>
<th>NEW ORLEANS</th>
<th>HOUSTON</th>
<th>MIAMI</th>
<th>SAVANNAH</th>
<th>CHARLESTON</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harbor Dues</td>
<td>$165</td>
<td>$200</td>
<td></td>
<td>$1,000</td>
<td>$1,000</td>
</tr>
<tr>
<td>Pilotage *</td>
<td>$1,128</td>
<td>$4,190</td>
<td>$1,465</td>
<td>$1,465</td>
<td>$1,465</td>
</tr>
<tr>
<td>Towage *</td>
<td>$570</td>
<td>$1,950</td>
<td>$1,800</td>
<td>$960</td>
<td></td>
</tr>
<tr>
<td>Dockage</td>
<td>$1,033</td>
<td>$3,115</td>
<td>$1,560</td>
<td>$2,681</td>
<td>$2,486</td>
</tr>
<tr>
<td>Wharfage</td>
<td>$8,599</td>
<td>$11,245</td>
<td>$6,615</td>
<td>$9,923</td>
<td>$9,856</td>
</tr>
<tr>
<td>Stevedorage **</td>
<td>$60,000</td>
<td>$60,000</td>
<td>$60,000</td>
<td>$60,000</td>
<td>$60,000</td>
</tr>
<tr>
<td>Receive/Deliver *</td>
<td>$22,350</td>
<td>$36,000</td>
<td>$30,000</td>
<td>$27,120</td>
<td>$15,090</td>
</tr>
<tr>
<td>Storage</td>
<td></td>
<td>$18,750</td>
<td></td>
<td>$4,500</td>
<td>$4,500</td>
</tr>
<tr>
<td>Crane Rental **</td>
<td>$14,250</td>
<td>$12,840</td>
<td>$10,800</td>
<td>$14,100</td>
<td>$13,350</td>
</tr>
<tr>
<td>total</td>
<td>$109,793</td>
<td>$135,681</td>
<td>$127,725</td>
<td>$120,354</td>
<td>$111,132</td>
</tr>
<tr>
<td>cost per TEU</td>
<td>$122</td>
<td>$150</td>
<td>$142</td>
<td>$134</td>
<td>$123</td>
</tr>
<tr>
<td>cost per box</td>
<td>$183</td>
<td>$226</td>
<td>$213</td>
<td>$201</td>
<td>$185</td>
</tr>
</tbody>
</table>

Notes of Section B (cont)

(1) discount plan offered for loaded boxes above 5000 a 10% reduction in receiving/delivery charge; above 8000 boxes the discount is 25%, above 16,000 boxes the discount is 50%

(2) for each successive 15 day period the rate is $7.15 for 20 foot or less boxes and $14.30 for boxes over 20'

Notes for Section C

* charge each way
** does not include overtime charges
### Table III.10

**Recommended Change in Rates from Analysis of Competing Services**

<table>
<thead>
<tr>
<th>Relative Cost of Competing Ports or Services</th>
<th>Sensitivity of Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>low</td>
</tr>
<tr>
<td>- higher</td>
<td>-</td>
</tr>
<tr>
<td>- comparable</td>
<td>-</td>
</tr>
<tr>
<td>- lower</td>
<td>-</td>
</tr>
</tbody>
</table>

++ = largest percent increase
-- = largest percent decrease

### Table III.11

**Cost Comparison for Some of the Major Trades of Karachi Port**

(US$/Metric Tons)

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Route</th>
<th>Port Charges</th>
<th>Stevedores</th>
<th>FOB/CIF Cost*</th>
<th>Ocean Freight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basmati Rice, bag</td>
<td>Pak-Gulf</td>
<td>1-2</td>
<td>2-2.5</td>
<td>560</td>
<td>68</td>
</tr>
<tr>
<td></td>
<td>Pak-UK/Cont</td>
<td></td>
<td></td>
<td></td>
<td>92</td>
</tr>
<tr>
<td>IRRI-6 Rice, bags</td>
<td>Pak-Singap.</td>
<td>1-2</td>
<td>2-2.5</td>
<td>200</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>Pak-UK/Cont</td>
<td></td>
<td></td>
<td></td>
<td>92</td>
</tr>
<tr>
<td>Baled Cotton</td>
<td>Pak-Singap.</td>
<td>2-3.5</td>
<td>2-2.5</td>
<td>750</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>Pak-UK/Cont</td>
<td></td>
<td></td>
<td></td>
<td>161</td>
</tr>
<tr>
<td>Cotton Piece</td>
<td>Pak-Singap.</td>
<td>2.5-4</td>
<td>2-2.5</td>
<td>2500</td>
<td>43</td>
</tr>
<tr>
<td>Goods in Containers</td>
<td>Pak-UK/Cont</td>
<td></td>
<td></td>
<td></td>
<td>76</td>
</tr>
<tr>
<td>General Cargo</td>
<td>UK/Cont-Pak</td>
<td>2.5-4.5</td>
<td>2-2.5</td>
<td>3000</td>
<td>97</td>
</tr>
<tr>
<td></td>
<td>Japan-Cont</td>
<td></td>
<td></td>
<td></td>
<td>85</td>
</tr>
</tbody>
</table>

* FOB for exports, CIF for imports
vessel sailing schedules. The daily cost of a vessel can be estimated using published charter rates, the estimates of vessel operators or the SHIPCOST model. Since additional effort is required to include these costs, the broader analysis should be limited to those trades and services which are thought to be most sensitive to port costs. These would be identified based on the port's marketing experience with existing clients.

A still more-detailed analysis would include the relative costs for the vessels to divert from their route to call at the competing ports as well as the costs of land transport for moving cargo to overlapping hinterlands. This analysis would be used where the competing ports are relatively close to each other or where there are a large number of alternative routes. An example of the former situation is in Pakistan where the ports of Karachi and Qasim are only 40 km apart and so have overlapping hinterlands. For these two ports, the differences in land transport costs are often comparable to any difference in port costs. An example of the latter situation is found in the three Malaysian ports, Jahore, Kelang and Penang. These ports compete for traffic among themselves and with Singapore, which is the main transhipment port in the region for cargoes moving to and from the Malaysian peninsula.

The sensitivity of port users to the costs of using competing ports and routes is determined through an analysis of:

1. the historical operating data on the number and type of vessels calling at the competing port,
2. the trends in ocean freight rates and in the profitability of the steamship companies as determined from published data, and
3. an analysis of the ocean and land transport costs for the alternatives.

as well as from interviews with the vessel operators concerning:

4. the relative advantages of using different ports and
5. the importance of port charges in determining port calls and routes.

Because this is a very complex analysis, it should be limited to a few trades where changes in routes have been experienced or are being actively contemplated.

The recommendations resulting from the analysis of competing ports and private sector services would be concerned with the adjustment of the port's charges relative to those of its competitors. These recommendations would take into account the level of competing charges, the sensitivity of demand and the marketing objectives within the general framework shown in Table III.10.
III.2.3.3 Competing International Trade

The third application of marketing analysis considers the effects of changes in the demand-based tariff items on the volume of trade for cargoes which do not have access to alternative services, ports or routes. The cost comparison is made between port charges and the total delivered cost for specific commodities. The delivered cost for both imports and exports is the sum of the production, transport and marketing costs.

In general, port charges represent a relatively small percentage of the total delivered cost and, therefore, only occasionally have a significant effect on the level of trade. However, this view may not be correct for some trades. The most obvious example is for the low-value bulk commodities where the port charges can represent a significant part of the total delivered cost. Less obvious examples apply to the breakbulk and container cargoes traded in highly competitive markets.

Breakbulk export cargoes, such as agricultural products and semi-manufactures, are more sensitive to port charges because profit margins are low. Although the port charges represent a small percentage of delivered cost, the competition limits the prices charged by the traders and the rates charged by the ocean carriers. Therefore, an increase in port charges causes a reduction in profit of the traders and vessel operators. Breakbulk imports for which the delivered price of substitute goods, either imports or local products, are competitively priced have similar competitive pressures which limit the ability to pass on increases in port charges. For containerized cargoes, the sensitivity to port charges is much lower, but these cargoes have more options in terms of routes and are more likely to have been considered in the previous round of marketing analysis.

The comparative pricing study is performed by computing the port charges on a per unit basis for each major group of commodities. To this is added the costs for ocean transport for exports. Next the values for the individual commodities or group of commodities are determined using the F.O.B. price for exports and the C.I.F. price for imports. An example of these cost calculations is shown in table III.11.

The sensitivity of these commodities to changes in delivered cost is determined from:

1. interviews with traders,
2. comparisons of the C.I.F. and local wholesale prices for imports,
3. information on the financial condition of the shippers-/consignees, and
4. an analysis of the historical data on relative price and level of demand for these commodities and their substitutes.
The recommendations which result from the marketing analysis are of two types. The first concern changes in the rates charged so as to meet the port-wide financial goals without causing a change in the level of use of port services that is inconsistent with the marketing objectives. The second concerns a change in either the charging parameters or the differentiation of rates in order to distribute the change in port charges according to the sensitivity of the port users to changes in transportation costs.

The scope of the marketing analysis will depend on the extent to which the port management has conducted similar efforts in the past and has thereby acquired the necessary sources of information and the staff to analyze this information. Marketing analysis like other forms of management information evolve with experience. The methods for this analysis do not change so much as the range of information considered as part of the analysis.

III.2.4 Summary of Phase II Results

Phase II begins with a division of the port's costs into fixed and variable costs and the port tariff into cost-based and demand-based tariff items. Next, the financial analysis produces recommendations for changes in the port's cost-based tariffs to insure that the revenues generated are sufficient to cover the variable costs of the services provided. Then the operational analysis determines which of the port's services are congested and which are under-utilized and produces recommendations to include congestion charges in the cost-based tariffs of the former and to reduce the demand-based tariff items of the latter. The marketing analysis completes the tariff evaluation procedure by producing recommendations for changes in the demand-based tariff items to meet the port's marketing objectives. The procedures and recommendations from both phases of the tariff evaluation procedure are summarized in Figure III.3.

III.3 Tariff Revision Procedures

The structured approach as described up to this point is a relatively linear process beginning with the financial analysis and ending with the marketing analysis. The outputs are a series of recommendations for changes in the individual tariff items or tariff categories. The next step is the tariff revision procedure presented in schematic form in Figure III.4. This procedure develops specific changes in the tariff items based upon the recommendations, then tests these against the port's financial, operational and marketing objectives. The tariff items are then revised once again. The process is iterated until the resulting changes in the tariff come closest to meeting the port's objectives.

The proposed changes in the cost-based tariff items are first tested against the financial objectives by calculating the revenues from these tariff items and comparing them with the variable costs for the services provided. This can be done on an item-by-item basis and is relatively simple.
Figure III.3
Flowchart for First Two Phases of the Tariff Evaluation Procedure

- Port-wide Financial Analysis
  - Estimates of Port-wide Revenue Requirements
  - revenues and costs by activity

- Financial Analysis by Activity
  - Recommended Changes in Tariff Items Levied for Services with Local Competition
  - revenues and costs by tariff item

- Financial Analysis by Tariff Category
  - Recommended Adjustments in Cost-Based Tariffs
  - tariff items separated into cost-based and demand-based

- Operational Analysis
  - Recommendations for Changes in Charging Parameters and rates for Cost-Based Tariff Items

- Marketing Analysis
  - Recommendations for Changes in the Charging Parameters and rates for Demand-based Tariffs
Figure III.4
Flowchart for Tariff Revision Procedure

- Proposed Revisions of Demand-Based Tariffs
  - Evaluation of Individual Tariff Items
    - Item-Specific Objectives
    - Financial Objectives
  - Evaluation of Modified Tariff Items
    - Service-Related Objectives
    - Financial Objectives
    - Marketing and Operational Objectives
- Proposed Revisions of Cost-Based Tariffs
  - Evaluation of All Tariff Items
    - Port-wide Financial Objectives
Next, the proposed changes in the demand-based and cost-based tariff items are tested against the marketing and operational objectives as well as the service-related financial objectives. The ship's bills and the consignee/shipper invoices are computed for typical port users and the charges are grouped by type of service. The change in charges for each service are used, together with the information on sensitivity of demand, to estimate the overall level of use for the service\(^{16}\) and the results are evaluated against the port's marketing objectives. The impact of the tariff revisions on the productivity at the berth and on the use of scarce port resources are evaluated against the operational objectives.

Finally, the revisions in all tariff items are combined to determine the effect on revenues by activity and port-wide.

III.4 The Use of the PORTARIF Program

The basic activities in this iterative process are the calculation of typical ship's bills and shipper/consignee invoices and the presentation of revenues from these bills according to tariff item and category, type of service, port activity, and total revenues. The PORTARIF program is designed to incorporate the results of all proposed tariff modifications and to automatically generate a revised estimate of revenues for individual services and for the port as a whole. The program accepts as input the items in the port tariff and the parameters of the representative sample of vessels which are used to computes the port charges.

The ship's bills can be used to determine how proposed tariff modifications affect the charges levied for specific classes of port users. If these modifications are expected to affect the volume of cargo, then the vessel sample can be revised to reflect this change and the bills will automatically be recomputed. The program performs sensitivity testing in which the vessel's performance parameters can be altered and the changes in port charges automatically computed. The changes will indicate the savings which can result from improvements in the vessels' productivity while in the port. If these potential savings are expected to induce a change in the performance of port's users, then the performance parameters for the vessels in the representative sample can be edited.

The revenue information generated by the PORTARIF program is compared with the information collected on the costs and utilization for individual port services. These comparisons will indicate if the financial, operating and marketing objectives are being met. A companion report describes the use of the program in more detail.

\(^{16}\) The estimated level of use for each service is input to the PORTARIF program as adjustments in the number of vessel calls and the amount of cargo handled per vessel call. The program allows for easy editing of the tariff items and the vessel parameters.
ABSTRACT

The PORTARIF program is designed to support the port tariff evaluation procedure described in Technical Note 3. This procedure requires a considerable amount of effort to categorize the tariff items according to demand-based and cost-based items and to divide the costs into fixed and variable costs and then to apply financial, operational and marketing analysis to develop recommendations for changes in the individual tariff items. These activities are difficult to automate since they require the judgement of the port management in differentiating the port's tariff items and costs and in defining the objectives to be used. However, the process of testing proposed changes in individual tariff items to determine if they meet these objectives can be automated. In some cases, an existing computer-based port accounting system can be used for this without significant reprogramming. In other cases, the program described in this report can be used.

ACKNOWLEDGEMENT

The individual responsible for initiating this effort and for staying the course was John Lethbridge. George Panagakos reviewed the text and provided valuable guidance in making a more useful chart for guiding the new user. The author maintains responsibility for failures to identify shoals or difficult currents. Updates to this manual will hopefully benefit from the input of those who have successfully navigated this program in spite of any deficiencies in this manual.
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   1.2 Nomenclature
   1.3 Starting the Program

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3. Port Tariff Files and the Tariff Menu
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CHAPTER I

INTRODUCTION

The PORTARIF program is designed to calculate the revenues which result from the tariff after changes have been made in the individual items. The program is designed for easy editing of individual tariff items so that the effects of changes in these items can be determined quickly and the user can test out a variety of changes, modifying the different tariff items until an acceptable overall tariff is achieved.

The basis for the revenue calculations is the ship's bill and the consignee/shipper's bill. The program applies the proposed tariff to a representative sample of port users and determines the charges for these users. The resulting bill's can then be used to evaluate the impact on the typical users, on the revenues for individual port services and on the port-wide revenues. The format of this analysis is shown in schematic form in Figure I.1.

The program requires two types of inputs. The first is a file containing a representative sample of port users. For most applications, this would be a sample of the typical vessels calling at a port. For each vessel, the input would include all the information necessary to compute the charges to the vessel and to the shippers/consignees for moving the cargo through the port. Also included would be the average number of calls in a year for each type of vessel. The complete sample of vessels would represent the total number of vessels calling at the port during a year. If the sample represents the port traffic over the previous year, it can be used to estimate the total revenues from port users in the previous year. These results can be compared with the accounting records to determine the accuracy of the sample. If the sample represents a forecast of future traffic, it can be used to estimate future revenues. It is possible to divide the sample into separate groups based on the type of users and to prepare separate files for each group. This approach might be taken where the analysis of different gateways or different forms of cargo, e.g. containers, dry bulk, etc., are conducted separately.

The second input is a file containing the items in the port tariff. These items are presented in a consistent format containing a rate, a charging formula which computes the charge resulting from this rate, and, where required, a condition formula which specifies under what circumstances the tariff item will apply. Each tariff item is assigned a number which is then used to order the output from the revenue calculations. In this way the tariff revenues can be grouped according to tariff category and service/cost center.

The PORTARIF program combines the information in these two files and computes the annual port revenues. The port charges for a vessel or shipper/consignee are computed by using their specifications in the representative sample. As the tariff items are modified, the program recomputes the revenues. The tariff can also be divided into subsets based on gateways or cargo form where these gateways have separate tariffs.
or where the tariff items are differentiated by cargo form.

Figure II.1
Flowchart for Tariff Evaluation Using the PORTARIF Program

The revenues are presented in three forms so that the impact of these modifications can be analyzed using the operational, marketing and financial objectives which were used to guide the tariff design or revision activity. The first form is the individual Ship’s Bill. This form summarizes the charges for the typical port user. As the tariff items are modified, the impacts on specific groups of users can be observed by examining the changes in their Ship’s Bills. These impacts can be compared with the marketing objectives to evaluate the changes in demand-based tariff items and to provide a basis for further revisions. Similarly, the effectiveness of both the demand-based and cost-based tariff items in meeting operational objectives for encouraging efficient use of port resources can be assessed by examining the Ship’s Bill’s for the typical vessels.

The second form of the port revenues is the grouping of revenues
according to tariff category or cost/service center. This grouping is used to evaluate the proposed tariff modifications with respect to the marketing and financial objectives set for the tariff categories or the financial objectives set for the cost/service centers.

The third form of the port revenues is the port-wide summary which is compared with the port-wide financial objectives to see if the combination of proposed modifications to the tariff items will meet these objectives.

The program can also be used to perform sensitivity analysis in which the parameters describing the performance of a typical vessel are modified over a specified range and the effects on port charges are determined. This analysis is used to evaluate the modifications in tariff items against the operating objectives by indicating if these are sufficient incentives for more efficient use of the port’s resources due to reductions in port charges as a result of improvements in vessel performance.
CHAPTER II

PORTARIF User's Manual

II.1 Technical Background

The PORTARIF program is primarily a data management system. It creates and maintains files that describe the port's tariff structure and the services requested by the users of the port. It also combines the information in the files to compute port revenues. Because of the intensive file manipulations required, this program was written using the DBASEIII Plus language. A directly executable code was then produced using the CLIPPER compiler. The program is distributed on a single disk which contains the compiled version of the program and some demonstration files.

The program can be run on any DOS-compatible machine equipped with 512 K. The speed at which the program operates depends on the system configuration. The slowest performance will result when using an 8088-based machine with floppy diskettes. The use of a hard disk for storing the files will reduce the performance time by about 30%. The use of an 80286-based machine with hard disk will further reduce performance time by 60%. The use of a RAM disk for temporary storage of the files will provide a further increase in speed.

II.1.1 File Structure

The PORTARIF program uses three types of files. The first type of file contains all or part of a port tariff. Each record in this file contains a tariff item. The fields in this record contain the rate charged, the charging formula and any condition which limits the application of that tariff item.

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1. A Copyrighted DBMS system produced by Ashton Tate.

2. A copyrighted compiler produced originally by Nantucket Inc. The uncompiled code is compatible with the Winter '86 edition of the compiler.

3. The uncompiled version is also supplied to allow experienced programmers to modify the code to meet their requirements. The current version does not operate under DBASEIII Plus because of the requirement for a large number of memory variables.

4. The basic MS DOS machine such as the IBM-PC

5. The AT level of machines

6. For this discussion, a tariff item is defined as a formula for computing a specific charge.
The second type of file contains information on the vessels which call at the port. Each record in the file describes a single vessel. The fields in each record contain the values for all the parameters used in the tariff items to compute the charges for that vessel and its cargo.

The third type of file is the output file. The results of the various analyses performed by the program are computed iteratively. The intermediate results are stored in output files which are then used to generate the output tables displayed at the conclusion of the analyses.

Since the program is written using a database language, there are relatively few limitations on the number of records in these files. The only constraint on the number of tariff items or vessels included in a file is the capacity of the medium on which the files are stored. The number of distinct charging parameters used in the tariff items is currently limited to 48 which may require that the port tariff be divided into logical components in order to determine all port revenues.

II.1.2 Nomenclature

In the following discussion, certain nomenclature will be used. Where instructions are included in the text they will be shown in bold text, e.g. start. The symbol [CR] refers to the Carriage Return or Enter key which is pressed to complete certain commands and most data inputs. The symbols [PgDn] and [PgUp] refer to the Page Down and Page Up keys generally found in the keyboard's cursor controls. The other cursor controls are the arrow keys which are referenced as [Up], [Dn], [Rt], and [Lt]. The footnotes, which are referenced in the text as n/, appear at the bottom of the page.

In addition to the written description of the program presented in this manual, there is a demonstration presented in Annex A. This demonstration is a series of commands which can be performed while reading the manual. This procedure makes use of a tariff file "99999" and a vessel file "9999" which are included with the system diskette. The sequence of steps in the demonstration are synchronized with the text by the use of notes indicated as [1]. When the note appears, the user performs the sequence of commands presented in Annex A under that number. To use this demonstration, the program must first be loaded onto the machine as described in note [1].

7 a vessel record requires about 1k while a tariff item requires about 0.2k

8 The limitation on charging units can be a constraint where the port tariff contains highly differentiated charges such as handling charges based on the type of commodity. In this situation, it may be appropriate to simplify the tariff items rather than attempt to perform an exhaustive analysis of the port's tariff.
II.1.3 Starting the Program

The program disk comes equipped with a version of the DOS 3.1 Command.Com file. In order to insure compatibility, the user should copy the program disk on to a new disk which has been formatted with the system included (format /s) or on to a hard disk in a directory set up for the program.9/

The program can be run on any DOS-compatible machine by placing the program diskette in drive A: and typing:

```
start [CR]
```

Once the program is loaded, the user can specify the directory on which the data files are stored, or will be stored, as discussed below. The outputs of the program can be directed to the screen, a user-specified file, or a printer. For the latter, there are no initialization commands and the output is printed in the default mode unless the user presets the printer's format.

II.2 Use of Menus

The PORTARIF program is menu-driven. Once the program is loaded, the Main menu (Figure II.1) will appear on the screen. This menu performs the basic control function. The first three options allow the user to specify the date, the directory on which the PORTARIF program is stored and the directory on which the files are stored. The date is initially obtained from the computer's system clock and is presented together with the time on the system clock in the upper right hand corner. If the date is to be corrected then select option A (press the A key), type in the date (e.g. 010187) and press [CR].[2]

Below the current date and time is a listing of the most recent date on which the program was used. This is automatically updated at the conclusion of each use of the program.

In the lower right quadrant of the menu is the information on the directories where the program and the data files are stored. The initial values for these parameters are those which were in use at the time the program was last terminated. They can be changed by selecting options B and C (type B or C) and entering the correct directories followed by [CR]. These directories are described by their drive and the directory name. Some examples are given below.[3]

```
B:  - the current directory on the B drive
C:\PSATARIF\ - the "psatarif" directory on the C drive 10/
```

---

9 If loaded onto a hard disk the program should be run with a "path" command which allows access to the Command.Com file

10 Note that both "\\"'s must be included for a sub-directory.
Figure II.1

Main Menu

<table>
<thead>
<tr>
<th>MAIN MENU</th>
<th>DATE</th>
<th>02/04/87</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Change Today's Date</td>
<td>TIME</td>
<td>00:03:08</td>
</tr>
<tr>
<td>B. Change the Program Directory</td>
<td>LAST TIME</td>
<td>02/03/87</td>
</tr>
<tr>
<td>C. Change the Data Sub-Directory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D. Prepare the Tariff File</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E. Prepare The Vessel File</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F. Analyze the Tariff</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G. File Maintenance</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Enter Selection (A - G or X to quit)::

Figure II.2

Tariff Menu

<table>
<thead>
<tr>
<th>TARIFF MENU</th>
<th>DISK</th>
<th>b:\</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. List Current Tariff Files</td>
<td>PATH</td>
<td>b:\</td>
</tr>
<tr>
<td>2. Create a New Tariff File</td>
<td>TARIFF</td>
<td>111111</td>
</tr>
<tr>
<td>3. Retrieve A Previously Saved Tariff File</td>
<td>VESSEL</td>
<td></td>
</tr>
<tr>
<td>4. Edit the Tariff Data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Edit the Charging Units</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Print the Tariff</td>
<td>1986 TRP</td>
<td>/jha</td>
</tr>
<tr>
<td>7. Print the Charging Units</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Choose 1 to 7; 0 to Return to Main Menu :0:
The next three menu options, D-F, are used to prepare the data files and perform the analysis. Option G, is used to perform system maintenance which includes purging unwanted files and deleting specific records from tariff and vessel files. The selection of any one of these four options leads to another menu as discussed below.

II.2.1 Tariff Menu (Main Menu - Option D)

Option D in the Main Menu is used to prepare, retrieve or edit the tariff files. When D is entered at the Main Menu prompt, the Tariff Menu (Figure II.2 on the previous page) will appear. This menu has seven options which are selected by typing in the appropriate number (without a [CR]).

The first option, 1, causes a list of the tariff files stored on the designated directory to appear on the screen. Each tariff file is identified by a five character code. As shown in Figure II.3, these files are listed with a "TAR" prefix and statistics are given on the size of these files and the date on which they were last updated.[4]

The second option, 2, in the Tariff Menu is used create a new tariff (see II.3.2) while the third option, 3, is used to retrieve an existing tariff file. If the third option is selected, then the area to the right of the TARIFF heading will be highlighted and a message will appear above this area requesting the user to enter the five character code which identifies the tariff file. The user types in the appropriate code followed by a [CR].[5]

Once a tariff file has been created or retrieved and its code appears on the Tariff Menu, then the fourth through seventh options allow the user to edit and print both the tariff items and the charging parameters used in the tariff (see 11.3.5-7). The default option for the Tariff Menu is 0. If the [CR] is pressed rather than selecting another option, the Main Menu will reappear on the screen.[6]

Figure II.3

Typical Listing of Tariff Files
II.2.2 Vessel Menu (Main Menu - Option E)

Option E in the Main Menu is used to prepare, retrieve or edit the vessel files. When E is entered at the Main Menu prompt, the Vessel Menu (Figure II.4) will appear on the screen. This menu has five options which are selected by typing in the appropriate number (without a [CR]). The first option, 1, causes a list of the vessel files stored on the designated directory to appear on the screen. Each vessel file is identified by a four character code. These files are listed with a "VESL" prefix and with statistics similar to those given for the tariff files.[7]

The second and third options, 2 and 3 respectively, are used to create and retrieve the vessel files. These procedures are similar to those used with the tariff files. If the third option is selected, then the area to the right of the VESSEL heading on the Vessel Menu will be highlighted and a message will appear requesting the user to enter the four character code which identifies the specific vessel file which is to be retrieved.[8] Once a vessel file has been retrieved, the fourth and fifth options, 4 and 5 respectively, can be used to edit and print the file.[9]

II.2.3 Analysis Menu (Main Menu - Option F)

Option F in the Main Menu is used to perform the analysis of the tariffs. The analysis cannot be performed until both a tariff file and a vessel file has been selected. Therefore it is necessary to have completed options D and E prior to selecting option F. When F is entered at the Main Menu prompt, the Analysis Menu (Figure II.5) will appear on the screen. This menu has three options. The first option, 1, is used to generate a sample invoice for one or all of the vessel stored in the vessel file. The second option, 2, is used to perform a Sensitivity analysis of the change in port charges with a change in selected vessel's charging parameters. For this option the user identifies the vessel, the parameters to be varied and the number of different variations to be entered. The program automatically computes the invoices for each of these variations. The third option, 3, is used to perform the Port Income analysis. For this option, the program computes the total revenues for all vessels in the vessel file broken down by tariff item.

Once the user has selected one of the three options by entering the appropriate number, then the user is asked to designate where the results of the analysis are to be displayed. The output can be directed to the screen, a printer or a disk file. For the latter, the user is asked to specify a five character name. The output will be stored on a file whose name includes the five character name preceded by "PRN". This file can be retrieved using a word processor or other software system which can handle ASCII-formatted files.[10]
Figure II.4

Vessel Menu

<table>
<thead>
<tr>
<th>VESSEL MENU</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. List Current Vessel Files</td>
</tr>
<tr>
<td>2. Create a New Vessel File</td>
</tr>
<tr>
<td>3. Retrieve A Previously Saved Vessel File</td>
</tr>
<tr>
<td>4. Edit the Vessel Data</td>
</tr>
<tr>
<td>5. Print the Vessel Data</td>
</tr>
</tbody>
</table>

Choose 1 to 6; 0 to Return to Main Menu :0:

Tariff II.5

Tariff Analysis Menu

<table>
<thead>
<tr>
<th>ANALYSIS MENU</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Prepare Ship's Bill for One or More Vessels</td>
</tr>
<tr>
<td>2. Perform Sensitivity Analysis for a Vessel</td>
</tr>
<tr>
<td>3. Compute the Port Income for a Selected Mix of Vessels</td>
</tr>
</tbody>
</table>

Choose 1 to 3; 0 to Return to Main Menu :0:
II.3 Port Tariff Files and the Tariff Menu

In order to use the PORTARIF program, it is necessary to know how to interpret tariffs in a consistent manner. The individual tariff items in a port tariff are composed of a basic rate, a charging formula and, optionally, a condition formula. These components must be defined for each of the tariff items entered in the port tariff.

As an example, a port tariff might include Port Dues of $.05 per GRT for all vessels over 5000 GRT calling at the port. In this case, under the tariff category Port Dues would be the tariff item Port Dues for vessels over 5000 GRT. The basic rate is $.05 and the charging formula is simply the vessel GRT. The condition formula would be that the GRT is greater than 5000. If the Port Dues were charged at the same rate per GRT but were assessed per day in port, the basic rate would still be $.05, but the charging formula would be equal to the product of the vessel's GRT and the number of days in port. If the Port Dues category included a charge of $.04 per GRT per day in port for vessels less than or equal to 5000 GRT, then that second tariff item would have $.04 for the basic rate and would have the condition formula that GRT ≤ 5000.

II.3.1 Identifying the Charging Parameters

In order to translate a port tariff into a form that is accessible to the PORTARIF program, the user must begin by defining the set of charging parameters which will be used in the port tariff. These charging parameters describe, in quantitative form, the characteristics of the vessel, its cargo and the services received so that the port charges can be computed. For example, the vessel's NRT or Nationality are charging parameters if these data are used to determine one or more of the port charges such as Port Dues or Pilotage. Similarly, the charging parameter would include the quantities of each type of cargo moving in each direction. If one or more of the tariff items, e.g. wharf handling, were differentiated according to cargo form and direction. A careful review of the items in a port tariff is required in order to identify all of the required charging parameters.11

A more complete description of the procedure for identifying the charging parameters and translating a tariff into the format required by PORTARIF is presented in Annex B. [11]

11 As previously mentioned, there is a limit on the number of charging parameters which can be defined (48) so some compromise may be required in the level of detail used to describe the tariff.
II.3.2 Creating a Tariff File (Tariff Menu - Option 2)

The second option, 2, on the Tariff Menu (see Figure II.2) is selected in order to begin constructing a tariff file. When 2 is entered, the Tariff Menu will disappear and in its place the following message will appear.

Enter the Tariff Reference Code ____

This can be any combination of letters and numbers with a maximum of five characters

The user then types in a five character code followed by a [CR]. This code will be used in subsequent attempts to retrieve, edit and print the tariff. If another tariff was previously stored under this reference code, then it will be lost.12

II.3.3 Units of Measure

Once the reference code has been entered, then a new message will appear on the screen as shown below asking the user to select the type of units which will be used in conjunction with the charging parameters.

TYPE OF MEASUREMENT UNITS

1. METRIC UNITS
2. ENGLISH UNITS

SELECT ONE OF ABOVE __

Once a choice has been made by typing either a 1 or 2 followed by a [CR], then the message will disappear and the list of measurement units will appear as shown in Figure II.6. The user has the option of inputting up to three additional units of measure or of accepting the form as is by pressing the [PgDn] key. The additional units are input by typing in

12 This assumes that the previous tariff file is stored in the same directory. Before the original file is lost, a messages will appear on the screen asking whether the existing file is to be written over. In order to remove a tariff file that is no longer needed, the user should select option G in the Main Menu.
Figure II.6

Input Form for Units of Measure

List of Measures Including User-Specified Measures

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>meters</td>
</tr>
<tr>
<td>M.T</td>
<td>metric tons</td>
</tr>
<tr>
<td>M.3</td>
<td>cubic meters</td>
</tr>
<tr>
<td>F.T</td>
<td>freight tons (ton or cu.m)</td>
</tr>
<tr>
<td>LTR</td>
<td>liters</td>
</tr>
<tr>
<td>BBL</td>
<td>barrels</td>
</tr>
<tr>
<td>HRS</td>
<td>hours</td>
</tr>
<tr>
<td>SHF</td>
<td>shifts</td>
</tr>
<tr>
<td>DAY</td>
<td>days</td>
</tr>
<tr>
<td>TEU</td>
<td>twenty-foot containers</td>
</tr>
<tr>
<td>FEU</td>
<td>forty-foot containers</td>
</tr>
</tbody>
</table>

First a symbol followed by [CR] and then a description of what that symbol refers to followed by [CR]. After the description is entered, the cursor will move to the next line. Two more units of measure can be entered using this same procedure or the form can be completed by pressing the [PgDn] key.

Additional units of measure should be determined by reviewing the port tariff. Possible additions are:

1. time units such as a half-shift, week or month,
2. volume units such as a truck or wagon load, bale, or pallet, or
3. weight units such as a kilogram or cwt.

Only those units which are essential should be included. Each charging parameter will be assigned a unit of measure from this list unless the parameter refers to a classification rather than quantity or to a unit or measure which is obvious.

---

13 This symbol can have up to three characters but must begin with a letter.
II.3.4 Charging Parameters

Once the units of measure have been identified, then the charging parameters are entered in a Charging Parameter Entry Form similar to that shown in Figure II.7. The form contains four columns. The left-most column is used to check off whether a charging parameter is to be used in the tariff. The next column contains the symbol used to refer to the charging parameter. The third column contains a description of the charging parameter and the fourth column contains the unit of measure used to compute the charging parameters. The units of measure which were defined in the previous input form are shown at the bottom of the screen for reference.

There are four different formats for the Charging Parameters Entry Form corresponding to the basic categories of charging parameters:

1. Vessel Parameters (Figure II.8a)
2. Cargo Parameters (Figure II.8b)
3. Performance Parameters (Figure II.8c)
4. Utility and Miscellaneous Parameters (Figure II.8d)

Certain charging parameters are already entered in these forms. These were selected because they are commonly found in port tariffs. If a pre-selected unit is to be included, then X[CR] is entered when the cursor is in the left-most column. This is followed by pressing [PgDn] to indicate acceptance of the Symbol, Description and Unit of Measure. If the pre-selected charging parameter is not to be included, then it can be excluded by pressing [PgDn] rather than X[CR]. If a pre-selected parameter is to be modified, then the user types X[CR] when the cursor is in the "X" column and then enters a new symbol of up to 10 characters followed by a [CR], a new description (up to 35 characters) followed by [CR], and a new unit of measure followed by [CR].

After a charging parameter has been accepted, modified or excluded, then the cursor will move to the next line. If a mistake is made and the mistake is on the same row, then the [Up] key can be used to move backwards along the line. A correction is made by typing over the incorrect entry or pressing the [Ctrl] and Y keys simultaneously to delete the incorrect entry before typing in the correct entry. Once a line is completed, it cannot be edited except by using the edit activity described in the next section.

14 The symbol must begin with a letter and can include digits, letters and underlines, but no leading blanks. As a matter of convention it is recommended that user-specified symbols begin with the character X so as to prevent the use of a symbol name which has already been reserved by the program for internal calculations.

15 To erase the pre-selected entry press [Ctrl] and Y simultaneously.
Figure II.7

Sample Input Form for Charging Units

VEssel-BASED CHARGING UNITS

<table>
<thead>
<tr>
<th>X</th>
<th>SYMBOL</th>
<th>DESCRIPTION</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GRT</td>
<td>Vessel's Gross Registered Tonnage</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DWT</td>
<td>Vessel's Deadweight</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NRT</td>
<td>Vessel's Net Registered Tonnage</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LOA</td>
<td>Vessel's Length Overall</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BEAM</td>
<td>Beam of Vessel</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DRAFT</td>
<td>Fully-Loaded Draft of Vessel</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DEPTH</td>
<td>Draft of Vessel When Entering Port</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>M</th>
<th>M_3</th>
<th>LTR</th>
<th>HRS</th>
<th>DAY</th>
<th>FEU</th>
</tr>
</thead>
<tbody>
<tr>
<td>M.T</td>
<td>F.T</td>
<td>BBL</td>
<td>SHF</td>
<td>TEU</td>
<td></td>
</tr>
</tbody>
</table>

After the user has moved through the list of pre-selected charging parameters, new charging parameters can be entered in the remaining blank lines in the Entry form. These new charging parameters are created by entering X[CR] followed by the Symbol, Description and Unit of Measure for that charging parameter. This can be repeated up to the limit of number of lines in each Charging Parameter Entry Form. The first three entry forms can each accept a total of twelve charging parameters. The last entry form can accept fourteen. Once all the desired charging parameters have been entered in a form, then the next form is called up by pressing the [PgDn] key repetitively until the first blank row is highlighted and then pressing [PgDn] one more time. [14]

After all four Charging Parameter Entry forms are completed then the Tariff Entry Form shown in Figure II.9 will appear on the screen. The lower half of this form contains a list of the charging parameters just selected. The upper half is used to describe the tariff item.
### Figure 8a

**Input Form for Vessel Data - Charging Units**

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>DESCRIPTION</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRT</td>
<td>Vessel's Gross Registered Tonnage</td>
<td></td>
</tr>
<tr>
<td>DWT</td>
<td>Vessel's Deadweight</td>
<td></td>
</tr>
<tr>
<td>NRT</td>
<td>Vessel's Net Registered Tonnage</td>
<td></td>
</tr>
<tr>
<td>LOA</td>
<td>Vessel's Length Overall</td>
<td>M</td>
</tr>
<tr>
<td>BEAM</td>
<td>Beam of Vessel</td>
<td></td>
</tr>
<tr>
<td>DRAFT</td>
<td>Fully-Loaded Draft of Vessel</td>
<td>M</td>
</tr>
<tr>
<td>DEPTH</td>
<td>Draft of Vessel When Entering Port</td>
<td></td>
</tr>
<tr>
<td>XTYPE</td>
<td>1=container, 2=breakbulk, 3=bulker</td>
<td></td>
</tr>
<tr>
<td>XROUTE</td>
<td>1=international 2=coastal</td>
<td></td>
</tr>
</tbody>
</table>

### Figure II.8b

**Input Form for Cargo Data - Charging Units**

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>DESCRIPTION</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CARGO1</td>
<td>Breakbulk Cargo, Inbound</td>
<td>F.T</td>
</tr>
<tr>
<td>CARGO2</td>
<td>Palletized Cargo, Inbound</td>
<td>F.T</td>
</tr>
<tr>
<td>CARGO3</td>
<td>Full Containers, FCL, Inbound</td>
<td>TEU</td>
</tr>
<tr>
<td>CARGO4</td>
<td>Full Containers, LCL, Inbound</td>
<td>TEU</td>
</tr>
<tr>
<td>CARGO5</td>
<td>Empty Containers, Inbound</td>
<td>TEU</td>
</tr>
<tr>
<td>CARGO6</td>
<td>Breakbulk Cargo, Outbound</td>
<td>F.T</td>
</tr>
<tr>
<td>CARGO7</td>
<td>Palletized Cargo, Outbound</td>
<td>F.T</td>
</tr>
<tr>
<td>CARGO8</td>
<td>Full Containers, FCL, Outbound</td>
<td>TEU</td>
</tr>
<tr>
<td>CARGO9</td>
<td>Full Containers, LCL, Outbound</td>
<td>TEU</td>
</tr>
<tr>
<td>CARGO10</td>
<td>Empty Containers, Outbound</td>
<td>TEU</td>
</tr>
</tbody>
</table>
Figure II.8c

Input Form for Performance Data Charging Units

PERFORMANCE-RELATED CHARGING UNITS

<table>
<thead>
<tr>
<th>X</th>
<th>SYMBOL</th>
<th>DESCRIPTION</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>PORTCALL</td>
<td>Number of Vessel Calls, Default = 1</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>PORT_TIME</td>
<td>Total Time Vessel Spent in Port</td>
<td>DAY</td>
</tr>
<tr>
<td>X</td>
<td>BERTH_TIME</td>
<td>Total Time Vessel Spent at Berth</td>
<td>HRS</td>
</tr>
<tr>
<td>X</td>
<td>GANGS</td>
<td>Average Number of Gangs Used Per Shift</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>GANG_SHF1</td>
<td>Number of 1st Shifts Worked</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>GANG_SHF2</td>
<td>Number of 2nd Shifts Worked</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>GANG_SHF3</td>
<td>Number of 3rd Shifts Worked</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>XGANTRY</td>
<td>Gantry Crane Use</td>
<td>HRS</td>
</tr>
<tr>
<td>X</td>
<td>XMORNING</td>
<td>Total Time at Mooring Point</td>
<td>DAY</td>
</tr>
</tbody>
</table>

Figure II.8d

Input Form for Utilities and Miscellaneous Data - Charging Units

EQUIPMENT AND UTILITIES CHARGING UNITS

<table>
<thead>
<tr>
<th>X</th>
<th>SYMBOL</th>
<th>DESCRIPTION</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>PILOTS</td>
<td>Number of Times Pilots Used</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>TUGBOAT1</td>
<td>Time Tugboat Type 1 Used</td>
<td>HRS</td>
</tr>
<tr>
<td>X</td>
<td>TUGBOAT2</td>
<td>Time Tugboat Type 2 Used</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>EQUIPMENT1</td>
<td>Floating Cranes</td>
<td>HRS</td>
</tr>
<tr>
<td>X</td>
<td>EQUIPMENT2</td>
<td>Mobile Cranes</td>
<td>HRS</td>
</tr>
<tr>
<td>X</td>
<td>EQUIPMENT3</td>
<td>Heavy Duty Forklifts</td>
<td>SHF</td>
</tr>
<tr>
<td>X</td>
<td>BUNKERS</td>
<td>Quantity of Bunkers Loaded</td>
<td>M.T</td>
</tr>
<tr>
<td>X</td>
<td>ELECTRIC</td>
<td>Quantity of Electricity Used</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>WATER</td>
<td>Quantity of Potable Water Used</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>XTRANSITIN</td>
<td>Ave. Storage Time for Inbound Cargo</td>
<td>DAY</td>
</tr>
<tr>
<td>X</td>
<td>XTRANSITOUT</td>
<td>Ave. Storage Time for Outbound Cargo</td>
<td>DAY</td>
</tr>
<tr>
<td>X</td>
<td>XEMPTYSTOR</td>
<td>Time For Storage of Empty Boxes</td>
<td>DAY</td>
</tr>
</tbody>
</table>
The first entry in the form is the tariff item number. It is entered by typing in five digits followed by a [CR]. This tariff item number is displayed in the tariff analysis outputs. Since all outputs will be sorted by tariff number, it is important to use a logical sequence in assigning the item numbers. Specifically, the first one or two digits should be used to indicate the cost/service center to which revenues from the tariff item are assigned. The next one or two digits should be used to refer to the tariff category and the last one or two digits should refer to the tariff item number. The output will sort the revenues by tariff number proceeding from smallest to largest therefore all tariff numbers should have the same total number of digits. A sample tariff item number might be 12021 where 12 is the service center, 2 is the tariff category and 1 is the tariff item number.

The next entry is the name of the tariff category, for example Port Dues, Wharfage, etc. This entry can be up to 25 characters and is concluded with a [CR]. This name will be printed with the item number on the tariff analysis output forms.

After the item number and name have been entered, the basic rate is typed in followed by [CR]. This rate must be a numeric value between .0001 and 99999.999. Decimal points may be used but not commas. Negative numbers can be entered by preceding the number with a minus sign. The decimal point located in the entry form should be ignored while typing in the rate. The program will align the number, once it has been entered.
The next entry is the charging formula. The charging formula can contain up to 35 characters. This entry can include any of the charging parameters shown in the lower half of the screen joined by the standard mathematical operators. 16/ The formula is entered followed by a [CR].

The last four entries in the Tariff Entry Form define the condition under which the tariff item applies. This condition is expressed as a logical relationship between the condition formula and one or more numeric constants. The value computed from the formula is compared with these numeric constants to determine if it is greater than, equal to or less than the specified values. If a condition is not to be included in the tariff item then press [PgDn] to proceed to a new tariff entry form.

If a condition is to be entered then the condition formula and at least one constraint must be entered. The condition formula has a format similar to the charging formula and it entered followed by a [CR]. This expression is given limits by entering numeric constants in any or all of the next three entries. These numbers can range from .01 to 9,999,999. A negative sign and decimal point can be used but no commas or brackets. Each number is entered followed by a [CR]. If no limit is to be entered, then simply press [CR]. The default value 0.0 will appear but the program will ignore this constraint. Different relationships can be established as shown below.

1000 < GRT < 15000
GRT LESS THAN 15000
EQUAL TO 0.0
GREATER THAN 1000

1000 ≤ GRT < 15000
GRT LESS THAN 15000
EQUAL TO 1000
GREATER THAN 1000

1000 < GRT ≤ 15000
GRT LESS THAN 15000
EQUAL TO 15000
GREATER THAN 1000

GRT = 15000
GRT LESS THAN 0.0
EQUAL TO 15000
GREATER THAN 0.0

Once the numeric constants have been entered, then a message will appear on the screen as follows.

Do You Wish To Enter Another Tariff Item? (Y/N) Y

16 multiplication => *, division => /, addition => +, subtraction => -, and exponentiation => **. The expression is processed left to right so that 3*2+5/2 is equal to 5.5. The order of precedence can be controlled by using brackets so that 3*(2+(5/2)) is equal to 13.5
The default value is Yes so that by pressing [CR], a new Tariff Input Form will appear on the screen and the process described above can be repeated. When the last tariff item has been entered, the process can be completed by typing N[CR].[15]

II.3.5 Editing the Charging Parameters (Tariff Menu - Option 5)

An existing tariff file can be modified by editing the current tariff item or by adding new charging parameters and tariff items. The charging parameters can be modified by choosing the fifth option in the Tariff Menu. This will cause the four Charging Parameter Entry Forms to appear on the screen in sequence with the current charging parameters displayed. The procedure used to edit the charging parameters is the same as was used to input these parameters. If no changes are to be made in a charging parameter, then that parameter can be bypassed by pressing the [PgDn] key. If the charging parameter is to be modified, then the individual entries can be corrected by typing over the old entries followed by a [CR] or can be left unaltered by pressing [CR].[17] If additional charging parameters are to be added, then they can be entered by filling in the blank lines in the Charging Parameter Entry Forms or by modifying the entries for pre-selected charging parameters which were not being used. In either case, an X[CR] is entered in the first column followed by the Symbol, Description and Unit of Measurement. After the four Charging Parameter Entry Forms have been completed, then the Tariff Menu will reappear.[16]

II.3.6 Editing the Tariff Items (Tariff Menu - Option 4)

Tariff items may be edited for three reasons;

1. to correct errors in the original entry of the tariff item,
2. to reflect any changes made in the charging parameters.[18]
3. to add new tariff items to the file
4. to introduce changes in individual tariff items in order to determine their effects on ship's bills and port income.

In the latter case, it is desirable to create a copy of the tariff file before introducing these changes. This can be done automatically. When the fourth option in the Tariff Menu is selected, a menu appears allowing the user to make the modifications to the original tariff file or to a copy of that file (Figure II.10a). If the latter option is selected, then the user is asked to enter a five character reference code for the new copy of the tariff file. The charging parameters and tariff items will

The [Ins/Typeover] key can be used along with the [Del] key to facilitate the editing. The old entry can be cleared by pressing the [Ctrl] and Y keys simultaneously.

If certain charging parameters are eliminated (by deleting the "X" in the check-off column) or their symbols are changed, then it is necessary to eliminate any references to these deleted charging parameters in the tariff items.
then be copied into this new file.\footnote{19} Once the copy of the tariff file has been completed, then the editing is performed on that copy. If no copy is requested then the original will be edited.

After the user decides whether to edit the original or a copy, another menu offers the choice of editing an existing tariff item in the tariff file or adding a new tariff item (see Figure II.10b). If the user selects the latter, then a blank Tariff Entry Form, similar to that used to input the tariff items (Figure II.9), will appear on the screen. If instead, an existing tariff item is to be edited, the following prompt will appear:

If You Wish to Edit a Specific Tariff Item Then
Enter the Item Number, Otherwise Press Return

The user can select a specific tariff item by entering the appropriate tariff item number followed by [CR]. If a specific item is not selected then the edit will begin with first tariff item in the file.

A tariff item is edited by modifying one or more of the entries in the Tariff Entry Form. If no change is to be made to an entry, then it is bypassed by pressing [CR]. If a modification is to be made, then the new entry is typed over the old one followed by pressing [CR]. The cursor will then move to the next entry. Once the tariff item has been modified, then the revision is saved either by pressing [PgDn] or by moving through the remaining entries in the form using [CR]. After the revision has been saved, the following prompt will appear:

Do You Wish To Edit Another Tariff Item? (Y/N) Y

The default is Yes. If the user responds by pressing [CR], then the prompt asking for the number of the tariff item to be edited will reappear and the edit process will be repeated. If the user responds by entering N[CR], then the edit will be completed and the Tariff Menu will reappear.

\section{II.3.7 Printing the Tariff File (Tariff Menu - Option 6 or 7)}

In order to review the contents of a tariff file, a printout can be made of the charging parameters and the tariff items. These printouts are generated by selecting the sixth and seventh options in the Tariff Menu. Samples of these printouts are shown in Figures II.11 and II.12. It is recommended that these printouts be generated prior to editing either the charging parameters or the tariff items.\footnote{18}
Figure II.10a
Tariff Edit Menu - Copy or Original

TARIFF MENU

Do You Wish to Edit a Copy of the File or the Original?

1. Copy
2. Original

Enter The Appropriate Number (1 or 2) :2:

Figure II.10b
Tariff Edit Menu - Edit or Add a Tariff Item

TARIFF MENU

Do You Wish to:

1. add new tariff items
2. edit existing tariff items

Enter The Appropriate Number (1 or 2) :2:
II.4 The Vessel Files

The vessel files contain information of the vessels which call at the port. The information concerns the extent of the vessel's use of the port's service, the time spent receiving these services and the characteristics of the vessel and its cargo all of which are used in computing the port charges.

In order to create a vessel file, it is necessary to select a sample of representative vessels. The sampling procedure was discussed in Part I of this paper. The information provided for each vessel must include values for all of the charging parameters specified in the port tariff. Thus the vessel file is linked to a specific set of charging parameters and can only be used with those tariffs which use the same set of charging parameters. If tariff files with different sets of charging parameters are being tested, the separate vessel files must be prepared to correspond to the different sets of charging parameters. The vessels included in the vessel file should be chosen with reference to the tariff file being analyzed. If the tariff file is limited to a subset of the port tariff, e.g. the container terminal charges, then the vessel file should be limited to those vessels affected by that subset, e.g. container vessels.

Before creating the vessel file, the values for each of the charging parameters used in the tariff must be determined for all the vessels to be entered in the file. This data is entered into a new vessel file by using the second option in the Vessel Menu. When 2 is entered, the following message will appear.

Enter the Vessel File Reference Code

This can be any combination of letters and numbers with a maximum of four characters

The user then types in a four character code followed by a [CR]. This code will be used to retrieve, edit and print the vessel file in the future. If a vessel file was already stored on the current directory under the same reference code, then that vessel file will be lost.

After the reference code has been entered, a Vessel Input Form similar to that shown in Figure II.13 will appear on the screen. This form contains

20 In order to make comparisons between different tariffs using the same set of vessels, it is necessary to develop a general set of charging parameters which can be applied to all tariff variations.

21 Copies of the printout for charging parameters mentioned above can be used as a data collection form.
Figure II.11

Printout of Tariff Items

ITEM NUMBER 00001
PILOTAGE
1000.0000 X PORTCALL
FOR NRT
LESS THAN 1000.00
EQUAL TO 1000.00
GREATER THAN 0.00

ITEM NUMBER 00002
PILOTAGE
1.0000 X NRT
FOR NRT
LESS THAN 0.00
EQUAL TO 0.00
GREATER THAN 1000.00

ITEM NUMBER 01001
PORT DUES
3.0000 X NRT
FOR XROUTE
LESS THAN 0.00
EQUAL TO 1.00
GREATER THAN 0.00

ITEM NUMBER 01002
PORT DUES
2.0000 X NRT
FOR XROUTE
LESS THAN 0.00
EQUAL TO 2.00
GREATER THAN 0.00

ITEM NUMBER 02001
TOWAGE, IN & OUT
7500.0000 X PORTCALL
FOR XROUTE
LESS THAN 0.00
EQUAL TO 1.00
GREATER THAN 0.00

ITEM NUMBER 03001
BERTHING
2000.0000 X XBERTH

ITEM NUMBER 04001
MOORAGE
0.2500 X NRT*MOOR_TIME
FOR NRT
LESS THAN 0.00
EQUAL TO 0.00
GREATER THAN 3200.00
**Figure II.12**

Printout of the Charging Units

### Vessel-Based Charging Units

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>DESCRIPTION</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRT</td>
<td>Vessel's Net Registered Tonnage</td>
<td>In</td>
</tr>
<tr>
<td>ROUTE</td>
<td>Route: international=1, coastal=2</td>
<td>In</td>
</tr>
<tr>
<td>XTOW_IN</td>
<td>Inward Towage - no. of times/call</td>
<td>In</td>
</tr>
<tr>
<td>XTOW_OUT</td>
<td>Outward Towage - no. of times/call</td>
<td>In</td>
</tr>
<tr>
<td>XBERTH</td>
<td>No. of berthings/call</td>
<td>In</td>
</tr>
</tbody>
</table>

### Cargo-Based Charging Units

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>DESCRIPTION</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CARGO1</td>
<td>Breakbulk Imports</td>
<td>in F.T</td>
</tr>
<tr>
<td>CARGO2</td>
<td>Breakbulk Exports</td>
<td>in F.T</td>
</tr>
<tr>
<td>CARGO3</td>
<td>Chemicals</td>
<td>in M.T</td>
</tr>
<tr>
<td>CARGO4</td>
<td>Foodgrain, Imports</td>
<td>in M.T</td>
</tr>
<tr>
<td>CARGO5</td>
<td>Foodgrain, Exports</td>
<td>in M.T</td>
</tr>
<tr>
<td>CARGO6</td>
<td>Fertilizer, Imports</td>
<td>in M.T</td>
</tr>
<tr>
<td>CARGO7</td>
<td>Fertilizer, Exports</td>
<td>in M.T</td>
</tr>
<tr>
<td>CARGO8</td>
<td>FCL Inbound containers</td>
<td>in TEU</td>
</tr>
<tr>
<td>CARGO9</td>
<td>FCL Outbound containers</td>
<td>in TEU</td>
</tr>
<tr>
<td>CARGO10</td>
<td>LCL In/outbound containers</td>
<td>in TEU</td>
</tr>
<tr>
<td>CARGO11</td>
<td>Empty Containers</td>
<td>in TEU</td>
</tr>
<tr>
<td>CARGO12</td>
<td>Crude Oil Shipment</td>
<td>in M.T</td>
</tr>
</tbody>
</table>

### Performance-Related Charging Units

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>DESCRIPTION</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PORTCALL</td>
<td>Unit Value per Port Call, Default = 1</td>
<td>in</td>
</tr>
<tr>
<td>BERTH_TIME</td>
<td>Total Time Vessel Spent at Berth</td>
<td>in DAY</td>
</tr>
<tr>
<td>SHIFT_2</td>
<td>Number of overtime shifts worked</td>
<td>in SHF</td>
</tr>
<tr>
<td>GANG_SHFT1</td>
<td>Number of gangs working 1st shift</td>
<td>in</td>
</tr>
<tr>
<td>GANG_SHFT2</td>
<td>Number of gangs working 2nd shift</td>
<td>in</td>
</tr>
<tr>
<td>PIPE_TIME</td>
<td>Time spent using petroleum pipeline</td>
<td>in DAY</td>
</tr>
<tr>
<td>MOOR_TIME</td>
<td>Time spent at mooring</td>
<td>in DAY</td>
</tr>
<tr>
<td>TRANSIT_IN</td>
<td>Ave. time Inbound BB cargo storage</td>
<td>in DAY</td>
</tr>
<tr>
<td>TRANSIT_OUT</td>
<td>Ave. time Outbound BB cargo storage</td>
<td>in DAY</td>
</tr>
<tr>
<td>IN_TIME</td>
<td>Ave. Inbound box storage time</td>
<td>in DAY</td>
</tr>
<tr>
<td>OUT_TIME</td>
<td>Ave. Outbound box storage time</td>
<td>in DAY</td>
</tr>
<tr>
<td>EMPTY_TIME</td>
<td>Ave. Empty Box Storage Time</td>
<td>in DAY</td>
</tr>
</tbody>
</table>

### Equipment and Utilities Charging Units

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>DESCRIPTION</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRANE_HIRE</td>
<td>Crane Hire Time</td>
<td>in SHF</td>
</tr>
<tr>
<td>FORK_HIRE</td>
<td>Forklift Truck Hire Time</td>
<td>in SHF</td>
</tr>
<tr>
<td>TRUCK_HIRE</td>
<td>Prime Mover Hire Time</td>
<td>in SHF</td>
</tr>
<tr>
<td>WATER</td>
<td>Quantity of Potable Water Used</td>
<td>in M.T</td>
</tr>
</tbody>
</table>
spaces for entering values for all of the charging parameters in the currently active tariff file. To the left of the space is the name of the charging parameter, to the right is the unit of measure used with this parameter.

Figure II.13

Vessel Input Form

VEssel DESCRIPTION FORM FOR VESSEL

<table>
<thead>
<tr>
<th>GRT</th>
<th>0</th>
<th>BERTH_TIME</th>
<th>0.0</th>
<th>HRS</th>
</tr>
</thead>
<tbody>
<tr>
<td>DWT</td>
<td>0</td>
<td>GANGS_SHF1</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>LOA</td>
<td>0</td>
<td>M</td>
<td>GANGS_SHF2</td>
<td>0.0</td>
</tr>
<tr>
<td>DRAFT</td>
<td>0</td>
<td>M</td>
<td>GANGS_SHF3</td>
<td>0.0</td>
</tr>
<tr>
<td>TYPE</td>
<td>0.0000</td>
<td>XGANTRY</td>
<td>0.0000</td>
<td>HRS</td>
</tr>
<tr>
<td>XROUTE</td>
<td>0.0000</td>
<td>XMoorING</td>
<td>0.0000</td>
<td>DAY</td>
</tr>
<tr>
<td>CARGO1</td>
<td>0</td>
<td>F.T</td>
<td>PILOTS</td>
<td>0.00</td>
</tr>
<tr>
<td>CARGO2</td>
<td>0</td>
<td>F.T</td>
<td>TUGBOAT1</td>
<td>0.00</td>
</tr>
<tr>
<td>CARGO3</td>
<td>0</td>
<td>TEU</td>
<td>EQUIPMENT1</td>
<td>0.00</td>
</tr>
<tr>
<td>CARGO4</td>
<td>0</td>
<td>TEU</td>
<td>EQUIPMENT2</td>
<td>0.00</td>
</tr>
<tr>
<td>CARGO5</td>
<td>0</td>
<td>TEU</td>
<td>EQUIPMENT3</td>
<td>0.00</td>
</tr>
<tr>
<td>CARGO6</td>
<td>0</td>
<td>F.T</td>
<td>BUNKERS</td>
<td>0.00</td>
</tr>
<tr>
<td>CARGO7</td>
<td>0</td>
<td>F.T</td>
<td>XTRANSITIN</td>
<td>0.0000</td>
</tr>
<tr>
<td>CARGO8</td>
<td>0</td>
<td>M.T</td>
<td>XTRANSITOU</td>
<td>0.0000</td>
</tr>
<tr>
<td>PORTCALL</td>
<td>0</td>
<td>M.T</td>
<td>XEMPTYSTOR</td>
<td>0.0000</td>
</tr>
<tr>
<td>PORT_TIME</td>
<td>0.0</td>
<td>DAY</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

VEssel PERFORMANCE FORMULAE

| 1. | = | | |
| 2. | = | | |
| 3. | = | | |
| 4. | = | | |

The first entry in the Vessel Input Form is the number of the vessel. This number is used for reference when editing the file and when computing the ship's bill. The vessel number can contain up to 4 digits. Leading blanks are permitted. The number is typed in followed by [CR]. The cursor then moves to the list of charging parameters.

22 Before entering the vessel file, it is necessary to retrieve a tariff file which contains the appropriate charging parameters.

23 The terms vessel file and ship's bill are used throughout the manual. These same items could be referred to as the cargo file and the shipper's/consignees bill, since they can also be used for the purpose of estimating the charges to the cargo rather than the charges to the vessel. In the examples given in the text a combination of the two has used to estimate the ports revenues from charges to both the cargo and the vessel.
The value for each parameter is entered by typing in the correct number followed by [CR]. These numbers can include decimal points and negative numbers but no commas or blanks. The location of the decimal point in the entry space should be ignored when entering the number since the program correctly aligns the number after it is entered. After entering a value, the cursor will then move to the next entry. Corrections can be made to any entry in the form by using the [Up] key to move backwards through the form and then typing over the incorrect entry.

When values have been entered for all charging parameters, the cursor moves to the lower part of the screen where the performance formulas are entered. These formulas are used to compute the values for specific charging parameters. The Vessel Input Form can accept up to four such equations. The left hand side of the equation contains the name of a charging parameter which is dependent on the value of other charging parameters that are being tested. The right hand side of the equation contains the formula used to compute the value of this dependent parameter. The formula contains names of charging parameters connected by the normal mathematical operators including brackets. The formula is calculated from left to right allowing for any changes in precedence specified by the brackets. Once a formula is evaluated, that result is assigned to the parameter on the left side. For example, the formula below substitutes the volume of cargo #1 divided by 120 into the vessel parameter berth-time.

\[ \text{BERTH\_TIME} = \frac{\text{CARGO1}}{120} \]

The calculated value overrides any value previously assigned to that parameter including any value previously entered in the Vessel Entry Form. The equations are calculated in sequence so it is possible to use a parameter from the left side of a previous equation in the formula of a subsequent equation. In the example shown below, Berth_time is first computed and then used to calculate Port_time.

\[
\begin{align*}
\text{BERTH\_TIME} &= \frac{\text{CARGO1}}{30\times\text{GANGS}} + \frac{\text{CARGO2}}{\text{GANTRY}\times20} \\
\text{PORT\_TIME} &= \frac{\text{BERTH\_TIME}}{24} + .25 
\end{align*}
\]

By extension, it is also possible to use two or more successive equations to compute a dependent parameter. In the following example, Berth_time is computed in two stages.

\[
\begin{align*}
\text{BERTH\_TIME} &= \frac{\text{CARGO1}}{30\times\text{GANGS}} + \frac{\text{CARGO2}}{\text{GANTRY}\times20} \\
\text{BERTH\_TIME} &= \text{BERTH\_TIME} + \frac{\text{CARGO4}}{1000} 
\end{align*}
\]

The equations are entered by inputting first the left side followed by [CR] and then the right side followed by [CR]. If no equation is to be entered, then [PgDn] is pressed and the cursor moves to the next line. After the four lines have been completed or bypassed, the information for that vessel will be saved and the following prompt will appear on the screen. [20]
Do You Wish to Add Another Vessel? (Y/N) __

The default is yes. If [CR] is pressed a blank Vessel Entry Form will appear on the screen and the input procedure will be repeated. If, on the other hand, the user types N[CR], then this procedure will be terminated and the Vessel Menu will reappear. A sample of the completed vessel form is shown in Figure II.14.

Figure II.14

Sample Completed Vessel Input Form

VESSEL DESCRIPTION FORM FOR VESSEL 0001 NUMBER OF VESSEL CALLS 0115

<table>
<thead>
<tr>
<th>GRT</th>
<th>10000</th>
<th>BERTH_TIME</th>
<th>12.0 HRS</th>
<th>XTRANSITOUT</th>
<th>5.00000DAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>DWT</td>
<td>16000</td>
<td>GANGS_SHF1</td>
<td>2.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOA</td>
<td>165 M</td>
<td>GANGS_SHF2</td>
<td>2.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DRAFT</td>
<td>9.0 M</td>
<td>GANGS_SHF3</td>
<td>0.0</td>
<td></td>
<td></td>
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<tr>
<td>TYPE</td>
<td>1.0000</td>
<td>XGANTRY</td>
<td>24.0000HDRS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>XROUTE</td>
<td>1.0000</td>
<td>XMOORING</td>
<td>0.0000DAY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CARGO1</td>
<td></td>
<td>F.T PILOTS</td>
<td>2.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CARGO2</td>
<td>0 F.T</td>
<td>TUGBOAT1</td>
<td>3.00 HRS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CARGO3</td>
<td>200 TEU</td>
<td>EQUIPMENT1</td>
<td>0.00 HRS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CARGO4</td>
<td>150 TEU</td>
<td>EQUIPMENT2</td>
<td>0.00 SHF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CARGO5</td>
<td>50 TEU</td>
<td>EQUIPMENT3</td>
<td>0.00 SHF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CARGO6</td>
<td></td>
<td>F.T BUNKERS</td>
<td>200.00 M.T</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CARGO7</td>
<td>F.T</td>
<td>XTRANSITIN</td>
<td>10.0000DAY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CARGO8</td>
<td>F.T</td>
<td>XTRANSITOUT</td>
<td>5.0000DAY</td>
<td></td>
<td></td>
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<tr>
<td>PORTCALL</td>
<td>1</td>
<td>XEMPTYSTOR</td>
<td>30.0000DAY</td>
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<td></td>
</tr>
<tr>
<td>PORT_TIME</td>
<td>1.0</td>
<td>DAY</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

VESSEL PERFORMANCE FORMULAE

1. XGANTRY = (CARGO1+CARGO2+CARGO3)/20
2. BERTH_TIME = 8*XGANTRY/2
3. PORT_TIME = (3+BERTH_TIME)/24
4. PORT_TIME = __________

II.4.1 Modifying the Vessel File (Vessel Menu - Option 4)

A vessel file may be modified for four reasons. The first reason is to correct mistakes made at the time of initial input. The second is to add new vessels to the file. The third is to modify the values of the vessels’ charging parameters to reflect changes in the vessel’s performance or demand for services. The final reason is to modify the values given to certain of the vessels’ charging parameters to reflect changes in the definition of these parameters.
In order to modify an existing vessel file, it must first be retrieved using the third option, 3, of the Vessel Menu. The edit is initiated by selecting the fourth option, 4, in the Vessel Menu. After 4 is entered, a menu will appear on the screen asking whether the proposed changes are to be made to the original file or to a copy. If the latter is selected, the user is asked to enter a new four character reference code. A copy of the vessel file will then be made using the new reference number and the copy will be edited rather than the original.

Once a selection has been made between the original and the copy, then a second menu will appear asking whether to edit an existing vessel in the file or to add a new vessel to the file. If a new vessel is to be added then a blank Vessel Entry Form, as shown in Figure II.13, will appear on the screen. If an existing vessel is to be edited, then the user is given a final prompt as follows:

If You Wish to Edit a Specific Vessel Then Enter the Vessel's Number, Otherwise Press Return

If a reference number is entered followed by [CR] then the input form for that vessel will appear on the screen. If no reference number is given and [CR] is pressed, then the input form for the first vessel in file will appear on the screen.

The values for the vessel's charging parameters are modified by typing over the previous entry or by deleting the current entry (pressing [Ctrl] and Y simultaneously) and typing in a new entry. If no modification is to be made to a parameter, then the cursor can be moved to the next entry by pressing [CR].

Once all changes are made, the user presses the [PgDn] key. There follows a prompt asking whether the user wishes to edit another vessel. The default is yes. By pressing [CR], another vessel can be selected and the edit process repeated. If N[CR] is entered, then the edit activity will be terminated and the Vessel Menu will reappear on the screen.[21]

II.4.2 Printing the Vessel File (Vessel Menu - Option 5)

The contents of the currently active vessel file can be printed by selecting the fifth option in the Vessel Menu. The format of this printout is shown in Figure II.15. Once the printout is completed, the Vessel Menu will reappear on the screen.[22]

II.5 Tariff Analysis (Main Menu - Option F)

The PORTARIF program performs three types of analysis using the ship's bill as a basis for the computations. The simplest form of analysis is the computation of the individual ship's bill (or shipper/consignee's invoice) for one or all of the vessels described in a vessel file. The second form of analysis is the computation of port income. If the vessel file contains a summary of the typical vessels calling at the
Figure II.15

Typical Vessel File Printout

VESSEL DESCRIPTION FORM FOR VESSEL 0001

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRT</td>
<td>2000</td>
</tr>
<tr>
<td>XROUTE</td>
<td>2.0000</td>
</tr>
<tr>
<td>XTOW_IN</td>
<td>0.0000</td>
</tr>
<tr>
<td>XTOW_OUT</td>
<td>0.0000</td>
</tr>
<tr>
<td>XBERTH</td>
<td>0.0000</td>
</tr>
<tr>
<td>CARG01</td>
<td>500 F.T</td>
</tr>
<tr>
<td>CARG02</td>
<td>100 F.T</td>
</tr>
<tr>
<td>CARG03</td>
<td>0 M.T</td>
</tr>
<tr>
<td>CARG04</td>
<td>0 M.T</td>
</tr>
<tr>
<td>CARG05</td>
<td>0 M.T</td>
</tr>
<tr>
<td>CARG06</td>
<td>0 M.T</td>
</tr>
<tr>
<td>CARG07</td>
<td>0 M.T</td>
</tr>
<tr>
<td>CARG08</td>
<td>0 TEU</td>
</tr>
<tr>
<td>CARG09</td>
<td>0 TEU</td>
</tr>
<tr>
<td>CARG10</td>
<td>0 TEU</td>
</tr>
<tr>
<td>CARG11</td>
<td>0 TEU</td>
</tr>
<tr>
<td>CARG12</td>
<td>0 M.T</td>
</tr>
<tr>
<td>PORTCALL</td>
<td>1</td>
</tr>
<tr>
<td>BERTH_TIME</td>
<td>3.0 DAY</td>
</tr>
<tr>
<td>SHIFT_2</td>
<td>3.0 SHF</td>
</tr>
<tr>
<td>GANG_SHIFT1</td>
<td>1</td>
</tr>
<tr>
<td>GANG_SHIFT2</td>
<td>1.0</td>
</tr>
<tr>
<td>PIPE_TIME</td>
<td>0.0 DAY</td>
</tr>
<tr>
<td>MOOR_TIME</td>
<td>0.0 DAY</td>
</tr>
<tr>
<td>TRANSIT_IN</td>
<td>15.0000 DAY</td>
</tr>
<tr>
<td>TRANSIT_OUT</td>
<td>8.0000 DAY</td>
</tr>
<tr>
<td>IN_TIME</td>
<td>8.0000 DAY</td>
</tr>
<tr>
<td>OUT_TIME</td>
<td>5.0000 DAY</td>
</tr>
<tr>
<td>EMPTY_TIME</td>
<td>0.0000 DAY</td>
</tr>
<tr>
<td>CRANE_HIRE</td>
<td>6.00 SHF</td>
</tr>
<tr>
<td>FORK_HIRE</td>
<td>12.00 SHF</td>
</tr>
<tr>
<td>TRUCK_HIRE</td>
<td>0.00 SHF</td>
</tr>
<tr>
<td>WATER</td>
<td>0.00 M.T</td>
</tr>
</tbody>
</table>

VESSEL PERFORMANCE FORMULAE

1. =
2. =
3. =
4. =
port, a composite bill is computed. The third form of analysis involves testing the change in port charges as the performance of a vessel is altered.

These analyses are performed by selecting option F in the Main Menu after both a tariff file and a vessel file have been retrieved. This will cause the Analysis Menu (Figure II.5) to appear on the screen. After a menu item is selected by entering the appropriate number, the Output Menu (Figure II.16) appears with options as to where the results of the analysis are to be directed. If the first option is selected, then the results are sent directly to the printer. If the second option is selected, the results appear on the screen in segments displayed sequentially by pressing [CR]. If the third option is selected, the user is asked to enter a five character name which will be used to generate an ASCII file containing the results of the analysis.

III.5.1 Ship’s Bill (Analysis Menu - Option 1)

The analysis of ship’s bills allows the user to evaluate the effect of changes in tariff items on individual vessels, cargoes or shipping services. Also the ship’s bill analysis can also be used to verify the accuracy of the information in the tariff file.

The analysis of ship’s bills is performed by typing 1 in response to the Analysis Menu. Following this, the output device is selected from the Output menu. Next a menu appears to determine whether the ship’s bill are to be computed for a single vessel or for all vessels in the vessel file. If the user’s response is 1[CR], then a prompt will request the reference number of the vessel for which the ship’s bill is to be computed. If the user’s response to this second menu is 2[CR], then a bill for each vessel in the vessel file will be computed sequentially and sent to the specified output device. A sample of the output is shown in Figure II.17. After the output is complete the Analysis Menu will reappear on the screen.

II.5.2 Port Income (Analysis Menu - Option 3)

Port Income analysis is used to compare the expected port revenue from different tariffs with the costs of operating and maintaining the port. This comparison can be made for port-wide costs and revenues or for cost/service center revenues and costs. The Port Income analysis can also

---

24 The file will be stored under the name "PRN" followed by the five character name.

25 This error-checking is accomplished by comparing manual calculations of the ship’s bills for one or more selected vessels with the results for the same vessels using the PORTARIF program. Any discrepancies can be checked on an item-by-item basis using the editing options for the tariff and vessel files.
OUTPUT MENU

OUTPUT TO

1. Printer
2. Screen
3. File

Choose 1 to 3; 0 to Return to Main Menu :2:

<table>
<thead>
<tr>
<th>PROGRAM</th>
<th>DATA</th>
<th>TARIFF</th>
<th>VESSEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>b:\</td>
<td>B:\</td>
<td>11111</td>
<td>2222</td>
</tr>
</tbody>
</table>

1986 TRP / jha
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>00001</td>
<td>PILOTAGE</td>
<td>0</td>
</tr>
<tr>
<td>00002</td>
<td>PILOTAGE</td>
<td>4,025,000</td>
</tr>
<tr>
<td>01001</td>
<td>PORT DUES</td>
<td>10,800,000</td>
</tr>
<tr>
<td>01002</td>
<td>PORT DUES</td>
<td>850,000</td>
</tr>
<tr>
<td>02001</td>
<td>TOWAGE, IN &amp; OUT</td>
<td>3,375,000</td>
</tr>
<tr>
<td>03001</td>
<td>BERTHING</td>
<td>400,000</td>
</tr>
<tr>
<td>04001</td>
<td>MOORAGE</td>
<td>100,000</td>
</tr>
<tr>
<td>04002</td>
<td>MOORAGE</td>
<td>0</td>
</tr>
<tr>
<td>05001</td>
<td>BERTHAGE</td>
<td>4,550,000</td>
</tr>
<tr>
<td>05002</td>
<td>BERTHAGE</td>
<td>562,500</td>
</tr>
<tr>
<td>06001</td>
<td>PIPELINE CHARGE</td>
<td>125,000</td>
</tr>
<tr>
<td>07001</td>
<td>CRANE HIRE</td>
<td>1,822,500</td>
</tr>
<tr>
<td>08001</td>
<td>FORKLIFT HIRE</td>
<td>825,000</td>
</tr>
<tr>
<td>09001</td>
<td>TRUCK HIRE</td>
<td>0</td>
</tr>
<tr>
<td>10001</td>
<td>WHARFAGE</td>
<td>2,000,000</td>
</tr>
<tr>
<td>10002</td>
<td>WHARFAGE</td>
<td>385,000</td>
</tr>
<tr>
<td>10003</td>
<td>WHARFAGE</td>
<td>8,000,000</td>
</tr>
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<td>10004</td>
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<td>0</td>
</tr>
<tr>
<td>10005</td>
<td>WHARFAGE</td>
<td>0</td>
</tr>
<tr>
<td>10006</td>
<td>WHARFAGE</td>
<td>2,560,000</td>
</tr>
<tr>
<td>10007</td>
<td>WHARFAGE</td>
<td>0</td>
</tr>
<tr>
<td>10008</td>
<td>WHARFAGE</td>
<td>6,187,500</td>
</tr>
<tr>
<td>10009</td>
<td>WHARFAGE</td>
<td>8,437,500</td>
</tr>
<tr>
<td>10010</td>
<td>WHARFAGE</td>
<td>9,460,000</td>
</tr>
<tr>
<td>10011</td>
<td>WHARFAGE</td>
<td>3,525,000</td>
</tr>
<tr>
<td>10012</td>
<td>WHARFAGE</td>
<td>13,500,000</td>
</tr>
<tr>
<td>11001</td>
<td>TRANSIT STORAGE, IN</td>
<td>10,000,000</td>
</tr>
<tr>
<td>11002</td>
<td>TRANSIT STORAGE, IN</td>
<td>0</td>
</tr>
<tr>
<td>11003</td>
<td>TRANSIT STORAGE, IN</td>
<td>0</td>
</tr>
<tr>
<td>11004</td>
<td>TRANSIT STORAGE, IN</td>
<td>0</td>
</tr>
<tr>
<td>12001</td>
<td>TRANSIT STORAGE, OUT</td>
<td>150,000</td>
</tr>
<tr>
<td>12002</td>
<td>TRANSIT STORAGE, OUT</td>
<td>0</td>
</tr>
<tr>
<td>13001</td>
<td>BOX STORAGE, IN</td>
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</tr>
<tr>
<td>13002</td>
<td>BOX STORAGE, OUT</td>
<td>0</td>
</tr>
<tr>
<td>13003</td>
<td>BOX STORAGE, EMPTY</td>
<td>12,925,000</td>
</tr>
<tr>
<td>14001</td>
<td>NIGHT WORK PREMIUM</td>
<td>195,000</td>
</tr>
<tr>
<td>15001</td>
<td>OVERTIME PREMIUM</td>
<td>261,250</td>
</tr>
<tr>
<td>16001</td>
<td>POTABLE WATER</td>
<td>377,500</td>
</tr>
</tbody>
</table>

Total: 116,888,750
be used to verify the accuracy of the ship's file.26/

The analysis of port income is performed by entering 3 when the Analysis Menu appears on the screen. Following this input, the user will be asked if the number of vessel calls per year is to be based on previously entered values (menu option 1) or is to be entered during the subsequent evaluations (menu option 2). Next the user selects an output device from the Output Menu. If the number of vessel calls is to be entered at this time, then a series of prompts will appear with the format shown below:

**How Many Calls By Vessels of Type XXXX **

In place of XXXX will be the reference number for each vessel presented in sequence. The user enters the number of vessel calls made in one year by that vessel or type of vessel.27/ After all of the vessels in the files have been processed, a report showing the breakdown of revenues by vessel type (see Figure II.18a) is sent to the specified output device. This is followed by a summary report of the ports income (see Figure II.18b). Afterwards, the Analysis Menu will reappear on the screen.

### II.5.3 Sensitivity Analysis (Analysis Menu - Option 2)

The Vessel Sensitivity Analysis is performed by entering 2 when the Analysis Menu appears. Next the output device is selected and then the following prompts will appear:

- **Enter the Vessel Number**
- **Enter the Number of Parameters to be Varied**
- **Enter the Number of Vessel Variations**

The first prompt requests the number of the vessel which is to be used as the base case for the sensitivity test. The user responds to the first prompt by entering a four character vessel code followed by [CR]. The second prompt concerns the number of vessel charging parameters which will be changed for each iteration of the sensitivity test. In response to the second prompt, the user enters a number between 1 and 9 followed by [CR]. It is desirable to limit the number of charging parameters varied since the effect of changes in one charging parameters is difficult to discern if several other parameters are being varied at the same time. Also, for each iteration, a new set of these charging parameters will have to be

---

26 If the vessels in this file are truly representative of the vessels which call at the port and the charging parameters for these vessels are correctly entered in the file, then the computed port income for the existing tariff should closely approximate the actual port income both overall and by tariff category.

27 This number will then replace the previously stored number.
### Figure II.18a

**A Sample Port Income Report - Detailed**

<table>
<thead>
<tr>
<th>VESSEL NUMBER</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUMBER OF VESSELS</td>
<td>100</td>
<td>50</td>
<td>50</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>00001 PILOTAGE</td>
<td>200,000</td>
<td>300,000</td>
<td>400,000</td>
<td>600,000</td>
<td>800,000</td>
</tr>
<tr>
<td>01001 PORT DUES</td>
<td>0</td>
<td>900,000</td>
<td>1,200,000</td>
<td>1,800,000</td>
<td>2,400,000</td>
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<tr>
<td>01002 PORT DUES</td>
<td>400,000</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>02001 TOWAGE, IN &amp; OUT</td>
<td>0</td>
<td>375,000</td>
<td>375,000</td>
<td>750,000</td>
<td>750,000</td>
</tr>
<tr>
<td>03001 BERTHING</td>
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<td>100,000</td>
<td>100,000</td>
<td>0</td>
<td>200,000</td>
</tr>
<tr>
<td>04001 MOORAGE</td>
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<td>0</td>
<td>100,000</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>04002 MOORAGE</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>0</td>
<td>600,000</td>
<td>400,000</td>
<td>2,400,000</td>
<td>400,000</td>
</tr>
<tr>
<td>05002 BERTHAGE</td>
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<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>06001 PIPELINE CHARGE</td>
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<td>50,000</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>07001 CRANE HIRE</td>
<td>270,000</td>
<td>472,500</td>
<td>0</td>
<td>1,080,000</td>
<td>0</td>
</tr>
<tr>
<td>08001 FORKLIFT HIRE</td>
<td>300,000</td>
<td>525,000</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>09001 TRUCK HIRE</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>10001 WHARFAGE</td>
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<td>1,200,000</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>10002 WHARFAGE</td>
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<td>10003 WHARFAGE</td>
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<td>8,000,000</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
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<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
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<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
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<td>0</td>
<td>2,560,000</td>
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<tr>
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<td>0</td>
</tr>
<tr>
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<td>0</td>
<td>4,500,000</td>
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<td>6,750,000</td>
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<tr>
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<td>0</td>
<td>7,200,000</td>
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<tr>
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<td>2,400,000</td>
<td>0</td>
</tr>
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</table>

6,752,500 11,116,250 10,655,000 9,290,000 41,425,000
**Figure 18.b**

A Sample Port Income Report - Summary

**TOTAL PORT INCOME FOR SAMPLE VESSELS**

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<td>16001</td>
<td>POTABLE WATER</td>
<td>377,500</td>
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</tbody>
</table>

**Total** 112,750,625
entered. The third prompt concerns the number of iterations to be made in this sensitivity test. The user enters a number between 1 and 10 followed by [CR].

After these inputs are completed, a form will appear on the screen with the heading "Enter the Names of the Charging Parameters Below" and with highlighted spaces for entering the symbols for the charging parameters which are being tested. A complete list of the charging parameter symbols is presented on the lower half of the screen for reference. The parameter should be entered in the same format as shown in this list followed by [CR].

After the names of all the charging parameters are entered, the screen is reformed with the Equation Entry Form shown in Figure II.19. These equations are similar to those in the vessel file, but they are specifically designed for use with the Sensitivity Tests. They are used to compute the values for charging parameters that vary as a result of changes in the charging parameters being tested. Their purpose can best be explained by example.

Suppose that a sensitivity test is to be performed to determine how the port charges will change with a change in the amount of cargo handled per vessel. Since changes in the quantity of cargo will affect other parameters such as time in port and time at berth, it is necessary to revise the values for these parameters as well as the quantities of cargo for each iteration of the sensitivity test. Alternatively, the values for the time in port and time at berth can be automatically recomputed for each iteration by stating their relationship to the volume of cargo handled. These parameters would then be recalculated each time the parameter for cargo volume is changed. In this way, it is necessary to enter only the variation in quantity of cargo for each iteration of the test.

The equations are entered by stating the name of the dependent charging parameter on the left hand side of the equation and the formula used to compute its value on the right hand side of the equation. The first column in the equation entry form allows the value of the dependent charging parameter to be computed as a decimal (N) or to be rounded up (U) or down (D) to the nearest integer value. In the example above, it is normal to round up the values of the time in port and the time at berth to the nearest integer. The default is N. A maximum of ten equations can be entered. The value of the dependent charging parameter will be recomputed for each iteration of the sensitivity test and this value will replace any previously entered value. These equations will also be retained for subsequent sensitivity tests provided that the user does not return to the main menu.

For each iteration of the sensitivity test, an input form will appear on the screen with the names of the charging parameters being tested and spaces for inputting values for these parameters. Each value is input as a number followed by [CR]. The numbers can contain a decimal point and a negative sign, but no commas, blanks or brackets. After values for all
Figure II.19

The Equation Entry Form

N/U/D Enter Formulas to be Used in Calculating Charging Parameters

<table>
<thead>
<tr>
<th>NRT</th>
<th>CARG01</th>
<th>CARG02</th>
<th>CARG03</th>
<th>CARG04</th>
<th>CARG05</th>
<th>CARG06</th>
<th>CARG07</th>
<th>CARG08</th>
<th>CARG09</th>
<th>CARG10</th>
</tr>
</thead>
<tbody>
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</tr>
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<td>CARG12</td>
<td>FORK_HIRE</td>
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</tr>
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<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
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<td>OUT_TIME</td>
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</tr>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
these parameters have been entered, the ship's bill for that iteration is computed. The number of the current iteration is shown in the left-hand corner of the screen during the computation.

When all of the iterations are completed, a detailed report of the charges for each iteration is sent to the output device in the format shown in Figure II.20. This report lists the value of the parameters which have been varied as well as the charges for that vessel configuration.

After the output is completed, the Analysis Menu will reappear on the screen. If 0 is entered or [CR] is pressed at that time, then the Main Menu will reappear.

II.6 File Maintenance (Main Menu - Option G)

The maintenance of the Tariff and Vessel files is performed in two ways. The first is to use the editing features already discussed, the second is to use the file maintenance routines. The routines are used to delete or copy these files or to erase specific records from these files. When option G is selected from the Main Menu, the Maintenance Menu will appear as shown in Figure II.21.

The first and second options, 1 and 2 respectively, in this menu allow the user to delete items from the current Tariff and Vessel Files. If the first option is selected, a list of tariff items in the Tariff file will appear on the screen, one item at a time, as shown in Figure II.22. The user determines whether the item is to be deleted or not by entering Y if the item is to be deleted and [CR] if the item is to be saved. After all of the items have been listed and selected for saving or deleting, then the Tariff file will be purged of the unwanted tariff items and the File Maintenance Menu will reappear.

If the second option in this menu is selected, then the same procedure can be used to remove unwanted vessels from the Vessel File. The list of vessels will appear, one-by-one, on the screen in the format shown in Figure II.23. After the user has selected which vessels to save and which to delete, the unwanted vessels will be purged.

The third and fourth options, 3 and 4, are used to copy the current tariff and vessel files to new disks and new directories. When one of these options is selected, then the following prompt will appear.

Enter New Directory Name

28 These functions can also be accomplished using the DOS copy command or other copy utilities.
### Sensitivity Tests for Vessel 0002

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<th>Fourth Iteration</th>
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<tr>
<td>13003</td>
<td>BOX STORAGE, EMPTY</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>14001</td>
<td>NIGHT WORK PREMIUM</td>
<td>600</td>
<td>600</td>
<td>900</td>
<td>1500</td>
<td>1800</td>
</tr>
<tr>
<td>15001</td>
<td>OVERTIME PREMIUM</td>
<td>1650</td>
<td>1650</td>
<td>2475</td>
<td>4125</td>
<td>4950</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>223,200</td>
<td>168,500</td>
<td>286,825</td>
<td>403,075</td>
<td>518,200</td>
</tr>
</tbody>
</table>
Figure II.21

File Maintenance Menu

MAINTENANCE MENU

1. Delete a Tariff Item from Tariff File
2. Delete a Vessel from the Vessel File
3. Copy Tariff File to Another Directory
4. Copy a Vessel File to Another Directory
5. Erase a Tariff File
6. Erase a Vessel File
7. Rebuild the Index for the Tariff File

Choose 1 to 6; 0 to Return to Main Menu :0:

Figure II.22

List of Tariff Items to Be Deleted

SELECT THE RECORDS TO BE DELETED

Delete Tariff Item 0001 (Y/N) N
Delete Tariff Item 1001 (Y/N) N
Delete Tariff Item 1002 (Y/N) N
Delete Tariff Item 1003 (Y/N) N
Delete Tariff Item 2001 (Y/N) N
Delete Tariff Item 2002 (Y/N) N
Delete Tariff Item 2003 (Y/N) N
Delete Tariff Item 3001 (Y/N) N
Delete Tariff Item 3002 (Y/N) N
Delete Tariff Item 3003 (Y/N) N
Delete Tariff Item 4001 (Y/N) N
Delete Tariff Item 4002 (Y/N) N
Delete Tariff Item 4003 (Y/N) N
Delete Tariff Item 5001 (Y/N) N
Delete Tariff Item 5002 (Y/N) N
Delete Tariff Item 6001 (Y/N) N
Delete Tariff Item 6002 (Y/N) N

1986 JHA
The user responds by entering the name of the drive and the directory where the copy of the tariff or vessel file is to be stored. For the main directory, an entry such as C:[CR] or B:[CR] is sufficient. For a sub-directory, the name of the directory and the "\"'s must be included, e.g. C:\NEWTARIF\[CR]. The copy of the file is made using the same file name but on a different directory. To access this copy the user can return to the Main Menu and modify the data directory entry using option C.

The fifth and sixth options, 5 and 6, of the Maintenance Menu allow the user to erase unwanted files. The files will be erased from the current Data directory. If the fifth option is selected, then the following prompt will appear with a highlighted space for entering the five character tariff file code.

Enter the Number of the Tariff File

If the sixth option is selected a similar prompt with a four character highlighted space will be provided to enter the vessel file code. In either case, once the code has been entered, then the user will be asked to confirm the request for erasing a file by responding to the following prompt:

Are You Sure (Y/N)? N

If the user responds by pressing [CR] then the erase procedure will be aborted, but if the user responds by entering Y[CR], then the named file will be erased.

The seventh option is used to reconstruct the index used with the Tariff file. The order in which the tariff items are presented is determined by an index file which insures that they are ordered numerically from large to small. Occassionally, this index will be lost and the access to the tariff file will become disoriented. This can easily be seen in the ordering of the outputs for the revenue calculations. In these situations, the seventh option in the Maintenance Menu should be selected and the number of the tariff file to be reindexed should be entered. This activity will take a little time, especially where it is a large tariff stored on a floppy disk.

After one of the seven maintenance options has been performed, the Maintenance Menu will reappear. In order to return to the Main Menu, the user presses [CR].
II.23 List of Vessels to be Deleted

SELECT THE RECORDS TO BE DELETED

Delete Vessel Number 0001 (Y/N) N
Delete Vessel Number 0002 (Y/N) N
Delete Vessel Number 0003 (Y/N) N
Delete Vessel Number 0004 (Y/N) N
Delete Vessel Number 0005 (Y/N) N
Delete Vessel Number 0006 (Y/N) N

II.7 Troubleshooting

The PORTARIF program has received considerable testing but like any other program problems will occur during execution. These problems can result from user error or from program bugs. If the program experiences logical errors during execution, then a message will appear at the top of the screen indicating the nature of the error and offering the user the option of entering Q, A, or I which stand for Quit, Abort or Ignore. The first option will create a normal exit from the program closing all files on the way. The second option will cause an immediate cessation of the program and should be avoided. The third option allows the user to continue by ignoring the logical error. If this option is selected, then the user is well advised to carefully review any output generated by the program.

If the program encounters one or more logical errors requiring the user to select the Quit option, then the following procedure should be followed. First, restart the program and reload the vessel and tariff files. Next perform the activity which caused the logical error. If the error continues to occur, then Quit, restart, load the tariff and vessel files and print out these files. Examine these printouts for incorrect entries in the charging and condition formulas of the tariff items and improper numbers in the charging parameters for the vessels. If a DBASE III plus software package is available then inspect the appropriate output file (SHIPBILL, VESLSENS, and INCOME) to see how far the analysis was before the error was incurred. Also consider making copies of the tariff and vessel files and deleting records from these copies to see if the problem exists in the records of these files.

If all else fails then contact the Transportation Department of PPR in the World Bank and request either direct support or a revised copy of the program.
Annex A

Tutorial Instructions

1. Begin by copying the compiled version to a blank diskette and then copying the Command.Com from your system disk onto the same diskette. Use this new disk to perform the tutorial. Place this diskette in drive A and type:

```
a:[CR]
start [CR]
```

2.

```
da
090987[CR]
```

3.

```
b
a:\[cr]
c
a:\[CR]
```

4.

```
d
1
after viewing the list
```

5.

```
3
99999[CR]
```

6.

```
[CR]
```

7.

```
e
1
after viewing the list
```

8.

```
3
9999[CR]
```

9.

```
[CR]
```

10.

```
F
1
2
1[CR]
0002[CR]
```

11. to see the sample tariff use the edit option in the tariff menu
after viewing the tariff item
move through the items

12.

13.

14. The cargo-related screen will now appear

The performance related screen will now appear

The utilities and miscellaneous screen will now appear
Now move through remaining forms using [PgDn] repeatedly until the
Tariff Menu reappears. If you skip past the Tariff Menu to the Main Menu then enter D to return to Tariff Menu.

17.

4
2
2
20001[CR]
[CR]
3.5[CR]
[CR][CR]
200[CR]
200[CR]
[CR]
20002[CR]
[CR][CR][CR]
[CR][CR][CR]
200[CR]
N[CR]

18. In order to make these printouts, first turn on your print then enter

6
7
[CR]

19.

E
2
8888[CR]
0001[CR]
125[CR]
6000[CR]
145[CR]
1[CR]
1000[CR]
[CR]
1[CR]
[CR][CR]
2[CR]
[CR]
2[CR]
[CR][CR]
3[CR]
[CR][CR][CR]
10[CR]
[CR]
20.
BERTH_TIME[CR]
CARGO1/45[CR]
PORT_TIME[CR]
BERTH_TIME/24 + .2[CR]
[PgDn]
N[CR]

21.
4
2
2
[CR][CR][CR]
[CR][CR]
[Up][Up]
12000[CR]
120[CR]
[PgDn]
N[CR]

22. Turn on the printer before performing this command
5
[CR]
Annex B

Translating a Tariff into a Standard Format

The process of translating a standard tariff from its published format into a form accessible by the program is a two stage process of first identifying the charging parameters and then formulating the tariff items. This process is outlined below for the sample port tariff shown in Table B.1.

B.1 Charging Parameters

The charging parameters derived from this published tariff are shown in Table B.2. All the charging parameters are either quantities (e.g. GRT) or numeric values specifying categories (e.g. cargo type). Each charging parameter that represents a quantity has a unit of measure unless that unit of measure is obvious (e.g. GRT). In Table B.2, most of the charging parameters for the different cargoes use either metric tons or freight tons as a unit of measure.

NRT is the charging parameter used for the Pilotage, Port Dues, Mooring and Berthage. An additional parameter, "Route", is required to indicate if the vessel is ocean-going or coastal. For the Berthage an additional parameter, "Berth_time", is required to specify the amount of time the vessel spends at the berth. A similar parameter, "Moor_time", is required for the Mooring Fee. The Towage is charged for each entry to and exist from the port, therefore parameter "Portcall", is needed to indicate a port call. This parameter would be set to 1. The equipment hire charges for the pipeline, cranes, forklifts and trucks require separate parameters (no.s 8 to 11) to measure how long this equipment has been used by a vessel.

The wharfage charges are based on the quantity of cargo handled differentiated by form of cargo and type of commodity. In order to estimate the port charges it is necessary to breakdown the quantities of cargo in the same manner. This can be done by providing a different parameter for each type of cargo as in parameters 17 to 28 or it can be done by allowing each vessel to have up to six types of cargo, with the types specified in parameters "cargotype1" - "cargotype6" with the quantities specified by parameters "cargol" - "cargo6" as shown in the lower half of Table B.2.

The storage charges are also based on the quantity of cargo as well as the amount of time the cargo spends in storage. The average dwell times are stored in parameters no.s 12 to 16 based on the cargo form and direction of flow. The cargoes for which storage is charged are limited to breakbulk cargoes and containers, therefore the quantities are measured by the parameters "cargol", "cargo2", and "cargo8" through "cargo11".
Table B.1

Interpreting A Published Tariff

The Published Tariff

<table>
<thead>
<tr>
<th>Tariff Items</th>
<th>Amount</th>
<th>Per</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilotage</td>
<td>1</td>
<td>NRT</td>
<td>1000 min.</td>
</tr>
<tr>
<td>Port Dues</td>
<td>3</td>
<td>NRT</td>
<td>ocean-going coastal</td>
</tr>
<tr>
<td>Towage, Inbound</td>
<td>2500</td>
<td>movement</td>
<td>ocean-going</td>
</tr>
<tr>
<td>Towage, Outbound</td>
<td>5000</td>
<td>movement</td>
<td>ocean-going</td>
</tr>
<tr>
<td>Berthing/Urberthing Tugs</td>
<td>2000</td>
<td>movement</td>
<td></td>
</tr>
<tr>
<td>Moorage</td>
<td>0.25</td>
<td>NRT</td>
<td>800/day min.</td>
</tr>
<tr>
<td>Berthage</td>
<td>0.5</td>
<td>NRT per day</td>
<td>1500/day min.</td>
</tr>
<tr>
<td>Pipeline charge</td>
<td>500</td>
<td>day</td>
<td></td>
</tr>
<tr>
<td>Crane Hire</td>
<td>450</td>
<td>shift</td>
<td></td>
</tr>
<tr>
<td>Forklift Hire</td>
<td>250</td>
<td>shift</td>
<td></td>
</tr>
<tr>
<td>Truck Hire</td>
<td>250</td>
<td>shift</td>
<td></td>
</tr>
<tr>
<td>Storage, Imports</td>
<td>10</td>
<td>Freight tonne-Day</td>
<td>8-17</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>&quot;</td>
<td>day 18-27</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>&quot;</td>
<td>day 28-37</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>&quot;</td>
<td>thereafter</td>
</tr>
<tr>
<td>Storage, Exports</td>
<td>1</td>
<td>&quot;</td>
<td>day 3-32</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>&quot;</td>
<td>thereafter</td>
</tr>
<tr>
<td>Box Storage, Inbound</td>
<td>100</td>
<td>Box-Days</td>
<td>3 days free</td>
</tr>
<tr>
<td>Outbound</td>
<td>50</td>
<td>&quot;</td>
<td>5 days free</td>
</tr>
<tr>
<td>Empties</td>
<td>50</td>
<td>&quot;</td>
<td>3 days free</td>
</tr>
<tr>
<td>Night Work premium</td>
<td>300</td>
<td>vessel-day</td>
<td></td>
</tr>
<tr>
<td>Overtime Premium</td>
<td>275</td>
<td>hook-hour</td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td>20</td>
<td>1000 liters</td>
<td></td>
</tr>
</tbody>
</table>

Wharfage Charges

<table>
<thead>
<tr>
<th>Wharfage Charges</th>
<th>Import</th>
<th>Export</th>
<th>Per</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Elsewhere Specified</td>
<td>16.0</td>
<td>11.0</td>
<td>Freight tonne</td>
</tr>
<tr>
<td>Chemicals</td>
<td>16.0</td>
<td>16.0</td>
<td>metric ton</td>
</tr>
<tr>
<td>Foodgrains</td>
<td>4.0</td>
<td>3.2</td>
<td></td>
</tr>
<tr>
<td>Fertilizers, Rock Phosphate</td>
<td>3.2</td>
<td>2.4</td>
<td></td>
</tr>
<tr>
<td>Full Containers, FCC</td>
<td>450.0</td>
<td>450.0</td>
<td>TEU</td>
</tr>
<tr>
<td>Full Containers, LCD</td>
<td>600.0</td>
<td>600.0</td>
<td>TEU</td>
</tr>
<tr>
<td>Empty Containers</td>
<td>300.0</td>
<td>300.0</td>
<td>TEU</td>
</tr>
<tr>
<td>Crude Oil, Diesel</td>
<td>6.0</td>
<td>6.0</td>
<td>1000 liters</td>
</tr>
</tbody>
</table>
Table B.2
The Charging Parameters

<table>
<thead>
<tr>
<th>Name</th>
<th>Definition</th>
<th>Unit of Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 NRT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Portcall</td>
<td>default value 1</td>
<td></td>
</tr>
<tr>
<td>3 Route</td>
<td>international=1,coastal=2</td>
<td></td>
</tr>
<tr>
<td>4 Towage_in</td>
<td>Inward Towage</td>
<td>movements</td>
</tr>
<tr>
<td>5 Towage_Out</td>
<td>Outward Towage</td>
<td>movements</td>
</tr>
<tr>
<td>6 Berth_Time</td>
<td>Time at Berth</td>
<td>days</td>
</tr>
<tr>
<td>7 Moor_time</td>
<td>Time at Mooring</td>
<td>days</td>
</tr>
<tr>
<td>8 Pipe_time</td>
<td>Time Using Pipeline</td>
<td>days</td>
</tr>
<tr>
<td>9 Crane_Hire</td>
<td>Time Using Crane</td>
<td>shifts</td>
</tr>
<tr>
<td>10 Fork_hire</td>
<td>Time Using Forklift</td>
<td>shifts</td>
</tr>
<tr>
<td>11 Truck_hire</td>
<td>Time Using Trucks</td>
<td>shifts</td>
</tr>
<tr>
<td>12 Transit_In</td>
<td>Ave. Store Time Inbound</td>
<td>days</td>
</tr>
<tr>
<td>13 Transit_Out</td>
<td>Ave. Store Time Outbound</td>
<td>days</td>
</tr>
<tr>
<td>14 In_time</td>
<td>Inbound Box Storage Time</td>
<td>days</td>
</tr>
<tr>
<td>15 Out_time</td>
<td>Outbound Box Storage Time</td>
<td>days</td>
</tr>
<tr>
<td>16 Empty_time</td>
<td>Empty Storage Time</td>
<td>days</td>
</tr>
<tr>
<td>17 Cargo1</td>
<td>Breakbulk Imports</td>
<td>freight tons</td>
</tr>
<tr>
<td>18 Cargo2</td>
<td>Breakbulk Exports</td>
<td>freight tons</td>
</tr>
<tr>
<td>19 Cargo3</td>
<td>Chemicals</td>
<td>metric tons</td>
</tr>
<tr>
<td>20 Cargo4</td>
<td>Import Foodgrains</td>
<td>metric tons</td>
</tr>
<tr>
<td>21 Cargo5</td>
<td>Export Foodgrains</td>
<td>metric tons</td>
</tr>
<tr>
<td>22 Cargo6</td>
<td>Import Fertilizer</td>
<td>metric tons</td>
</tr>
<tr>
<td>23 Cargo7</td>
<td>Export Fertilizer</td>
<td>metric tons</td>
</tr>
<tr>
<td>24 Cargo8</td>
<td>Inbound Full Containers, FCL</td>
<td>TEU</td>
</tr>
<tr>
<td>25 Cargo9</td>
<td>Outbound Full Containers, FCL</td>
<td>TEU</td>
</tr>
<tr>
<td>26 Cargo10</td>
<td>In and Out Full Containers, LCL</td>
<td>TEU</td>
</tr>
<tr>
<td>27 Cargo11</td>
<td>Empty Containers</td>
<td>TEU</td>
</tr>
<tr>
<td>28 Cargo12</td>
<td>Crude Oil and Diesel</td>
<td>1000 liters</td>
</tr>
<tr>
<td>29 Shift_2</td>
<td>overtime shifts</td>
<td>shifts</td>
</tr>
<tr>
<td>30 Gang_shift1</td>
<td>ave. gangs, normal shift</td>
<td>gangs</td>
</tr>
<tr>
<td>31 Gang_shift2</td>
<td>ave. gangs, overtime shift</td>
<td>gangs</td>
</tr>
<tr>
<td>32 Water</td>
<td>Potable Water</td>
<td>1000 liters</td>
</tr>
</tbody>
</table>

alternating cargo charging parameters

| 17 Cargo1         | Breakbulk Imp=1, Exp=2                          | freight tons             |
| 18 Cargo2         | Chemicals = 3                                   | metric tons              |
| 19 Cargo3         | Foodgrains, Imp=4, Exp=5                        | metric tons              |
| 20 Cargo4         | Fertilizers, Imp=6, Exp=7                       | metric tons              |
| 21 Cargo5         | Containers, In-FCL =8,                         | TEU                      |
| 22 Cargo6         | Out-FCL=9, LCL=10,Empty=11                      | TEU                      |
|                  | Crude & P.O.L. = 12                             |                          |
| 23 Cargo1         | Quantity of Cargo type 1                        |                          |
| 24 Cargo2         | Quantity of Cargo type 2                        |                          |
| 25 Cargo3         | Quantity of Cargo type 3                        |                          |
| 26 Cargo4         | Quantity of Cargo type 4                        |                          |
| 27 Cargo5         | Quantity of Cargo type 5                        |                          |
| 28 Cargo6         | Quantity of Cargo type 6                        |                          |
B.2 Tariff Items

For this sample tariff, the simplest items are the port dues and the towage fees. The former is a unit charge per NRT and the latter is a unit charge per movement in and movement out. However, the basic rates are affected by the routes served by the vessel. Coastal vessels pay no towage fee and port dues are only 2 per NRT. The charging parameters are the vessel's NRT, the number of port calls (assuming that only one movement is made in each direction per port call) and the route served. The basic rate for port dues is 3 for international vessels and 2 for coastal vessels. The basic rates for the inbound and outbound towage have combined into a single rate 7500 for ocean-going vessels (see Table B.3). The charging parameter ROUTE has been used to designate the category of vessel. A value of 1 is used for ocean-going vessels and 2 is used for coastal vessels.

The interpretation of the pilotage and moorage fees are a more complicated since they have minimum charges. The pilotage has a basic rate of 1 and a charging parameter of NRT with a minimum charge of 1000. The minimum rate is treated as a condition. For vessels with an NRT greater than 1000, the basic rate is 1 and the charging parameter is NRT. For vessels with an NRT less than or equal to 1000, the basic rate is 1000 and the charging parameter is the port call. The same approach is used for the Moorage charge with the conditions that the NRT is either greater than 3200 or less than or equal to 3200 (see Table B.3).

The wharfage charge is differentiated by type of cargo in the published tariff, therefore it is necessary to identify these cargoes separately when describing a vessel. A separate charging parameter is assigned to each type of cargo. In cases where a distinction is made between a type of cargo which is inbound and the same cargo outbound, then two separate charging parameters are assigned. These charging parameters are each multiplied by the basic rate specified in the tariff. Where the rates for two cargoes are the same, a combined tariff item is introduced using a charging formula which is the common rate multiplied by the sum of the cargo quantities (Table B.3). None of these tariff items have conditions.

The alternative approach to wharfage charges as shown at the bottom of Tables III.2 and III.3 is to use one (or more) charging parameter to designate the type of cargo carried in a vessel and one (or more) charging parameter to specify the actual quantity of cargo carried. In this case, the tariff items would use the quantity parameter within the charging formula and the type of cargo parameters within the condition formula (Table B.4).

For the overtime premium, the charge is levied based on the number of hours worked. The overtime is the final two hours of a shift. It would be possible to include a charging parameter named "Over_time" and to multiply that charging parameter by the number of gangs worked to determine hook-hours. However, in the present example, it has been assumed that the overtime is worked in both shifts if two shifts are worked in a day and no overtime is worked otherwise. Therefore, the charging formula is the
<table>
<thead>
<tr>
<th>Name</th>
<th>Rate</th>
<th>Charging Formulas</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port Dues</td>
<td>3.0</td>
<td>NRT</td>
<td>Route = 1</td>
</tr>
<tr>
<td></td>
<td>2.0</td>
<td>NRT</td>
<td>Route = 2</td>
</tr>
<tr>
<td>Towage, In and Out</td>
<td>7500</td>
<td>Vesselcall</td>
<td>Route = 1</td>
</tr>
<tr>
<td>Pilotage</td>
<td>1.0</td>
<td>NRT</td>
<td>NRT &gt; 1000</td>
</tr>
<tr>
<td></td>
<td>1000</td>
<td>Vesselcall</td>
<td>NRT ≤ 1000</td>
</tr>
<tr>
<td>Moorage</td>
<td>0.25</td>
<td>NRT</td>
<td>NRT &gt; 3200</td>
</tr>
<tr>
<td></td>
<td>800</td>
<td>Vesselcall</td>
<td>NRT ≤ 3200</td>
</tr>
<tr>
<td>Wharfage</td>
<td>16.0</td>
<td>Cargo1 + Cargo3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11.0</td>
<td>Cargo2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.0</td>
<td>Cargo4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.2</td>
<td>Cargo5 + Cargo6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.4</td>
<td>Cargo7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>450</td>
<td>Cargo8 + Cargo9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>600</td>
<td>Cargo10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>300</td>
<td>Cargo11</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6.0</td>
<td>Cargo12</td>
<td></td>
</tr>
<tr>
<td>Overtime Premium</td>
<td>275</td>
<td>(Gang_shft1 + Gang_shft2) * Shift2 * 2</td>
<td></td>
</tr>
<tr>
<td>Box Storage, Inbound</td>
<td>100</td>
<td>Cargo8 * (In_time - 3)</td>
<td>In_time &gt;3</td>
</tr>
<tr>
<td>Outbound</td>
<td>50</td>
<td>Cargo9 * (Out_time - 5)</td>
<td>Out_time &gt;5</td>
</tr>
<tr>
<td>Storage, Imports</td>
<td>10</td>
<td>Cargo1 * (Transit_In - 7)</td>
<td>Transit_In &gt;7 and &lt; 18</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>Cargo1</td>
<td>Transit_In &gt;17</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>Cargo1 * (Transit_In - 17)</td>
<td>Transit_In &gt;17 and &lt; 28</td>
</tr>
<tr>
<td></td>
<td>150</td>
<td>Cargo1</td>
<td>Transit_In &gt;27</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>Cargo1 * (Transit_In - 27)</td>
<td>Transit_In &gt;27 and &lt; 38</td>
</tr>
<tr>
<td></td>
<td>200</td>
<td>Cargo1</td>
<td>Transit_In &gt;37</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>Cargo1 * (Transit_In - 37)</td>
<td>Transit_In &gt;37</td>
</tr>
</tbody>
</table>
Table B.4

Alternative Wharfage Charge

<table>
<thead>
<tr>
<th>Wharfage</th>
<th>Cargo1</th>
<th>Cargo2</th>
<th>Cargotype1</th>
<th>Cargotype2</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>Cargol</td>
<td>1 or 3</td>
<td>1 or 3</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Cargo2</td>
<td>1 or 3</td>
<td>1 or 3</td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Cargo1</td>
<td>2</td>
<td></td>
<td>Cargotype1 = 2</td>
</tr>
<tr>
<td>11</td>
<td>Cargo2</td>
<td>2</td>
<td></td>
<td>Cargotype2 = 2</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Cargo1</td>
<td>4</td>
<td></td>
<td>Cargotype1 = 4</td>
</tr>
<tr>
<td>4</td>
<td>Cargo2</td>
<td>4</td>
<td></td>
<td>Cargotype2 = 4</td>
</tr>
</tbody>
</table>

The number of second shifts worked multiplied by the sum of the number of gangs worked in the first and second shifts. This total is then multiplied by two to account for the two hours worked in each shift (Table B.3).

The tariff item for storage of containers combines a charging formula with a condition. For inbound FCL boxes, the storage is free for the first 3 days, therefore the condition is that the storage time, In_Box, must exceed 3. Since the basic rate is levied for each day beyond the three days, the storage time must be modified by subtracting 3. Finally the basic rate is charged for each TEU so the charging formula must include the modified storage time multiplied by the number of inbound FCL’s measured in TEU.

The final tariff item in table B.3, the breakbulk storage charge, includes multiple conditions as well as a charging formula. The storage charge is levied against the cargo based on the period of storage measured in days and by the quantity stored measured in freight tons. Since the rate escalates with the period of storage, it is necessary to define separate tariff items for each period of time which has a unique rate. The condition associated with each tariff item is that the period of storage be within a specified range.
The World Bank

Port Tariff Evaluation

Technical Paper

PART III

PROGRAM DOCUMENTATION
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* Billing2.Prg
* Compute and Store Charges for Specific Tariff Item
* Assumes that Vessel Parameters are Loaded into memory

SELECT 1
GOTO TOP
SET EXACT ON
@12,6 SAY "Calculating"
DO WHILE .NOT.EOF()
  DOT = DOT + .25
  IDOT = INT(DOT)
  @12,IDOT SAY ","
  IF COUNTER2 = 1
    SELECT 3
    APPEND BLANK
    REPLACE SENSITIV->TARIFITEM WITH TARIFFS->ITEM_NO
    REPLACE SENSITIV->TITLE WITH TARIFFS->TITLE
  ENDIF
  AMNT1 = TARIFFS->FORMULA1
  AMNT2 = TARIFFS->FORMULA2
  AMTCHARGE = TARIFFS->RATE * &AMNT1
  REPLACE SENSITIV->&BILL WITH AMTCHARGE
  IF AMNT2 <> ""
    AMNT3 = &AMNT2
    IF TARIFFS->EQUALTO < 0 .AND. AMNT3 = TARIFFS->EQUALTO
      ELSE
        IF TARIFFS->MORETHAN <> 0 .AND. AMNT3 <= TARIFFS->MORETHAN
          REPLACE SENSITIV->&BILL WITH 0.0
          ENDIF
        IF TARIFFS->LESSTHAN <> 0 .AND. AMNT3 >= TARIFFS->LESSTHAN
          REPLACE SENSITIV->&BILL WITH 0.0
          ENDIF
        IF TARIFFS->EQUALTO <> 0 .AND. TARIFFS->EQUALTO <= 0.0;
          .AND. TARIFFS->MORETHAN = 0.0 .AND. AMNT3 <> TARIFFS->EQUALTO
          REPLACE SENSITIV->&BILL WITH 0.0
          ENDIF
      ENDIF
    ENDIF
  SKIP
  IF COUNTER2 > 1
    SELECT 3
    SKIP
    SELECT 1
  ENDIF
ENDDO
SET EXACT OFF
RETURN
* Billing3.Prg
* Compute and Store Charges for Specific Tariff Item
* Assumes that Vessel Parameters are Loaded into memory

SELECT 3
IF COUNTER1 = 1 .AND. COUNTER2 = 1
  GOTO 2
ELSE
  GOTO COUNTER3 + 2
ENDIF
SELECT 1
GOTO TOP
SET EXACT ON
DO WHILE .NOT.EOF()
  DOT = DOT + .25
  IDOT = INT(DOT)
  @ 12, IDOT SAY "."
  IF COUNTER1 = 1
    IF COUNTER2 = 1 .AND. COUNTER3 = 1
      SELECT 4
      APPEND BLANK
    ENDIF
    .SELECT 3
    APPEND BLANK
    REPLACE INCOME->PAGES WITH VESSEL->VESSELID
    REPLACE INCOME->TARIFFNUM WITH TARIFFS->ITEM_NO
    REPLACE INCOME->TITLE WITH TARIFFS->TITLE
    SELECT 1
    ENDIF
  AMNT1 = TARIFFS->FORMULA1
  AMNT2 = TARIFFS->FORMULA2
  AMTCHARGE = TARIFFS->RATE * &AMNT1 * VESSEL->VESSELNUM/1000
  REPLACE INCOME->&BILL WITH AMTCHARGE
  IF AMNT2 <> 
    AMNT3 = &AMNT2
    IF TARIFFS->EQUALTO <> 0 .AND. AMNT3 = TARIFFS->EQUALTO
      ELSE
        IF TARIFFS->MORETHAN <> 0 .AND. AMNT3 <= TARIFFS->MORETHAN
          REPLACE INCOME->&BILL WITH 0.0
        ENDIF
        IF TARIFFS->LESSTHAN <> 0 .AND. AMNT3 >= TARIFFS->LESSTHAN
          REPLACE INCOME->&BILL WITH 0.0
        ENDIF
        IF TARIFFS->EQUALTO <> 0 .AND. TARIFFS->LESSTHAN = 0.0; .AND. TARIFFS->MORETHAN = 0.0 .AND. AMNT3 <> TARIFFS->EQUALTO
          REPLACE INCOME->&BILL WITH 0.0
        ENDIF
      ENDIF
    ENDIF
  ENDIF
SKIP
IF COUNTER1 > 1
SELECT 3
SKIP
SELECT 1
ENDIF
ENDDO
GOTO TOP
SET EXACT OFF
RETURN
* Billing.Prg
* Compute and Store Charges for Specific Tariff Item
* Assumes that Vessel Parameters are Loaded into memory
*

GOTO TOP
SET EXACT ON
DO WHILE .NOT.EOF()
    DOT = DOT + .25
    IDOT = INT(DOT)
$12,1DOT SAY "."
    AMNT1 = TARIFFS->FORMULA1
    AMNT2 = TARIFFS->FORMULA2
    AMTCHARGE = TARIFFS->RATE * &AMNT1
    REPLACE TARIFFS->BILL WITH AMTCHARGE
    SELECT 3
    APPEND BLANK
    REPLACE SHIPBILL->PAGES WITH VESSEL->VESSELID
    REPLACE SHIPBILL->RATE WITH TARIFFS->RATE
    REPLACE SHIPBILL->ITEM_NO WITH TARIFFS->ITEM_NO
    REPLACE SHIPBILL->TITLE WITH TARIFFS->TITLE
    REPLACE SHIPBILL->BILL WITH AMTCHARGE
    IF AMNT2 <> ""
        AMNT3 = &AMNT2
        IF TARIFFS->EQUALTO <> 0 .AND. AMNT3 = TARIFFS->EQUALTO
            ELSE
                IF TARIFFS->MORETHAN <> 0 .AND. AMNT3 <= TARIFFS->MORETHAN.
                    REPLACE SHIPBILL->BILL WITH 0.0
                    REPLACE TARIFFS->BILL WITH 0.0
                ENDIF
                IF TARIFFS->LESSTHAN <> 0 .AND. AMNT3 >= TARIFFS->LESSTHAN
                    REPLACE SHIPBILL->BILL WITH 0.0
                    REPLACE TARIFFS->BILL WITH 0.0
                ENDIF
                IF TARIFFS->EQUALTO <> 0 .AND. TARIFFS->LESSTHAN = 0.0 .AND. TARIFFS->MORETHAN = 0.0 .AND. AMNT3 <> TARIFFS->EQUALTO
                    REPLACE SHIPBILL->BILL WITH 0.0
                    REPLACE TARIFFS->BILL WITH 0.0
                ENDIF
            ENDIF
        ENDIF
    ENDIF
    SELECT 2
    SKIP
ENDDO
SET EXACT OFF
RETURN
* Bills Program
* For computing ships bills

ANSWER4 = 2
ANSWER9 = ""

CLEAR

@ 1, 26 SAY "COMPUTATION MENU"
@ 3, 29 SAY "INVOICE FOR"
@ 5, 25 SAY "1. SINGLE VESSEL"
@ 6, 26 SAY "2. ALL VESSELS"
@ 8, 21 SAY "ENTER APPROPRIATE CHOICE"
@ 8, 47 GET ANSWER4 PICTURE "#" RANGE 1,2
@ 4, 21,7, 45 BOX FRAME1
READ
SET CONFIRM ON
CLEAR
IF ANSWER4 = 1
    @ 10, 21 SAY "ENTER THE VESSEL NUMBER"
    @ 10, 46 GET ANSWER9 PICTURE "XXXX"
READ
CLEAR
ENDIF

@ 12, 6 SAY "Men at Work"
READ
SELECT 1
USE &MPATH&NUMVESSEL ALIAS VESSEL
SELECT 2
USE &MPATH&NEWTAR ALIAS TARIFFS
SELECT 3
USE SHIPBILL
DELETE ALL
PACK
SELECT 1
COUNTER1 = 1
IF ANSWER16 = 1
    LASTLINE = 55
ELSE
    LASTLINE = 23
ENDIF

LASTLINE = 23

IF ANSWER4 = 1
    LOCATE FOR VESSEL->VESSELID = ANSWER9
    DO COMPUTE
    SELECT 2
    DO BILLINGS
    CLEAR
    SELECT 2
    GOTO TOP
    IF ANSWER16 = 1
        SET DEVICE TO PRINT
ENDIF
@ 1, 6 SAY "VESSEL NUMBER "
@ 1,20 SAY VESSEL->VESSELID
@ 1,38 SAY " RATE"
@ 1,50 SAY "CHARGES"
LINE = 2
BIGTOTAL = 0.0
DO WHILE .NOT. EOF()
  DO WHILE LINE < LASTLINE .AND. .NOT. EOF()
    @ LINE, 1 SAY ITEM_NO
    @ LINE, 8 SAY TITLE
    @ LINE, 37 SAY TARIFFS->RATE
    @ LINE, 47 SAY BILL PICTURE ",###,###,###
    LINE = LINE + 1
    BIGTOTAL = BILL + BIGTOTAL
  SKIP
ENDDO
IF EOF()
  @ LINE, 37 SAY "Total"
  @ LINE, 47 SAY BIGTOTAL PICTURE ",###,###,###,###"
ENDIF
IF ANSWER16 = 2
  WAIT
    @ 2, 0, 23, 79 BOX ""
ELSE
  SET DEVICE TO SCREEN
ENDIF
LINE = 2
ENDDO
ELSE
  GOTO TOP
ENDDO
DO WHILE .NOT. EOF()
  DO COMPUTE
  SELECT 2
  DO BILLINGS
  CLEAR
  SELECT 2
  GOTO TOP
  IF ANSWER16 = 1
    SET DEVICE TO PRINT
  ENDIF
  @ 1, 6 SAY "VESSEL NUMBER "
  @ 1, 20 SAY VESSEL->VESSELID
  @ 1, 38 SAY "RATE"
  @ 1, 50 SAY "CHARGES"
  LINE = 2
  BIGTOTAL = 0.0
  DO WHILE .NOT. EOF()
    DO WHILE LINE < LASTLINE .AND. .NOT. EOF()
      @ LINE, 1 SAY ITEM_NO
      @ LINE, 8 SAY TITLE
      @ LINE, 37 SAY TARIFFS->RATE
      @ LINE, 47 SAY BILL PICTURE ",###,###,###,###"
      LINE = LINE + 1
      BIGTOTAL = BILL + BIGTOTAL
    SKIP
  ENDDO
ENDDO
IF EOF()
    @ LINE,37 SAY "Total"
    @ LINE,47 SAY BIGTOTAL PICTURE "###,###,###,###"
ENDIF
IF ANSWER16 = 2
    WAIT
    @ 2,0,23,79 BOX ""
ELSE
    SET DEVICE TO SCREEN
ENDIF
LINE = 2
ENDDO
SELECT 1
SKIP
COUNTER1 = COUNTER1 + 1
ENDDO
ENDIF
SELECT 3
GOTO TOP
IF ANSWER16 = 1
    EJECT
    SET DEVICE TO SCREEN
ENDIF
IF ANSWER16 = 3
    REPORT FORM INVOICE TO FILE &FILPRINT
ENDIF
CLOSE DATABASES
RETURN
* Charges.prg
* Controls and Executes Calculation of Charges

DO WHILE .T.
SET CONFIRM OFF
ANSWER8 = 0
ANSWER08 = 1
ANSWER16 = 2
@ 1,1, 3,65 BOX ""
@ 1,52, 12,78 BOX ""
@ 1,7, 20,49 BOX ""
@ 4,1, 23,50 BOX FRAME1
@ 6, 16 SAY "ANALYSIS MENU"
@ 8, 7 SAY "1. Prepare Ship's Bill for One or"
@ 9, 15 SAY "More Vessels"
@ 10, 7 SAY "2. Perform Sensitivity Analysis"
@ 11, 15 SAY "for a Vessel"
@ 12, 7 SAY "3. Compute the Port Income for a"
@ 13, 15 SAY "Selected Mix of Vessels"
@ 22, 4 SAY "Choose 1 to 3; 0 to Return to Main Menu : "
@ 22, 45 GET ANSWER8 PICTURE "#" RANGE 0,3
READ
IF ANSWER8 = 0
   SET CONFIRM ON
   RETURN
ENDIF
IF ANSWER8 = 3
@ 8,7,22,49 BOX ""
@ 8,7 SAY "How are number of vessels to be entered?"
@ 11,7 SAY "1. Use Numbers Previously Entered"
@ 13,7 SAY "2. Enter a Number for Each Vessel Type"
@ 22,4 SAY "Choose 1 or 2"
@ 22,20 GET ANSWER08 PICTURE "#" RANGE 1,2
READ
ENDIF
@ 8,7, 20,49 BOX ""
FILPRINT = ""
@ 6,16 SAY "OUTPUT MENU "
@ 8, 7 SAY "Output To"
@ 9, 7 SAY "1. Printer"
@ 10, 7 SAY "2. Screen"
@ 11, 7 SAY "3. File"
@ 22, 4 SAY "Choose 1 to 3; 0 to Return to Main Menu : "
@ 22, 45 GET ANSWER16 PICTURE "#" RANGE 0,3
READ
SET CONFIRM OFF
IF ANSWER16 = 3
   @ 20, 21 SAY "ENTER FILE NAME"
   @ 20, 38 GET FILPRINT PICTURE "XXXXX"
   READ
ENDIF
CLEAR
FILPRINT = "PRN" + FILPRINT
DOT = 18
DO CASE
    CASE ANSWER8 = 1
        DO BILLS
    CASE ANSWER8 = 2
        DO TESTS
    CASE ANSWER8 = 3
        DO REVENUES
    ENDCASE
CLEAR
ENDDO
RETURN
* Compute.Prg
* Sets Up and Stores Billing Information

CLEAR
DOT = 18
@ 12, 6 SAY "Calculating"
@ 12, DOT SAY "."
IDOT = DOT
LOOPER = 1
DO WHILE LOOPER < 50
  IF LOOPER < 10
    LOOPER2 = STR(LOOPER, 1, 0)
  ELSE
    LOOPER2 = STR(LOOPER, 2, 0)
  ENDIF
  LCHECK = "CHECKS" + LOOPER2
  LUNITS = "UNITS" + LOOPER2
  LUNIT = &LUNITS
  LPARAM = "PARAM" + LOOPER2
  IF UPPER(&LCHECK) = "X"
    &LUNIT = VESSEL->&LPARAM
  ENDIF
  LOOPER = LOOPER + 1
ENDDO
DO COMPUTE2
RETURN
* Compute2.prg.
* Computes Formulas for the Vessel

SET EXACT ON
IF FORMULAE1 <> ""
    EQUATELS = VESSEL->FORMULAE1
    EQUATERS = VESSEL->FORMULAS1
    &EQUATELS = &EQUATERS
ENDIF
IF FORMULAE2 <> ""
    EQUATELS = VESSEL->FORMULAE2
    EQUATERS = VESSEL->FORMULAS2
    &EQUATELS = &EQUATERS
ENDIF
IF FORMULAE3 <> ""
    EQUATELS = VESSEL->FORMULAE3
    EQUATERS = VESSEL->FORMULAS3
    &EQUATELS = &EQUATERS
ENDIF
IF FORMULAE4 <> ""
    EQUATELS = VESSEL->FORMULAE4
    EQUATERS = VESSEL->FORMULAS4
    &EQUATELS = &EQUATERS
ENDIF
IF ANSWER8 = 2
    DO COMPUTE3
ENDIF
SET EXACT OFF
RETURN
* Compute3.prg
* Computes Formulas for the Vessel

LOOPER = 1
DO WHILE LOOPER < 10
   LOOPER2 = STR(LOOPER,1,0)
   LFORM = "FORMUL" + LOOPER2
   IF &LFORM <> ""
      LFORM1 = "FORMUL" + LOOPER2
      LFORM2 = "SITUAT" + LOOPER2
      EQUATELS = &LFORM
      EQUATERS = &LFORM1
      &EQUATELS = &EQUATERS
      IF UPPER(&LFORM2) = "U"
         &EQUATELS = &EQUATELS + .99
         &EQUATELS = INT(&EQUATELS)
      ENDIF
      IF UPPER(&LFORM2) = "D"
         &EQUATELS = INT(&EQUATELS)
      ENDIF
   ENDIF
   LOOPER = LOOPER + 1
ENDDO
IF FORMUL10 <> ""
   EQUATELS = FORMUL10
   EQUATERS = FORMUL20
   &EQUATELS = &EQUATERS
ENDIF
RETURN
* Housekep.prg
* Program for fixing files

DO WHILE .T.
SET CONFIRM OFF
ANSWER = 0

@ 1,15, 3,65 BOX ""
@ 4,52, 12,78 BOX ""
@ 8,7, 20,49 BOX ""
@ 4,1, 23,50 BOX FRAME1
@ 13,52,21,78 BOX FRAME1
@ 8, 5 SAY "1. Delete a Tariff Item from Tariff File"
@ 10, 5 SAY "2. Delete a Vessel from the Vessel File"
@ 12, 5 SAY "3. Copy Tariff File to Another Directory"
@ 14, 5 SAY "4. Copy a Vessel File to Another Directory"
@ 16, 5 SAY "5. Erase a Tariff File"
@ 18, 5 SAY "6. Erase a Vessel File"
@ 20, 5 SAY "7. Rebuild Index for Tariff File"
@ 14,55 SAY "PROGRAM"
@ 16,55 SAY "DATA"
@ 18,55 SAY "TARIFF"
@ 20,55 SAY "VESSEL"
@ 14,64 SAY mdir PICTURE "XXXXXXXXXX"
@ 16,64 SAY mpath PICTURE "XXXXXXXXX"
@ 18,64 SAY proj PICTURE "XXXX"
@ 20,64 SAY nvessel PICTURE "XXXX"
@ 22, 4 SAY "Choose 1 to 6; 0 to Return to Main Menu : :
@ 22, 45 GET ANSWER PICTURE "#" RANGE 0,7

READ
SET CONFIRM ON
@ 8,5, 20,49 BOX ""
DO CASE
   CASE ANSWER = 0
      RETURN
   CASE ANSWER = 1
      CLEAR
      USE &MPATH&NEWTAR INDEX &ORDERS ALIAS TARIFFS
      GOTO TOP
      @ 1,12 SAY "SELECT THE RECORDS TO BE DELETED"
      LINE = 3
      DO WHILE .NOT. EOF()
         GOAHEAD = "N"
         @ LINE, 12 SAY "Delete Tariff Item "
         @ LINE, 33 SAY ITEM_NO
         @ LINE, 40 SAY "(Y/N) "
         @ LINE ,46 GET GOAHEAD
      READ
IF UPPER(GOAHEAD) = "Y"
    DELETE
ENDIF
IF LINE = 23
    LINE = 3
    @ 2,12, 23,78 BOX ""
ELSE
    LINE = LINE + 1
ENDIF
SKIP
ENDDO
PACK

CASE ANSWER = 2
    CLEAR
    USE &MPATH&NUMVESSEL
    GOTO TOP
@ 1,12 SAY "SELECT THE RECORDS TO BE DELETED"
    LINE = 3
DO WHILE .NOT. EOF()
    GOAHEAD = "N"
    @ LINE, 12 SAY "Delete Vessel Number"
    @ LINE, 35 SAY VESSELID
    @ LINE, 42 SAY "(Y/N)"
    @ LINE ,48 GET GOAHEAD
    READ
    IF UPPER(GOAHEAD) = "Y"
        DELETE
    ENDIF
    IF LINE = 23
        LINE = 3
        @ 2,12, 23,78 BOX ""
    ELSE
        LINE = LINE + 1
    ENDIF
    SKIP
ENDDO
PACK

CASE ANSWER = 3
    NEWDIR = ""
@ 12,7 SAY "Enter New Directory Name"
@ 13,7 GET NEWDIR PICTURE "XXXXXXXXXXXXXXXX"
READ
    NEWDIR = TRIM(NEWDIR)
    USE &MPATH&NEWCHARG
    FILE1 = NEWDIR+NEWCHARG
    COPY TO &FILE1
    USE &MPATH&NEWTAR INDEX &ORDERS ALIAS TARIFFS
    FILE1 = NEWDIR+NEWTAR
    COPY TO &FILE1
    FILE1 = MPATH + ORDERS + ".NTX"
FILE2 = NEWDIR + ORDERS + ".NTX"
COPY FILE &FILE1 TO &FILE2
FILE1 = MPATH + "MES" + TRIM(PROJ) + ".MEM"
FILE2 = NEWDIR + "MES" + TRIM(PROJ) + ".MEM"
COPY FILE &FILE1 TO &FILE2

CASE ANSWER = 4
NEWDIR = ""
@ 12,7 SAY "Enter New Directory Name"
@ 13,7 GET NEWDIR PICTURE "XXXXXXXXXXX"
READ
NEWDIR = TRIM(NEWDIR)
USE &MPATH&NUMVESSEL
FILE1 = NEWDIR + NUMVESSEL
COPY TO &FILE1

CASE ANSWER = 5
DPROJ = ""
@ 10,5 SAY "Enter the Number of the Tariff File"
@ 11,21 GET DPROJ PICTURE "XXXX"
READ
GOAHEAD = "N"
@ 13,5 SAY "Are You Sure (Y/N)?"
@ 13,25 GET GOAHEAD PICTURE "A"
READ
IF UPPER(GOAHEAD) = "Y"
    FILE1 = MPATH + "CHG" + TRIM(DPROJ) + ".DBF"
    ERASE &FILE1
    FILE1 = MPATH + "TAR" + TRIM(DPROJ) + ".DBF"
    ERASE &FILE1
    FILE1 = MPATH + "MES" + TRIM(PROJ) + ".MEM"
    ERASE &FILE1
ENDIF

CASE ANSWER = 6
DPROJ = ""
@ 10,5 SAY "Enter the Number of the Vessel File"
@ 11,21 GET DPROJ PICTURE "XXXX"
READ
GOAHEAD = "N"
@ 13,5 SAY "Are You Sure (Y/N)?"
@ 13,25 GET GOAHEAD PICTURE "A"
READ
IF UPPER(GOAHEAD) = "Y"
    FILE1 = MPATH + "VESL" + TRIM(DPROJ) + ".DBF"
    ERASE &FILE1
ENDIF

CASE ANSWER = 7
DPROJ = ""
@ 10,5 SAY "Enter the Number of the Tariff File"
@ 11,21 GET DPROJ PICTURE "XXXXX"
READ
NEWTAR = "TAR" + DPROJ
USE &NEWTAR INDEX &ORDERS ALIAS TARIFFS
REINDEX

ENDCASE
CLEAR
ENDDO
RETURN
* Measure.Prg
* Program for entering units of measure

MEASTYPE = 0
SET FORMAT TO MEASMENU
READ
SET FORMAT TO
SET TALK OFF
CLEAR
@ 1, 10 TO 24, 57
NEWMEAS = "MES" + PROJ
DO CASE
    CASE MEASTYPE = 1
        USE METRIC
    CASE MEASTYPE = 2
        USE ENGLISH
ENDCASE
COPY TO &NEWMEAS
USE &NEWMEAS ALIAS MEASURES
GOTO TOP
@ 0, 16 SAY "SYMBOL"
@ 0, 24 SAY "DESCRIPTION"
IF MEASTYPE = 1
    @ 2, 16 SAY "Metric Units of Measure"
ELSE
    @ 2, 16 SAY "English Units of Measure"
ENDIF
@ 3, 16 SAY MEASURES->SYMBOL
@ 3, 24 SAY MEASURES->DESCRIPT
MEASURE1 = MEASURES->SYMBOL
SKIP
@ 4, 16 SAY MEASURES->SYMBOL
@ 4, 24 SAY MEASURES->DESCRIPT
MEASURE2 = MEASURES->SYMBOL
SKIP
@ 5, 16 SAY MEASURES->SYMBOL
@ 5, 24 SAY MEASURES->DESCRIPT
MEASURE3 = MEASURES->SYMBOL
SKIP
@ 6, 16 SAY MEASURES->SYMBOL
@ 6, 24 SAY MEASURES->DESCRIPT
MEASURE4 = MEASURES->SYMBOL
SKIP
@ 7, 16 SAY MEASURES->SYMBOL
@ 7, 24 SAY MEASURES->DESCRIPT
MEASURE5 = MEASURES->SYMBOL
SKIP
@ 8, 16 SAY MEASURES->SYMBOL
@ 8, 24 SAY MEASURES->DESCRIPT
MEASURE6 = MEASURES->SYMBOL
SKIP

18
@ 10, 16 SAY "Time Units"
@ 12, 16 SAY MEASURES->SYMBOL
@ 12, 24 SAY MEASURES->DESCRIPT
MEASURE7 = MEASURES->SYMBOL
SKIP
@ 13, 16 SAY MEASURES->SYMBOL
@ 13, 24 SAY MEASURES->DESCRIPT
MEASURE8 = MEASURES->SYMBOL
SKIP
@ 14, 16 SAY MEASURES->SYMBOL
@ 14, 24 SAY MEASURES->DESCRIPT
MEASURE9 = MEASURES->SYMBOL
SKIP
@ 16, 16 SAY "Container Units"
@ 17, 16 SAY MEASURES->SYMBOL
@ 17, 24 SAY MEASURES->DESCRIPT
MEASURE10 = MEASURES->SYMBOL
SKIP
@ 18, 16 SAY MEASURES->SYMBOL
@ 18, 24 SAY MEASURES->DESCRIPT
MEASURE11 = MEASURES->SYMBOL
SKIP
@ 20, 16 SAY "Add Other Units as Required"
@ 21, 16 GET MEASURES->SYMBOL
@ 21, 24 GET MEASURES->DESCRIPT
MEASURE12 = MEASURES->SYMBOL
SKIP
@ 22, 16 GET MEASURES->SYMBOL
@ 22, 24 GET MEASURES->DESCRIPT
MEASURE13 = MEASURES->SYMBOL
SKIP
@ 23, 16 GET MEASURES->SYMBOL
@ 23, 24 GET MEASURES->DESCRIPT
MEASURE14 = MEASURES->SYMBOL
READ
RETURN
* Newtariff Program
* Used to enter a new tariff

CLEAR
SET FORMAT TO
PROJ = " "

@ 5, 18 SAY "Enter the Tariff Reference Code"
@ 9, 16 SAY "This can be any combination of letters and"
@ 10, 16 SAY "numbers with a maximum of five characters"
@ 8,10,11,63 BOX FRAME1
@ 5, 50 GET PROJ PICTURE "XXXXX"
READ
NEWTAR = "TAR" + PROJ
ORDERS = "IND" + PROJ
USE TARIFFS
COPY STRUCTURE TO &MPATH&NEWTAR

* Input Units of Measure to be Used For Charging Units

CLEAR
MEASTYPE = 1

@ 2, 19 SAY "TYPE OF MEASUREMENT UNITS"
@ 6, 23 SAY "1. METRIC UNITS"
@ 7, 23 SAY "2. ENGLISH UNITS"
@ 11, 19 SAY "SELECT ONE OF ABOVE"
@ 4, 19, 9, 43 BOX FRAME2
@ 11, 40 GET MEASTYPE PICTURE "#" RANGE 1,2
READ

IF MEASTYPE = 1
   USE METRIC ALIAS MEASURES
ELSE
   USE ENGLISH ALIAS MEASURES
ENDIF
GOTO TOP
MEASURE1 = MEASURES->SYMBOL
DESCRIPT1 = MEASURES->DESCRIPT
SKIP
MEASURE2 = MEASURES->SYMBOL
DESCRIPT2 = MEASURES->DESCRIPT
SKIP
MEASURE3 = MEASURES->SYMBOL
DESCRIPT3 = MEASURES->DESCRIPT
SKIP
MEASURE4 = MEASURES->SYMBOL
DESCRIPT4 = MEASURES->DESCRIPT
SKIP
MEASURE5 = MEASURES->SYMBOL
DESCRIPT5 = MEASURES->DESCRIPT
SKIP
MEASURE6 = MEASURES->SYMBOL
DESCRIPT6 = MEASURES->DESCRIPT
SKIP
MEASURE7 = MEASURES->SYMBOL
DESCRIPT7 = MEASURES->DESCRIPT
SKIP
MEASURE8 = MEASURES->SYMBOL
DESCRIPT8 = MEASURES->DESCRIPT
SKIP
MEASURE9 = MEASURES->SYMBOL
DESCRIPT9 = MEASURES->DESCRIPT
SKIP
MEASURE10 = MEASURES->SYMBOL
DESCRIPT10 = MEASURES->DESCRIPT
SKIP
MEASURE11 = MEASURES->SYMBOL
DESCRIPT11 = MEASURES->DESCRIPT
MEASURE12 = " "
DESCRIPT12 = " "
MEASURE13 = " "
DESCRIPT13 = " "
MEASURE14 = " "
DESCRIPT14 = " 

CLEAR
@ 3,15 SAY "List of Measures Including User-Specified Measures"
@ 7,20 SAY MEASURE1
@ 7,26 SAY DESCRIP1
@ 8,20 SAY MEASURE2
@ 8,26 SAY DESCRIP2
@ 9,20 SAY MEASURE3
@ 9,26 SAY DESCRIP3
@ 10,20 SAY MEASURE4
@ 10,26 SAY DESCRIP4
@ 11,20 SAY MEASURE5
@ 11,26 SAY DESCRIP5
@ 12,20 SAY MEASURE6
@ 12,26 SAY DESCRIP6
@ 13,20 SAY MEASURE7
@ 13,26 SAY DESCRIP7
@ 14,20 SAY MEASURE8
@ 14,26 SAY DESCRIP8
@ 15,20 SAY MEASURE9
@ 15,26 SAY DESCRIP9
@ 16,20 SAY MEASURE10
@ 16,26 SAY DESCRIP10
@ 17,20 SAY MEASURE11
@ 17,26 SAY DESCRIP11
@ 18,20 GET MEASURE12
@ 18,26 GET DESCRIP12
@ 19,20 GET MEASURE13
@ 19,26 GET DESCRIP13
@ 20,20 GET MEASURE
@ 20,26 GET DESCRIP
@ 6,18,21,63 BOX FRAME
READ
CLEAR
CLOSE DATABASES
NEWONE = "MES" + PROJ
SAVE ALL LIKE MEASURE* TO &MPATH&NEWONE

* Input the Charging Units to be Used with the Tariff

USE CHARGEUN
NEWCHARG = "CHG" + PROJ
COPY TO &MPATH&NEWCHARG
USE &MPATH&NEWCHARG ALIAS CHARGES
DO UNITS
CLOSE DATABASES

* Input the Tariff Items

USE &MPATH&NEWTAR INDEX &ORDERS ALIAS TARIFFS

ONWARD = .T.
ANSWER = "Y"
FIRST = 1
DO WHILE ONWARD

APPEND BLANK
DO TARIFINP
@ 1,1,10,72 BOX ""
@ 4, 12 SAY "Do You Wish To Enter Another Tariff Item? (Y/N) "
@ 4, 60 GET ANSWER
READ
IF UPPER(ANSWER) <> "Y"
    ONWARD = .F.
ENDIF
FIRST = FIRST + 1
@ 1,1,10,72 BOX ""
ENDDO
NUMTARIF = FIRST - 1
CLEAR
INDEX ON ITEM_NO TO &ORDERS
CLOSE DATABASES
RETURN
* Oldtariff Program
* Used to load an previously saved tariff

CLEAR
DOT = 28
IDOT = 28
@ 12,6 SAY "Preparing Tariff Data"
@ 12,DOT SAY "."
SET FORMAT TO
NEWMEAS = "MES" + PROJ
NEWTAR = "TAR" + PROJ
NEWCHARG = "CHG" + PROJ
RESTORE FROM &MPATH&NEWMEAS ADDITIVE
USE &MPATH&NEWCHARG ALIAS CHARGES
GOTO TOP
LOOPER = 1
DO WHILE LOOPER < 50
    IF LOOPER <10
        LOOPER2 = STR(LOOPER,1,0)
    ELSE
        LOOPER2 = STR(LOOPER,2,0)
    ENDIF
    LUNITS = "UNITS" + LOOPER2
    LCHECKS = "CHECKS" + LOOPER2
    LMEAS = "MEAS" + LOOPER2
    &LUNITS = CHARGES->SYMBOL
    &LCHECKS = CHARGES->CHECKOFF
    &LMEAS = CHARGES->UNITS
    SKIP
    LOOPER = LOOPER + 1
    IDOT = IDOT + .2
    DOT = INT(IDOT)
@ 12, DOT SAY "."
ENDDO
RETURN
* Revenues.prg
* Program for Computing Port Revenues

@ 12, 6 SAY "Men at Work"
READ
SELECT 1
USE &MPATH&NEWVAR INDEX &ORDERS ALIAS TARIFFS
SELECT 2
USE &MPATH&NUMVESSEL ALIAS VESSEL
GOTO TOP
SELECT 3
USE PORTINCM ALIAS INCOME
DELETE ALL
PACK
APPEND BLANK
APPEND BLANK
SELECT 4
USE FINALTOT
DELETE ALL
PACK
COUNTER1 = 1
COUNTER3 = 1
SELECT 2
DO WHILE .NOT. EOF()
   COUNTER2 = 1
   DO WHILE .NOT. EOF().AND. COUNTER1 < 6
      IF ANSWERO8 = 2
         CLEAR
         @ 12, 10 SAY "How Many Calls by Vessels of Type"
         @ 12, 45 SAY VESSEL->VESSELID PICTURE 'XXXX'
         @ 12, 52 GET VESSEL->VESSELNUM PICTURE "#####" READ
      ENDIF
   ENDIF
   DO COMPUTE
      BILL = "CHARG" + STR(COUNTER1,1,0)
   SELECT 3
   GOTO COUNTER3
   SET DECIMAL TO 0
   REPLACE &BILL WITH VAL(VESSEL->VESSELID)
   SKIP
   REPLACE &BILL WITH VESSEL->VESSELNUM
   SKIP
   DO BILLING3
   CLEAR
   SELECT 2
   SKIP
   COUNTER1 = COUNTER1 + 1
ENDDO
SELECT 4
GOTO TOP
SELECT 3
GOTO COUNTER3
IF ANSWER16 = 1
   SET DEVICE TO PRINT
   LASTLINE = 55
ELSE
   LASTLINE = 23
   CLEAR
ENDIF
BIGTOTAL1 = 0.0
BIGTOTAL2 = 0.0
BIGTOTAL3 = 0.0
BIGTOTAL4 = 0.0
BIGTOTAL5 = 0.0
@ 1,30 SAY "INCOME TEST (REVENUES IN 000's)"
@ 2,6 SAY "VESSEL NUMBER"
@ 2, 30 SAY INCOME->CHARG1 PICTURE "#####"
@ 2, 41 SAY INCOME->CHARG2 PICTURE "#####"
@ 2, 52 SAY INCOME->CHARG3 PICTURE "#####"
@ 2, 63 SAY INCOME->CHARG4 PICTURE "#####"
@ 2, 74 SAY INCOME->CHARG5 PICTURE "#####"
SKIP
@ 3,6 SAY "NUMBER OF VESSELS"
@ 3, 30 SAY INCOME->CHARG1 PICTURE "#####"
@ 3, 41 SAY INCOME->CHARG2 PICTURE "#####"
@ 3, 52 SAY INCOME->CHARG3 PICTURE "#####"
@ 3, 63 SAY INCOME->CHARG4 PICTURE "#####"
@ 3, 74 SAY INCOME->CHARG5 PICTURE "#####"
SKIP
LINE = 4
DO WHILE .NOT. EOF()
   DO WHILE .NOT. EOF() .AND. LINE < LASTLINE
      ANSWERX = INCOME->CHARG1 + INCOME->CHARG2 + INCOME->CHARG3
      ANSWERX = ANSWERX + INCOME->CHARG4 + INCOME->CHARG5
      ANSWERX = ANSWERX + FINALTOT->TOTAL
      REPLACE INCOME->TOTAL WITH ANSWERX
      @ LINE,1 SAY TARIFFS->ITEM_NO
      @ LINE, 8 SAY TARIFFS->TITLE PICTURE "XXXXXXXXXXXXXXXXX"
      @ LINE, 25 SAY INCOME->CHARG1 PICTURE "###,###,###
      @ LINE, 36 SAY INCOME->CHARG2 PICTURE "###,###,###
      @ LINE, 47 SAY INCOME->CHARG3 PICTURE "###,###,###
      @ LINE, 58 SAY INCOME->CHARG4 PICTURE "###,###,###
      @ LINE, 69 SAY INCOME->CHARG5 PICTURE "###,###,###
      BIGTOTAL1 = CHARG1 + BIGTOTAL1
      BIGTOTAL2 = CHARG2 + BIGTOTAL2
      BIGTOTAL3 = CHARG3 + BIGTOTAL3
      BIGTOTAL4 = CHARG4 + BIGTOTAL4
      BIGTOTAL5 = CHARG5 + BIGTOTAL5
      SKIP
      SELECT 4
      REPLACE FINALTOT->TOTAL WITH ANSWERX
      REPLACE FINALTOT->TITLE WITH TARIFFS->TITLE
      REPLACE FINALTOT->ITEM_NO WITH TARIFFS->ITEM_NO
      25
SELECT 1
SKIP
SELECT 3
LINE = LINE + 1
ENDDO
IF .NOT. EOF()
LINE = 4
ELSE
@ LINE, 25 SAY BIGTOTAL1 PICTURE "##,##,##,##"
@ LINE, 36 SAY BIGTOTAL2 PICTURE "##,##,##,##"
@ LINE, 47 SAY BIGTOTAL3 PICTURE "##,##,##,##"
@ LINE, 58 SAY BIGTOTAL4 PICTURE "##,##,##,##"
@ LINE, 69 SAY BIGTOTAL5 PICTURE "##,##,##,##"
ENDIF
IF ANSWER16 <> 1
WAIT
@ 4,0,23,79 BOX ""
ENDIF
ENDDO
IF ANSWER16 = 1
SET DEVICE TO SCREEN
ENDIF
COUNTER1 = 1
COUNTER2 = COUNTER2 + 1
COUNTER3 = RECCOUNT() + 1
APPEND BLANK
APPEND BLANK
SELECT 2
ENDDO
SELECT 4
GOTO TOP
LINE = 3
BIGTOTAL = 0.0
IF ANSWER16 = 1
SET DEVICE TO PRINT
ELSE
CLEAR
ENDIF
@ 1,5 SAY "TOTAL PORT INCOME FOR SAMPLE VESSELS (000's)"
DO WHILE .NOT. EOF()
DO WHILE LINE < LASTLINE .AND. .NOT. EOF()
@ LINE, 1 SAY ITEM_NO
@ LINE, 8 SAY TITLE
@ LINE, 37 SAY TOTAL PICTURE "##,##,##,##,##"
LINE = LINE + 1
BIGTOTAL = TOTAL + BIGTOTAL
SKIP
ENDDO
IF EOF()
@ LINE, 27 SAY "Total"
@ LINE, 37 SAY BIGTOTAL PICTURE "##,##,##,##,##"
26
ENDIF
IF ANSWER16 <> 1
    WAIT
        @ 3,0, 23,78 BOX ""
ENDIF
LINE = 3
ENDDO
SELECT 3
GOTO TOP
IF ANSWER16 = 1
    EJECT
    SET DEVICE TO SCREEN
ENDIF
IF ANSWER16 = 3
    REPORT FORM REVENU11 TO FILE &FILPRINT
ENDIF
RETURN
* Program.: START.PRG

* Close all open files
CLEAR ALL

* Set working environment
SET TALK OFF
SET BELL OFF
SET HEADING OFF
SET MENU OFF
SET CONFIRM ON

* Pull retained variables from memory file PISMEMOR.MEM
RESTORE FROM MEMOR1
RESTORE FROM MEMOR2 ADDITIVE
RESTORE FROM MEMOR3 ADDITIVE
RESTORE FROM MEMOR4 ADDITIVE
RESTORE FROM MEMOR5 ADDITIVE
SET DEFAULT TO &MDIR
SET PATH TO &MPATH

PUBLIC NUTARIF
PUBLIC NUMVESSEL
PUBLIC NEWTAR
PUBLIC NEWCHARG
PUBLIC ORDERS
PUBLIC FRAME1
PUBLIC FRAME2

* initialize new variables.

PROJ = " "
CHOICEM = " "
NUMVESSEL = " "
ORDERS = " "

* SINGLE BOX FRAME
FRAME1 = CHR(218)+CHR(196)+CHR(191)+CHR(179)
FRAME1 = FRAME1 + CHR(217)+CHR(196)+CHR(192)+CHR(179)

* DOUBLE BOX FRAME
FRAME2 =CHR(201)+CHR(205)+CHR(187)+CHR(186)
FRAME2 = FRAME2 + CHR(188)+CHR(205)+CHR(200)+CHR(186)

CLEAR
today=DATE()

DO WHILE .T.

* ON ERROR LOOP
nvessel = substr(numvessel,5,4)
CLEAR
@ 1,15,3,65 BOX FRAME2
@ 4,1,23,50 BOX FRAME1
@ 4,52,12,78 BOX FRAME1
@ 13,52,21,78 BOX FRAME1
@ 2,19 SAY "TARIF F A N A L Y S I S S Y S T E M"
@ 6,16 SAY " MAIN MENU"
@ 8,9 SAY "A. Change Today's Date"
@ 10,9 SAY "B. Change the Program Directory"
@ 12,9 SAY "C. Change the Data Sub-Directory"
@ 14,9 SAY "D. Prepare the Tariff File"
@ 16,9 SAY "E. Prepare The Vessel File"
@ 18,9 SAY "F. Analyze the Tariff"
@ 20,9 SAY "G. File Maintenance"
@ 22,4 SAY "Enter Selection (A - G or X to quit) : : :
@ 6,55 SAY "DATE"
@ 8,55 SAY "TIME"
@ 10,55 SAY "LAST TIME"
@ 14,55 SAY "PROGRAM"
@ 16,55 SAY "DATA"
@ 18,55 SAY "TARIFF"
@ 20,55 SAY "VESSEL"
@ 6,68 SAY today
@ 10,68 SAY mlastday
@ 14,64 SAY mdir PICTURE "XXXXXXXXXX"
@ 15,64 SAY mpath PICTURE "XXXXXXXXXX"
@ 18,64 SAY proj PICTURE "XXXXX"
@ 20,64 SAY nvessel PICTURE "XXXX"
@ 22,53 SAY " 1986 TRP/jha"
@ 23,52, 23,78 BOX FRAME1

DO WHILE .T.
    i=0
    DO WHILE i=0
        i=INKEY()
        @ 8,68 SAY TIME()
        @ 22,42 SAY " "
        IF UPPER(CHR(i))$"ABCDEFGHIJKLMNOPQRSTUVWXYZ"
            EXIT
        ENDFLD
        i=0
    ENDDO
    @ 22,42 SAY UPPER(CHR(i))

    IF .NOT. CHR(i)$"Aa"
        EXIT
    ENDFLD

    * Change today's date
    SET COLOR TO N/W
@@ 8,9 SAY "A. Change Today's Date"
  SET COLOR TO W/N
@@ 6,68 GET today
READ
@@ 6,68 SAY today
@@ 8,9 SAY "A. Change Today's Date"
@@ 22,42 SAY ""

ENDDO

DO CASE

* Exit system
CASE CHR(i) $ "Xx"
  * retain today's date
  mlastday = today
  SET SAFETY OFF
  SAVE ALL LIKE mdir to memor1
  SAVE ALL LIKE mpath to memor3
  SAVE ALL LIKE mlastday to memor4
  SET SAFETY ON

  * clear variables and return to calling program or dbase system
  SET TALK ON

  * SET ESCAPE ON
  SET BELL ON
  SET HEADING ON
  SET MENU ON
  CLEAR ALL
  CLEAR
  RETURN

* Change Directory
CASE CHR(i) $ "bb"
  MDIR = ""
  SET COLOR TO N/W
@@ 10,9 SAY "B. Change the Program Directory"
@@ 14,64 get MDIR PICTURE "XXXXXXXXXXX"
READ
MDIR = TRIM(MDIR)
SET DEFAULT TO &MDIR
SET COLOR TO W/N
@@ 10,9 SAY "B. Change the Program Directory"
@@ 22,43 SAY ""

* Change the path
CASE CHR(i) $ "Cc"
  MPATH = ""
  SET COLOR TO N/W
@@ 12,9 SAY "C. Change the Data Sub-Directory"
@@ 16,64 get MPATH PICTURE "XXXXXXXXXXX"
READ
SET COLOR TO W/N
@ 12,9 SAY " C. Change the File Sub-Directory"
@ 22,43 SAY " "
MPATH = TRIM(MPATH)
SET PATH TO &MPATH

* Create, Retrieve or Edit the Tariff File
CASE CHR(i) $ "dD"
  DO TARIFF

* Create, Retrieve or Edit the Tariff File
CASE CHR(i) $ "eE"
  DO VESSEL

* Go to the Analysis Routines
CASE CHR(i) $ "fF"
  IF PROJ = " "
    @ 8,9,20,49 BOX ""
    @ 8,9 SAY "A Tariff File not yet selected."
    @ 10,9 SAY "Select an existing tariff or"
    @ 12,9 SAY "Initialize a new one"
    @ 14,9 SAY "before using this option."
    WAIT
    CLEAR
    CHOICEM = 0
    LOOP
  ELSE
    IF NUMVESSEL = " "
      SET FORMAT TO
      @ 8,9,20,49 BOX ""
      @ 8,9 SAY "A Vessel File not yet selected."
      @ 10,9 SAY "Select an existing tariff or"
      @ 12,9 SAY "Initialize a new one"
      @ 14,9 SAY "before using this option."
      WAIT
      CLEAR
      CHOICEM = 0
      LOOP
    ELSE
      SITUAT1 = "N"
      SITUAT2 = "N"
      SITUAT3 = "N"
      SITUAT4 = "N"
      SITUAT5 = "N"
      SITUAT6 = "N"
      SITUAT7 = "N"
      SITUAT8 = "N"
      SITUAT9 = "N"
      SITUAT10 = "N"
      FORMUL1 = " "
      FORMUL2 = " "
      FORMUL3 = " 

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DO CHARGES
CLOSE DATABASES

ENDIF
ENDIF

* Program Maintenance
CASE CHR(i) $ "Gg"
DO HOUSEKEEP

ENDCASE

ENDDO

RETURN
* Eof: Mainmenu.prg
* Tariff.prg
* Sets Up Menu for Tariff Modification

DO WHILE .T.
SET CONFIRM OFF
ANSWER = 0

@ 1,15,3,65 BOX ""
@ 4,52,12,78 BOX ""
@ 8,7,20,49 BOX ""
@ 6, 16 SAY "TARIFF MENU"
@ 8, 7 SAY "1. List Current Tariff Files"
@ 10, 7 SAY "2. Create a New Tariff File"
@ 12, 7 SAY "3. Retrieve A Previously Saved Tariff File"
IF PROJ = 
@ 22, 4 SAY "Choose 1 to 3; 0 to Return to Main Menu : :"
@ 22, 45 GET ANSWER PICTURE "#" RANGE 0,3
ELSE
@ 14, 7 SAY "4. Edit the Tariff Data"
@ 16, 7 SAY "5. Edit the Charging Parameters"
@ 18, 7 SAY "6. Print the Tariff"
@ 20, 7 SAY "7. Print the Charging Units"
@ 22, 4 SAY "Choose 1 to 7; 0 to Return to Main Menu : :"
@ 22, 45 GET ANSWER PICTURE "#" RANGE 0,7
ENDIF
READ.
SET CONFIRM ON
DO CASE

* List Existing Tariff File on Sub-directory
CASE ANSWER = 1
CLEAR
LOOK = MPATH + "TAR*.dbf"
RUN DIR &LOOK
WAIT
CLEAR

* Create a New Tariff Database
CASE ANSWER = 2
DO NEWTARIF

* Use an Existing Tariff File
CASE ANSWER = 3
SET COLOR TO N/W
@ 9,54 SAY "Enter a Five Character"
@ 10,54 SAY "Tariff Code"
@ 12, 7 SAY "3. Retrieve A Previously Saved Tariff File"
@ 18,64 GET proj PICTURE "XXXXX"
READ
SET COLOR TO W/N
@ 12, 7 SAY "3. Retrieve A Previously Saved Tariff File"
@ 22,43 SAY "  
@ 9,54 SAY "  
@ 10,54 SAY "  
DO OLDTARIF  
LOOPER = 1  
DO WHILE LOOPER < 50  
   IF LOOPER < 10  
      LOOPER2 = STR(LOOPER,1,0)  
   ELSE  
      LOOPER2 = STR(LOOPER,2,0)  
   ENDIF  
   LCHECK = "CHECKS" + LOOPER2  
   LLUNIT = "UNITS" + LOOPER2  
   IF UPPER(&LCHECK) = "X"  
      LUNIT = &LLUNIT  
      PUBLIC &LUNIT  
      &LUNIT = 0.0  
   ENDIF  
   LOOPER = LOOPER + 1  
ENDDO  
ORDERS = "IND" + PROJ  

* Edit the Charging Units  
CASE ANSWER = 5  
   USE &MPATH&NEWCHARG ALIAS CHARGES  
   DO UNITS  
   CLOSE DATABASES  

* Edit the Tariff  
CASE ANSWER = 4  
   @ 8,7,20,49BOX "  
   SET CONFIRM OFF  
   ANSWER2 = 2  
   @ 8,10 SAY "Do You Wish to Edit a"  
   @ 9,10 SAY "Copy of the File or"  
   @ 10,10 SAY "the Original?"  
   @ 12,10 SAY "1. Copy"  
   @ 14,10 SAY "2. Original"  
   @ 22,4 SAY "Enter The Appropriate Number (1 or 2) :::"  
   @ 22,45 GET ANSWER2 PICTURE "#" RANGE 1,2  
   READ  
   IF ANSWER2 = 1  
      SET CONFIRM ON  
      OLDMEM = "MES" + PROJ + ".MEM"  
      USE &MPATH&NEWTAR INDEX &ORDERS ALIAS TARIFFS  
      PROJ = "  
      SET COLOR TO N/W  
      @ 9,54 SAY "Enter a Five Character"  
      @ 10,54 SAY "Tariff Code"  
      @ 18,64 GET PROJ PICTURE "XXXXX"  
      READ  
      SET COLOR TO W/N  
   ELSE  
      USE &MPATH&NEWCHARG ALIAS CHARGES  
      DO UNITS  
      CLOSE DATABASES  
   ENDIF  
   USE &MPATH&NEWTAR INDEX &ORDERS ALIAS TARIFFS  
   PROJ = "  
   SET COLOR TO W/N  
   @ 9,54 SAY "Enter a Five Character"  
   @ 10,54 SAY "Tariff Code"  
   @ 18,64 GET PROJ PICTURE "XXXXX"  
   READ  
   SET COLOR TO N/W  
   USE &MPATH&NEWTAR INDEX &ORDERS ALIAS TARIFFS  
   PROJ = "  
   SET COLOR TO N/W  
   @ 9,54 SAY "Enter a Five Character"  
   @ 10,54 SAY "Tariff Code"  
   @ 18,64 GET PROJ PICTURE "XXXXX"  
   READ  
   SET COLOR TO W/N
NEWTAR = "TAR" + PROJ
ORDERS = "IND" + PROJ
USE &MPATH&NEWTAR INDEX &ORDERS ALIAS TARIFFS
INDEX ON ITEM_NO TO &MPATH&ORDERS
USE &MPATH&NEWCHARG
NEWCHARG = "CHG" + PROJ
COPY TO &MPATH&NEWCHARG
NEWMEM = "MES" + PROJ + ".MEM"
COPY FILE &MPATH&OLDMEM TO &MPATH&NEWMEM
CLOSE DATABASES
ENDIF
ANSWER9 = 2
@ 8,7,20,49 BOX "" 
@ 10,10 SAY "Do You Wish to:"
@ 12,10 SAY "1. add new tariff items"
@ 14,10 SAY "2. edit existing tariff items"
@ 22, 4 SAY "Enter The Appropriate Number (1 or 2) : :"
@ 22, 45 GET ANSWER9 PICTURE "#" RANGE 1,2
READ CLEAR
SET CONFIRM ON
USE &MPATH&NEWTAR INDEX &ORDERS ALIAS TARIFFS
IF ANSWER9 = 2
   ANSWER10 = "" 
   @ 12,12 SAY "If you Wish to Edit a Specific Tariff Item Then"
   @ 13,12 SAY "Enter the Item Number Otherwise Press Return"
   @ 13, 58 GET ANSWER10 PICTURE "XXXXXX"
   READ
   IF ANSWER10 <> "" 
      SEEK ANSWER10
      IF EOF()
         @ 11,12 SAY "Not Found, Try Again"
         @ 11,60 GET ANSWER10 PICTURE "XXXXX"
         READ
      SEEK ANSWER10
   ENDIF
ENDIF
ENDIF
CLEAR
ONWARD = .T.
ANSWER3 = "Y"
FIRST = 1
DO WHILE ONWARD
   IF ANSWER9 = 1
      APPEND BLANK
   ENDIF
   DO TARIFINP
      @ 1,1,8,72 BOX ""
      @ 4, 12 SAY "Do You Wish To Add/Edit Another Tariff Item? (Y/N) "

@ 4, 65 GET ANSWER3
READ
IF UPPER(ANSWER3) <> "Y"
   ONWARD = .F.
ELSE
   IF ANSWER9 = 2
      ANSWER10 = "   "
   @ 22,12 SAY "If you Wish to Edit a Specific Tariff Item Then"
   @ 23,12 SAY "Enter the Item Number Otherwise Press Return"
   @ 23, 57 GET ANSWER10 PICTURE "XXXXX"
   READ
   IF ANSWER10 <> "   "
      SEEK ANSWER10
      IF EOF()
         @ 23,12 SAY "Not Found, Try Again"
         @ 23, 57 GET ANSWER10 PICTURE "XXXXX"
         READ
         SEEK ANSWER10
      ELSE
         SKIP
         IF EOF()
            ONWARD = .F.
         ENDIF
      ENDIF
   ENDIF
ENDIF
ENDIF
FIRST = FIRST + 1
@ 1,1,8,72 BOX ""
ENDDO
CLEAR
CLOSE DATABASES

* Print Out the Tariff
CASE ANSWER = 6
   USE &MPATH&NEWTAR INDEX &ORDERS ALIAS TARIFFS
   DO TARIFOUT

* Print Out the Charging Units
CASE ANSWER = 7
   USE &MPATH&NEWCHARG ALIAS CHARGES
   DO UNITSOUT
CASE ANSWER = 0
   RETURN
ENDCASE
CLEAR
@ 4,1,23,50 BOX FRAME1
@ 13,52, 21,78 BOX FRAME1
@ 14,55 SAY "DISK"
@ 16,55 SAY "PATH"

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@18,55 SAY "TARIFF"
@20,55 SAY "VESSEL"
@14,64 SAY mdir PICTURE "XXX"
@16,64 SAY mpath PICTURE "XXXXXXX"
@18,64 SAY proj PICTURE "XXXXX"
@20,64 SAY nvessel PICTURE "XXXX"
@22,53 SAY "1986 TRP/jha"
@23,52,23,78 BOX FRAME1

ENDDO
RETURN
* Tarifinp.prg
* Input the tariff items

@ 1, 24 SAY "TARIFF ITEM NUMBER"
@ 1, 45 GET TARIFFS->ITEM_NO
@ 2, 24 SAY "NAME"
@ 2, 30 GET TARIFFS->TITLE
@ 4, 4 GET TARIFFS->RATE
@ 4, 17 SAY "X"
@ 4, 21 GET TARIFFS->FORMULA1
@ 4, 60 SAY "FOR"
@ 5, 7 SAY "rate Charging Formula"
@ 7, 7 GET TARIFFS->FORMULA2
@ 6, 20 SAY "(OPTIONAL)"
@ 6, 46 SAY "LESS THAN"
@ 6, 60 GET TARIFFS->LESSTHAN
@ 8, 12 SAY " Condition Formula"
@ 7, 46 SAY "EQUAL TO"
@ 7, 60 GET TARIFFS->EQUALTO
@ 8, 46 SAY "GREATER THAN"
@ 8, 60 GET TARIFFS->MORETHAN

IF FIRST = 1
    LCOL = 4
    LLINE = 9
    LOOPER = 1
    DO WHILE LOOPER < 50
        IF LOOPER <10
            LOOPER2 = STR(LOOPER,1,0)
        ELSE
            LOOPER2 = STR(LOOPER,2,0)
        ENDIF
        LCHECK = "CHECKS" + LOOPER2
        LUNITS = "UNITS" + LOOPER2
        IF UPPER(&LCHECK) = "X"
            LLINE = LLINE + 1
            IF LLINE = 22
                LLINE = 10
                LCOL = LCOL + 18
            ENDFIND
            LLINE, LCOL SAY &LUNITS
        ENDFIND
        LOOPER = LOOPER + 1
    ENDDO
@ 9, 3, 22, 73 BOX FRAME1
ENDIF
READ
RETURN
* Tarifout.prg
* Output the tariff items

SET DEVICE TO PRINT
LLINE = 0
GOTO TOP
DO WHILE .NOT. EOF()
   IF LLINE > 47
      LLINE = 0
   ENDFILD
   @ LLINE + 1, 30  SAY "ITEM NUMBER"
   @ LLINE + 1, 43  SAY TARIFFS->ITEM_NO
   @ LLINE + 2, 30  SAY TARIFFS->TITLE
   @ LLINE + 3, 28  SAY TARIFFS->RATE
   @ LLINE + 3, 41  SAY "X"
   @ LLINE + 3, 45  SAY TARIFFS->FORMULA1
   LLINE = LLINE + 4
   IF TARIFFS->LESSTHAN <> 0.0 .OR. TARIFFS->EQUALTO <> 0.0; .OR. TARIFFS->MORETHAN <> 0.0
      @ LLINE, 46  SAY "LESS THAN"
      @ LLINE, 60  SAY TARIFFS->LESSTHAN
      @ LLINE + 1, 4  SAY "FOR"
      @ LLINE + 1, 8  SAY TARIFFS->FORMULA2
      @ LLINE + 1, 46  SAY "EQUAL TO"
      @ LLINE + 1, 60  SAY TARIFFS->EQUALTO
      @ LLINE + 2, 46  SAY "GREATER THAN"
      @ LLINE + 2, 60  SAY TARIFFS->MORETHAN
   LLINE = LLINE + 3
   ENDFILD
   SKIP
ENDDO
EJECT
SET DEVICE TO SCREEN
RETURN
* Tests.prg
* Program to control sensitivity testing

ANSWER5 = " 
ANSWER6 = 1
ANSWER4 = 1
IF ANSWER16 = 1
    LASTLINE = 55
ELSE
    LASTLINE = 23
ENDIF
CLEAR
@ 10, 10 SAY "Enter the Vessel Number"
@ 10, 40 GET ANSWER5 PICTURE "XXXX"
@ 12, 10 SAY "Enter Number of Vessel Parameters to be Tested"
@ 12, 60 GET ANSWER6 PICTURE "f" RANGE 1,9
@ 14, 10 SAY "Enter Number of Iterations of the Sensitivity Tests"
@ 14, 60 GET ANSWER4 PICTURE "f" RANGE 1,9
READ
CLEAR
COUNTER1 = 1
LINE = 3
@ 1,10 SAY "Enter the Names of the Charging Parameters Below"
DO WHILE COUNTER1 <= ANSWER6
    ANSWER18 = "SYMB" + STR(COUNTER1,1,0)
    @ LINE, 20 GET &ANSWER18 PICTURE "XXXXXXXXXX"
    COUNTER1 = COUNTER1 + 1
    LINE = LINE + 2
ENDDO
LCOL = 4
LLINE = 11
LOOPER = 1
DO WHILE LOOPER < 50
    IF LOOPER < 10
        LOOPER2 = STR(LOOPER,1,0)
    ELSE
        LOOPER2 = STR(LOOPER,2,0)
    ENDIF
    LCHECK = "CHECKS" + LOOPER2
    LUNITS = "UNITS" + LOOPER2
    IF UPPER(&LCHECK) = "X"
        LLINE = LLINE + 1
        IF LLINE = 24
            LLINE = 12
            LCOL = LCOL + 18
        ENDIF
        @ LLINE, LCOL SAY &LUNITS
    ENDIF
    LOOPER = LOOPER + 1
ENDDO
READ
Enter Formulas to be Used in Calculating Charging Parameters

```
DO WHILE LOOPER < 11
    LOOPER2 = STR(LOOPER, 1, 0)
    IF LOOPER = 10
        LFORM = "FORMUL10"
        LFORM2 = "FORMUL20"
        LFORM3 = "SITUAT10"
    ELSE
        LFORM = "FORMUL" + LOOPER2
        LFORM2 = "FORMUL1" + LOOPER2
        LFORM3 = "SITUAT" + LOOPER2
    ENDIF
    LOOPER = LOOPER + 1
    @ LOOPER, 3 GET &LFORM3
    @ LOOPER, 7 GET &LFORM PICTURE "XXXXXXXXXX"
    @ LOOPER, 18 SAY "="
    @ LOOPER, 20 GET &LFORM2 PICTURE;
    "XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
ENDDO
READ
CLEAR
CLOSE DATABASES
@ 12, 6 SAY "Men at Work"
READ
SELECT 1
USE &MPATH&NEWTAR INDEX &ORDERS ALIAS TARIFFS
SELECT 2
USE &MPATH&NUMVESSEL ALIAS VESSEL
SELECT 3
USE VESLSENS ALIAS SENSITIV
DELETE ALL
PACK
SELECT 2
LOCATE FOR VESSEL->VESSELID = ANSWER5
DO COMPUTE
SELECT 3
GOTO TOP
COUNTER2 = 1
COUNTER3 = 1
BILL = "CHARGE1"
DO WHILE COUNTER3 <= ANSWER6
    APPEND BLANK
    ANSWER7 = "SYMB" + STR(COUNTER3, 1, 0)
    ANSWER10 = &ANSWER7
    ANSWER11 = &ANSWER10
    REPLACE SENSITIV->&BILL WITH ANSWER11
    REPLACE SENSITIV->TITLE WITH ANSWER10
    COUNTER3 = COUNTER3 + 1
ENDDO
```
DO BILLING2
CLEAR
GOTO TOP
DO WHILE COUNTER2 <= ANSWER4
  SELECT 2
  LOCATE FOR VESSEL->VESSELID = ANSWER5
  COUNTER3 = 1
  @ 1,20 SAY "Enter Parameters For Iteration 
  @ 1,53 SAY COUNTER2
  LINE = 3
  DO WHILE COUNTER3 <= ANSWER6
    ANSWER7 = "SYMB" + STR(COUNTER3,1,0)
    ANSWER18 = "VALU" + STR(COUNTER3,1,0)
    &ANSWER18 = 0.0
    @ LINE, 20 SAY &ANSWER7
    @ LINE, 40 GET &ANSWER18 PICTURE "#####
    COUNTER3 = COUNTER3 + 1
    LINE = LINE + 1
  ENDDO
  READ
  @ 1,20, 8,60 BOX "
  COUNTER2 = COUNTER2 + 1
  BILL = "CHARGE" + STR(COUNTER2,1,0)
  SELECT 3
  GOTO TOP
  COUNTER3 = 1
  DO WHILE COUNTER3 <= ANSWER6
    ANSWER7 = "SYMB" + STR(COUNTER3,1,0)
    ANSWER18 = "VALU" + STR(COUNTER3,1,0)
    ANSWER10 = &ANSWER7
    ANSWER11 = &ANSWER18
    &ANSWER10 = ANSWER11
    REPLACE SENSITIV->&BILL WITH ANSWER11
    SKIP
    COUNTER3 = COUNTER3 + 1
  ENDDO
  SELECT 2
  DO COMPUTE2
  DO BILLING2
  CLEAR
  DOT = 18
ENDDO
CLEAR
SELECT 3
IF A"ANSWER16 = 1
  SET DEVICE TO PRINT
ENDIF
LINE = 6
@ 1,20 SAY "Sensitivity Tests for Vessel"
@ 1,55 SAY VESSEL->VESSELID
@ 3,1 SAY ;
"Tariff First Second Third"
GOTO TOP
BIGTOTAL1 = 0.0
BIGTOTAL2 = 0.0
BIGTOTAL3 = 0.0
BIGTOTAL4 = 0.0
BIGTOTAL5 = 0.0
DO WHILE .NOT. EOF()  
DO WHILE LINE < LASTLINE .AND. .NOT. EOF()  
@ LINE,1 SAY TARIFITEM  
@ LINE,8 SAY TITLE  
@ LINE,31 SAY CHARGE1 PICTURE "#####U###"  
@ LINE,41 SAY CHARGE2 PICTURE "#####f'"  
@ LINE,51 SAY CHARGE3 PICTURE "1111111111"  
@ LINE,61 SAY CHARGE4 PICTURE '1###'  
@ LINE,71 SAY CHARGE5 PICTURE "#####Uf'"  
LINE = LINE + 1  
BIGTOTAL1 = CHARGE1 + BIGTOTAL1  
BIGTOTAL2 = CHARGE2 + BIGTOTAL2  
BIGTOTAL3 = CHARGE3 + BIGTOTAL3  
BIGTOTAL4 = CHARGE4 + BIGTOTAL4  
BIGTOTAL5 = CHARGE5 + BIGTOTAL5  
SKIP
ENDDO
IF EOF()  
@ LINE,20 SAY "Total"  
@ LINE,30 SAY BIGTOTAL1 PICTURE "##,###,###"  
@ LINE,40 SAY BIGTOTAL2 PICTURE "##,###,###"  
@ LINE,50 SAY BIGTOTAL3 PICTURE "##,###,###"  
@ LINE,60 SAY BIGTOTAL4 PICTURE "##,###,###"  
@ LINE,70 SAY BIGTOTAL5 PICTURE "##,###,###"  
ENDIF
IF ANSWER16 = 2  
WAIT  
@ 6,0,23,79 BOX ""  
ELSE  
SET DEVICE TO SCREEN  
ENDIF  
LINE = 6
ENDDO
IF ANSWER4 > 4  
LINE = 6  
IF ANSWER16 = 1  
SET DEVICE TO PRINT  
ENDIF  
@ 1,20 SAY "Sensitivity Tests for Vessel"
@ 1,55 SAY VESSEL->VESSELID
@ 3,1 SAY :
"Tariff      "Fifth     Sixth     Seventh    Eighth"
@ 3,71 SAY " Ninth"
@ 4,1 SAY :
" Item Description   Iteration Iteration Iteration Iteration Iteration"
@ 4,71 SAY "Iteration"
@ 5,1 SAY :
" ----    ----------    ----------    ----------    ----------    ----------"
@ 5,71 SAY "--------"
GOTO TOP
BIGTOTAL1 = 0.0
BIGTOTAL2 = 0.0
BIGTOTAL3 = 0.0
BIGTOTAL4 = 0.0
BIGTOTAL5 = 0.0
DO WHILE .NOT. EOF()
    DO WHILE LINE < LASTLINE .AND. .NOT. EOF()
        @ LINE,1 SAY TARIFITEM
        @ LINE,8 SAY TITLE
        @ LINE,31 SAY CHARGE6 PICTURE "##########"
        @ LINE,41 SAY CHARGE7 PICTURE "##########"
        @ LINE,51 SAY CHARGE8 PICTURE "##########"
        @ LINE,61 SAY CHARGE9 PICTURE "##########"
        @ LINE,71 SAY CHARGE10 PICTURE "##########"
        LINE = LINE + 1
        BIGTOTAL1 = CHARGE6 + BIGTOTAL1
        BIGTOTAL2 = CHARGE7 + BIGTOTAL2
        BIGTOTAL3 = CHARGE8 + BIGTOTAL3
        BIGTOTAL4 = CHARGE9 + BIGTOTAL4
        BIGTOTAL5 = CHARGE10 + BIGTOTAL5
    SKIP
ENDDO
IF EOF()
    @ LINE,20 SAY "Total"
    @ LINE,30 SAY BIGTOTAL1 PICTURE "##,###,###"
    @ LINE,40 SAY BIGTOTAL2 PICTURE "##,###,###"
    @ LINE,50 SAY BIGTOTAL3 PICTURE "##,###,###"
    @ LINE,60 SAY BIGTOTAL4 PICTURE "##,###,###"
    @ LINE,70 SAY BIGTOTAL5 PICTURE "##,###,###"
ENDIF
IF ANSWER16 = 2
    WAIT
    @ 6,0,23,79 BOX ""
ENDIF
LINE = 6
ENDDO
ENDIF
IF ANSWER16 = 3
    REPORT FORM SENSIT TO FILE &FILPRINT
ENDIF
IF ANSWER16 = 1
    44
EJECT
SET DEVICE TO SCREEN
ENDIF
RETURN
* Units.prg
* Enters first 12 charging units

CLEAR

GOTO TOP
@ 1, 15 SAY "VESSEL-BASED CHARGING UNITS"
@ 3, 3 SAY "X"
@ 3, 8 SAY "SYMBOL"
@ 3, 20 SAY "DESCRIPTION"
@ 3, 60 SAY "UNITS"
@ 2, 1, 18, 70 BOX FRAME1
LINE = 5
DO WHILE LINE < 17
    @ LINE, 3 SAY CHARGES->CHECKOFF
    @ LINE, 6 SAY CHARGES->SYMBOL
    @ LINE, 20 SAY CHARGES->DESCRIPT
    @ LINE, 62 SAY CHARGES->UNITS
    SKIP
    LINE = LINE + 1
ENDDO
@ 20, 1, 23, 70 BOX FRAME2
@ 21, 5 SAY MEASURE1
@ 22, 5 SAY MEASURE2
@ 21, 15 SAY MEASURE3
@ 22, 15 SAY MEASURE4
@ 21, 25 SAY MEASURE5
@ 22, 25 SAY MEASURE6
@ 21, 35 SAY MEASURE7
@ 22, 35 SAY MEASURE8
@ 21, 45 SAY MEASURE9
@ 22, 45 SAY MEASURE10
@ 21, 55 SAY MEASURE11
@ 22, 55 SAY MEASURE12
@ 21, 65 SAY MEASURE13
@ 22, 65 SAY MEASURE14

GOTO TOP
LOOPER = 1
DO WHILE LOOPER < 8
    LINE = LOOPER + 4
    LOOPER2 = STR(LOOPER, 1, 0)
    @ LINE, 3 GET CHARGES->CHECKOFF
    @ LINE, 6 GET CHARGES->SYMBOL
    @ LINE, 20 GET CHARGES->DESCRIPT
    @ LINE, 62 GET CHARGES->UNITS
    READ
    LCHECK = "CHECKS" + LOOPER2
    LUNIT = "UNITS" + LOOPER2
    LMEAS = "MEAS" + LOOPER2
    &LUNIT = CHARGES->SYMBOL
    &LCHECK = CHARGES->CHECKOFF
&LMEAS = CHARGES->UNITS
LOOPER = LOOPER + 1
SKIP
ENDDO
DO WHILE LOOPER < 13
  LINE = LOOPER + 4
  IF LOOPER < 10
    LOOPER2 = STR(LOOPER,1,0)
  ELSE
    LOOPER2 = STR(LOOPER,2,0)
  ENDIF
  @ LINE, 3 GET CHARGES->CHECKOFF
  @ LINE, 6 GET CHARGES->SYMBOL
  @ LINE, 20 GET CHARGES->DESCRIPT
  @ LINE, 62 GET CHARGES->UNITS
  READ
  IF UPPER(CHARGES->CHECKOFF) <> "X"
    LOOPER = 12
  ENDIF
  LCHECK = "CHECKS" + LOOPER2
  LUNIT = "UNITS" + LOOPER2
  LMEAS = "MEAS" + LOOPER2
  &LUNIT = CHARGES->SYMBOL
  &LCHECK = CHARGES->CHECKOFF
  &LMEAS = CHARGES->UNITS
  LOOPER = LOOPER + 1
  SKIP
ENDDO
LOOPER = 1
DO WHILE LOOPER < 13
  IF LOOPER <10
    LOOPER2 = STR(LOOPER,1,0)
  ELSE
    LOOPER2 = STR(LOOPER,2,0)
  ENDIF
  LCHECKS = "CHECKS" + LOOPER2
  IF UPPER(&LCHECKS) = "X"
    LUNITS = "UNITS" + LOOPER2
    LLUNITS = &LUNITS
    PUBLIC &LLUNITS
    &LLUNITS = 0.0
  ENDIF
  LOOPER = LOOPER + 1
ENDDO
@ 1,1,19,72 BOX ""
SKIP
DO UNITS2
RETURN
* Units2.prg
* Input the second group of 10 charging units

GOTO 13

@ 1, 25 SAY "CARGO-BASED CHARGING UNITS"
@ 3, 3 SAY "X"
@ 3, 8 SAY "SYMBOL"
@ 3, 20 SAY "DESCRIPTION"
@ 3, 60 SAY "UNITS"
@ 2,1, 18,70 BOX FRAME1
LINE = 5
DO WHILE LINE < 17
    @ LINE, 3 SAY CHARGES->CHECKOFF
    @ LINE, 6 SAY CHARGES->SYMBOL
    @ LINE, 20 SAY CHARGES->DESCRIPT
    @ LINE, 62 SAY CHARGES->UNITS
    SKIP
    LINE = LINE + 1
ENDDO
GOTO 13
LOOPER = 13
DO WHILE LOOPER < 25
    LINE = LOOPER - 8
    LOOPER2 = STR(LOOPER,2,0)
    @ LINE, 3 GET CHARGES->CHECKOFF
    @ LINE, 6 GET CHARGES->SYMBOL
    @ LINE, 20 GET CHARGES->DESCRIPT
    @ LINE, 62 GET CHARGES->UNITS
    READ
    LCHECK = "CHECKS" + LOOPER2
    LUNIT = "UNITS" + LOOPER2
    LMEAS = "MEAS" + LOOPER2
    &LUNIT = CHARGES->SYMBOL
    &LCHECK = CHARGES->CHECKOFF
    &LMEAS= CHARGES->UNITS
    LOOPER = LOOPER + 1
    SKIP
ENDDO
LOOPER = 13
DO WHILE LOOPER < 25
    LOOPER2 = STR(LOOPER,2,0)
    LCHECKS = "CHECKS" + LOOPER2
    IF UPPER(&LCHECKS) = "X"
        LUNITS = "UNITS" + LOOPER2
        LLUNITS = &LUNITS
        PUBLIC &LLUNITS
        &LLUNITS = 0.0
    ENDIF
    LOOPER = LOOPER + 1
ENDDO
@ 1,1,19,72 BOX ""
SKIP
DO UNITS3
RETURN
* Units3.prg
* Input the third group of 12 changing units

GOTO 25
@ 1, 20 SAY "PERFORMANCE-RELATED CHARGING UNITS"
@ 3, 3 SAY "X"
@ 3, 8 SAY "SYMBOL"
@ 3, 20 SAY "DESCRIPTION"
@ 3, 60 SAY "UNITS"
@ 2,1, 18,70 BOX FRAME1
LINE = 5
DO WHILE LINE < 17
   @ LINE, 3 SAY CHARGES->CHECKOFF
   @ LINE, 6 SAY CHARGES->SYMBOL
   @ LINE, 20 SAY CHARGES->DESCRIPTION
   @ LINE, 62 SAY CHARGES->UNITS
   SKIP
   LINE = LINE + 1
ENDDO
GOTO 25
LOOPER = 25
DO WHILE LOOPER < 32
   LINE = LOOPER - 20
   LOOPER2 = STR(LOOPER,2,0)
   @ LINE, 3 GET CHARGES->CHECKOFF
   @ LINE, 6 GET CHARGES->SYMBOL
   @ LINE, 20 GET CHARGES->DESCRIPTION
   @ LINE, 62 GET CHARGES->UNITS
   READ
   LCHECK = "CHECKS" + LOOPER2
   LUNIT = "UNITS" + LOOPER2
   LMEAS = "MEAS" + LOOPER2
   &LUNIT = CHARGES->SYMBOL
   &LCHECK = CHARGES->CHECKOFF
   &LMEAS = CHARGES->UNITS
   LOOPER = LOOPER + 1
   SKIP
ENDDO
DO WHILE LOOPER < 37
   LINE = LOOPER - 20
   LOOPER2 = STR(LOOPER,2,0)
   @ LINE, 3 GET CHARGES->CHECKOFF
   @ LINE, 6 GET CHARGES->SYMBOL
   @ LINE, 20 GET CHARGES->DESCRIPTION
   @ LINE, 62 GET CHARGES->UNITS
   READ
   IF UPPER(CHARGES->CHECKOFF) <> "X"
      LOOPER = 36
  ENDIF
   LCHECK = "CHECKS" + LOOPER2
   LUNIT = "UNITS" + LOOPER2
   LMEAS = "MEAS" + LOOPER2
50
&LUNIT = CHARGES->SYMBOL
&LCHECK = CHARGES->CHECKOFF
&LMEAS = CHARGES->UNITS
LOOPER = LOOPER + 1
SKIP
ENDDO
LOOPER = 25
DO WHILE LOOPER < 37
  LOOPER2 = STR(LOOPER, 2, 0)
  LCHECKS = "CHECKS" + LOOPER2
  IF UPPER(&LCHECKS) = "X"
    LUNITS = "UNITS" + LOOPER2
    LLUNITS = &LUNITS
    PUBLIC &LLUNITS
    &LLUNITS = 0.0
  ENDIF
  LOOPER = LOOPER + 1
ENDDO
@ 1,1,19,72BOX "$ DO UNITS4
RETURN
* Units4.prg
* Input the final group of 14 charging units

GOTO 37
@ 1, 15 SAY "EQUIPMENT AND UTILITIES CHARGING UNITS"
@ 3, 3 SAY "X"
@ 3, 8 SAY "SYMBOL"
@ 3, 20 SAY "DESCRIPTION"
@ 3, 60 SAY "UNITS"
@ 2,1,20,70 BOX FRAME1
LINE = 5
DO WHILE LINE < 19
    @ LINE, 3 SAY CHARGES->CHECKOFF
    @ LINE, 6 SAY CHARGES->SYMBOL
    @ LINE, 20 SAY CHARGES->DESCRIPT
    @ LINE, 62 SAY CHARGES->UNITS
    SKIP
    LINE = LINE + 1
ENDDO
GOTO 37
LOOPER = 37
DO WHILE LOOPER < 46
    LINE = LOOPER - 32
    LOOPER2 = STR(LOOPER,2,0)
    @ LINE, 3 GET CHARGES->CHECKOFF
    @ LINE, 6 GET CHARGES->SYMBOL
    @ LINE, 20 GET CHARGES->DESCRIPT
    @ LINE, 62 GET CHARGES->UNITS
    READ
    LCHECK = "CHECKS" + LOOPER2
    LUNIT = "UNITS" + LOOPER2
    LMEAS = "MEAS" + LOOPER2
    &LUNIT = CHARGES->SYMBOL
    &LCHECK = CHARGES->CHECKOFF
    &LMEAS= CHARGES->UNITS
    LOOPER = LOOPER + 1
    SKIP
ENDDO
DO WHILE LOOPER < 51
    LINE = LOOPER -32
    LOOPER2 = STR(LOOPER,2,0)
    @ LINE, 3 GET CHARGES->CHECKOFF
    @ LINE, 6 GET CHARGES->SYMBOL
    @ LINE, 20 GET CHARGES->DESCRIPT
    @ LINE, 62 GET CHARGES->UNITS
    READ
    IF UPPER(CHARGES->CHECKOFF) <> "X"
        LOOPER = 50
    ENDIF
    LCHECK = "CHECKS" + LOOPER2
    LUNIT = "UNITS" + LOOPER2
    LMEAS = "MEAS" + LOOPER2
&LUNIT = CHARGES->SYMBOL
&LCHECK = CHARGES->CHECKOFF
&LMEAS= CHARGES->UNITS
LOOPER = LOOPER + 1
SKIP
ENDDO
LOOPER = 37
DO WHILE LOOPER < 51
  LOOPER2 = STR(LOOPER,2,0)
  LCHECKS = "CHECKS" + LOOPER2
  IF UPPER(&LCHECKS) = "X"
    LUNITS = "UNITS" + LOOPER2
    LLUNITS = &LUNITS
    PUBLIC &LLUNITS
    &LLUNITS = 0.0
  ENDIF
  LOOPER = LOOPER + 1
ENDDO
LOOPER = LOOPER + 1
ENDDO
CLEAR
RETURN
* Unitout.prg
* display charging units

CLEAR
SET DEVICE TO PRINT
GOTO TOP

@ 1, 15 SAY "VESSEL-BASED CHARGING UNITS"
@ 2, 8 SAY "SYMBOL"
@ 2, 20 SAY "DESCRIPTION"
@ 2, 60 SAY "UNITS"
LINE = 3
LOOPER = 1
DO WHILE LOOPER<13
  IF UPPER(CHARGES->CHECKOFF) = "X"
    @ LINE, 6 SAY CHARGES->SYMBOL
    @ LINE, 20 SAY CHARGES->DESCRIPT
    @ LINE, 58 SAY "in"
    @ LINE, 62 SAY CHARGES->UNITS
  ENDIF
  LOOPER = LOOPER + 1
  SKIP
ENDDO
LINE = LINE + 1
@ LINE, 25 SAY "CARGO-BASED CHARGING UNITS"
@ LINE +1, 8 SAY "SYMBOL"
@ LINE +1, 20 SAY "DESCRIPTION"
@ LINE +1, 60 SAY "UNITS"
LINE = LINE + 4
DO WHILE LOOPER<25
  IF UPPER(CHARGES->CHECKOFF) = "X"
    @ LINE, 6 SAY CHARGES->SYMBOL
    @ LINE, 20 SAY CHARGES->DESCRIPT
    @ LINE, 58 SAY "in"
    @ LINE, 62 SAY CHARGES->UNITS
  ENDIF
  SKIP
  LOOPER = LOOPER + 1
ENDDO
LINE = LINE + 1
@ LINE, 20 SAY "PERFORMANCE-RELATED CHARGING UNITS"
@ LINE +1, 8 SAY "SYMBOL"
@ LINE +1, 20 SAY "DESCRIPTION"
@ LINE +1, 60 SAY "UNITS"
LINE = LINE + 4
DO WHILE LOOPER<37
  IF UPPER(CHARGES->CHECKOFF) = "X"
    @ LINE, 6 SAY CHARGES->SYMBOL
    @ LINE, 20 SAY CHARGES->DESCRIPT
    @ LINE, 58 SAY "in"
  ENDIF
  SKIP
  LOOPER = LOOPER + 1
ENDDO

54
@ LINE, 62 SAY CHARGES->UNITS
   LINE = LINE + 1
ENDIF
SKIP
LOOPER = LOOPER + 1
ENDDO
LINE = LINE + 1
@ LINE, 15 SAY "EQUIPMENT AND UTILITIES CHARGING UNITS"
@ LINE + 1, 8 SAY "SYMBOL"
@ LINE + 1, 20 SAY "DESCRIPTION"
@ LINE + 1, 60 SAY "UNITS"
LINE = LINE + 4
DO WHILE LOOPER < 51
   IF UPPER(CHARGES->CHECKOFF) = "X"
      @ LINE, 6 SAY CHARGES->SYMBOL
      @ LINE, 20 SAY CHARGES->DESCRIPTION
      @ LINE, 58 SAY "in"
      @ LINE, 62 SAY CHARGES->UNITS
      LINE = LINE + 1
   ENDIF
   SKIP
   LOOPER = LOOPER + 1
ENDDO
READ
EJECT
SET DEVICE TO SCREEN
RETURN
* Veselout.prg
* Program for outputting vessel data

SET DEVICE TO PRINT
GOTO TOP
DO WHILE .NOT. EOF()
  @ 1, 16 SAY "VESSEL DESCRIPTION FORM FOR VESSEL"
  @ 1, 52 SAY VESSEL->VESSELID
  LINE = 3
  LOOPER = 1
DO WHILE LOOPER < 49
  IF LOOPER <10
    LOOPER2 = STR(LOOPER,1,0)
  ELSE
    LOOPER2 = STR(LOOPER,2,0)
  ENDIF
  LCHECK = "CHECKS" + LOOPER2
  LUNITS = "UNITS" + LOOPER2
  LPARAM = "PARAM" + LOOPER2
  LMEAS = "MEAS" + LOOPER2
  IF UPPER(&LCHECK) = "X"
    @ LINE, 32 SAY &LUNITS
    @ LINE, 42 SAY &LPARAM
    @ LINE, 52 SAY &LMEAS
    LINE = LINE + 1
  ENDIF
  LOOPER = LOOPER + 1
ENDDO
ENDDO

@ LINE+2, 23 SAY "VESSEL PERFORMANCE FORMULAE"
@ LINE+4, 1 SAY "1."
@ LINE+4, 4 SAY VESSEL->FORMULAE1
@ LINE+4, 13 SAY "="
@ LINE+4, 15 SAY VESSEL->FORMULAS1
@ LINE+5, 1 SAY "2."
@ LINE+5, 4 SAY VESSEL->FORMULAE2
@ LINE+5, 13 SAY "="
@ LINE+5, 15 SAY VESSEL->FORMULAS2
@ LINE+6, 1 SAY "3."
@ LINE+6, 4 SAY VESSEL->FORMULAE3
@ LINE+6, 13 SAY "="
@ LINE+6, 15 SAY VESSEL->FORMULAS3
@ LINE+7, 1 SAY "4."
@ LINE+7, 4 SAY VESSEL->FORMULAE4
@ LINE+7, 13 SAY "="
@ LINE+7, 15 SAY VESSEL->FORMULAS4
EJECT
SKIP
ENDDO

SET DEVICE TO SCREEN
RETURN
Vessel.prg
* Sets Up Vessel Files
Vessel.prg
* Sets Up Vessel Files

DO WHILE .T.
SET CONFIRM OFF
ANSWER = 0
@ 1,15,3,65 BOX ""
@ 4,52,12,78 BOX ""
@ 8,7, 20,49 BOX ""
@ 6,16 SAY "VESSEL MENU"
@ 8,7 SAY "1. List Current Vessel Files"
@ 10,7 SAY "2. Create a New Vessel File"
@ 12,7 SAY "3. Retrieve A Previously Saved Vessel File"
IF NUMVESSEL = ""
@ 22,4 SAY "Choose 1 to 3; 0 to Return to Main Menu : :" 
@ 22,45 GET ANSWER PICTURE "#" RANGE 0,3
ELSE
@ 14,7 SAY "4. Edit the Vessel Data"
@ 16,7 SAY "5. Print the Vessel Data"
@ 22,4 SAY "Choose 1 to 6; 0 to Return to Main Menu : :" 
@ 22,45 GET ANSWER PICTURE "#" RANGE 0,6
ENDIF
READ
SET CONFIRM ON
DO CASE

* List the Vessel Files Stored on Sub-Directory
CASE ANSWER = 1
CLEAR
LOOK = MPATH + "VESL*.dbf"
DIR &LOOK
WAIT
CLEAR

* Create a New Vessel File
CASE ANSWER = 2
NVESSEL = ""
SET COLOR TO N/W
@ 9,54 SAY "Enter a Four Character"
@ 10,54 SAY "Vessel Code"
@ 20,64 GET NVESSEL PICTURE "XXXX"
READ
SET COLOR TO W/N
CLEAR
NUMVESSEL = "VESL" + NVESSEL
USE VESSELS
COPY STRUCTURE TO &MPATH&NUMVESSEL
CLOSE DATABASES
USE &MPATH&NUMVESSEL ALIAS VESSEL
ANSWER3 = "Y"
DO WHILE UPPER(ANSWER3) = "Y"

57
APPEND BLANK
DO VESSELIN
CLEAR
@ 12, 12 SAY "Do You Wish to Add Another Vessel? (Y/N)"
@ 12, 55 GET ANSWER3
READ
CLEAR
ENDDO
CLOSE DATABASES

* Retrieve an Existing Vessel File
CASE ANSWER = 3
    NVESSEL = " "
    SET COLOR TO N/W
    @ 9, 54 SAY "Enter a Four Character"
    @ 10, 54 SAY "Vessel Code"
    @ 20, 64 GET NVESSEL PICTURE "XXXX"
    READ
    SET COLOR TO W/N
    @ 9, 54 SAY " "
    @ 10, 54 SAY " 
    NUMVESSEL = "VESL" + NVESSEL
    USE &MPATH&NUMVESSEL ALIAS VESSEL

* Edit the Current Vessel File
CASE ANSWER = 4
    @ 8,7,20,49 BOX " "
    SET CONFIRM OFF
    ANSWER2 = 2
    @ 8,10 SAY "Do You Wish to Edit"
    @ 9,10 SAY " Copy of the Existing File"
    @ 10,10 SAY " or the Original? "
    @ 12,10 SAY "1. Copy"
    @ 14,10 SAY "2. Original"
    @ 22, 4 SAY "Choose Number (1 or 2) : : ":
    @ 22, 29 GET ANSWER2 PICTURE "#" RANGE 1,2
    READ
    IF ANSWER2 = 1
        SET CONFIRM ON
        USE &MPATH&NUMVESSEL
        NVESSEL = " "
        SET COLOR TO N/W
        @ 9, 54 SAY "Enter a Four Character"
        @ 10, 54 SAY "Vessel Code"
        @ 20, 64 GET NVESSEL PICTURE "XXXX"
        READ
        SET COLOR TO W/N
        @ 9, 54 SAY " 
        @ 10, 54 SAY " 
        NUMVESSEL = "VESL" + NVESSEL
        COPY TO &MPATH&NUMVESSEL
CLOSE DATABASES
ENDIF

USE &MPATH&NUMVESSEL ALIAS VESSEL
GOTO TOP

IF ANSWER2 = 2
   @ 8,7,20,49 BOX ""
   @ 10, 10 SAY "1. Add Vessels to the File"
   @ 12, 10 SAY "2. Edit The Existing Vessels"
   @ 22, 4 SAY "Choose Number (1 or 2) : :
   @ 22, 29 GET ANSWER2 PICTURE "#" RANGE 1,2
READ
CLEAR
SET CONFIRM ON

ENDIF

IF ANSWER2 = 1
   ANSWER3 = "Y"
   DO WHILE UPPER(ANSWER3) = "Y"
      APPEND BLANK
      DO VESSELIN
      CLEAR
      @ 12, 12 SAY "Do You Wish to Add Another Vessel? (Y/N)"
      @ 12, 55 GET ANSWER3
      READ
      CLEAR
   ENDDO

ELSE
   ANSWER3 = "Y"
   DO WHILE UPPER(ANSWER3) = "Y" .AND. .NOT. EOF()
      CLEAR
      ANSWER10 = " "
      @ 12,12 SAY "If you Wish to Edit a Specific Vessel Then"
      @ 13,12 SAY "Enter the Vessel Number Otherwise Press Return"
      @ 13,60 GET ANSWER10 PICTURE "XXXX"
      READ
      IF ANSWER10 <> " "
         LOCATE FOR VESSEL->VESSELID = ANSWER10
      ENDIF
   ENDIF
   CLEAR
   DO VESSELIN
   CLEAR
   @ 12, 12 SAY "Do You Wish to Edit Another Vessel? (Y/N)"
   @ 12, 54 GET ANSWER3
   READ
   CLEAR
   SKIP
ENDDO
**ENDIF**
**CLOSE DATABASES**

* Print Out the Vessel File

**CASE ANSWER = 5**

**IF NUMVESSEL = " "**
**NVESSEL = " "**
**SET COLOR TO N/W**
@ 9, 54 SAY "Enter a Four Character"  
@ 10, 54 SAY "Vessel Code"  
@ 20, 64 GET NVESSEL PICTURE "XXXX"  
**READ**
**SET COLOR TO W/N**
@ 9, 54 SAY " "  
@ 10, 54 SAY " "
**NUMVESSEL = "VESL" + NVESSEL**

**ENDIF**

**USE &MPATH&NUMVESSEL ALIAS VESSEL**

**DO VESELOUT**

* Return to Main Menu

**CASE ANSWER = 0**

**RETURN**

**ENDCASE**

**CLEAR**

@ 4,1,23,50 BOX FRAME1  
@ 13,52,21,78 BOX FRAME1  
@ 14,55 SAY "DISK"  
@ 16,55 SAY "PATH"  
@ 18,55 SAY "TARIFF"  
@ 20,55 SAY "VESSEL"  
@ 14,64 SAY mdir PICTURE "XXX"  
@ 16,64 SAY mpath PICTURE "XXXXXXXX"  
@ 18,64 SAY proj PICTURE "XXXXX"  
@ 20,64 SAY nvessel PICTURE "XXXX"  
@ 22,53 SAY "1986 TRP/jha"  
@ 23,52,23,78 BOX FRAME1

**ENDDO**

**RETURN**

**DO WHILE .T.**

**SET CONFIRM OFF**

**ANSWER = 0**

@ 1,15,3,65 BOX " "  
@ 4,52,12,78 BOX " "  
@ 8,7, 20,49 BOX " "  
@ 6, 16 SAY "VESSEL MENU"  
@ 8, 7 SAY "1. List Current Vessel Files"  
@ 10, 7 SAY "2. Create a New Vessel File"  
@ 12, 7 SAY "3. Retrieve A Previously Saved Vessel File"
@ 14, 7 SAY "4. Edit the Vessel Data"
@ 16, 7 SAY "5. Print the Vessel Data"
@ 22, 4 SAY "Choose 1 to 6; 0 to Return to Main Menu : :
@ 22, 45 GET ANSWER PICTURE "#" RANGE 0,6 READ
SET CONFIRM ON
DO CASE

* List the Vessel Files Stored on Sub-Directory
CASE ANSWER = 1
  CLEAR
  LOOK = MPATH + "VESL*.dbf"
  DIR &LOOK
  WAIT
  CLEAR
* Create a New Vessel File
CASE ANSWER = 2
  NVESSEL = " "
  SET COLOR TO N/W
  @ 9, 54 SAY "Enter a Four Character"
  @ 10, 54 SAY "Vessel Code"
  @ 20, 64 GET NVESSEL PICTURE "XXXX"
  READ
  SET COLOR TO W/N
  CLEAR
  NUMVESSEL = "VESL" + NVESSEL
  USE VESSELS
  COPY STRUCTURE TO &MPATH&NUMVESSEL.
  CLOSE DATABASES
  USE &MPATH&NUMVESSEL ALIAS VESSEL
  ANSWER3 = "Y"
  DO WHILE UPPER(ANSWER3) = "Y"
    APPEND BLANK
    DO VESSELIN
    CLEAR
    @ 12, 12 SAY "Do You Wish to Add Another Vessel? (Y/N)"
    @ 12, 55 GET ANSWER3
    READ
    CLEAR
  ENDDO
  CLOSE DATABASES

* Retrieve an Existing Vessel File
CASE ANSWER = 3
  NVESSEL = " "
  SET COLOR TO N/W
  @ 9, 54 SAY "Enter a Four Character"
  @ 10, 54 SAY "Vessel Code"
  @ 20, 54 GET NVESSEL PICTURE "XXXX"
  READ
  SET COLOR TO W/N
  @ 9, 54 SAY " "

61

61
* Edit the Current Vessel File
CASE ANSWER = 4
   @ 8,7,20,49 BOX ""
   SET CONFIRM OFF
   ANSWER2 = 2
   @ 8,10 SAY "Do You Wish to Edit"
   @ 9,10 SAY "Copy of the Existing File"
   @ 10,10 SAY "or the Original?"
   @ 12,10 SAY "1. Copy"
   @ 14,10 SAY "2. Original"
   @ 22,4 SAY "Choose Number (1 or 2) :
   @ 22,29 GET ANSWER2 PICTURE "#" RANGE 1,2
   READ
   IF ANSWER2 = 1
      SET CONFIRM ON
      USE &MPATH&NUMVESSEL
      NVESSEL = " "
      SET COLOR TO N/W
      @ 9,54 SAY "Enter a Four Character"
      @ 10,54 SAY "Vessel Code"
      @ 20,64 GET NVESSEL PICTURE "XXXX"
      READ
      SET COLOR TO W/N
      @ 9,54 SAY " "
      @ 10,54 SAY " 
      NUMVESSEL = "VESL" + NVESSEL
      COPY TO &MPATH&NUMVESSEL
      CLOSE DATABASES
   ENDF)
   USE &MPATH&NUMVESSEL ALIAS VESSEL
   GOTO TOP
   IF ANSWER2 = 2
      @ 8,7,20,49 BOX ""
      @ 10,10 SAY "1. Add Vessels to the File"
      @ 12,10 SAY "2. Edit The Existing Vessels"
      @ 22,4 SAY "Choose Number (1 or 2) :
      @ 22,29 GET ANSWER2 PICTURE "#" RANGE 1,2
      READ
      CLEAR
   ENDIF
   SET CONFIRM ON
ENDIF

IF ANSWER2 = 1
   ANSWER3 = "Y"
   DO WHILE UPPER(ANSWER3) = "Y"
      APPEND BLANK
      DO VESSELIN
      CLEAR
@ 12, 12 SAY "Do You Wish to Add Another Vessel? (Y/N)"
@ 12, 55 GET ANSWER3
READ
CLEAR
ENDDO
ELSE
ANSWER3 = "Y"
DO WHILE UPPER(ANSWER3) = "Y" .AND. .NOT. EOF()
CLEAR
ANSWER10 = ""
@ 12,12 SAY "If you Wish to Edit a Specific Vessel Then"
@ 13,12 SAY "Enter the Vessel Number Otherwise Press Return"
@ 13,60 GET ANSWER10 PICTURE "XXXX"
READ
IF ANSWER10 <> ""
LOCATE FOR VESSEL->VESSELID = ANSWER10
IF EOF()
@ 11,12 SAY "Not Found, Try Again"
@ 11, 60 GET ANSWER10 PICTURE "XXXX"
READ
LOCATE FOR VESSEL->VESSELID = ANSWER10
ENDIF
ENDIF
ENDIF
DO VESSELIN
CLEAR
@ 12, 12 SAY "Do You Wish to Edit Another Vessel? (Y/N)"
@ 12, 54 GET ANSWER3
READ
CLEAR
SKIP
ENDDO
ENDIF
CLOSE DATABASES

* Print Out the Vessel File
CASE ANSWER = 5
  IF NUMVESSEL = ""
    NVESSEL = ""
    SET COLOR TO N/W
    @ 9, 54 SAY "Enter a Four Character"
    @ 10, 54 SAY "Vessel Code"
    @ 20, 64 GET NVESSEL PICTURE "XXXX"
    READ
    SET COLOR TO W/N
    @ 9, 54 SAY ""
    @ 10, 54 SAY ""
    NUMVESSEL = "VESL" + NVESSEL
  ENDIF
USE &MPATH&NUMVESSEL ALIAS VESSEL
DO VESELOUT
* Return to Main Menu
  
  CASE ANSWER = 0
  
  RETURN
  
ENDCASE
  
CLEAR
  
@ 4,1,23,50 BOX FRAME1
@ 13,52,21,78 BOX FRAME1
@ 14,55 SAY "DISK"
@ 16,55 SAY "PATH"
@ 18,55 SAY "TARIFF"
@ 20,55 SAY "VESSEL"
@ 14,64 SAY mdir PICTURE "XXX"
@ 16,64 SAY mpath PICTURE "XXXXXXXX"
@ 18,64 SAY proj PICTURE "XXXXX"
@ 20,64 SAY nvessel PICTURE "XXXX" 
@ 22,53 SAY " 1986 TRP/jha"
@ 23,52,23,78 BOX FRAME1
  
ENDDO
  
RETURN
* Vesselin.prg
* Program for inputing vessel data

REPLACE VESSEL->TARIFF WITH NEWTAR
@ 1, 1, 18, 79 BOX FRAME1
@ 18, 0, 23, 79 BOX FRAME2
@ 1, 4 SAY "VESSEL DESCRIPTION FORM FOR VESSEL"
@ 1, 47 SAY "NUMBER OF CALLS"
@ 1, 40 GET VESSEL->VESSELID
@ 1, 63 GET VESSEL->VESSELNUM PICTURE "###"
LINE = 2
COLUMN = 3
LOOPER = 1
DO WHILE LOOPER < 49
    IF LOOPER < 10
        LOOPER2 = STR(LOOPER, 1, 0)
    ELSE
        LOOPER2 = STR(LOOPER, 2, 0)
    ENDIF
    LCHECK = "CHECKS" + LOOPER2
    LUNITS = "UNITS" + LOOPER2
    LPARAM = "PARAM" + LOOPER2
    LMEAS = "MEAS" + LOOPER2
    IF UPPER(&LCHECK) = "X"
        @ LINE, COLUMN SAY &LUNITS
        @ LINE, COLUMN + 10 GET &LPARAM
        @ LINE, COLUMN + 20 SAY &LMEAS
        IF LINE = 17
            LINE = 2
            COLUMN = COLUMN + 25
        ELSE
            LINE = LINE + 1
        ENDIF
    ENDIF
    LOOPER = LOOPER + 1
ENDDO

@ 18, 23 SAY "VESSEL PERFORMANCE FORMULAE"
@ 19, 1 SAY "1."
@ 19, 4 GET VESSEL->FORMULAE1
@ 19, 15 SAY "="
@ 19, 17 GET VESSEL->FORMULAS1
@ 20, 1 SAY "2."
@ 20, 4 GET VESSEL->FORMULAE2
@ 20, 15 SAY "="
@ 20, 17 GET VESSEL->FORMULAS2
@ 21, 1 SAY "3."
@ 21, 4 GET VESSEL->FORMULAE3
@ 21, 15 SAY "="
@ 21, 17 GET VESSEL->FORMULAS3
@ 22, 1 SAY "4."
@ 22, 4 GET VESSEL->FORMULAE4

65
@ 22, 15  SAY "="
@ 22, 17  GET VESSEL->FORMULAS4
READ
RETURN
### Database Files

**Structure for database:** `B:chargeun.dbf`

- Number of data records: **50**
- Date of last update: **02/04/87**

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**Total:** **50**

**Structure for database:** `B:english.dbf`

- Number of data records: **11**
- Date of last update: **01/07/87**

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**Total:** **34**

**Structure for database:** `B:finaltot.dbf`

- Number of data records: **17**
- Date of last update: **12/17/87**

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**Total:** **44**

**Structure for database:** `B:metric.dbf`

- Number of data records: **11**
- Date of last update: **01/07/87**

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**Total:** **34**
### Structure for database: `B:portincm.dbf`

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**Total** 102

### Structure for database: `B:shipbill.dbf`

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**Total** 56

### Structure for database: `B:tariffs.dbf`

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Number of data records: 0
Date of last update: 02/04/87

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Date of last update: 12/17/87

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Memory Files

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  MEASURE2 pub C "M.T"
  MEASURE3 pub C "M_3"
  MEASURE4 pub C "F.T"
  MEASURE5 pub C "LTR"
  MEASURE6 pub C "BBL"
  MEASURE7 pub C "HRS"
  MEASURE8 pub C "SHF"
  MEASURE9 pub C "DAY"
  MEASURE10 pub C "TEU"
  MEASURE11 pub C "FEU"
  MEASURE12 pub C ""
  MEASURE13 pub C ""
  MEASURE14 pub C ""
  14 variables defined, 70 bytes used
  242 variables available, 5930 bytes available

. restore from memor1
  . display memory
  MDIR pub C "B:"
  1 variables defined, 5 bytes used
  255 variables available, 5995 bytes available

. restore from memor2
  . display memory
  CHECKS1-48 pub C ""
  UNITS1-48 pub C ""
  MEAS1-48 pub C ""

. restore from memor3
  . display memory
  MPATH pub C "B:"
  1 variables defined, 5 bytes used
  255 variables available, 5995 bytes available
. restore from memor4
. display memory
MLASTDAY pub D 12/17/87
 1 variables defined, 9 bytes used
255 variables available, 5991 bytes available

. restore from memor5
. display memory
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MEASURE2 pub C ""
MEASURE3 pub C ""
MEASURE4 pub C ""
MEASURE5 pub C ""
MEASURE6 pub C ""
MEASURE7 pub C ""
MEASURE8 pub C ""
MEASURE9 pub C ""
MEASURE10 pub C ""
MEASURE11 pub C ""
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MEASURE14 pub C ""
14 variables defined, 28 bytes used
242 variables available, 5972 bytes available