Final Report

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Interisland Liner Shipping Rate Rationalization Study

Volume II

Shipping Cost and Rate Analysis

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FOREWORD

The Interisland Liner Shipping Rate Rationalization Study (SRRS) was conducted in the Philippines from November 1990 through August 1991 by a six-person team. This study was completed through the assistance of the U.S. Agency for International Development (A.I.D.). Throughout the study the team received full cooperation from management and staff of the Maritime Industry Authority (MARINA) and the Philippine Shippers' Council (SHIPPERCON). A.I.D. and the Conference of Interisland Shipowners and Operators (CISO), together with MARINA and SHIPPERCON, closely reviewed the work of the team and provided valuable information and comments. Several other Philippine public and private organizations also provided useful information and comments. Notwithstanding all of these important inputs from various concerned organizations and individuals, the analyses, conclusions, and recommendations in this report remain solely those of the SRRS team and do not necessarily reflect the views or policies of MARINA, SHIPPERCON, A.I.D., CISO, or any other individual or organization. Certainly any mistakes that might appear in the report are solely the responsibility of the study team.

The SRRS first phase report submitted in June 1991 and the draft final report submitted in August 1991 are incorporated into this final report, with some revisions based on comments and further analysis.

This final report is submitted in five volumes. Volume I presents the findings and recommendations of the SRRS team on liner shipping rate rationalization and deregulation; Volume II presents study shipping cost and rate analysis and incorporates most of the first phase report; Volume III discusses the economic effects of shipping rate regulation and deregulation; Volume IV discusses the design and development of MARINA and SHIPPERCON databases; and Volume V presents a broader review of the Philippine interisland shipping sector and identifies desirable actions to be taken for improvement of the sector.

ACRONYMS

ADB	Asian Development Bank
A.I.D.	U.S. Agency for International Development
BOC	Bureau of Customs
CISO	Conference of Interisland Shipowners and Operators
DOC	daily operating cost
DODO	drive-on drive-off
DOTC	Department of Transport and Communications
DRC	daily running cost
DTI	Department of Trade and Industry
DWT	deadweight tons
f.a.k.	freight—all kinds (cargo shipping rates)
GRT	gross registered tons
HPA	Harbor Pilots Association
IATS	Interisland Agro-Transport Study (recommended)
JICA	Japan International Cooperation Agency
LOLO	lift-on lift-off
LSRS	Liner Shipping Route Study (recommended)
MARINA	Maritime Industry Authority
MICT	Manila International Container Terminal
navaids	navigational aids (lighthouses, beacons, and buoys)
NM	nautical mile
NRTSDS	Nationwide RORO Transport System Development Study
PAL	Philippine Airlines
PCG	Philippine Coast Guard
PICO	port integrated clearance office
PISA	Philippine Interisland Shipping Association
PISDA	Philippine Interisland Shipping Development Act
PPA	Philippine Ports Authority
PTF	Presidential Task Force (on interisland shipping)
PTSR	Philippine Transport Sector Review
RORO	roll-on roll-off
SHIPPERCON	Philippine Shippers' Council
SMSA	Southwestern Mindanao Shipowners' Association
SRRS	Interisland Liner Shipping Rate Rationalization Study
TOR	terms of reference
USAID	A.I.D. mission
VAFCSO	Visayan Association of Ferryboat and Coastwise Service Operators

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Chapter 1

INTRODUCTION

Recommendations of the Presidential Task Force

Volume I of the Interisland Liner Shipping Rate Rationalization Study (SRRS) provided background information, including reference to the findings of the 1989 Presidential Task Force (PTF), which was originally conceived to examine safety in interisland shipping.

In carrying out its mandate, the PTF broadened its view to include problems besides safety; among their recommendations were those that would affect the "cost and adequacy of shipping services." Previous studies had already identified certain aspects of this category, such as distortions in how liner freight rates and passenger fares were calculated and shipping problems resulting in part from inappropriate cargo and passage rates.

To create an environment that would attract investors to shipping services and thereby improve competition and efficiency, the PTF made the following recommendations:

- Establish an indicative freight rate for each route, with a range of ±15 percent of the indicative rate.
- Deregulate Second Class passage rates (First Class was already deregulated). Third Class could remain regulated but must at least be adjusted for inflation. Fifty percent of passenger space would be mandatorily allotted to Third Class services.
- Abolish the ad valorem rates and review the entire freight rate structure, with a view to arriving at a simplified and more realistic commodity classification system that would provide for rates that adjusted for inflation.

- Continue a current investigation by the Maritime Industry Authority (MARINA) of adopting the class rate plus a $^{3}/_{10}$ percent surcharge (insurance premium fee) on the declared value.

- Upgrade the classification of Agricultural Products from Basic Class to Class C, in order to combat discrimination against (and exclusion of) agricultural products by liner services because of low freight rates.

The PTF also expressed its opinions on deregulation of entry into particular liner routes. The PTF believed that, as much as possible, there should be competition on all routes.

However, if a new route had barely enough volume for one liner operator, such a carrier should be guaranteed a monopoly on the route for a maximum of 5 years. After 5 years, a second and perhaps a third carrier should be encouraged, assuming traffic load factors had reached appropriate levels.

Some of the rate regulation changes recommended by the PTF were adopted in May 1989. For example,

- Second Class passage was deregulated.

- Ad valorem-rate setting was abolished, but a $^{3}/_{10}$ percent surcharge on the declared value of the cargo (but excluding Basic Class commodities) was introduced.

- Basic Class commodities were reclassified to Class C and were to be known as Class C (Basic); their rate levels were similar to the other commodity classifications.

The officially computed rates were not changed to be "indicative" only, and fork tariffs were not introduced at that time. The next steps toward liner rate deregulation were taken in October 1989, when an increase in passage and freight rates was authorized and changes in the level and structure of rates were made.

- The $^{3}/_{10}$ percent surcharge was abolished, ending ad valorem rate setting.

- A set of fork tariffs was introduced permitting actual freight rates for Class A, B, C, and C (Basic) cargoes to vary within ±5 percent of the specified commodity rate.

- Rates for certain cargoes, such as all interisland cargoes in transit (foreign exports or imports, all refrigerated cargoes, and livestock), were deregulated.

Objectives of the Shipping Cost and Rate Analysis

The SRRS team was required to identify the desirable next step in liner shipping rate rationalization and liberalization, with the expectation of implementing the step during 1991.

It was evident that the most effective way to achieve rationalization, and one that had not recently been fully addressed, was to adopt a fundamental approach—in other words, to determine as accurately as possible the cost of operating the service, include the permissible rate of return, and compute the corresponding cost per ton of cargo, or per passenger, for comparison with the prevailing tariff.

When starting a detailed cost analysis of interisland liner fleet operations, based on data in annual reports submitted to MARINA by individual ship operators, the SRRS team had as its objectives

- To recommend a tariff structure that would accurately reflect the costs of the liner operations,
- To recommend a fork tariff for 1991 that would provide a range of flexible freight rates within the industry to meet variable trading conditions and various productivity levels.
- To recommend a rate-monitoring system that would facilitate monitoring by MARINA and the Philippine Shippers' Council (SHIPPERCON) of actual user charges versus authorized rates.
- To develop the mechanics for periodic adjustment of the fork tariff after 1991.

The next sections address these principal concerns.

Chapter 2

OVERVIEW OF THE DOMESTIC SHIPPING SECTOR

Domestic shipping services in the Philippines consist almost entirely of interisland services. Road transport adequately serves intra-island coastal transport demand.

Philippine interisland shipping has traditionally consisted of three categories of shipping: liner shipping, tramp shipping, and industrial carriage.

Liner shipping operations refer to shipping services covered by government franchises that regulate rates, routes, and sailing schedules. Operators act as common carriers under a public convenience license, and freight shipments are normally covered by bills of lading.

Tramp shipping operators function as contract carriers. Their operations are governed by franchises that permit them to negotiate shipment rates and terms and determine routes and sailing schedules. Shipments are normally covered by contracts of affreightment.

Industrial carriers exist because of the need to cater to the needs of their own or associated enterprises.

Organizational Framework

Government Agencies

Rate regulation applies to common carriers, that is, liner operators, which operate under franchise privileges, with fixed sailing schedules, routes, and fares or freight rates approved by the Maritime Industry Authority (MARINA).[1]

[1]MARINA was created by Presidential Decree (PD) No. 474 in 1974.

MARINA designates liner shipping routes as primary, secondary, tertiary, feeder, and development routes. All primary routes have Manila at one end as a terminal and at the other end principal ports of the main islands, including Cebu, Tacloban (Leyte), Catbalogan (Samar), Iloilo (Panay), Bacolod (Negros), Puerto Princesa (Palawan), and the Mindanao ports of Davao, Cagayan de Oro, General Santos, and Zamboanga.

There are 12 secondary routes, 9 of which connect Cebu to surrounding islands and principal ports, and 2 of which connect Luzon (via Batangas) to Mindoro (via Calapan and San Jose). The remaining secondary route is the short run (ferry service) between Iloilo and Bacolod.

There are about 200 tertiary feeder and development routes, most of which have no liner services.

According to MARINA's records, a total of 569 operators have been granted franchises to operate as common carriers. The total number of vessels covered by these franchises was 1,485. Currently, some 800 vessels are franchised.

MARINA has primary responsibility for marine safety; however, the Philippine Coast Guard (PCG), created as a major unit of the Philippine Navy by Republic Act No. 5173, currently is responsible for the inspection of vessels and certification of their seaworthiness.

The Philippine ports served by the domestic fleet are classified as national ports, municipal ports, and private ports. The national ports are all commercial ports, owned by the Philippine government and administered by the Philippine Ports Authority (PPA), created in 1974 by PD 505. The PPA also administers some smaller municipal ports as well as some supervisory responsibility and taxing authority over private ports.

Private and Nonprivate Entities

Conference of Interisland Shipowners and Operators

The Conference of Interisland Shipowners and Operators (CISO) was organized in 1962 to represent the interests of the interisland liner shipping industry. It is funded by contributions from its member companies and in 1983 was formally registered with the Securities and Exchange Commission as a nonprofit, nonstock corporation.

CISO has 17 members, representing larger companies and a few moderate-sized shipping firms. CISO members account for 80 to 85 percent of total liner traffic and possess a similar proportion of the industry's deadweight tonnage, spread over approximately 120 vessels. A breakdown of the number of vessels and deadweight tonnage for 10 CISO members is given in the table below.

Information on vessels and deadweight tonnage from the other CISO members[2] was not available.

Company	*No. of Vessels*	*Total DWT*
Aboitiz Shipping	14	51,206
C.A. Gothong Lines	8	9,237
Lorenzo Shipping	8	21,260
Negros Navigation	11	16,042
Solid Shipping	6	17,308
Sulpicio Lines	30	70,488
Sweet Lines	15	17,180
Williams Lines	17	63,317
Trans Asia Shipping	6	2,956
George & Peter Lines	6	1,581
Total	121	270,575

Most of CISO's services operate on primary liner routes from Manila and on secondary liner routes from Cebu, with little competition from non-CISO lines.

Southwestern Mindanao Shipowners' Association

Among non-CISO liner shipping operators, eight operators serving the Sulu Archipelago have formed their own conference, the Southwestern Mindanao Shipowners' Association (SMSA).

Philippine Interisland Shipping Association

An organization constituting the entire interisland shipping industry was organized in 1977 as the Philippine Interisland Shipping Association (PISA), under the auspices of MARINA. PISA includes sectoral groups such as CISO, the Lighterage Association of the Philippines (LAP), and the Philippine Association of Tanker Owners and Operators (PHILTANKO). It has represented the country's domestic shipping industry in the solution of problems affecting its members and in the removal of obstacles to the industry's progress.

Philippine Shippers' Council

The Philippine Shippers' Council (SHIPPERCON) was created in 1973 by PD No. 165, with the objective of promoting the common interests of Philippine exporters, importers, and other commercial users of sea transport. SHIPPERCON is a quasi-public sector organization under the Department of Trade and Industry

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[2]Includes Alberto Gothong Enterprises, Eusebio Shipping Lines, Lapu-lapu Shipping Lines, San Vicente Shipping Corp., Viva Shipping Line, and Archipelago Lines.

(DTI) and has predominantly private sector membership. It is empowered to negotiate, on behalf of shippers, satisfactory terms of shipment.

Policy Framework

As mandated in PD No. 474, MARINA undertakes the following functions:

Policies for Sectoral Development

1. Adopt and implement a practicable and coordinated maritime industry development program that includes
   - Early replacement of obsolescent and uneconomic vessels,
   - Modernization and expansion of the Philippine merchant fleet,
   - Enhancement of domestic capability for shipbuilding repair and maintenance, and
   - Development of a supply of trained manpower.
2. Provide and help provide the necessary financial and technological assistance to the maritime industry.
3. Provide and help provide a favorable climate for expansion of domestic and foreign investment in shipping enterprises.

Policies for Supervision and Control

- Provide for the effective supervision, regulation, and rationalization of the organizational management, ownership, and operations of all water transport utilities and other maritime enterprises.

This shall include the regulation of interisland rates, regulation of entry by granting of route franchises, regulation of safety, and supervision of service standards.

Chapter 3

REVIEW OF EXISTING TARIFF STRUCTURE AND ADJUSTMENT PROCEDURE

Structural Aspects of the Tariff

The existing tariff structure prescribes a set of formulas for user charges that vary by the classification of commodities or service class of passengers and by the distance of the voyage. Each liner cargo rate formula consists of a fixed component and a distance-related component, whereas Third Class passage rates, the only passenger class now regulated by MARINA, provide only a distance-related component.

Fixed and Distance-Related Components

For links without a precalculated tariff, the existing tariff appears to have been determined on the basis of formulas with two basic components:

- A fixed component ostensibly intended to reflect the cost of the vessel while it loads or discharges in port. It is computed in ₱/revenue ton; however, passage rate formulas do not provide for such a fixed component.

- A variable component ostensibly intended to reflect the cost of the vessel's time at sea. The magnitude of the component depends upon a distance category coefficient applied to the distance traveled. It is computed in ₱/revenue ton mi or ₱/passenger mi.

Conversely, the SRRS team does not preclude the possibility that in 1928, when the first rate formulas for liner shipping were prescribed, the fixed component took into account vessel-running costs, that is, all time costs, including crewing costs, repairs and maintenance, insurance, management and overhead costs, and reasonable profit, whereas the distance-related component reflected voyage costs, for example, fuel, port charges, passenger meals, and other costs. It

is possible that this traditional and internationally accepted approach was adopted in 1928 and that the respective amount of these components was distorted by numerous across-the-board rate adjustments that disregarded the relative increases in voyage and running costs.

The SRRS team favors the latter approach to rationalize interisland liner rates because not only is it considered the traditional method of calculating costs, but also it tends to more closely approximate the exponential behavior of cost with respect to distance, and the resulting linear approximation of distance-dependent costs, at least theoretically or under controlled conditions, should yield rates that are incremental with distance.

Commodity Classifications

For tariff purposes, commodities, of which there is a list of approximately 600 identified items, are allocated to four classifications—A, B, C, and C (Basic). Commodities in Classes A, B and C are categorized broadly on the basis of their status as fully processed, semiprocessed, or unprocessed, respectively. Class C (Basic) commodities consist of rice, palay, corn, corn grits, fruits, and vegetables.

The present commodity tariff structure is more simple than and compares favorably with previous structures, which contained other classes such as Ad Valorem, Class D, and multiples of classes A and B.

The reasons for grouping commodities according to classes are as follows:

- To simplify the tariff structure; thus, the fewer the number of rate levels charged, the simpler the structure is to implement.
- To allow rates to vary relative to the average cost of providing the service. In contrast to applying a freight—all kinds (f.a.k.) rate, which is not uncommon in container services, classification allows the operator to levy incremental charges for varying costs of cargo handling (liner terms specify that stevedoring charges are for the account of the ship operator) and to anticipate potential claims resulting from differences in commodity values and packaging methods.
- To allow for cross-subsidization, that is, considering that the trading of some commodities is highly elastic with respect to freight rates but their revenue contribution could be higher than the incremental cost of transport. This is especially true for low-paying cargoes, which may be worth transporting if the ship will otherwise be sailed in ballast or with empty cargo space. Problems may arise, however, when carrying capacity is limited and low-paying cargoes are shut out in favor of more lucrative freight. Despite these potential problems, cross-subsidization is widely accepted by freight conferences.

Trip Length Dependence

Depending on the direct trip distance between origin and destination ports, the existing tariff structure provides a corresponding set of rate formulas that consider three distance ranges, namely, ≤100 mi, 101 to 300 mi, and >300 mi.

Extra Charges and Other Structural Aspects

Regulation of liner cargo rates was instituted in 1929. The original regulation provided ship operators the option, for commodities valued ≥₱1,000/ton, to levy a charge of 0.5 percent of the value of the commodity or to apply a formula with a fixed element and a variable (distance of shipment) element in order to arrive at a charge for cargo shipment services.

Over time, and as inflation resulted in higher prices for all commodities, the ad valorem charge option became applicable to more and more commodities. Regulated rate adjustment for inflation was generally performed in line with the inflation rate (with some time lags) when applied to the formula; however, for relatively short distance shipments, unjustifiable adjustments of the ad valorem percentage resulted in a gradually increasing divergence of the ad valorem rates and the formula rates. By 1981, ship operators were permitted to charge 4.2 percent of the cargo value for a shipment of any distance; by 1989, the ad valorem percentage had risen to 7.3 percent.

Structural Modifications Between 1983 and 1990

Rate Differentiation by Route Length

The tariff structure specifying different rates by distance was adopted July 21, 1983 (Case 83-10405). The rationale for adopting a rate formula for each distance range was to enable rates to more closely approximate the cost of providing the service. No background papers exist about how this structure, with three distance ranges, evolved. It appears that the fixed component of the rate formula (expressed in ₱/revenue ton) was intended to represent port costs, whereas the distance-related component corresponded to voyage costs.

The SRRS team's derivation of cost-based fixed and distance components is discussed in Chapters 4 and 5.

Deregulation of First and Second Class Passenger Rates

The domestic shipping sector offers a wide range of passenger services to cater to various classes of passengers. However, the more basic classifications offered are First Class, Second Class and Third Class passage. First Class was deregulated many years ago, and Second Class passage was deregulated in 1989.

Third Class passage continues to be regulated with rates currently based on ₱1.1182/passenger mi for short trips (up to 100 mi), ₱1.0274 for medium-length trips (101 to 300 mi), and ₱0.9368 for longer trips (301 mi and over).

Abolition of Ad Valorem Rates

As early as 1980, MARINA realized that adjustment of the ad valorem percentage for "inflation" resulted in a squaring of the effect of inflation, since the values of the commodities to which the percentage was applied were also increasing, and that a considerable distortion had therefore occurred in the original intention for using an ad valorem rate.

Subsequently, MARINA recommended that the ad valorem option be dropped. No action was taken, however, until the Presidential Task Force (PTF) made the same recommendation in 1989. The ad valorem option was discontinued in May 1989,[3] and all commodities then classified as Ad Valorem were reclassified as Class A or returned to their original commodity classification.

At the same time, a surcharge of $^3/_{10}$ percent of the declared value of a commodity (but excluding Basic Class commodities) was imposed, in addition to the applicable class rate. Basic Class commodities were defined as rice, palay, corn, corn grits, fruits, vegetables, and livestock.

Abolition of the Valuation Surcharge

Pursuant to an order of the Maritime Industry Board dated October 25, 1990, which authorized an increase in passage and freight rates and provided for changes in the level and structure of interisland liner rates, the $^3/_{10}$ percent surcharge was abolished.[4]

Adoption of a Fork Tariff

By the same order, member companies of CISO, as well as some other operators who had fulfilled certain necessary conditions, were authorized to implement a new structure and schedule of specified rates, including a fork tariff system for both Third Class passage and freight. The new rate consisted of a base or indicative rate, ±5 percent.

According to CISO President Paciencio Balbon, all CISO members charged the upper limit of the fork tariff because the rate adjustment granted by the government failed to cover the full effects of inflation and the loss in revenue resulting from abolition of the valuation surcharge ($^3/_{10}$ percent of the declared value) on all cargoes (excluding Basic commodities, as indicated above).

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[3]MARINA Memorandum Circular 46.

[4]MARINA Memorandum Circular 57.

Deregulation of Rates for Selected Commodities

Additionally, by the same order, the freight rates of refrigerated, transit, and livestock cargoes were deregulated.

Tariff Quantum and Characteristics for Freight

MARINA Memorandum Circular 59, issued April 11, 1991, authorized base rates for commodity Classes A, B, C, and C (Basic), as shown in Table 3-1.

Table 3-1. Base Freight Rates

Distance	Class A		Class B		Class C		C (Basic)	
(mi)	Fixed[a]	Variable[b]	Fixed	Variable	Fixed	Variable	Fixed	Variable
0 to 100	108.1502	0.8176	86.5620	0.6539	70.3119	0.5323	62.4995	0.4731
101 to 300	89.0771	0.7629	71.2617	0.6101	57.9155	0.4968	51.4805	0.4415
301 and over	70.0041	0.7085	56.0248	0.5658	45.5167	0.4609	40.4593	0.4096

Note: The rates in this table took effect April 26, 1991. Operators are permitted to continue charging rates within a fork range of ±5 percent of the prescribed base rates.

[a]Measured in ₱/ton.
[b]Measured in ₱/ton/mi.

Relative Magnitudes of Rates by Trip Length

A comparative analysis of freight rates by distance range reveals that across all commodity classes, commodities traveling between 0 and 100 mi are charged 54.5 percent more for the fixed-cost component and 15.5 percent more for the distance-related component than are commodities traveling 301 mi or greater. For commodities traveling between 101 and 300 mi, the fixed cost and distance-related components are, respectively, 27.2 percent and 7.8 percent higher than for commodities traveling 301 mi or greater.

Relative Magnitudes in Rates of Commodity Classes

A comparative analysis of freight rates by commodity class reveals that Class A commodities pay 73 percent more freight than Class C (Basic) commodities, whereas Class B and Class C commodities pay 38 percent and 12.5 percent more, respectively. The percentage relationships between the freight rates charged for each commodity class and the rate for Class C (Basic) commodities appear constant, irrespective of the distance categories.

Relative Magnitude of Contribution from Fixed and Distance-Related Components

A comparative analysis of the contributions calculated from Table 3-1 reveals the following:

- For a voyage of 100 mi, the fixed component contributes 57 percent of the freight and the distance-related component 43 percent.
- For a voyage of 300 mi, the fixed component contributes 28 percent and the distance-related component 72 percent.
- For a voyage of 600 mi the fixed component contributes 14 percent and the distance-related component 86 percent.

These relationships hold regardless of commodity classification.

Tariff Quantum and Characteristics for Passengers

MARINA Memorandum Circular 59, previously mentioned, authorized base rates for Third Class passenger travel, as shown in the following table:

Distance (mi)	*Third Class Passage Base (₱/passenger mi)*
0 to 100	1.1182 x distance
101 to 300	1.0274 x distance
301 and over	0.9368 x distance

As with freight rates, the new passenger rates took effect April 26, 1991, but operators were allowed to continue to charge rates within a fork range of ±5 percent of the prescribed base rates.

Relative Magnitudes of Fares by Trip Length

A comparative analysis of passenger fares by distance range category reveals that for distances of 0 to 100 mi fares are 19.4 percent higher per mile than for distances 301 mi and over. For distances of 101 to 300 mi fares are 9.7 percent higher per mile than for distances 301 miles and over.

Prevailing Tariff Adjustment Procedure: Revenue Deficiency Method

When the defunct Board of Transportation had jurisdiction over shipping rates, tariff adjustments were applied, on behalf of the Philippine Government,

through across-the-board increases in passage and freight rates. The increases were accompanied by minor restructuring through adoption of rate formulas that varied by distance groups and by creating a commodity group consisting of "basic" goods. The basic method applied in determining the required adjustment was referred to as the "deficiency in rates by the required revenue approach." Essentially, the procedure involved the following steps:

- Review of ship operators' operating costs.
- Assessment of operators' fixed assets.
- Computation of the revenue required to attain a 12 percent return on assets and working capital, that is, total operating costs plus 12 percent of the sum of the fixed assets plus working capital.
- Comparison of actual revenue received (based on audited financial statements provided by ship operators) and the estimate of required revenue, as computed above. The difference indicated the deficiency in rates.
- Subjective setting of the relative magnitude of increases in passenger fares and freight rates that would cover the calculated deficiency in rates.
- Discussion and finalization of the proposed adjustments in passenger fares and freight rates, through public hearings.

After rate regulatory functions were transferred to MARINA in 1985, tariff adjustments were carried out similarly, but innovative changes were introduced, as discussed earlier.

Chapter 4

ANALYSIS OF VESSEL COSTS

Assessment of Data

Based on MARINA franchising records, 1,215 watercraft were granted franchise documents in the form of a Special Permit, Provisional Authority, or Certificate of Public Convenience. Technically, these vessels constitute the common carriers that are governed by rate regulations, although most of these are vessels of less than 100 tons deadweight, such as motorized bancas, wooden pumpboats, and motor launches serving short-distance hauls. With the limited time and data available, the SRRS team confined its cost analysis to vessels with, at the very least, a reported income statement. After reviewing all annual reports for 1989[5] submitted by ship operators to MARINA, the SRRS team found only 271 vessels that qualified for basic cost analyses; however, only 127 vessels were considered to have adequate financial, operations, and traffic data for any analysis that could serve as a basis for establishing cost-based tariffs. Although the sample size used by the SRRS appears small relative to the total number of watercraft, the sample vessels still constitute more than 90 percent of the total domestic liner capacity, in terms of both deadweight and passenger capacity.

Most of the 127 vessels with adequate data are owned by CISO-member companies. Of the total 17 CISO members, only 11 submitted annual reports to MARINA in 1989. Of the 11, only 9 companies supplied all information in conformity with the prescribed reporting format. To fill the information gaps in some annual reports, the SRRS team gathered data from the following sources:

- CISO (for vessel particulars and route distances),
- Management Services Staff (MSS) Inventory of Philippine Domestic Fleet (1987),

[5]The most recent year available as of the writing of this report.

- MSS Domestic Operating Fleet (1989), and
- Interviews with selected shipping companies.

The current information system needs to be greatly improved in order to provide the information needed to support rate regulation activities. It is therefore appropriate to cite a number of shortcomings that could promptly be addressed so that future analysis of vessel costs can be undertaker with greater ease. Some observations follow.

- Various data sources identify vessels by their respective names. Some operators rename their vessels for commercial, paranormal, or posterity reasons; thus, difficulties arise when data are compiled from various sources. Adoption of a permanent identifier, such as the vessel's call sign, hull number, or official code, by all information sources will greatly facilitate data integration.
- Some companies have no clear understanding of how accounts are to be classified, for example, an operator who reported common carrier's tax presumably as part of administrative expenses. MARINA may benefit from preparing a chart of accounts, which can be disseminated to all interisland operators. This may even help advance professionalism in the financial management of some shipping companies.
- There is no account that records meal expense for passengers. This expense is presumably covered under the "food and subsistence" account, which includes provisions for the crew. A new account called "passenger meals" could improve the accuracy of any comparative cost analysis between passenger and passenger-cargo vessels.
- Several companies fail to submit their annual reports to MARINA for several reasons:
  - Small operators are unaware of such a reporting requirement.
  - The reporting format includes too many details and proves too tedious for small operators to properly accomplish, more so for certified public accountants to certify.
  - Penalties for failure to submit the annual report are not enforced.
- Because of its dependence on the Philippine Coast Guard for data on vessel registrations, certificates of inspection, ship admeasurement, and vessel plan alterations, MARINA's Vessel Inventory System is seldom updated. Thus, the SRRS team has identified the need for the following changes:

- Adopt a modified annual report form as presented in Appendix A. The proposed format essentially differs from the existing format by including vessel particulars and copies of vessel statutory documents and by prescribing basic information essential to MARINA that must be submitted and optional information that respondents may volunteer.
- Require submission of annual report form before any application for renewal of franchise is granted by MARINA, in addition to the ₱200/day penalty for late submission or nonsubmission of report.
- Induce ship operators to submit backup copies of their annual report data on computer diskettes using dBASE, Symphony, Lotus 1-2-3, or Framework, in formats similar to those prescribed in Appendix M-A of Volume IV.
- Foster closer coordination between MARINA, the Philippine Coast Guard, and SHIPPERCON in the exchange of information on ship registrations and ship safety, vessel particulars, traffic, rate policy and franchise violations, and complaints about the availability or lack of shipping services. On this basis, foster cooperation in the maintenance and sharing of a database.

Classification and Coding of Data

The SRRS team adopted a system of classifying vessel types, company scale of operation, and average trip length furnished by each vessel on record. Each classification serves as a parameter for cost analysis. By sorting vessel records of similar parameters, variances in vessel cost per ton or per passenger within the same set of classifications can be minimized; thus, vessel records with typical costs can be further scrutinized and excluded from the samples if found to be incongruous.

Types of Vessels

Each vessel on record was categorized according to its respective type of service, using the following codes:

1 Conventional Cargo Service
2 Roll-on roll-off (RORO) Service
3 Container Service
4 Pure Passenger Service
5 Combined Passenger-Breakbulk Cargo Service
6 Combined Passenger-RORO Service
7 Combined Passenger-Container Service
8 Fastboat Service (speed exceeding 20 kn)
9 Others not elsewhere stated

Scale of Company Operation

Based on the hypothesis that the operating cost level of a vessel is influenced by the scale of operations, the vessel-operating companies were classified according to the value of their assets, as follows:

- A Companies with assets of at least ₱100 million
- B Companies with assets of at least ₱50 million but less than ₱100 million
- C Companies with assets of at least ₱10 million but less than ₱50 million
- D Companies with assets of less than ₱10 million

The SRRS inception report presented a different classification system, which categorizes the scale of operation by number and tonnage of the fleet operated rather than by asset value, as follows:

- L Large: Company is operating 5 or more vessels and has a fleet of 10,000 GRT or more
- M Medium: Company is operating fewer than 5 vessels and has a fleet of 10,000 GRT or more, or company has 3 or more vessels with an aggregate weight of 3,000 GRT or more but less than 10,000 GRT
- S Small: Company is operating vessels totaling less than 3,000 GRT, or company has fewer than 3 vessels with a total weight of less than 10,000 GRT
- U Unclassified: Company has no report covering its fleet

Originally it was anticipated that this alternative manner of classifying scale of operation would have advantages over the asset value system because it removes distortions resulting from valuation appraisal of assets by some companies. Furthermore, distortion resulted from the manner in which vessels chartered under PD 760/866 would be valued if only true scale of operation were reflected. The SRRS team opted to use the value of assets rather than the arbitrarily set criteria of number and gross tonnage of vessels because

- Several operators did not disclose their fleet statistics, particularly the contract terms of local charters, for example, bareboat charter, time charter, or voyage charter, which affect the scale of operation;
- A preliminary assessment of some sample companies with data on number and gross tonnage of operated vessels indicated no distinct difference in vessel operating cost for number of vessels and gross tonnage of the company, at least for the arbitrarily set criteria; and

- The use of value of total assets is a traditionally accepted approach in classifying scales of company operation.

Average Trip Length

In the inception report, the SRRS team indicated its intent to analyze shipping costs by category of routes, that is, primary, secondary, tertiary, and ferry. After a preliminary analysis of costs, the SRRS team noted that no distinct characteristics in cost appeared between route categories. The SRRS team also noted from operations records that vessels shifted from one route to another; furthermore, several primary routes also include port-to-port legs served by secondary routes. The SRRS team therefore believed that no meaningful analysis for tariff-setting purposes could be derived from examining these route categories. Because no general cost characteristics are apparent for each route category, the SRRS team concluded that rate analysis would have to be undertaken route by route, assuming there were no problems in availability and reliability of data. The SRRS team chose to use average trip length as a parameter for cost analyses because it directly relates to the tariff structure now adopted by MARINA and because of lack of data.

Since the existing tariff structure provides rates based on three distance ranges, the SRRS team opted to maintain the same number of and ranges for classification of trip lengths. Adding more distance ranges and changing the magnitudes of the ranges in any proposed tariff would only make its structure more complex and more difficult to institute. Conversely, reducing the number of distance ranges would result in a greater disparity between costs of shipping services and the prescribed rate that should correspond to the distance range; this necessarily results from averaging.

Thus, the SRRS team adopted the following classification codes to represent the average trip length of the vessels for which costs are to be analyzed:

1	Routes with average trip length ≤100 mi
2	Routes with average trip length >100 mi but ≤300 mi
3	Routes with average trip length >300 mi
0	Routes not defined and with indeterminate average trip length

Profile of Vessel Samples

Vessel Samples by Deadweight and Age Group

The initial file of vessel records available for cost analysis consisted of 271 vessel samples with an aggregate of about 2.15 million DWT, ranging from 16 DWT to a maximum of 160,985 DWT. The samples included some vessels, mostly >10,000 DWT, that were shifted from time to time from oceangoing trading to domestic

trading. Because 29 samples had no information on deadweight, the mean size of vessels with DWT data was 8,903 DWT with a standard deviation of 21,311.

The age of the cargo vessels in the sample ranged from new deliveries to as old as 47 years. Some 94 vessels had no information on year built. The mean age of the vessel samples was estimated at 19 years, with a standard deviation of 7. Table 4-1 shows vessel samples by deadweight tonnage and age group.

Table 4-1. Vessel Samples by Deadweight and Age Group

Deadweight Range (tons)	Age (yr) 0-4	4-8	8-12	12-16	16-20	20-24	>24	No information	Total
>=10,000	0	0	0	1	0	0	0	40	41
8,000 to 10,000	0	0	1	0	0	0	0	0	1
6,000 to 8,000	0	0	0	4	2	1	0	2	9
5,000 to 6,000	0	0	0	1	4	2	0	3	10
4,000 to 5,000	0	1	1	3	6	2	1	7	21
3,000 to 4,000	0	0	2	1	3	5	3	0	14
2,000 to 3,000	0	0	0	4	9	9	3	9	34
1,500 to 2,000	0	0	1	1	9	10	0	1	22
1,000 to 1,500	1	0	0	0	9	4	5	4	23
750 to 1,000	0	0	0	2	2	0	0	0	4
500 to 750	3	0	0	3	4	3	2	0	15
250 to 500	2	2	3	3	6	5	3	9	33
0 to 250	3	0	1	4	1	3	2	1	15
No information	1	0	3	2	1	4	0	18	29
Total	10	3	12	29	56	48	19	94	271

Note: Base year for age is 1989.

Vessel Samples by Passenger Capacity and Age Group

Of the 271 samples, 93 vessels were reported to have some capacity for commercially transporting passengers. It is uncertain how many of the 178 remaining samples are pure or combined passenger-cargo vessels. Nevertheless, the 93 samples had an aggregate capacity of 65,180 passengers, an average of 701 passengers per vessel, with a standard deviation of 663. The passenger-carrying vessels on file had capacities ranging from as low as 4 to as high as 2,960.

The age of passenger vessels ranged from 3 to 47 years. On average, passenger vessels appeared to be older than cargo vessels: their average age was 21 years with a standard deviation of 7.

Table 4-2 shows vessel samples in the database by passenger capacity and age.

Table 4-2. Vessel Samples by Passenger Capacity and Age Group

Deadweight Range (tons)	Age (yr) 0-4	4-8	8-12	12-16	16-20	20-24	>24	No information	Total
>2,000	0	0	1	3	1	0	0	0	5
1,500 to 2,000	0	0	0	1	6	1	0	0	8
1,100 to 1,500	0	0	0	0	4	0	1	1	6
1,000 to 1,100	0	0	0	1	3	1	1	0	6
900 to 1,000	0	0	0	1	0	2	2	1	6
800 to 900	0	0	0	3	4	0	1	0	8
700 to 800	0	0	0	0	2	2	0	0	4
600 to 700	0	0	1	1	1	2	0	0	5
500 to 600	0	1	0	0	3	2	2	0	8
400 to 500	0	0	0	0	0	0	1	0	1
300 to 400	3	0	0	0	1	1	2	0	4
200 to 300	2	0	0	0	0	1	0	1	2
0 to 200	1	0	0	4	9	14	2	0	30
No information	9	2	10	15	22	22	7	91	[illegible]
Total	10	[illegible]	12	29	56	48	19	94	271

Note: Base year for age is 1989.

Vessel Samples by Type, Average Trip Length, and Scale of Operation

The analyses in the succeeding sections of this report greatly depend on the availability of data classified under each cost parameter and combinations of the parameter. Estimates of mean cost and its standard deviation improve relative to the number of sample vessels available under each unique combination of cost parameters. Table 4-3 shows the data available for trip length and scale of operations by type of vessel, as well as the extent to which factors influencing cost can be analyzed. Figures 4-1 to 4-3 present graphic profiles of the sample vessels.

The SRRS team had intended to include vessel age as a parameter in Table 4-3, in order to further minimize variances in estimates and eliminate samples observed to be spurious. However, as may be seen from Tables 4-1 and 4-2, data on vessel age are too meager; when they are integrated into Table 4-3, only a few vessels remain with a given set of parameters; thus, no meaningful analysis could be performed except in the case of particular vessel types, such as parameter combination Type 3, Distance 3, Scale A.

Table 4-3. Number of Samples, by Vessel Type, Average Trip Length, and Scale of Operations

Vessel Type	Average Trip Length	Company Scale	Number of Samples
1	0	A	9
1	0	B	1
1	0	C	20
1	0	D	16
1	0	X	46
1	3	A	4
1	3	B	13
1	3	C	5
1	3	X	22
1	X	X	68
3	0	A	5
3	0	B	2
3	0	X	7
3	2	A	2
3	2	X	2
3	3	A	29
3	3	B	11
3	3	X	40
3	X	X	49
4	0	B	1
4	0	C	1
4	0	X	2
4	1	A	2
4	1	D	2
4	1	X	4
4	3	C	2
4	3	X	2
4	X	X	8
5	0	A	6
5	0	C	4
5	0	D	9
5	0	X	19
5	1	A	5
5	1	C	4
5	1	X	9
5	2	A	4
5	2	B	1
5	2	C	3
5	2	X	8

(continued on next page)

Table 4-3 (continued)

Vessel Type	Average Trip Length	Company Scale	Number of Samples
5	3	A	2
5	3	C	1
5	3	X	3
5	X	X	39
6	0	A	3
6	0	X	3
6	1	C	2
6	2	A	1
6	2	B	5
6	2	C	1
6	2	X	7
6	3	A	7
6	3	B	1
6	3	X	8
6	X	X	22
7	2	A	5
7	2	X	5
7	3	A	13
7	3	X	13
7	X	X	18
9	0	A	14
9	0	B	7
9	0	C	42
9	0	D	4
9	0	X	67
9	X	X	67
X	X	X	271

Notes: X = all classes. Other combinations of parameters not mentioned have no data.

Figure 4-1. Profile of Sample Vessels by Type of Vessel

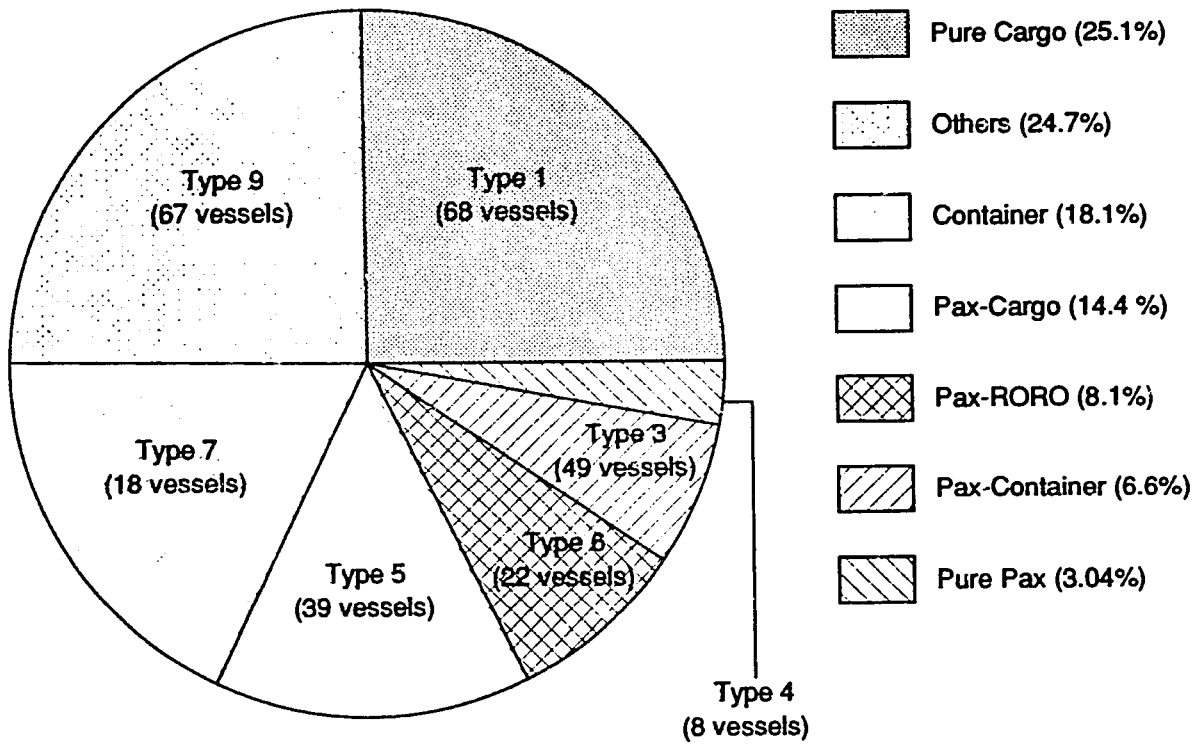


Figure 4-2. Profile of Sample Vessels by Average Trip Length (mi)

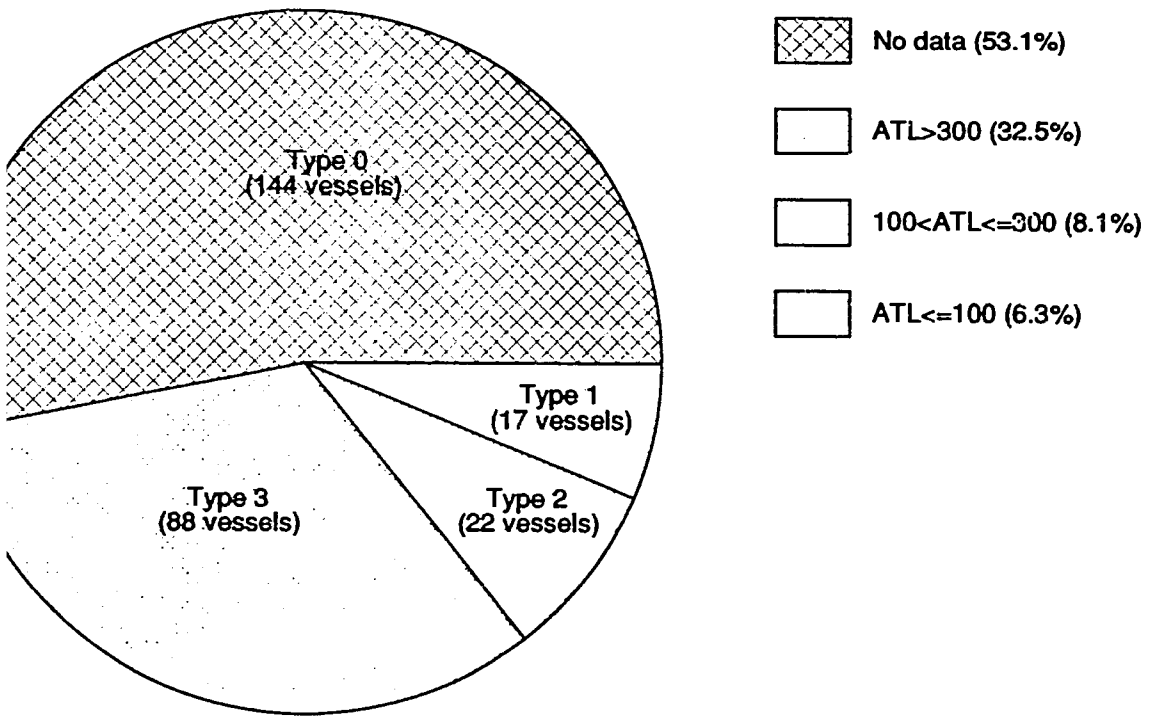
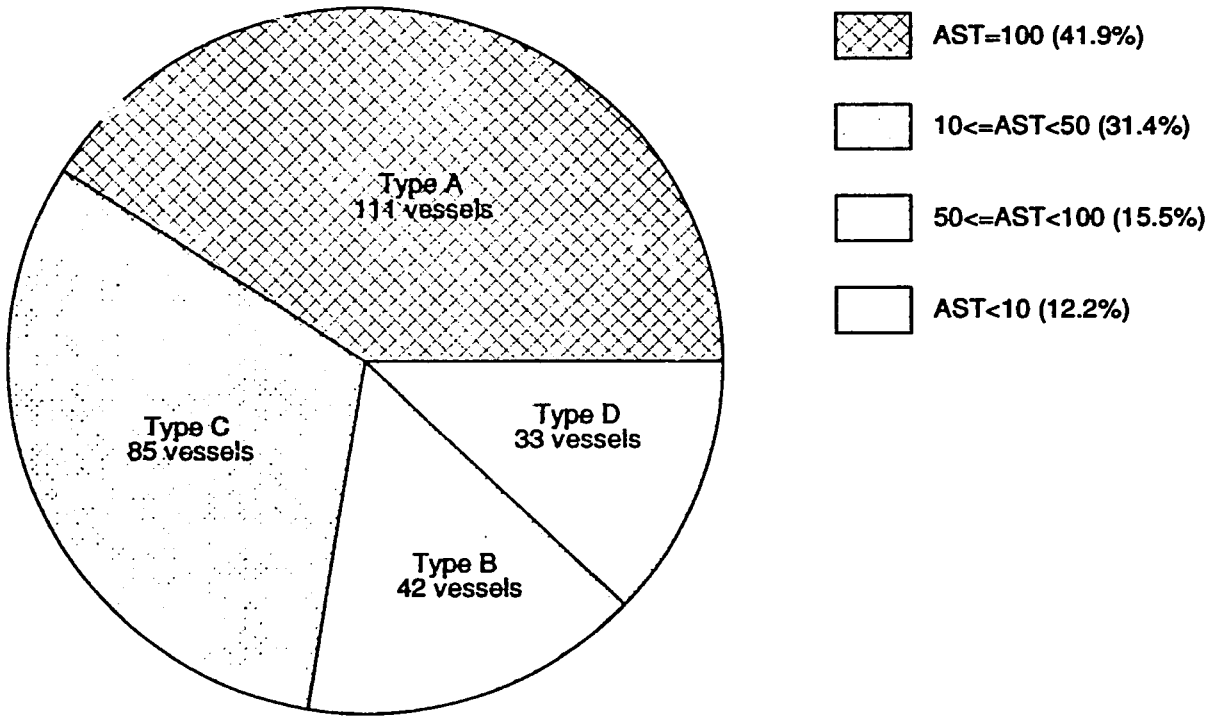


Figure 4-3. Profile of Sample Vessels by Scale of Operations (₱ million)



General Methodology in Computing Costs for Each Vessel

The SRRS team developed a computer program in dBASE IV as a tool for computing vessel cost. The instruction code of the program, VESANAL.PRG, is presented in Appendix B. The process flow in computing costs and in specifying the type of reports to be generated is illustrated in Figure 4-4 and described in the following sections.

Defining Exogenous and Policy Variables

The data source used by the SRRS was the "1989 Annual Report of Domestic Shipping Companies." The first step in preparing the program was to analyze major cost items and determine the extent to which they have changed. The next section details how the adjustment factors were derived to translate 1989 costs to current cost levels. Policy variables include the allowable return on investment, now set at 12 percent on floating assets plus 2 months of working capital, and whether rates should be computed based on actual costs and regardless of load factor performance of vessels (which is implicitly adopted by the "revenue deficiency method") or on design load factors and utilization rates. Further details of these policy concepts are discussed in Chapter 5. In estimating costs, the SRRS team generated two sets of estimates: one based on actual costs, and another set based on a design load factor of 60 percent for both passenger and cargo and a utilization rate of 320 commissionable days per vessel year.

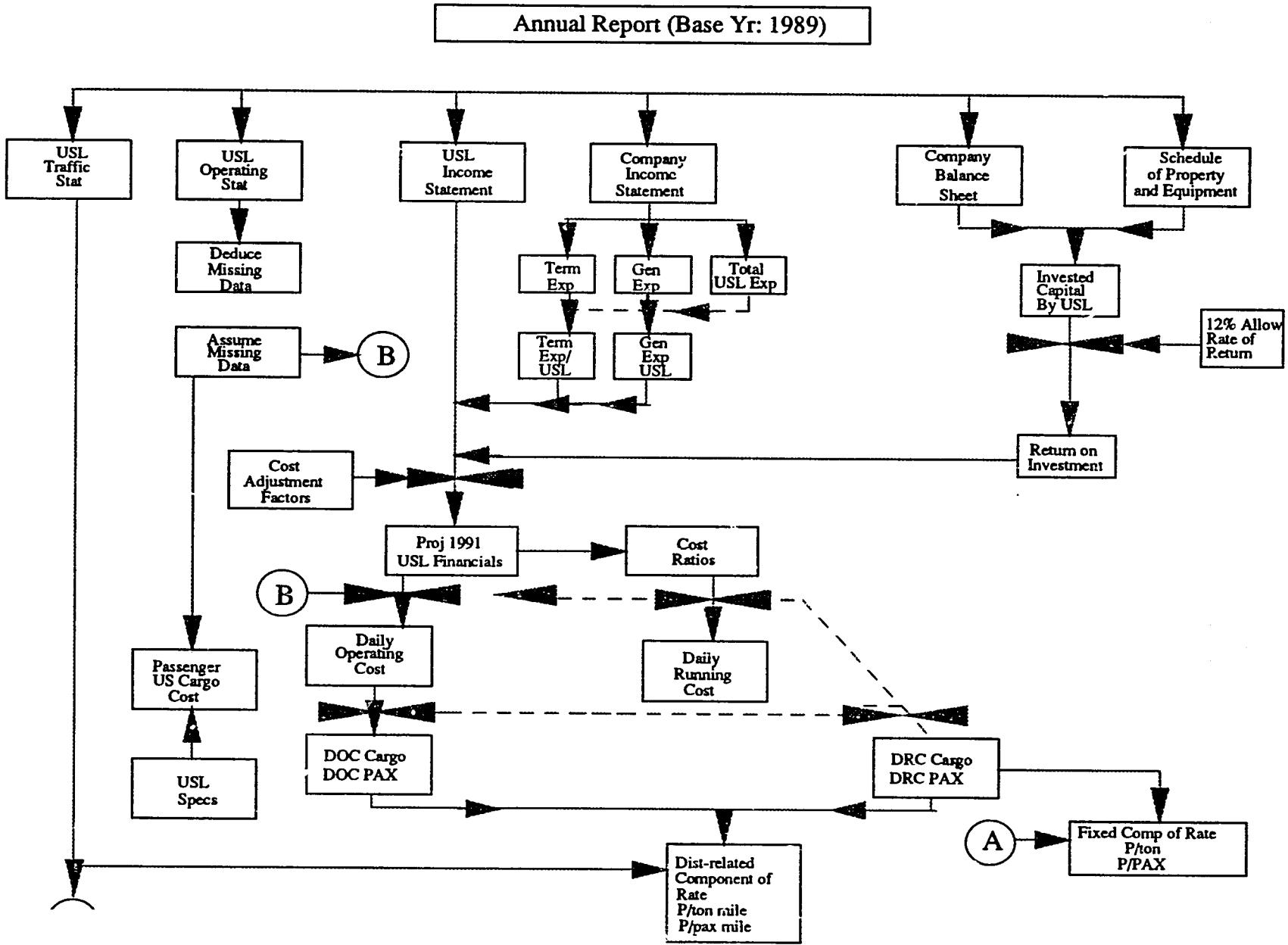
The rationale for adopting 60 percent as a load factor is that this factor is currently used as a criterion in granting new franchises; in principle, it is supposedly the load factor at which operators may still realize a reasonable return. With a load factor of more than 60 percent and considering traffic imbalances and seasonality, the quality of service is expected to deteriorate relatively; thus, at this point, additional operators and vessels are allowed to service the route in question. The rationale for adopting a vessel utilization rate of 320 days per year is that some 30 days are lost each year because of climatological disturbances and some 15 days are provided for drydocking and repairs.

The next step was to specify the type of ratio analysis that should be performed by the software, that is, cost in relation to either gross revenue, net revenue, or total operating expenses. Because the SRRS team had to compare costs by vessel type, average trip distance, and other factors, the ratio analysis in relation to total operating expenses was adopted. This choice appears most suitable because revenues relate to actual load factors and ship utilization; choosing otherwise would be inconsistent with the specification of computing costs based on design criteria.

Deducing Values of Undefined Operating Data

Data on vessel operations were found to be generally insufficient. However, some vessels reported data that enabled the SRRS team to deduce other undefined data. The following formulas were used, depending on data available.

Figure 4-4. General Methodology in Computing Cost



$$Voyages = \frac{MilesRun}{AverageTripDistance}$$

or

$$Voyages = \frac{Commissionable\ Days - Total\ Time\ in\ Port}{Average\ Time\ at\ Sea\ per\ Voyage}$$

or

$$Voyages = \frac{Total\ Time\ in\ Port}{Average\ Days\ in\ Port\ per\ Voyage},$$

where

$$Total\ Time\ in\ Port = \frac{Total\ Tons\ Served}{AverageGrossHandlingRate},$$

$$Average\ Days\ in\ Port\ per\ Voyage = \frac{Average\ Tons\ Served\ per\ Voyage}{Average\ Gross\ Handling\ Rate}$$

and

$$Average\ Tons\ Served\ per\ Voyage = Cargo\ Load\ Factor * DWT * dwtcoef.$$

This procedure was incorporated into the software. Thus, the software checks whether any missing data are to be deduced and, if there are, solves for any of the above formulas depending on the information available.

Assuming Values of Undefined Variables

In some instances not all independent variables mentioned in the preceding formulas are available. Thus, the SRRS team assumed some values for selected variables that are within a zone of reasonableness. These variables are vessel speed, gross cargo handling rates, trip distance, and commission days.

When not defined, vessel speed was assumed to be

10 kn for conventional cargo, RORO, and unclassified vessels (Types 1, 2, and 9)

12 kn for passenger-cargo and passenger-RORO vessels (Types 5 and 6)

14 kn for passenger vessels, passenger-container ships, and pure container vessels (Types 4, 7, and 3)

28 kn for fastboat services (Type 8)

When the gross cargo handling rate was needed to estimate undefined variables, the following values were assumed by the SRRS team:

- 400 tons/day for conventional cargo vessels, passenger-cargo vessels, and unclassified vessels and for deadweight ≤3,500
- 800 tons/day for conventional cargo vessels, passenger-cargo vessels, and unclassified vessels and for deadweight >3,500, or for RORO, passenger-RORO, and passenger vessels with deadweight ≤3,500
- 1,600 tons/day for RORO, passenger-RORO, and passenger vessels with deadweight >3,500
- 960 tons/day (from 12t x 8 x 10) for container and passenger-container vessels with deadweight ≤3,500
- 1,920 tons/day (from 12t x 8 x 2 x 10) for container and passenger-container vessels with deadweight >3,500

When there are two or more undefined dependent variables and availability of either route length or commission days will permit the derivation of the remaining unknown variable, the average trip distance was assumed to be 392 miles and the number of commission days was 320 days per year.

Another variable assumed is *dwtcoef*, which reflects the adjustment in deadweight to determine the payload. Since interisland vessels ply relatively short distances, it was assumed that 5 percent of deadweight is lost to bunkers, stores, and the like; thus, *dwtcoef* is assumed to be 0.95.

If, as in the case of vessels with passenger capacity, cargo traffic and passenger traffic were not reported, the SRRS team estimated them by dividing the respective revenue by a 1989 rate for cargo and passage corresponding to the average trip length of the route; if not defined, 1989 rates based on Class A (cargo) and Third Class (passenger) passage from Cebu to Manila were assumed for estimation purposes.

Computing Daily Operating and Running Costs for Each Vessel

Having at this stage of the process a set of values for operating data variables, the SRRS team computed daily operating cost by dividing total operating expenses, including allowable profit, by the number of commissionable days. Likewise, the SRRS team computed daily running cost by dividing total running cost (i.e., all costs including allowable profit but excluding voyage expenses) by the number of commissionable days. Both these estimates yield actual cost per day.

Continuing with the concept of setting rates based on design load factors and vessel utilization, the computed total running cost of each vessel is divided by the design utilization of 320 days instead of the actual commission days. The rationale for setting a design utilization is to spread running costs (which are mainly fixed costs) uniformly over a reasonable period for rate setting purposes.

Thus, the rates evolved will intrinsically penalize operators who fail to derive a reasonable number of commissionable days per year, perhaps due to improper ship maintenance.

Computing for Other Cost Indicators

The SRRS team computed for other common cost indicators such as voyage cost per mile and cost per day at sea. Estimates on voyage cost per mile can be used when assessing the distance-related cost of vessels of comparable size. Voyage cost per mile can also serve as a basis for the distance-related component of the tariff when divided by the traffic that can be served.

Estimates of cost per day at sea, that is, voyage cost per day plus daily running cost based on design utilization, were likewise computed as an alternative basis for estimating the "at sea" portion of a voyage. When divided by ton-miles, this cost indicator could also serve as a basis for the distance-related component of the tariff; however, it differs from the previous indicator in that it apportions the running cost to the relative time spent in port and at sea.

Generating the Report on Vessel Cost Analysis

After running the program VESANAL.PRG to create a file containing the vessel cost analysis, a program entitled ANALREPO.PRG was developed and used to generate a hard copy of the analysis. The instruction code of this program is presented in Appendix C.

A sample copy of the printout from ANALREPO.PRG is shown as Figure 4-5. For purposes of confidentiality, the names of the vessel and its operator were omitted.

Cost and Revenue Adjustment Factors

Because the SRRS uses data from 1989, it is necessary that conditioning adjustment in terms of inflation or increase in prices of goods and services be developed to update 1989 costs to 1991 level. Adjustment factor calculations shown in Table 4-4 were developed for major cost items. Table 4-5 shows the average percentage increase in inflation from 1989 to 1991.

The adjustment factors were developed by adapting price increase information from external sources, as discussed below. The increases were analyzed by their effect on the 1989 base numbers. If a price increase was implemented sometime in 1989, the inflation rate to be used the following year was adjusted to avoid compounding its effect when applied to the 1989 base numbers. Thus, the development of the adjustment factors takes into consideration the timing difference in computing for each factor as shown in the calculations.

COMPANY:
VESSEL:
VESTYPE: 6 PAX-RORO VSL
GRT: 1098 DWT: 800
YEAR ACQUIRED: 84 ACQUISITION COST: 2676

CATEGORY: L
VESCODE: C0015
ENGINE BHP: 0
PAX: 784
SERVICE LIFE: 15

SCALE: A
YRBUILT: 1971
SPEED: 12
CLASS: F
SALVALUE: 0

.....OPERATING/TRAFFIC DATA.....

DAYS IN COMMISSION: 275 DRYDOCK: 31 REPAIRS: 59 LAID-UP: 0
ROUTE: MNL/CBG/CTB/ORM ROUTE CATEGORY: S
MILES RUN: 42468 NO. OF VOYAGES: 46 AVG. ROUTE LENGTH: 923

METRIC TONS SERVED: 40358
TON-MILES PERFORMED: 32275680
PASSENGERS SERVED: 74068
PAX-MILES PERFORMED: 33294912

TON-MILES SERVED: 9248743
CARGO LOAD FACTOR: 29 %
PAX-MILES SERVED: 15898203
PAX LOAD FACTOR: 48 %

.....FINANCIAL DATA.....

	1989 ₱'000	%	1991 ₱'000
REVENUE:			
FREIGHT	14,999	67.8	19,829
PASSENGER	12,728	61.2	17,883
CHARTERS	0	0.0	0
OTHER REVENUE	191	0.7	191
LESS: CCTAX	(818)	(3.8)	(1,102)
COMM.	(849)	(3.8)	(1,122)
TOTAL REV NET	27,100	**.*	36,801
VOYAGES EXPENSES:			
FUEL-DIESEL	0	0.0	0
FUEL-BUNKER	0	0.0	0
FUEL-SFO	5,159	36.4	10,643
PORT CHARGES	395	1.4	395
CARGO CHARGES	458	1.8	523
MISC VOY EXP	0	0.0	0
TOTAL	6,012	39.6	11,562
RUNNING EXPENSES:			
LUBE	1,055	5.0	1,474
SALARIES	1,466	8.8	2,568
BENEFITS	101	0.6	177
FOOD & SUBST	1,193	4.6	1,354
SUPPLIES	936	4.2	1,238
DRYDOCK, R&M	1,754	7.8	2,270
INSURANCE	680	2.3	680
CLAIMS	285		1,285
TAXES & LICENSES	95	0.3	95
MISC RUNNING EXP	272	0.9	272
TOTAL	7,837	35.6	10,413
ADMINISTRATIVE & OVERHEAD EXPENSES:			
TERMINALS	2,964	13.1	3,835
GENERAL ADMIN	1,297	5.9	1,716

	1989 ₱'000	%	1991 ₱'000
CAPITAL EXPENSES:			
DEPRECIATION AT COST	657	2.2	657
DEPRECIATION ON APPR	0	0.0	0
VSL ACQUISITION COST			2,676
CAPITALIZED EXPENSES			5,423
TOTAL INVESTMENT IN VSL	8,099		
LESS: ACCUM DEPREC'N	(		4,116)
NET BOOK VALUE OF VSL	3,983		
ADD: WORKING CAPITAL			4,739
TOTAL INVESTED CAPITAL	8,722		
PROVN FOR RETURN ON INVSTMT	1,047		

==========ANALYSIS (AT 1991 COSTS)==========

DAILY OPERATING COST: 106,288.23
DAILY RUNNING COST:
BASED ON REPORTED COMMDAYS 64,246.37
BASED ON 320 DAYS PER YR 55,211.72

VOYAGE COST PER MILE: 272.2405
COST PER DAY AT SEA: 142,651.64

ASSUMING (--ASSUMING 60 & 60 % LOAD FACTOR--)

PAX SHARE IN COST	**VOYAGE COST PER** TONMILE	PAXMILE	**FIXED COST** PER TON	PER PAX
0%	0.5970	0.0000	437.78	0.00
20%	0.4776	0.1157	350.22	0.00
40%	0.3582	0.2315	262.67	0.00
60%	0.2388	0.3472	175.11	0.00
80%	0.1194	0.4630	87.56	0.00
100%	0.0000	0.5787	0.00	0.00
REV BASED	0.3230	0.2657	236.82	0.00

REMARKS: SPEED WAS ASSUMED; CHR HIRE TREATED AS PART OF CAPEX

Table 4-4. Adjustment Factors for Base Year 1989 to Projected Year 1991

	Cost Adjustment Factor	Percent Increase	Adjustment Basis
Operating Expense			
Common carrier's tax	1.472	47.2	70 percent freight revenue; 30 percent passenger revenue
Commission	1.428	42.8	See "Freight"
Fuel-diesel	1.906	90.6	Adjustment factor
Fuel-bunker	2.015	101.5	Adjustment factor
Fuel-special fuel oil	2.063	106.3	Adjustment factor
Port charges	1.143	14.3	See "Cargo charges"
Cargo charges	1.288	28.8	Adjustment factor
Miscellaneous voyage			No adjustment
Lubricants	1.397	39.7	Petroleum inflation
Crew salaries	1.752	75.2	Adjustment factor
Crew benefits	1.752	75.2	Adjustment factor
Food and subsistence	1.135	13.5	Food inflation
Supplies	1.323	32.3	General inflation
Drydocking, repair, and maintenance	1.268	26.8	Adjustment factor
Insurance			No adjustment
Claims			No adjustment
Taxes and licenses			No adjustment
Miscellaneous running			No adjustment
Terminal	1.253	25.3	Composite factor
General and administrative	1.335	33.5	Composite factor
Average	1.418	41.8	
Revenue			
Freight	1.428	42.8	Adjustment factor
Passenger	1.574	57.4	Adjustment factor
Charter			No adjustment
Other			No adjustment
Average	1.426	42.6	

Table 4-5. Average Percentage Change in Inflation

	Percentage of Total Cost or Revenue	Percent Increase
Operating Expenses		
Common carrier's	4.7	47.2
Commission	0.8	42.8
Fuel[a]	18.3	104.2
Pilotage	0.5	14.3
Port charges	0.7	14.3
Stevedoring	4.7	37.2
Lubricants	3.0	39.7
Salaries and wages	4.3	75.2
Food and subsistence	3.1	13.5
Supplies	2.6	32.3
Water	0.4	0
Charter hire	2.6	0
Drydocking, repair, and maintenance	15.2	26.8

(continued on next page)

Table 4-5 (continued)

	Percentage of Total Cost or Revenue	Percent Increase
Operating Expenses (continued)		
Insurance	4.6	0
Claims	1.5	0
Other taxes and licenses	0.4	0
Employee benefits	0.6	75.2
Miscellaneous running	1.6	0
Vessel depreciation: Cost	3.0	0
Vessel depreciation: Appr. Incr.	1.4	0
Terminal	15.7	25.3
General and administrative	12.3	33.5
Total	100.0	41.85
Revenue		
Freight	62.0	42.8
Passenger	28.0	57.4
Charter	9.0	0
Other	1.0	0
Total	100.0	42.608

[a]The breakdown for fuel by type, usage, and percent increase is as follows: bunker, 11.0 percent, 90.6 percent; diesel, 8.0 percent, 101.5 percent; and special fuel oil, 81.0 percent, 106.3 percent.

Fuel

Fuel prices were raised four times between 1989 and 1990, the last in December 1990. Officially, fuel prices are provided by the Energy Regulatory Board (ERB). Cost adjustment factors are calculated for each type of fuel (diesel, bunker, special fuel oil) since cost increases vary. Also, type of fuel used varies from vessel to vessel (see Tables 4-6 and 4-7).

Personnel Cost

Adjustment to personnel costs is based on minimum wage movements from 1989 to 1991 and on assumed changes in salary levels for officers. (See Tables 4-8 to 4-10.) The adjustment factor is a weighted mix of these two bases. It should be noted that salary levels for officers are estimates based on the consultant's observation of industry trends. The alternative was to conduct a salary survey, which was not conducted because of time constraint. On the basis of estimates, salaries for officers have risen faster than wages because foreign ships have competitive salaries. Thus, although minimum wage increased 1.5 times over that of 1989, salaries increased about 2 times. The following table shows the adjustment factors for wages in salaries from 1989 to 1991:

	1990 over 1989	Percent Mix	1991 over 1989	Percent Mix
Minimum wage	1.386	51	1.542	51
Officers' salary	1.971	49	1.971	49
Average	1.673		1.752	

Table 4-6. Fuel Price Increase Adjustment Factor, 1989-1991

Type of Fuel	Factor	Number of Months	Total Adjustment
Diesel			
Actual 1989			
January-August	1.0000	7.5	7.5000
August-November	1.2948	3.5	4.5318
December	1.2948 x 1.0364	1	1.3419
Total			13.3737
1989 annual effect of increase			
January-December	1.2948 x 1.0364	12	16.1032
1989 effective increase (16.1032/13.3737)			1.2041
1990-1991 increase over 1989			
(1.2041[a] x 1.2724[b] x 1.2443[c])			1.906
Bunker			
Actual 1989			
January-August	1.0000	7.5	7.5000
August-November	1.2153	3.5	4.2536
December	1.2153 x 1.2126	1	1.4737
Total			13.2272
1989 actual effect of increase			
January-December	1.2153 x 1.2126	12	17.6841
1989 effective increase (17.6841/13.2272)			1.3369
1990-1991 increase over 1989			
(1.3369[a] x 1.4354[b] x 1.0500[c])			2.015
Special fuel oil (average)			
Actual 1989			
January-August	1.0000	7.5	7.5000
August-December	1.1723	3.5	4.1031
December	1.1723 x 1.2412	1	1.4551
Total			13.0581
1989 annual effect of increase			
January-December	1.1723 x 1.2412	12	17.4607
1989 effective increase (17.4607/13.0581)			1.337
1990-1991 increase over 1989			
(1.3369[a] x 1.3588[b] x 1.1356[c])			2.063

[a] 1989 factor.
[b] September 1990 factor.
[c] December 1990 factor.

Table 4-7. Fuel Price Increases, 1989–1991

Type of Fuel	From	To	Percent Increase	Effective Date
Diesel		3.3916	Base	
	3.3916	4.3916	29.48	August 16, 1989
	4.3916	4.5516	3.64	November 30, 1989
	4.5516	5.7916	27.24	September 21, 1990
	5.7916	7.2066	24.43	December 10, 1990
Bunker		2.3225	Base	
	2.3225	2.8225	21.53	August 16, 1989
	2.8225	3.4225	21.26	November 30, 1989
	3.4225	4.9125	43.54	September 21, 1990
	4.9125	5.1580	5.00	December 10, 1990
SFO[a] 57		2.9071	Base	
	2.9071	3.2230	10.87	August 16, 1989
	3.2231	4.2271	31.15	November 30, 1989
	4.2271	5.4097	27.98	September 21, 1990
	5.4097	6.3872	18.07	December 10, 1990
Average SFO[b]		2.5813	Base	
	2.5813	3.0261	17.23	August 16, 1989
	3.0261	3.7560	24.12	November 30, 1989
	3.7560	5.1037	35.88	September 21, 1990
	5.1037	5.7956	13.56	December 10, 1990

Note: No price increase after December 1990.

[a]Special fuel oil.
[b]30 percent SFO 57, 70 percent other SFO.

Sources: Energy Regulatory Board (for diesel and bunker); Shell Corporation and Philippines National Oil Corporation (for SFO). [Information compiled by MARINA.]

Table 4-8. Personnel Cost Increase Adjustment Factors, 1989–1991

	Factor	Number of months	Total	Adjustment
Wages				
Actual 1989				
January-June	1.000	6	6.000	-
July-December	1.391	6	8.346	-
Total 1989	-	-	14.346	-
1989 annual effect of increase				
January-December	1.391	12	16.692	-
1989 effective increase				
(16.692/14.346)	-	-	-	1.164
1990 increase over 1989[a]				
(1.164 x 1.191)	-	-	-	1.386
1991 increase over 1989[a]				
(1.164 x 1.191 x 1.113)	-	-	-	1.542
Salaries				
Actual 1989				
January-October	1.000	10	10.000	-
November-December	1.327	2	2.654	-
	-	-	12.654	-
1989 annual effect of increase				
January-December[a]	1.327	12	15.924	-
1989 effective increase				
(15.924/12.654)	-	-	-	1.258
1991 increase over 1989[a]				
(1.258 x 1.246 x 1.257)[b]	-	-	-	1.971

[a]Based on minimum wage increases, as shown in Table 4-9.
[b]1.1257 is the 1991 factor.

Table 4-9. Minimum Wage Increases

	From (₱/day)	To (₱/day)	Percentage Increase	Effective Date
1989	64	89	39.1	July 1, 1989
1990	89	106	19.1	Nov. 1, 1990
1991	106	118	11.3	Jan. 1, 1991

Note: Baseline wage is ₱64/day.

Table 4-10. Officer Salary Increases

	January 1988	January 1989		October 1989		January 1990		December 1990	
	(₱)	(₱)	Percentage Increase	(₱)	Percentage Increase	(₱)	Percentage Increase	(₱)	Percentage Increase
Monthly Average									
Master	6,500	8,000	23.1	12,000	50.0	16,000	33.3	20,000	25.0
Chief Mate	5,000	6,500	30.0	8,000	23.1	10,000	25.0	14,000	40.0
Second Mate	4,000	5,000	25.0	6,500	30.0	8,000	23.1	10,000	25.0
Third Mate	2,800	3,500	25.0	4,500	28.6	5,000	11.1	5,500	10.0
Radio Operator	3,500	4,500	28.6	5,000	11.1	5,500	10.0	6,000	9.1
Chief Engineer	6,500	8,000	23.1	12,000	50.0	16,000	33.3	20,000	25.0
Second Engineer	5,000	6,500	30.0	8,000	23.1	10,000	25.0	14,000	40.0
Third Engineer	4,000	5,000	25.0	6,500	30.0	8,000	23.1	10,000	25.0
Fourth Engineer	2,800	3,500	25.0	4,500	28.6	5,000	11.1	5,500	10.0
Average	-	-	25.9	-	32.7	-	24.6	-	25.7

Stevedoring

The PPA authorized a 25 percent increase in cargo handling rates on August 10, 1989, and another 20 percent increase during the second quarter of 1991 (Table 4-11).

Table 4-11. Stevedoring Cost Increase Adjustment Factors, 1989-1991

	Factor	Number of Months	Total	Adjustment
Actual 1989				
January-August	1.000	7.5	7.500	-
August-December	1.250	4.5	5.625	-
				13.125
1989 annual effect of increase				
January-December	1.250	12	15.000	-
1989 effective increase (15.00/13.125)	-	-	-	1.143
1990 increase over 1989 (1990 factor = 1.00)	-	-	-	1.143
1991 increase over 1989 (1991 factor = 1.20)	-	-	-	1.3716

Sources: Memorandum Circular 44, August 7, 1989; Memorandum Circular 13-91, May 2, 1991, Philippine Ports Authority.

Drydocking, Repair, and Maintenance

Indicators for drydocking cost increases were provided by four shipyards:

- PNOC Dockyard and Engineering Corp.
- Keppel Philippines Shipyard, Inc.
- Cebu Shipyard and Engineering Works, Inc.
- Philippine Iron Construction and Marine Works, Inc.

The adjustment factor is the average percentage increase for the four shipyards, derived from the weighted average of all repair and maintenance performed in each shipyard, as shown in the following table and in Table 4-12.

	Percent		
Shipyard	*1990 over 1989*	*1991 over 1990*	*1991 over 1989*
A	15.0	10.0	26.5
B	15.0	15.0	32.2
C	10.0	12.0	23.2
D	24.0	0.0	24.0
Average	16.0	9.3	26.8

Table 4-12. Drydocking, Repair, and Maintenance Increase Adjustment Factors, 1989-1991

	Percent Increase	Adjustment Factor
Average yearly increase		
1990 over 1989	16.0	-
1991 over 1990	9.3	-
1990 increase over 1989 (1.00 x 1.160)	-	1.160
1991 increase over 1989 (1.160 x 1.093)	-	1.268

Other Costs

Adjustment factors for miscellaneous costs are determined as follows:

- **Port charges**—Same as that for cargo handling.
- **Lubricants**—Based on 1990 petroleum products inflation rate.
- **Food and subsistence**—Based on 1990 food inflation rate.
- **Supplies**—Based on inflation rates of 12.7 percent in 1990 and 17.7 percent in 1991.
- **Terminal expenses**—Composite inflation rate for repair and maintenance, salaries and wages, fuel, lubricants, and other expenses.
- **General and administrative expenses**—Composite inflation rate for salaries and other expenses.

No adjustments are provided for insurance, claims, taxes and licenses, and miscellaneous expenses.

Revenue Adjustment Factors

Adjustment factors for revenue are calculated from the three tariff increases authorized by MARINA, as shown in the following table:

		Cargo (percent)		
Memorandum Circular	*Passenger (percent)*	*Basic*	*Nonbasic*	*Effective date*
46				
Passenger	22	-	-	May 29, 1989
Basic freight	-	76	8.0	May 29, 1989
CBM freight (20 percent of total nonbasic cargo)	-	-	8.0	May 29, 1989
Total freight	-	-	9.6	-
57	30	20	25	November 12, 1990
59	12	8	8	April 10, 1991

The method of computing adjustment factors accounted for 1989 revenues, which are the base figures, so that they are not counted twice (Table 4-13).

Table 4-13. Revenue Adjustment Factors, 1989-1991

	Factor	Number of months	Total	Adjustment
Passengers				
Actual 1989				
January-May	1.000	5	5.000	-
June-December	1.220	7	8.540	-
1989 annual effect of increase				
January-December	1.220	1	14.640	-
1989 effective increase				
(14.640/13.540)	-	-	-	1.081
1990 increase over 1989				
(1.081 x 1.30)	-	-	-	1.406
1991 increase over 1989				
(1.081 x 1.30 x 1.12)	-	-	-	1.574
Cargo				
Basic				
Actual 1989				
January-May	1.000	5	5.000	-
June-December	1.760	7	12.320	-
	-	-	17.320	-
1989 annual effect of increase				
January-December	1.760	12	21.120	-
1989 effective increase				
(21.120/17.320)	-	-	-	1.219
1990 increase over 1989				
(1.219 x 1.20)	-	-	-	1.463[a]
1991 increase over 1989				
(1.219 x 1.20 x 1.08)	-	-	-	1.580[a]
Nonbasic				
Actual 1989				
January-May	1.000	5	-	5.000
June-December	1.096	7	-	7.672
	-	-	-	12.672
1989 annual effect of increase				
January-December	1.096	12	-	13.152
1989 effective increase				
(13.152/12.672)	-	-	-	1.038
1990 increase over 1989				
(1.038 x 1.25)	-	-	-	1.297[a]
1991 increase over 1989				
(1.038 x 1.25 x 1.08)	-	-	-	1.401[a]

[a]Share of total cargo revenue was 0.15 for basic, 0.85 for nonbasic. Average adjustment for 1990 increase over 1989, 1.322; for 1991 increase over 1989, 1.428.

Cost Ratio Analysis

To analyze the cost structure of interisland liner shipping, the SRRS team undertook an analysis of cost ratios relative to total operating cost.

Cost Ratios by Type of Vessel

The SRRS team developed a program called COSTANA1.PRG, which retrieves the ratios calculated by VESANAL.PRG and generates a hard copy. The instruction codes for this program are presented in Appendix D. A sample copy of the report generated from the program is shown in Appendix E.

Table 4-14 summarizes the ratios by type of vessel. Because SRRS is concerned mainly with operating costs of vessels, all financial data from vessels that were chartered out were excluded from the samples.

Table 4-14. Expenses Relative to Total Operating Expenses (percent)

Vessel Type	Voyage Expenses	Running Expenses	Terminal Expenses	Administrative Expenses	Depreciation at Cost	Depreciation on Appreciation	Profit
1	29	39	5	7	14	0	5
3	30	32	14	11	8	2	3
4	29	40	4	13	12	0	2
5	38	42	5	8	3	0	4
6	32	36	6	13	6	1	3
7	32	37	13	10	4	1	3
9	21	45	NA	10	12	2	NA

Notes: Based on 1991 estimates. NA = not applicable.

From Table 4-14, it can be seen that

- Voyage expenses of container vessels (3 and 7) were relatively higher than those of conventional cargo vessels because of fuel expenses resulting from higher speeds and faster turnaround.
- Terminal expenses of container vessels were also relatively higher than those of conventional cargo vessels because terminal operations tend to be more capital intensive.
- Administrative expenses of conventional cargo vessels were relatively lower than those of other vessel types regardless of whether the latter carried passengers.

- Depreciation "at cost" of passenger-cargo and passenger-container vessels was relatively lower than that of other vessels because average age of the former two was greater than 20 years old.

Analysis and Exclusion of Vessels with Anomalous Ratios

The SRRS team closely examined the sample vessels that exhibited ratios significantly deviating from the mean estimates presented in Table 4-14. The following observations were noted.

- Several vessels operated for only a few days during 1989. Some even did not operate at all (e.g., Vessels D0029, H0002, N0035, W0027, and S0216).

- Some vessels reflected a relatively high fuel cost (e.g., Vessels J0081, T0011, A0041, and A0042).

- Abnormal running costs were noted in some cases because of excessive claims (Vessel D0072 after it sank) or because of major expenses in repairs and drydocking (Vessels C0017 and D0078).

Vessels that were chartered out, and therefore show no voyage expenses, were excluded before mean ratios were estimated. Other vessels mentioned earlier were likewise marked for exclusion in succeeding analyses.

Analysis of Daily Running Costs

Daily running cost includes

- All vessel expenses not directly related to voyages,

- A portion of shore-based expenses incurred in "running" the vessel, including terminal and administrative expenses, and

- A reasonable return on investment.

Daily running cost is comparable to the expenses incurred by a shipowner who puts his vessel under time charter.

Daily Running Cost by Vessel Type, Average Trip Length, and Deadweight

As can be seen from the results of the program COSTANA1 in Appendix E, daily running costs varied widely not only by the type and size of vessel but also by average trip length, as well as by other factors that could not be ascertained because of the limited data available.

The SRRS team computed for the average daily running cost of ships with common parameters similar to those presented in Table 4-3. Because of data constraints, the common parameters adopted for the analysis were type of vessel, deadweight range, average trip length category, and operator scale of operation.[6] Table 4-15 shows the average daily running cost by these common parameters.

Exclusion of Vessel Records With Anomalous Data and DRC Estimates

As mentioned earlier, the estimated daily running cost of vessel records marked for deletion in the preceding section was excluded from the analysis. The preliminary findings showed that vessels with no reported route and average trip length tended to increase the range and standard deviation of estimates for daily running cost; therefore, these vessels were likewise excluded from the analysis.

Observed Characteristics of Daily Running Cost

The following observations were drawn from Table 4-15.

- Pure-cargo and pure-passenger vessels (Types 1, 3, and 4) generally showed daily running costs that, as expected, increased directly relative to deadweight.
- Cargo and container vessels with combined passenger services revealed that a few cases of daily running costs were relatively higher than those for a relatively lower deadweight range; these occurrences are attributable mainly to differences in design configurations, such as DWT:GRT and PAX:GRT ratios, among others. Such occurrences are to be expected.
- For passenger-RORO vessels (Type 6), variations in deadweight ranges appeared to be marginally relative to running costs. This type of vessel has widely varying design configurations and other cost factors unique to RORO operations prevail.

Analysis of Daily Operating Costs

Daily operating cost includes

- All vessel expenses, both voyage-related and fixed expenses,

[6]The operator scale of operation had a significant effect only in isolated cases. Therefore, data samples from these cases were eliminated during the screening process.

- A proportion of shore-based expenses that are incurred in "running" the vessel, including terminal and administrative expenses, and
- A reasonable return on investment.

Daily Operating Cost by Vessel Type, Average Trip Length, and Deadweight

In like manner that daily running costs were analyzed. Table 4-16 presents an analysis of the average daily operating cost of the sample vessels.

Observed Characteristics of Daily Operating Cost

The following observations were drawn from Table 4-16.

- Pure-cargo and pure-passenger vessels (Types 1, 3, and 4) generally showed daily operating costs that, as expected, increased directly relative to deadweight, whereas combined passenger-cargo and passenger-container services had no set pattern because design configurations varied more widely for these ships.
- The difference between daily operating cost and daily running cost of vessels varied relative to their ratios of voyage to total operating expenses.

Comparative Analysis of Pure Cargo Versus Combined Passenger Cargo Vessels

The SRRS team deemed it essential to investigate the relative cost in providing passenger and cargo services in order to relate daily operating and daily running costs to the respective types of services. This section separately analyzes conventional cargo vessels and containerships, both with and without passenger services, to demonstrate their differences in operating costs as well as in ship design. An analysis of pure passenger vessels compared with passenger-cargo vessels was intended but not possible because of limited data.

Losses in Deadweight Per Passenger Capacity Installed

A ship of a given size, usually classified by its gross registered tonnage, may have been designed to carry either cargo, or passengers, or both. The more passengers that are to be carried, the less cargo space can be accommodated. This example elucidates the physical interrelationship between cargo capacity and passenger capacity.

Table 4-15. Average Daily Running Cost of Domestic Liner Vessels by Vessel Type, Deadweight, and Average Trip Length (₱ thousand)

Deadweight range (tons)	0<ATL≤100 mi			100<ATL≤300 mi				ATL>300 mi				
	4	5	6	3	5	6	7	1	3	5	6	7
0-250	-	17.2	-	-	-	-	-	-	-	-	-	-
250-500	79.4	34.1	54.8	23.2	26.5	-	52.6	-	-	-	-	-
500-750	98.3	63.2	-	-	87.0	101.9	-	-	-	-	-	-
750-1,000	-	-	-	-	49.0	90.7	-	-	-	-	-	-
1,000-1,500	-	-	-	-	-	86.2	-	-	37.3	159.1	172.3	146.0
1,500-2,000	-	-	-	-	-	-	-	-	-	-	-	-
2,000-3,000	-	-	-	-	-	-	-	-	-	-	-	-
3,000-4,000	-	-	-	-	-	-	-	-	-	-	-	-
4,000-5,000	-	-	-	-	-	-	-	-	-	-	-	-
5,000-6,000	-	-	-	-	-	-	-	-	-	-	-	-
6,000-8,000	-	-	-	-	-	-	-	-	-	-	-	-
8,000-10,000	-	-	-	-	-	-	-	-	-	-	-	-
≥10,000	-	-	-	-	-	-	-	-	-	-	-	-

Note: 1991 prices. Dashes indicate not applicable.

Table 4-16. Average Daily Operating Cost of Domestic Liner Vessels by Vessel Type, Deadweight, and Average Trip Length (₱ thousand)

Deadweight range (tons)	0<ATL≤100 mi			100<ATL≤300 mi				ATL>300 mi				
	4	5	6	3	5	6	7	1	3	5	6	7
0-250	-	26.0	-	-	-	-	-	-	-	-	-	-
250-500	98.9	42.6	80.7	25.9	65.2	-	66.5	-	-	-	-	-
500-750	118.2	94.5	-	-	116.4	137.2	-	-	-	-	-	-
750-1,000	-	-	-	-	82.4	132.7	-	-	-	-	-	-
1,000-1,500	-	-	-	-	-	131.5	-	-	46.1	215.3	261.0	210.6
1,500-2,000	-	-	-	-	-	-	142.8	30.3	90.2	199.9	394.2	263.5
2,000-3,000	-	-	-	-	257.5	-	148.8	50.0	-	-	482.9	284.0
3,000-4,000	-	-	-	-	-	-	-	57.5	135.3	-	-	-
4,000-5,000	-	-	-	-	-	-	-	78.6	134.5	-	433.1	412.2
5,000-6,000	-	-	-	-	-	-	-	-	181.9	-	256.1	-
6,000-8,000	-	-	-	-	-	-	-	-	189.1	-	-	-
8,000-10,000	-	-	-	-	-	-	-	-	251.4	-	-	-
≥10,000	-	-	-	-	-	-	-	-	300.9	-	-	-

Note: 1991 prices. Dashes indicate not applicable.

Table 4-17 presents an analysis of how deadweight changes relative to changes in passenger capacity. Vessels of comparable GRT are analyzed to estimate the shadow DWT of the pure cargo vessel, assuming that the vessel had the same GRT as the combined passenger-cargo vessel. This shadow DWT is derived by multiplying the DWT:GRT ratio by the difference in GRT of the two vessels and adding the product to the specified deadweight of the pure cargo vessel. The difference in DWT and in passenger capacity yields the desired estimates. Admittedly, the results are mere approximations, and different results may be obtained as the domestic fleet changes its general configuration and accommodation plans for cabin, noncabin, and deck passengers.

As Table 4-17 shows, about 1.99 tons in deadweight are lost on the average for every additional passenger space installed. Case by case, this relationship could range from 0.49 to 2.92 tons lost per passenger space. As more third class or noncabin passenger capacity is installed, the relationship tends to shift towards the lower range.

Table 4-17. Change in Deadweight Relative to Change in Passenger Capacity of Conventional Cargo Vessels

VSL CODE	VTYP	GRT	DWT	PAX CAP	DWT: GRT	SHADOW DWT OF COMP V5	∂DWT 1to5	∂PAXC 1to5	∂DWT: ∂PAX
I0009	1	2948.66	4829.60	0	1.64	4690.28	-2708	950	-2.85
D0038	5	2863.60	1982.30	950	0.69				
P0035	1	2671.43	4436.11	0	1.66	4755.22	-2773	950	-2.92
D0163	1	2502.66	4240.00	0	1.69	4034.31	-2610	994	-2.63
D0047	5	2381.25	1424.50	994	0.60				
P0019	1	2323.19	3554.00	0	1.53	3642.82	-2218	994	-2.23
O0006	5	1441.00	693.00	927	0.48				
V0041	1	1357.36	2146.96	0	1.58	2279.25	-1586	927	-1.71
DS135	1	1110.98	2000.00	0	1.80	1998.18	-1346	970	-1.39
S002J	5	1109.97	652.00	970	0.59				
L0086	1	895.97	1351.28	0	1.51	1333.89	-941	669	-1.41
T0011	5	884.44	392.85	669	0.44				
M0129	1	874.13	1200.00	0	1.37	1214.15	-821	669	-1.23
S0075	5	503.38	225.00	373	0.45				
J0034	1	499.13	591.30	0	1.18	596.33	-371	373	-1.00
S0079	5	445.75	425.00	312	0.95				
P0041	1	431.15	560.00	0	1.30	578.96	-154	312	-0.49

Notes: Vessel type 1 = conventional cargo, vessel type 5 = passenger-cargo. Summary of changes in deadweight per passenger space installed—Weighted average = -1.99; Minimum = -0.49; Maximum = -2.92.

Cost Differential Relative to Installed Passenger Capacity

In view of the amenities provided to passengers as well as additional crew and capital costs on board passenger vessels, daily operating and daily running costs of passenger-cargo vessels are relatively higher than those for pure cargo vessels of comparable gross tonnage. Table 4-18 presents an analysis on how daily operating costs could change in relation to an incremental change in passenger capacity. The analysis was confined only to vessels with comparable gross tonnages and no peculiarities in cost ratios and quantum of daily operating cost. From Table 4-18, it can be seen that the daily operating cost of combined passenger-cargo vessels is expected to increase by an average of ₱59.13 per installed passenger space per day.

Table 4-18. Differential in Daily Operating Cost Relative to Incremental Passenger Capacity of Cargo and Passenger-Cargo Vessels

VSL CODE	VTYP	GRT	DWT	PAX CAP	DAILY OPG COST	DOC: GRT	SHADOW DOC OF COMP V5	∂DOC 1to5	∂PAXC 1to5	∂DOC: ∂PAXC
S0038	1	1479.30	3616	12	96,060	64.94	93,573	32,730	915	35.77
O0006	5	1441.00	693	927	126,303	87.65				
VS041	1	1357.36	2147	0	59,454	43.80	63,118	63,185	927	68.16
DS135	1	1110.98	2000	0	20,195	18.18	19,602	43,188	555	77.82
A0043	5	1078.40	532	555	62,791	58.23				
R0004	5	1038.76	492	855	91,568	88.15				
F0018	1	999.83	2194	0	25,942	25.95	26,952	64,616	855	75.57
A0041	5	1030.02	444	668	65,167	63.27				
F0018	1	999.83	2194	0	25,942	25.95	26,725	38,441	668	57.55
E0035	1	930.86	1812	0	23,961	25.74	23,827	58,578	842	69.57
C0101	5	925.66	800	842	82,405	89.02				
E0035	1	930.86	1812	0	23,961	25.74	22,766	28,595	669	42.74
T0011	5	884.44	393	669	51,361	58.07				
S0079	5	445.75	425	312	37,530	84.20				
P0041	1	431.15	560	0	26,375	61.17	27,268	10,262	312	32.89

Notes: Based on 1991 estimates. Vessel type 1 = conventional cargo, vessel type 5 = passenger-cargo. Summary of changes in daily operating cost and per additional passenger space—Weighted average = 59.13; Minimum = 32.89; Maximum = 77.82.

Likewise, daily running costs are estimated to increase by ₱38.45 for every passenger space provided on the vessel, as shown in Table 4-19.

Table 4-19. Incremental Daily Running Cost Relative to Incremental Passenger Capacity of Conventional Cargo and Passenger-Cargo Vessels

VSL CODE	VTYP	GRT	DWT	PAX CAP	DAILY RUN COST	DRC: GRTOF	SHADOW COMP	DRC V51to5	∂DRC ∂PAXC 1to5	∂PAXC ∂DRC: ∂PAXC
S0038	1	1479.30	3615.82	12	66195	44.75	64481	36367	915	39.75
O0006	5	1441.00	693.00	927	100848	69.98				
VS041	1	1357.36	2146.96	0	36290	26.74	38526	62321	927	67.23
DS135	1	1110.98	2000.00	0	15191	13.67	14745	10982	555	19.79
A0043	5	1078.40	532.01	555	25727	23.86				
R0004	5	1038.76	491.90	855	73940	71.18				
F0018	1	999.83	2194.00	0	18971	18.97	19710	54231	855	63.43
A0041	5	1030.02	443.54	668	26503	25.73				
F0018	1	999.83	2194.00	0	18971	18.97	19544	6959	668	10.42
E0035	1	930.86	1812.00	0	16505	17.73	16413	32641	842	38.77
C0101	5	925.66	800.00	842	49054	52.99				
E0035	1	930.86	1812.00	0	16505	17.73	15682	5541	669	8.28
T0011	5	884.44	392.85	669	21223	24.00				
S0079	5	445.75	425.00	312	29016	65.09				
P0041	1	431.15	560.00	0	16680	38.69	17244	11771	312	37.73

Note: Based on 1991 estimates. Vessel type 1 = conventional cargo, vessel type 5 = passenger-cargo vessel. Summary of changes in daily running cost per additional passenger space—Weighted average = 38.45; Minimum = 8.28; Maximum = 67.23.

Cost of Passenger Carriage Relative to Cargo Service

After deriving, in physical and cost terms, the incremental effects of changes in passenger capacity, the SRRS team apportioned the ship's daily running cost to cargoes and passengers as follows:

$$\textit{Cargo Share in DRC} = \left(DRC - \frac{\partial DRC}{\partial PAX} * PAXCAP\right) * \frac{DWT}{DWT + \frac{\partial DWT}{\partial PAX} * PAXCAP}$$

$$\text{Passenger Share in } RC = \left(DRC - \frac{\partial DRC}{\partial PAX} * PAXCAP\right) * \left(\frac{PAXCAP * \frac{\partial DWT}{\partial PAX}}{DWT + \frac{\partial DWT}{\partial PAX} * PAXCAP}\right) + \frac{\partial DRC}{\partial PAX} * PAXCAP$$

where

DRC = D ly running cost,

$PAXCAP$ = P ssenger capacity,

DWT = D adweight capacity,

$\frac{\partial DWT}{\partial PAX}$ = Δ WT relative to $\Delta PAXCAP$ or = 1.99 (based on Table 4-17), and

$\frac{\partial DRC}{\partial PAX}$ = Δ RC relative to $\Delta PAXCAP$ or = 38.45 (based on Table 4-19).

)aily operatin costs are similarly apportioned to cargo and passengers. A dBAS IV program c illed MAINANA2.PRG was developed by the SRRS team to facilit e the proces: lescribed earlier. The instruction codes and database struct :e of MAINAN 2 are presented in Appendix F.

( )mparative Analysis of Pure Container Versus Combined Passenger-Container Vessels

The SRRS tea analyzed the relationship between passenger costs and conta er transport)st by applying the same procedure described for cargo versu combined pa senger cargo vessels.

Losse: n Deadweight 'er Passenger Capacity Installed

Table 4-20 pr ents the approximated loss in deadweight for every passe ger capacity i stalled on container vessels. The range in observed values (i.e., f m 0.4 to 3.6), pears to be wider for container vessels compared with the range or conventio l cargo vessels. The weighted average loss in deadweight of 2.3 to per passeng was likewise larger in the case of container vessels.

Cost I fferential by I talled Passenger Capacity

Table 4-21 sh ws the analysis of differential daily operating cost by incre ents in passe ger capacity. The results indicate that daily costs increase on aver e ₱84.44 for e ery passenger space provided on board container vessels. Depe ling on the p senger accommodation plan, however, the results may vary withi the range of out ₱23 to ₱130 per passenger per day. Conversely, the daily runni cost was nc d to increase by an average of about ₱40.87 per passenger spac er day, as sh wn in Table 4-22.

Table 4-20. Change in Deadweight Relative to Change in Passenger Capacity of Container Vessels

VSL CODE	VTYP	GRT	DWT	PAX CAP	DWT: GRT	SHADOW DWT OF COMP V7	∂DWT 3to7	∂PAXC 3to7	∂DWT: ∂PAX
S0163	3	4733.00	7218.30	11	1.53	7194.74	-4331	1622	-2.67
P0066	7	4717.55	2863.57	1633	0.61				
S0066	3	4585.43	7000.00	0	1.53	7201.69	-4338	1633	-2.66
W0019	3	4566.84	8513.00	0	1.86	8007.29	-3239	2003	-1.62
D0082	7	4295.55	4767.96	2003	1.11				
S0154	3	3792.71	6382.20	0	1.68	6372.27	-4575	1261	-3.63
D0105	7	3786.81	1797.76	1261	0.47				
W0018	3	3742.12	6000.00	0	1.60	6071.65	-4274	1261	-3.39
S0018	3	2749.70	4431.70	0	1.61	4415.29	-2486	1089	-2.28
O0012	7	2739.52	1929.00	1089	0.70				
S0059	3	2677.59	4175.00	0	1.56	4271.56	-2343	1089	-2.15
C0014	7	2452.29	1164.52	807	0.47				
O0010	3	2347.87	3249.06	0	1.38	3393.56	-2229	807	-2.76
C0014	7	2452.29	1164.52	807	0.47				
C0002	3	2331.15	2996.20	0	1.29	3151.90	-1987	807	-2.46
W0011	3	2185.11	3220.00	0	1.47	3017.39	-937	912	-1.03
L0018	7	2047.62	2080.33	912	1.02				
M0050	7	1998.34	1439.85	857	0.72				
W0015	3	1989.76	3500.00	11	1.76	3515.09	-2075	846	-2.45
D0059	3	1968.14	3284.72	37	1.67	3280.21	-2107	989	-2.13
T0001	7	1965.44	1172.76	1026	0.60				
L0038	3	1866.34	3191.99	0	1.71	3361.48	-2189	1026	-2.13
S0077	7	1493.29	416.30	861	0.28				
L0039	3	1489.33	2600.00	0	1.75	2606.91	-2190	861	-2.54
L0034	3	1109.04	1415.91	0	1.28	1322.29	-322	812	-0.40
S0071	7	1035.71	1000.00	812	0.97				
L0031	3	1034.41	1800.00	0	1.74	1802.26	-802	812	-0.99
S0148	7	987.73	339.00	520	0.34				
L0033	3	979.85	2028.24	0	2.07	2044.55	-1706	520	-3.28

Notes: Vessel type 3 = container, vessel type 7 = passenger-container. Summary of changes in deadweight per passenger space installed—Weighted average = -2.30; Minimum = -0.40; Maximum = -3.63.

Table 4-21. Differential Daily Operating Cost Relative to Additional Passenger Capacity on Container Vessels

VSL CODE	VTYP	GRT	DWT	PAX CAP	DAILY OPG COST	DOC: GRT	SHADOW OF COMP V7	DOC∂DOC 3to7	∂PAXC 3to7	∂DOC: ∂PAXC
S0163	3	4733	7218	11	216,684	45.78	215,977	185,461	1,622	114.34
P0066	7	4718	2864	1633	401,438	85.09				
S0066	3	4585	7000	0	183,565	40.03	188,854	212,583	1,633	130.18
W0019	3	4567	8513	0	251,380	55.04	236,447	212,543	2,003	106.11
D0082	7	4296	4768	2003	448,989	104.50				
S0154	3	3793	6382	0	196,752	51.87	196,446	65,306	1,261	51.79
D0105	7	3787	1798	1261	261,753	69.12				
W0018	3	3742	6000	0	190,643	50.94	192,920	68,833	1,261	54.59
S0018	3	2750	4432	0	162,564	59.12	161,962	56,335	1,089	51.73
O0012	7	2740	1929	1089	218,297	79.68				
A0008	3	2665	4293	11	188,299	70.65	193,572	24,725	1,078	22.94
C0014	7	2452	1164	807	225,621	92.00				
S0062	3	2312	3500	11	116,782	50.50	123,857	101,764	796	127.84
W0011	3	2185	3220	0	139,371	63.78	130,602	48,240	912	52.89
L0018	7	2048	2080	912	178,842	87.34				
M0050	7	1998	1440	857	202,155	101.10				
W0015	3	1990	3500	11	100,281	50.39	100,713	101,442	846	119.91
S0077	7	1493	417	861	93,364	62.52				
L0039	3	1489	2600	0	27,737	18.62	27,811	65,553	861	76.14
L0034	3	1109	1416	0	46,090	41.55	43,042	77,739	812	95.74
S0071	7	1036	1000	812	120,781	116.60				
S0060	3	1031	2021	10	76,296	74.03	76,679	44,102	802	54.99

Notes: Based on 1991 cost estimates. Vessel type 3 = pure container, vessel type 7 = passenger-container. Summary of changes in daily operating cost per additional passenger space—Weighted average = 84.44; Minimum = 22.94; Maximum = 130.18.

Table 4-22. Differential Daily Running Cost Relative to Additional Passenger Capacity on Container Vessels

VSL CODE	VTYP	GRT	DWT	PAX CAP	DAILY RUN COST	DRC: GRT	SHADOW DRC OF COMP V7	∂DRC 3to7	∂PAXC 3to7	∂DRC: dPAXC
S0163	3	4733	7218	11	132,271	27.94	131,839	63,670	1,622	39.25
P0066	7	4718	2864	1633	195,509	41.44				
S0066	3	4585	7000	0	90,342	19.70	92,945	102,565	1,633	62.81
W0019	3	4567	8513	0	201,594	44.14	189,618	113,196	2,003	56.51
D0082	7	4296	4768	2003	302,814	70.49				
S0154	3	3793	6382	0	126,652	33.39	126,455	11,827	1,261	9.38
D0105	7	3787	1798	1261	138,282	36.51				
S0018	3	2750	4432	0	130,549	47.47	130,066	15,144	1,089	13.91
O0012	7	2740	1929	1089	145,210	53.00				
A0008	3	2665	4293	11	139,577	52.37	143,486	1,724	1,078	1.60
W0011	3	2185	3220	0	105,850	48.44	99,189	29,497	912	32.34
L0018	7	2048	2080	912	128,687	62.84				
M0050	7	1998	1440	857	139,201	69.65				
W0015	3	1990	3500	11	61,951	31.13	62,218	76,983	846	91.00
S0077	7	1493	417	861	70,990	47.53				
L0039	3	1489	2600	0	22,827	15.32	22,888	48,102	861	55.87
L0034	3	1109	1416	0	37,346	33.67	34,876	37,424	812	46.09
S0071	7	1036	1000	812	72,301	69.80				
S0060	3	1031	2021	10	44,167	42.85	44,389	27,912	802	34.80

Notes: Based on 1991 cost estimates. Vessel type 3 = pure container, vessel type 7 = passenger-container. Summary of changes in daily running cost per additional passenger space—Weighted average = 40.87; Minimum = 1.60; Maximum = 91.00.

Chapter 5

ESTABLISHMENT OF A 1991 FORK TARIFF

After the SRRS team's investigation of traffic, financial, and vessel operating data, much doubt remained about the accuracy of reports by various ship operators. As mentioned earlier, a need remains to improve the database if any conclusive basis is determined for recommending a 1991 fork tariff. In recommending a new fork tariff, that is, a base tariff and a fork range, not only should cost estimates be reliable, but the effects of the shift from the present user charges to the new rate levels will have to be carefully assessed in the light of the social, economic, and political conditions prevailing in the Philippines.

Applying a Modified Revenue Deficiency Method

The SRRS team applied a "revenue deficiency" method that indicates a composite (across-the-board) rate adjustment similar to the traditional approach used by the defunct Board of Transportation and MARINA. However, the SRRS slightly modified the method as follows.

- Financial analysis was undertaken by vessel performance rather than by company performance.
- Vessels that had no freight or passenger revenue because of their being chartered out were excluded, since their inclusion would result in distortion when determining passage and freight adjustments.

Thus, of the sample population of 271 vessels covering 57 shipping companies, the SRRS team considered only 174 vessels operated by 38 shipping companies as eligible for this type of analysis.

Analysis of Required Rate Adjustment

Table 5-1 presents the consolidated revenue and expenses of vessels operated by 38 shipping companies,[7] after the effects of cost increases and rate

[7]A0003, A0025, A0036, B0010, B0031, C0004, C0049, E0005, G0030, I0005, I0009, I0010,

Table 5-1. Revenues and Expenses of 38 Vessel-Operating Companies and Required Rate Adjustments (following MARINA Memorandum Circular 59)

REVENUE:		ADMIN & OVERHEAD EXPENSES:	
Freight	3,807,679	Terminals	584,776
Passage	1,862,128	Gen. Administrative	545,408
Charters	14,088		1,130,184
Other Rev	48,214		
Gross Revenue	5,732,110	CAPITAL EXPENSES:	
Less:		Depreciation at Cost	282,045
Carrier Tax	(152,020)	Deprec'n on Appraisal	66,095
Commissions	(50,346)	Total Vsl Deprec'n	348,140
NET REVENUE	5,529,743		
		Total Investmt in Vessels	1,813,086
VOYAGE EXPENSES:		Less:Accum Deprec'n	(771,831)
Fuel-Diesel	198,978	Net Book Value of Vsl	1,041,255
Fuel-Bunker	354,133	Add: Working Capital	816,589
Fuel-Special	961,054	Total Invested Capital	1,857,844
Port Charges	57,711		
Cargo Charges	218,593	Provision for 12% Return on Invest	222,941
Misc. Voy. Exp	2,570		
	1,793,040		
RUNNING EXPENSES:		CALCULATION FOR RATE ADJUSTMENT:	
Lubricants	159,513	Total Expenses	5,346,235
Salaries	341,930	Add: Allowable Return	222,941
Benefits	40,513	REQUIRED REVENUE	5,569,176
Food & Subsist.	134,903		
Supplies	134,624	GROSS REVENUE	5,732,110
Drydock, R&M	719,956		
Insurance	221,228	REQ'D RATE ADJUSTMENT:	
Claims	29,716	(Req'd Rev - Gross Rev) / Gross Rev * 100	
Taxes & Licenses	6,574		= -2.8%
Misc. Running Exp	83,547		
	1,880,238		

Note: Based on 1991 prices.

adjustments discussed in the previous chapter are considered. Based on data from these sample vessels, the recent adjustment in base rates put in effect by MARINA Memorandum Circular 59 provides a return on investment of about 20 percent.[8]

I0011, I0014, I0021, K0002, L0001, L0008, M0024, M0031, N0004, N0012, P0010, P0011, P0041, S0004, S0005, S0010, S0013, S0016, S0017, S0020, S0023, S0024, S0035, T0018, T0021, and W0003.

[8]The revenue deficiency is -2.8 percent, assuming that traffic volumes are relatively inelastic with respect to changes in rates.

When the existing fork range of ±5 percent is applied, MARINA Memorandum Circular 59 puts into effect an average return on investment ranging from 5 to 36 percent for the given sample vessels.

The SRRS team developed a dBASE IV program called FORKANA1.PRG to generate the figures in Table 5-1 and calculate for the revenue deficiency and theoretical rate adjustment needed for each vessel to attain a 12 percent return on investment. The program also computes for the return on investment realized by each vessel under the existing freight and passage rates. The instruction codes of FORKANA1.PRG are provided in Appendix G.

On the basis of the results of the calculations performed by FORKANA1.PRG, it appeared that some vessels have highly profitable operations. Some vessels could still attain a 12 percent return even with a reduction in existing rates of as much as 46 percent.[9] Conversely, some vessels performed so poorly that their revenues or rates, or both, had to increase by as much as 1,506 percent just to attain a 12 percent return.[10]

It may be noted that the "consolidated revenue deficiency" method, illustrated in Table 5-1, indicates an average rate adjustment that is weighted on the basis of the absolute values of revenues and expenses of each vessel; thus, vessels (or even companies) that reported larger revenues or expenses tend to influence the result of the computation in favor of their required rate adjustment. Conversely, vessels with lower revenues and expenses, perhaps because of size limitations or low productivity or activity, will likely obtain a relatively lower rate adjustment using this method versus taking the simple average of the revenue deficiency of each vessel. To support this contention, SRRS computed the simple average "required rate adjustment" of the 174 sample vessels. The results are as follows:

- The simple average required rate adjustment was 51 percent, which is much higher than the weighted average adjustment of -2.8 percent.
- Ninety-three vessels indicated the need for further rate increases. and a simple average rate adjustment of 119 percent was needed to make at least half of them realize a 12 percent return.

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[9]For example, vessel L0038, plying a primary route, reflected a return on investment of 528 percent and a revenue deficiency of -46 percent; vessel AS050, also plying a primary route, indicated a return on investment of 596 percent and a revenue deficiency of -36 percent.

[10]For example, vessel L0030, serving a primary route, showed a revenue deficiency of 1,506 percent while realizing a -117 percent return on investment; vessel E0007, serving a secondary route, reflected a revenue deficiency of 254 percent while realizing a -443 percent return on floating assets.

- Eighty-one vessels indicated rates of return >12 percent. A rate reduction of 27 percent could enable at least half of them to realize a 12 percent return.
- Seventeen vessels with an average trip length of ≤100 mi posted a required rate adjustment of 43 percent.
- Twenty-two vessels with an average trip length ranging from 101 to 300 mi required a rate adjustment of 28 percent.
- Eighty-four vessels with an average trip length >300 mi indicated a need for a higher rate adjustment of 49.6 percent.

The foregoing discussion in no way suggests that the simple average "required rate adjustment" be adopted. The SRRS team merely wishes to point out that the "consolidated revenue deficiency" method may leave a good number of vessels with low revenue or expenses (perhaps more than half of the sample vessels) with inadequate potential returns despite the rate adjustment; however, these vessels could still be provided some relief through the adoption of a fork tariff and through incremental revenues from unregulated commodities and passenger classes.

Post-April 1991 Tariff Levels Based on Revenue Deficiency Method

The formulas discussed in the preceding chapter could be used in establishing the relative rates for freight and passage. For ready reference, the formulas are as follows:

$$\textit{Cargo Share in DOC} = \left(DOC - \frac{\partial DOC}{\partial PAX} \cdot PAXCAP\right) \cdot \frac{DWT}{DWT + \frac{\partial DWT}{\partial PAX} \cdot PAXCAP}$$

$$\textit{Passenger Share in DOC} = \left(DOC - \frac{\partial DOC}{\partial PAX} \cdot PAXCAP\right) \cdot \left(\frac{PAXCAP \cdot \frac{\partial DWT}{\partial PAX}}{DWT + \frac{\partial DWT}{\partial PAX} \cdot PAXCAP}\right) + \frac{\partial DOC}{\partial PAX} \cdot PAXCAP$$

where

DOC = Daily operating cost,

$PAXCAP$ = Passenger capacity,

DWT = Deadweight capacity,

$\frac{\partial DWT}{\partial PAX}$ = ΔDWT relative to $\Delta PAXCAP$ or = 1.99 (based on Table 4-17), and

$\frac{\partial DOC}{\partial PAX}$ = ΔDOC relative to $\Delta PAXCAP$ or = 32.89 (based on Table 4-18).

The sample vessels registered an aggregate deadweight capacity of 337,044 tons and passenger capacity of 59,742. Applying the above formulas, the respective share of cargo and passengers to cover daily operating cost (in this case, DOC of the fleet) is as follows:

$$\textit{Cargo Share in DOC} = (DOC - 32.89 * 59{,}742) * \frac{337{,}004}{337{,}044 + 1.99 * 59{,}742}$$

or $= (DOC - 1{,}964{,}914) * 0.74$

$$\textit{Passenger Share in DOC} = (DOC - 1{,}964{,}914) * (1 - 0.74) + 1{,}964{,}914$$

or $= (0.26 * DOC - 510{,}878) + 1{,}964{,}914$

The *DOC* of the fleet was estimated at ₱17.4 million on the basis of the total expenses plus allowable return (see Table 5-1) and the average of 320 commission days per year.

Thus, the cargo share of DOC is ₱11.4 million and the passenger share is ₱6.0 million. This suggests that freight revenue should be about 66 percent of total required revenue; passengers account for the balance.

Based on the required revenue calculation in Table 5-1, the required freight and passenger revenues were computed and compared with their respective revenues that were realizable after MARINA Memorandum Circular 59 became effective, as follows:

	Required Revenue	*Estimated Revenue*	*Required Rate Adjustment (percent)*
Freight	3,675,656	3,807,679	-3.5
Passage	1,893,520	1,862,128	1.7

Previous rate increases for freight and passage were granted rather arbitrarily and to some extent were influenced by what ship operators petitioned versus what opponents (ship users) during the public hearings were willing to accept. The procedure described in this chapter provides an objective approach to determining how freight and passage rates could be adjusted in the future when the government opts to continue applying the "revenue deficiency" method.

The above procedure could be improved further to account for traffic elasticities, incremental revenues derived from unregulated commodities and passenger classes, and so on. The SRRS team lacked the materials, time, and data to develop more sophisticated models for rate adjustment. For the time being, therefore, the rate adjustments shown in the preceding in-text table were converted to an alternative 1991 tariff, shown in Table 5-2, maintaining the relative magnitudes of fixed and distance-related components of rates for varying distance ranges.

Table 5-2. Alternative 1991 Tariff Based on the Revenue Deficiency Method

A. PASSAGE RATES (₱ per Passenger)

Distance in n.miles	First Class	Second Class	Third Class
0 - 100	<-Unregulated-->		1.14
101 - 300	<-Unregulated-->		1.04
301 and above	<-Unregulated-->		0.95

B. FREIGHT RATES (₱ per revenue ton)

Distance in n. miles	Class A Fixed + Dist.Related	Class B Fixed + Dist.Related
0 - 100	104.36 + .789*dist.	83.53 + .631*dist.
101 - 300	85.96 + .736*dist.	68.77 + .589*dist.
301 and above	60.41 + .611*dist.	54.02 + .546*dist.

Distance in n. miles	Class C Fixed + Dist.Related	Class C Basic Fixed + Dist.Related
0 - 100	67.85 + .514*dist.	60.31 + .456*dist.
101 - 300	55.89 + .479*dist.	44.43 + .426*dist.
301 and above	43.92 + .445*dist.	39.04 + .395*dist.

The tariff shown in Table 5-2 presents some disparities. For example, user charges for some distance ranges fail to increase in relation to distance. In the case of passage rates, passengers will pay less when traveling on a route length between 101 and 108 mi (e.g., Butuan-Tagbilaran or Ormoc-Surigao) compared with a route with a length of 100 mi (e.g., Ormoc-Sogod or Baybay-Cabalian). Likewise, a passenger traveling between 301 and 328 mi (e.g., Davao-Surigao or Cagayan-Sipalay), will pay less than when traveling a distance of about 300 mi (e.g., Cagayan-Dumaguete). In the case of freight rates, the same disparities as in passage rates are observed in route legs like Estancia-Manila (288 mi) where Class A cargoes will be charged ₱266.37 per ton while the same cargo transported between the longer route like Bacolod-Manila (336 mi) will pay only ₱265.71/ton.

Because of the shortcomings of the "revenue deficiency" method, coupled with across-the-board rate adjustments, the SRRS team considered a cost-based approach as an alternative in establishing the 1991 tariff.

In its efforts to fine-tune the 1991 tariff, the SRRS team grouped vessel samples by their respective average trip distance classification and performed the analysis in Table 5-2 for each distance range. The results of the trial calculation, shown in Table 5-3, appeared to suggest that the rate adjustment required by each distance range in the prevailing tariff varies from -6.5 to 9.6 percent, and the extent of adjustment for freight and passage varies even more widely. However, the process of eliminating dubious observations led to working with relatively few vessel samples; therefore, the results could not be used to suggest an alternative tariff level. The transition from one distance range to another reflects greater rate disparities. If the rate adjustments indicated in Table 5-3 were to be adopted, the tariff would therefore not be practicable. This exercise, however, indicates the possibility that the sample vessels have bias as a result of operational anomalies.

Table 5-3. Trial Calculation of Rate Adjustment for Freight and Passage by Distance Range

	Mi		
	0<Dist≤100	101<Dist≤300	Dist>300
General increase (percent)	1.0	9.6	-6.5
Freight (percent)	-65	-43	-10
Passage (percent)	24	60	8
Number of vessel samples considered	11	21	44

Applying a Cost-Based Method for Tariff Setting

Concepts of a Cost-Based Tariff

A principle basic to cost-based tariffs is the application of commodity rates and passenger rates that approximate the mean cost of providing the service to each type of commodity or passenger. The realities of the liner trade, however, often make it difficult, if not almost impossible, to adhere to this principle. Services need to be provided on a regular schedule, and user charges should be provided at a fairly stable level. Freight and passenger rate cross-subsidization

among commodity groups and passenger classes is an everyday occurrence in the liner trades.

Typical examples of cross-subsidization are found when the franchised route of a liner vessel has significant imbalances in trade, such as a high load factor for an outgoing voyage and a low load factor for the return voyage. In such cases, the resulting transport cost per ton of commodity with a high load factor will be much less than that with a lower load factor. Nevertheless, it is possible that a similar commodity may be flowing in both directions, for example, bagged yellow corn in one direction and bagged white corn or soya meal in the other. It therefore proves impracticable to allocate the voyage costs to each commodity for purposes of setting rates based simply on weight or volume. The result would run counter to the liner concept of providing published, and thus fairly stable, rates.

Furthermore, shipping costs vary significantly according to factors such as methods and quality of packaging, seasonal variations in traffic, trip length, and ship characteristics. These factors help determine the cost of providing the service. It is therefore a misconception that each commodity can be charged a fixed freight rate that corresponds exactly to the cost of transporting that commodity, plus a modest profit. Exact correspondence could occur only when a full shipload of homogeneous bulk or neobulk cargo is transported on a contract basis (such as in the case of tramp vessels). Even then, the correspondence between unit cost and rate may still not be in effect when freight market conditions are too unsteady. This again illustrates that even if the objective is to charge ship users cost-based rates, the transport demand function still has to be recognized as a derived demand, and rates will be established by some arbitrary procedure to closely approximate costs. It must still be kept in mind the limits that commodity shippers can reasonably bear.

In the case of the interisland fleet of liner vessels, which in Chapter 4 were shown to widely vary in cost, the cost-based tariff adopted by the SRRS must be based on "averages." These averages, from which base rates can be determined, apply to average cost for

- A wide range of ship types and sizes;
- A set of routes and route legs of varying lengths;
- A period of operation corresponding to the schedule of financial reports, that is, annual average costs;
- Carriage of a mix of commodities, instead of an average cost for carriage of specific commodities that the SRRS deems impracticable, given the available data and time; and
- An average cost of varying scales of operation.

An analysis of the extent to which the mix of commodities under Classes A, B, C, C (Basic), and so forth can reasonably bear rates lies beyond the scope of this report. The SRRS team, therefore, applied the "cost-base" principle by deriving a composite base rate (which, in effect, is the revenue-weighted average of the base rate of all rate-regulated commodity groups and the effective rate of deregulated commodities). This rate should approximate the mean cost of providing the service.

Tariff Based on Actual Costs

In Chapter 4, the operating and running costs of each vessel were apportioned to cargoes and passengers with the aid of a program named MAINANA2.PRG. The results of these computations were further processed to derive the fixed and distance-related components of the composite freight and passenger rates, which are based on actual costs. For this purpose, the SRRS team developed a program called COSTANA2.PRG, for which instruction codes are provided in Appendix H. COSTANA2 computed for the fixed component of the composite cargo rate by dividing the cargo share in total running cost by the total number of tons of cargo served. The fixed component of the composite passenger rate was likewise derived by dividing the passenger share of total running cost by the total number of passengers served. Conversely, the distance-related component was estimated by dividing the respective shares of cargo and passenger in the total voyage expenses by the total number of ton-miles and passenger-miles served. Vessel samples in the database file MAINANA2.DBF were sorted according to average trip length classification and later purged of samples with insufficient data. The remaining data were processed with COSTANA2, and the results were further scrutinized to eliminate atypical samples, using "meta-analysis" techniques.[11] A second and final run of COSTANA2 generated the results shown in Table 5-4.

The composite rates shown in Table 5-4 show the fixed and distance-related components of the cost function that enables the respective vessel groups to realize a 12 percent return on investment. Also presented in the table is an analysis of the composition of traffic, in terms of percentage difference between the cost of estimated average freight or passage and the cost of Class A cargoes or Third Class passengers. The percentage differences were then used to convert the cost functions into the 1991 Class A tariff, as presented in Table 5-5.

A comparison of the rates provided by the tariff in Table 5-5 and the prevailing rates approved by MARINA is presented in Table 5-5 and graphically in Figure 5-1. The overall result of this method, in terms of ₱/ton or ₱/passenger, on the interisland vessels included as samples as a whole may be comparable to that of the revenue deficiency method described in the in-text table earlier in this chapter. However, the method used in Table 5-5 is valid only if no vessels are excluded from the analysis, that is, vessel financials show no anomalies. The

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[11]Gene Glass, University of Arizona.

Table 5-4. Required Composite Freight and Passage Rates Based on Actual Costs

A. REQUIRED COMPOSITE FREIGHT RATES

Distance in n.miles		Composite Rate Compont Fixed	Dist.Relatd	Ave. Trip Dist	Group Ave. Freight	Existing Class A Tariff
> 0-100	AVE	136.92	0.540	58.2	₱156.28	₱155.73
	MAX	515.24	0.877			
	MIN	28.57	0.029	Thus, composite rate = Class A		
101-300	AVE	158.77	0.350	179.1	264.60	₱225.71
	MAX	786.03	0.417			
	MIN	69.04	0.084	Thus, composite rate = 117% Class A		
>300	AVE	279.98	0.240	499.2	420.51	₱423.54
	MAX	1561.36	1.417			
	MIN	97.31	0.076	Thus, composite rate = 99% Class A		

B. REQUIRED COMPOSITE PASSENGER RATES

					Group Ave. Fare	
>0-100	AVE	67.35	0.530	43	₱64.99	₱48.08
	MAX	107.60	0.960			
	MIN	37.47	0.320	Thus, composite rate = 135% 3rd Cl.		
101-300	AVE	153.29	0.540	153.9	172.48	158.12
	MAX	480.19	0.738			
	MIN	84.10	0.314	Thus, composite rate = 109% 3rd Cl.		
>300	AVE	299.37	0.540	367.4	390.16	344.18
	MAX	1421.05	1.823			
	MIN	131.47	0.242	Thus, composite rate = 113% 3rd Cl.		

method in Table 5-5 presents an advantage over the revenue deficiency method in that the relative quantum of fixed and distance components of the tariff is derived.

Tariff Based on Design Parameters Set by Policy

If the present rate levels are to be adjusted in accordance with a policy to cover average costs plus reasonable return on capital based on a design load factor and design utilization rate, the base rates for each distance range will be expected to change. The current database does not provide adequate and reliable information on cargo and passenger load factors; therefore, the SRRS team has presented no rate formulas based on design parameters.

The scant information available, however, appears to indicate that liner rates could be further reduced if the design parameters were set at a 60 percent

Table 5-5. Alternative 1991 Tariff with Calibrated Fixed and Distance-Related Components Based on Actual Costs

A. PASSAGE RATES (₱ per Passenger)

Distance in n.miles	First Class	Second Class	Third Class Passengers
0 - 100	<-Unregulated-->		₱ 36.19 + .71*dist.
101 - 300	<-Unregulated-->		140.63 + .50*dist.
301 and above	<-Unregulated-->		264.93 + .48*dist.

B. FREIGHT RATES (₱ per revenue ton)

Distance in n. miles	Class A Fixed + Dist.Related	Class B Fixed + Dist.Related
0 - 100	136.92 + .540*dist.	109.54 + .432*dist.
101 - 300	160.72 + .417*dist.	128.58 + .334*dist.
301 & above	218.18 + .356*dist.	174.54 + .285*dist.

Distance in n. miles	Class C Fixed + Dist.Related	Class C Basic Fixed + Dist.Related
0 - 100	89.00 + .351*dist.	82.15 + .324*dist.
101 - 300	104.47 + .271*dist.	96.43 + .250*dist.
301 and above	141.82 + .231*dist.	130.80 + .214*dist.

load factor and 320 commissionable days per year. The following table presents the average load factor and average commissionable days for each class of vessel.

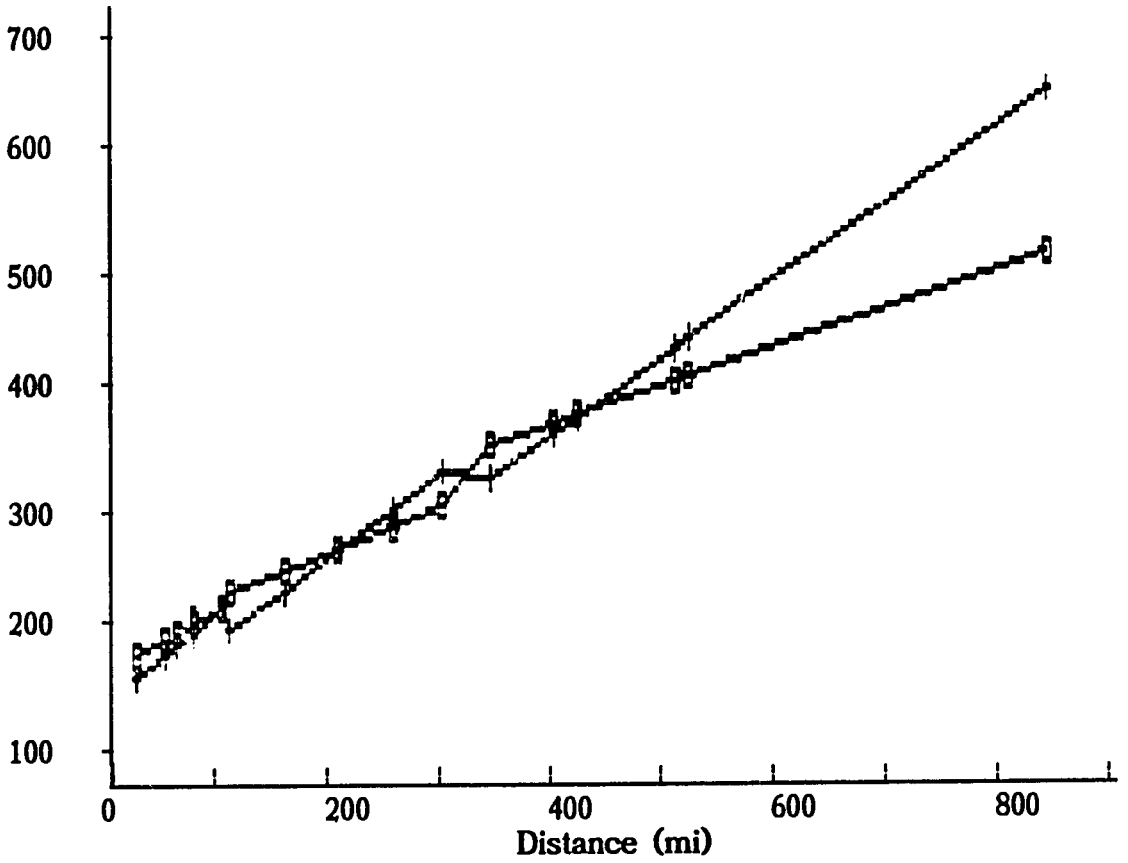
	Percent		
Distance (mi)	*Average Cargo Load Factor*	*Average Passenger Load Factor*	*Average Commissionable Days*
1-100	25	58	285
101-300	52	77	313
301 and over	57	47	304

Assessing the Fork Range of the Tariff

Preliminary Findings on Existing Fork Range

CISO reported that operators generally charge the upper limit of the fork rate (base rate of +5 percent) because the rate adjustment granted by the government in 1990 has allegedly been inadequate. As evident from Chapter 4, this allegation appeared valid before the adjustment in rates under MARINA Memorandum Circular 59. When rate levels are much lower than the mean cost of providing the service, having a narrow fork range to stimulate a healthy competition does not seem practicable.

Figure 5-1. Proposed versus Prevailing Tariff for Cargo Commodity Class A



Alternative Bases for Setting the Fork Range

The SRRS team investigated several possibilities to serve as the basis for the upper and lower limits of the fork. The fork range could be determined according to the extent of the

- Cost variations of vessels within each average trip distance group;
- Cost differences between various ship types and technologies;
- Seasonal variation in traffic;
- Difference in rates of commodity classes and adopting fewer commodity classes.

Selecting the Basis for Setting the Fork Range

As discussed in Chapter 4, daily running and operating costs were noted to vary significantly even within each type of vessel. Thus, simply adopting the variance as a basis for the fork range would be tantamount to having pseudo-regulated shipping rates. In addition, simple adoption of the variance poses greater risks of industry dislocations, especially when great disparities exist between traffic demand and supply of bottoms. In line with PTF recommendations, the SRRS team considers a fork range of ±15 percent of the reference rate adequate to provide the required flexibility to shift from the prevailing rates to the cost-based tariff recommended by SRRS. At the same time, this rate minimizes the likelihood of industry dislocations.

Assuming the upper limit of the fork rate is charged, incremental freight to be paid by shippers of high value goods will still be minimal when compared with their landed cost. Conversely, the SRRS team's cost analysis indicates that several efficient vessels can still attain a return of at least 12 percent even if the lower limit of the fork becomes prevalent.

Phased Implementation of the Cost-Based Tariff

Setting a Limit to Rate Adjustments

As may be observed from Table 5-6, adoption of the rate formulas recommended by the SRRS will result in major shifts in rates on some route legs. Although the wider fork range of ±15 percent of the reference rate provides ship operators flexibility to charge what the market can bear, the combined effects of the shift in rate levels and the increase in fork range could be detrimental on some routes with large disparities in traffic demand and tonnage supply. In this respect, the SRRS team considers it necessary to limit the adjustment of the reference rates to ±10 percent. Hence, the maximum allowable shift in rates would be ±26.5 percent on any route.

Bridging the Gap

Considering that the rate adjustments, at least for the purpose of shifting from the prevailing rates to a cost-based tariff, will be limited, some measures to reduce both carriers' and shippers' costs will be necessary, particularly for route legs that require rate adjustments larger than those allowed by MARINA. Measures to improve port efficiency, vessel operating efficiency, vessel service standards and safety, as discussed in Chapter 8, will help bridge the gap between the required and the prescribed rates.

Table 5-6. Comparative Ship User Charges for Cost-Based Tariff and Prevailing MARINA Memorandum Circular 59 Rates for Selected Route Legs

Origin	Destin	Dist.	Cost-Based Tariff A	Cost-Based Tariff C-Bas	Prevailing Tariff A	Prevailing Tariff C-Bas	Percentage Incr(Decr) A	Percentage Incr(Decr) C-Bas
Iloilo	Pulupandan	25	150.42	90.25	128.5	74.32	17%	21%
Cagayan	Medina	50	163.92	98.35	149.0	86.15	10%	14%
Bacolod	Sipalay	60	169.32	101.50	157.2	90.88	8%	12%
Nasipit	Jagna	75	177.42	106.40	169.4	97.98	5%	9%
Baybay	Cabalian	100	190.92	114.50	189.9	109.80	1%	4%
Ormoc	Surigao	107	205.34	123.10	170.7	98.72	20%	25%
Dumaguete	Iloilo	154	224.94	134.90	206.5	119.40	9%	13%
Iligan	Iloilo	202	244.95	146.90	243.1	140.60	1%	4%
Manila	Culasi	250	264.97	158.90	279.8	161.80	-5%	-2%
Cagayan	Dumaguete	292	282.48	169.40	311.8	180.30	-9%	-6%
Bacolod	Manila	336	337.80	202.70	308.0	178.00	10%	14%
Cebu	Manila	392	357.73	214.60	347.7	201.00	3%	7%
Maasin	Manila	414	365.56	219.30	363.3	210.00	1%	4%
Davao	Dumaguete	500	396.18	237.80	424.2	245.20	-7%	-3%
Manila	Zamboanga	512	400.45	240.30	432.7	250.10	-7%	-4%
Davao	Manila	829	513.30	308.20	657.3	380.00	-22%	-19%

3rd Class Passage

Origin	Destin	Dist.	Cost-Based Tariff	Prevailing Tariff	Percentage Incr(Decr)
Iloilo	Pulupandan	25	54	28	93%
Cagayan	Medina	50	72	56	28%
Bacolod	Sipalay	60	79	67	18%
Nasipit	Jagna	75	90	84	7%
Baybay	Cabalian	100	107	112	-4%
Ormoc	Surigao	107	194	110	76%
Dumaguete	Iloilo	154	217	158	37%
Iligan	Iloilo	202	241	208	16%
Manila	Culasi	250	264	257	3%
Cagayan	Dumaguete	292	285	300	-5%
Bacolod	Manila	336	426	315	35%
Cebu	Manila	392	452	367	23%
Maasin	Manila	414	463	388	19%
Davao	Dumaguete	500	504	468	8%
Manila	Zamboanga	512	510	480	6%
Davao	Manila	829	661	777	-15%

Other Tariff Options

Seasonal Rates

Corollary to the concept of adopting a wider band for the tariff is adoption of seasonal rates. By allowing operators to charge higher rates during peak traffic season, ship users who have some degree of flexibility in adjusting their trip schedule may take advantage of lower rates during off-peak seasons and thereby reduce to some extent the seasonal variations in traffic. In addition, they can reduce the likelihood of either an overcapacity during "lean" months or excessive overloading during peak months.

As an alternative to adopting a tariff system with predefined seasonal rates, the wider fork range of ±15 of the reference rate could be used by operators as the legal flexibility to charge seasonal rates as they wish, provided they are within the fork range.

Loyalty and Volume Discounts

The fork tariff with a range of ±15 percent could also provide operators the flexibility to grant loyalty or volume discounts to valued shippers. Such flexibility will enable liner operators to adjust their charges to a level that in some cases can be competitive with tramp rates, after considering stevedoring and other port expenses.

Surcharges

The wider fork range could also provide individual companies the autonomy to adopt a system of penalties or surcharges, such as for

- Dunnaging or sweeping when cargo packaging is nonstandard,
- Heavy lift,
- Oversized articles, and
- Perishability or propensity to breakage and loss.

Chapter 6

LINER SHIPPING RATES BY ROUTE

Recommendation for Cost-Based Freight Tariff by Route After 1992

The PTF recommended that MARINA establish an indicative freight rate for each route and that freight rates be primarily based on port-to-port cost and consider distance, normal load factor, and direction of traffic.

During the study it became clear that calculation of rates by formulas, a convenient and workable procedure provided that the components are properly weighted, is neither the most satisfactory nor the fairest way to develop a tariff structure. Although the fixed and distance components of the formulas take into account the division of vessel costs, they do not reflect variations in route and port costs. The ultimate solution is a cost-based, route-by-route analysis. Whether the PTF had in mind a cost-based, route-by-route analysis, the SRRS team believes this type of analysis is the best way to achieve PTF's objective.

Shortcomings of Industrywide Rates

As has been well illustrated in Chapters 4 and 5, there are serious problems in identifying, on the basis of average costs, appropriate freight and passage rates for all operators on all routes in the Philippine interisland liner services, particularly when significant imbalances in directional traffic occur.

The problems and shortcomings arise largely because of the wide variety of costs associated with operating vessels that are not comparable in type, size, class, age, speed, fuel consumption and quality, and so on. If all the vessels were identical, the setting of equitable freight and passage rates would be a simple matter. Consequently, determining absolute, appropriate freight and passage rates is not readily attainable by any method. That is one of the reasons why fork rates are desirable.

Voyage Cost Estimate

One of the most used and useful procedures in ship operation worldwide is voyage cost estimation. The purpose of the voyage cost estimate is to determine in advance the profit or loss that the carrier may expect to incur at the end of a given voyage, based on the agreed freight rate and the volume of cargo lifted.

The voyage cost estimate, and subsequent voyage cost analysis (which shows the carrier the errors in his estimate), permits him to monitor every segment of his cost parameters and modify items that can be controlled.

In foreign-going trades, the voyage cost estimate is commonly used in calculating negotiated rates for the carriage of homogeneous bulk cargoes, and it is used also to monitor the profitability of liner, as well as tramp, shipping services.

The basis of the calculation is the daily running cost, consisting of "fixed" cost items, which remain constant whether the ship is at sea or in port. Fixed costs include vessel amortization costs, allowance for periodic classification surveys and repairs, voyage end repairs, engine, deck and stewards stores, victualling, spare part replacement, crew salaries and wages (including benefits), insurance premiums, and overhead.

The annual total of these costs, divided by the anticipated number of commissionable days (320 in interisland liner services), produces the daily running cost.[12]

The product of the daily running cost and the number of days on the voyage, including port days, is the cost of the ship's time for that voyage or route.

To this figure must be added variable costs that are incurred solely as a result of the voyage, including fuel cost, cargo-handling charges and port dues (based on estimated cargo volumes), pilotage, agency fees, and any other charges directly attributable to the voyage.

The total represents the calculated cost of the voyage, which can be checked and corrected as necessary by a subsequent voyage analysis. The procedure is normally applied to a specific vessel for which the operating characteristics and costs are available and is easily carried out routinely by the carrier's operating staff.

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[12]The average daily running costs for several domestic liner vessel types are presented in Chapter 4, Table 4-15.

Application to a Route-by-Route Cost Analysis

In order to arrive at a representative cost per route or per route leg in the interisland service, three methods can be used:

1. Develop a voyage cost estimate for a specific "typical" vessel currently in service, using vessel daily running costs developed on the basis of data provided by the operator and voyage costs calculated on the basis of an assumed load factor for the route or route leg and actual port dues and stevedoring charges.

2. Similar to Method 1, but based on a "designed" vessel with characteristics considered generally suited to the route and basing the amortization of capital cost on current secondhand market prices, and carrying charges on financial terms that are now, or may become, available to the industry.

3. Develop a voyage cost estimate on the basis of the daily running cost, and the voyage cost, determined by averaging the respective costs of all the operators on the route.

Of the first two methods, the second is preferable because it represents a somewhat independent approach but still has the benefit of allowing access to operating data provided by liner operators through their annual reports.

In either case, the vessel chosen should be a reasonably efficient type with some container-carrying and handling capability; that is, it should not be the least efficient breakbulk cargo type, but neither should it be the most efficient roll-on roll-off container and vehicle carrier.

Ideally, costs should be obtained for several ship types to determine the possible range in cost variations. Method 3 includes this feature; even though this method involves simple averaging of a number of different operations, the SRRS team recommends this approach, provided that all necessary data are available.

Nonetheless, it is important to arrive at a single voyage cost that represents a reasonably efficient transport unit. The intention is to arrive at a "norm" for the route.

Timing of the Introduction of Route-by-Route Liner Shipping Rates

All cost-based systems are heavily dependent on the availability of detailed and accurate data, both in the initial setup of the system and in its periodic monitoring.

The SRRS team's recommendation to adopt a route-by-route tariff suggests its implementation after 1992. In the meantime, it is anticipated that the data

reporting and processing system will have improved to the extent that many more operators are submitting annual reports that incorporate true financial, operating, and traffic information and that analysis, storage, and retrieval of the data are fast and efficient.

Enhancement of Prospects for Negotiated Rates and Liberalization

The transition from a route cost to a route tariff will include addition of a stipulated percentage return on investment based on a directional load factor, as well as the average cargo mix for route and direction.

According to the SRRS's recommendations, by 1992-1993 commodity Classes A and B will be combined to Class AB, with a ±20 percent fork tariff, and the Class C rates will be 80 percent of the Class AB rates. Class C (Basic) will disappear in 1991. By 1993, commodity classification for containerized cargo will be abolished, and the f.a.k. rate for containers will be widened by route, taking into consideration directional imbalances unique to the routes, to ±20 percent.

By using the commodity rate relationships and the average cargo mix for the route and direction, determining the magnitude of the tariff will be straightforward. Once a cost-based, route-by-route tariff is attained, the tariff could be regarded as indicative, with a suitable plus or minus fork range, and subject to review by public hearings.

Chapter 7

DEVELOPMENT OF RATE MONITORING SYSTEM AND MECHANICS FOR ADJUSTMENT OF THE FORK TARIFF

Rationale for Monitoring Rates

In the light of the discussions in Volumes III and V in which the interisland liner sector is said to benefit from phased deregulation of freight rates, an effective system of monitoring rates is necessary in order to

- Protect shippers' interests against overcharging;
- Protect ship operators' investments against destructive competition; and
- Assess how rates changed within the allowable fork range, as each measure recommended by the SRRS toward rate deregulation is adopted, so that the government can decide whether to proceed with further deregulation.

Possible Roles of Government in Rate Monitoring

S.G.S. Type of Inspection of Shipments

The inspection system provided by the S.G.S. Company was adopted while domestic shipping was being regulated in Indonesia. The system succeeded in smoothing the flow of cargo, which had ground to a halt because of customs procedures. Such a system, operated either by MARINA personnel or through a company like S.G.S. that is active in the Philippines, could be used to

- Inspect cargoes with a view to checking their nature and value, thus countering the current trend of some shippers to overvalue their cargo, and
- Check documentation to verify rates being charged.

Data Processing of Bills of Lading

An alternative approach to monitoring rates is to process data from bills of lading, either for all shipments or, more practically, through stratified random sampling of ship operators and routes. From the resulting data files, a system like the one described in Volume IV could be developed to generate a list of suspected cases of overcharging or undercutting as well as to monitor rate indices of selected commodities and commodity groups.

Receiving System and Complaint Handling

The previously discussed approach to rate monitoring provides an active role for government; likewise, it is possible for government to maintain a passive role as it currently has because of institutional and budgetary constraints. At present, MARINA relies on complaints from shippers or passengers regarding cases of overcharging or complaints from competitor lines regarding cases of rate undercutting.

Recommended Software for Adjustment of the Fork Tariff

In estimating the 1991 fork tariff, the SRRS team developed a series of software programs that not only provided rate estimates for this report but could also enable MARINA to calibrate the rate base at any time in the future and compute for the extent of rate adjustment in the event that any of the major cost components, such as fuel and salaries, change. Chapters 4 and 5 referred to the specific dBASE programs to be used in each phase of the tariff adjustment procedure; the instruction codes of these programs are provided in the appendixes.

General Process Flow and Basic Features of System

The computer programs provided in the appendixes integrate into the system the following general process flow and features, while applying the same methodology as that generally described in Chapter 4, as follows:

1. Process the data from the new annual report format by creating separate files by section, thereby enabling the use of various computer terminals for simultaneous encoding work.

2. Integrate all the separate files created by various computer stand-alone units or local-area network (LAN) stations into a main database.

3. Generate statistical profiles of deadweight, passenger capacity, and age of the interisland fleet, contained in the main database.

4. Define rate policy variables such as the allowable rate of return, and specify either the design load factors or actual load factors to be used in cost per unit-mile calculations.

5. Audit the operations and financial data to indicate which reports may be doubtful and assign reasonable assumptions when some data are missing;

6. Generate a hard copy or disk file of cost analysis by vessel.

7. Eliminate anomalous vessel records from the database, either manually or automatically on the basis of statistical tests, before estimating new fork tariffs.

8. Allocate daily operating and daily running costs to the respective types of service provided by each vessel, that is, cargo or passenger service, or both.

9. Estimate a fixed and distance-related component for a composite rate covering all commodity groups, similar to f.a.k.

10. Determine the relative magnitude of the weighted mean rate relative to a reference rate, that is, Class A, given the cargo and passenger traffic mix.

11. Compute the tariff for each commodity group on the basis that the prevailing extent of cross-subsidization among commodity groups and passenger classes is maintained.

Cost Monitoring and Tariff Adjustment Cycle

The systems developed by the SRRS team provide MARINA the ease to compute for separate adjustments for the fixed and distance-related components of the tariff. This systematic procedure is designed so that even low-level personnel can maintain the required database and run the program for

- **Periodic adjustments**, which could be undertaken at prescribed intervals to recalibrate the base rates and fork ranges of the tariff, review the classification of commodities, and assess the need for any further restructuring or deregulation; and

- **Occasional adjustments**, which could be undertaken whenever the cost of providing the service changes as a result of inflation, currency devaluation, increase in cost of major items such as fuel and salaries, or changes in operational efficiency of vessels, brought about by external factors.

Chapter 8

EXTERNAL FACTORS AFFECTING THE COST OF LINER SHIPPING OPERATIONS

This chapter provides a description of and commentary on some current operating aspects that affect cost levels and therefore influence freight and passage tariffs.

Many of these factors are responsible for delays in the turnaround of ships in port. When multiplied by the number of ships and their daily running costs, these delays can amount to millions of pesos every year in unproductive cost.

The components of the daily running cost were listed in Chapter 4 and consist of those fixed cost items, that is, items that remain constant whether the ship is at sea or in port. The annual total of these costs, divided by the anticipated number of commission days (320 in interisland liner services), produces the daily running cost.

Estimating Cost of Delays by Average Daily Running Costs

Table 4-15 (Chapter 4) shows a computation of average daily running cost of domestic liner vessels by vessel type, deadweight, and average trip length.

Among the vessel types, the one with the most data, and the most consistent data, is Type 3, the pure container vessel. For this vessel type, it is therefore simple to deduce the range of daily running costs by deadweight classification. All the other types are less well provided with data of sufficient quantity or consistency, or both. However, it is possible to derive average order-of-magnitude daily cost for all types except Type 2, the RORO vessel, for which no cost figures are available. For Type 5, the passenger-breakbulk vessel, enough data are available, but they are confined to the deadweight range below 2,000 tons.

The derived cost indications for the seven vessel types are presented in Table 8-1. The averages in Table 8-1 do not distinguish average trip lengths. Following is a comparison of the data presented in Table 4-15, which were used in preparing Table 8-1, for each type of vessel.

Table 8-1. Average Daily Running Costs, by Vessel Type (₱ thousand)

Deadweight (tons)	Pure Breakbulk	Cargo-RORO	Pure Container	Pure Passenger	Passenger Breakbulk	Passenger-RORO	Passenger-Container
250	—	—	—	70	—	—	
500	—	—	—	90	5	60	60
1,000	15	—	30	—	10	115	115
1,500	—	—	—	—	15	—	
2,000	25	—	50	—	20	230	170
3,000	40	—	70	—	—	230	210
4,000	50	—	90	—	—	220	250
5,000	65	—	110	—	—	200	290
6,000	—	—	135	—	—	—	
7,000	—	—	160	—	—	—	
8,000	—	—	180	—	—	—	
9,000	—	—	200	—	—	—	
10,000	—	—	225	—	—	—	

Note: Dashes indicate not applicable.

- **Type 1 (pure breakbulk).** The four figures listed for Type 1 in Table 4-15 have an average trip length (ATL) >300 mi.

- **Type 3 (pure container).** Forty-nine vessels listed in Table 4-3 are Type 3. Of the total 271 vessels, only 122 vessels had adequate financial, operations, and traffic data. There was no indication, however, of how many of the 122 are Type 3, nor of the average deadweight of the pure container ships.

  An examination of the results of the analysis in Table 4-15 shows that all but one of the nine Type 3 vessel costs have an ATL >300 mi; those vessels are thus directly comparable with each other.

  The figures in the table provide the basis for the derived, order-of-magnitude, daily running costs for the pure container ship, Type 3.

- **Type 4 (pure passenger).** As shown in Table 4-15, only two cost figures are available, both with an ATL of 0 to 100 mi, one in the 250 to 500 deadweight range, the other in the 500 to 750 deadweight range.

- **Type 5 (passenger-breakbulk).** Costs for the eight Type 5 vessels shown in Table 4-15 are almost evenly divided over the range of average trip lengths. There is still a fair degree of consistency.

  As indicated above, however, the deadweight range covers only deadweights below 2,000, which may or may not reflect the size range for this type of vessel.

- **Type 6 (combined passenger-RORO).** Of the nine cost figures indicated in Table 4-15 for Type 6, one vessel has an ATL of 0 to 100

mi, three have an ATL of 100 to 300 mi, and five have an ATL >300 mi. There is a degree of consistency up to the 2,000- to 3,000-DWT level; thereafter, daily cost appears to show a decline.

Type 7 (combined passenger-container). Table 4-15 shows three cost indicators with an ATL of 100 to 300 mi and four with an ATL >300 mi. There is a good degree of agreement between the figures, but the rate of increase drops after the 1,500- to 2,000-DWT range.

Based on the averages listed in Table 8-1, if the deadweight of a pure container vessel is, say, 5,000 tons, the average daily running cost may be assumed to be ₱110,000.

On this basis, if the number of days of avoidable delays for the whole container fleet in a given year amounts to, say, 1,000, the savings would be ₱110 million.

Port Efficiency

The PTSR and the SRRS teams identified a number of problems facing the interisland shipping industry. Several problems related to ports are discussed in this section; others related to vessel operation are described later in this chapter.

The port problems listed below were selected roughly in order of descending importance.

- Unsatisfactory and insufficient cargo-handling equipment.
- Inadequate port land and storage areas, resulting in inefficient port operations and unsatisfactory connections with road transport (both trucking and passenger vehicle service).
- Operational practices.
- Berth occupancy.
- Poor condition of port facilities.
- Lack of incentive among stevedores and arrastre firms to increase the efficiency of their operations.
- High or unnecessary port and cargo-handling charges.
- Excessive time requirements for, and difficulties of, completing clearance documentation.
- Unsuitable facilities for RORO operations.
- Compulsory pilotage.

Unsatisfactory and Insufficient Cargo-Handling Equipment

The causes of several problems that have hindered the development of the domestic shipping industry are in part a result of the history, and, more specifically, the geography, of the Philippine port system. Before adequate road systems and motorized road transport services were developed, there was a need to have many ports, few of which required extensive landside areas.

A large number of these ports continue to serve many small hinterland areas. Consequently, the ports have relatively low cargo throughputs, for which it would be difficult to justify the provision of cargo-handling equipment. The use of such equipment would reduce not only the turnaround time of a vessel but also the manual labor requirement. The result is high cargo-handling costs and high shipping costs.

The traditional remedy, which the SRRS team recommends in order to reduce the cost of interisland shipping, is to withdraw service from many of these small ports and provide liner services only to strategically located ports that are well connected to other areas by safe and secure road transport systems.

Some of the private ports no longer served directly may wish to function as feeder ports,[13] through the employment of small coastal vessels in competition with road services. This arrangement should not be discouraged, because a significant number of these minor ports will continue to be required to serve the needs of short-distance ferry services.

The strategic liner service ports remaining after this streamlining should be provided with facilities to service roll-on roll-off and drive-on drive off (DODO) traffic, in order to encourage the development of this type of interisland transport for containers and vehicles, despite the existence of lift-on lift-off (LOLO) facilities.

Purely interisland ports are not equipped with shore gear (except for bulk cargo ports), and all general cargo, whether breakbulk or containerized, is loaded and discharged using ships' gear or manual labor, sometimes aided by mobile road cranes. The exceptions are ports like Batangas and Calapan, which are RORO ports.

Inadequate Port Land and Storage Areas

As indicated earlier, few of the large number of ports that became established in the islands over the years required extensive landside areas.

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[13]"Feeder port" is used here as defined in the PTSR, that is, a minor port feeding to liner cargo or international ports.

Consequently, today, especially in the port of Manila, there is a lack of working area at the piers and restricted storage and stacking areas inside and outside the port.

Similar problems exist elsewhere, except at ports that were designed and built to specifications financed by, for example, the World Bank or the Asian Development Bank (ADB), at which working and storage space has been provided. Most other ports are reported to suffer from restriction due to appropriation or purchase of adjacent land areas.

Even at an isolated port sited at the end of a road serving a hinterland, the roadsides and the area around the port itself are occupied by various kinds of businesses, bars, entertainment centers, squatters' dwellings, and so on. Squatters are a very real social and economic problem because they have nowhere else to go and are naturally drawn to areas of social and commercial activities.

Squatter settlements can be and are being taken care of by suitable resettlement and aid to homeless people—witness the clearing of settlements along Roxas Boulevard in Manila—even though it may take a long time to provide for all those in need.

Speculative purchase of land surrounding ports should be discouraged as a matter of policy by whichever authority has jurisdiction, whether the port be private or public, as part of area planning schemes. This is, no doubt, even more difficult to control than the squatters, given the political aspects.

At ports at which land has been appropriated and put to poor use and at which the land is now needed to improve the efficiency of the port, the interests of the port should prevail.

Operational Practices

The problem of ports with limited landside areas is exacerbated by some of the operational practices that have developed, particularly at the domestic piers in the North Harbor. The system currently used involves dedicated berths, whereby certain berths have been assigned to specific ship operators, who in turn have installed their appointed arrastre or stevedore companies in situ. The port, therefore, operates like a collection of small ports, with the piers being used for the storage of cargo. This makes it impractical for other ship operators to use the berths, even when no vessel is alongside.

When the piers were built and the PPA had no funds to operate them, the piers were leased out to individual operators, who built their own storage buildings and provided their own cargo gear. The lease was contracted for 25 years, of which 6 remain. There is no clear incentive for these owners to change the arrangement. In the North Harbor, the 25-year contract is between the PPA and the ship operators who constructed storage buildings on the piers. There is no plan to change the "allocation" of the piers when the 25 years is up.

Regular callers established themselves on certain piers, which traditionally they are their piers. Theoretically, others can use berths when they are vacant, but if the regular caller arrives, the others must leave. There are unallocated berths in the harbor, mainly at Pier 18, where trampers and other vessels can dock by notifying the arrastre office of their estimated time of arrival, 24 hours ahead of time.[14]

One of the problems, therefore, facing the domestic shipping industry is the slow turnaround of ships in port, particularly in Manila, which handles a third of the interisland cargo (10 million metric tons [MT] annually), with a corresponding effect on vessel schedules.

With the assigned system in Manila, there are berths that are idle at the same time that ships are waiting to dock alongside. There should be a way to solve this problem (through discussion and cooperation) to make the most efficient use of the existing berths.

Finding an arrangement would increase the number of ship calls and reduce the number of ships, as well as contribute to the solution of a number of problems, including overloading of passenger vessels and manning, to name a few.

Setting aside the concept of a new, relocated domestic terminal, which does not appear to be popular and would certainly be a costly enterprise, the most practical solution might be complete reorganization of the North Harbor.

Such a reorganization should be based on division of the harbor area into three sectors, serving passengers, container cargoes, and breakbulk cargoes, respectively. The areas should be leased out by the PPA through competitive bidding and operated privately on behalf of all ship operators, in much the same fashion as the Manila International Container Terminal (MICT) is operated. The port could remain under the management of the PPA/PPC but operated on the same principle as the MICT, that is, by a consortium on the basis of a long-term lease.

It is unnecessary to envision vast sums of money being spent on a rearrangement plan, although clearly some financing would be required, with a reasonable to good expectation of early payback. The current rehabilitation of the North Harbor, to be completed in 1994, appears to be a move in the right direction. The forthcoming period of repair and reconstruction in the harbor could offer a unique opportunity to revise the operational setup. Goals could be based on modest expenditure for a more efficient facility, with emphasis on RORO movements to speed up passenger and cargo transit.

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[14]The consultant observed that Pier 18 appears to be one of the better-organized areas in the North Harbor.

Ideally, all the "permanent" occupancies of the North Harbor should be terminated as soon as can be arranged. The shipping company offices on the piers should be removed and the sheds removed or used exclusively to handle cargo in transit, not for extended storage periods. Stacking and storage space should be arranged in a common user container yard outside of the port area. Container storage along Marcos Road and R10 should be prohibited. In addition, the squatters in the port, whose right to live where they wish is strongly defended at present by the representative for human rights, should be relocated.

The area known as Slip Zero, next to Pier 2, is to be developed for container stacking and, depending on the extent of the area that can be freed up by relocation of the large number of squatter families living there, should improve the currently chaotic storage of containers. The area immediately adjacent to and north of Pier 16 will be developed as a common-user container berth and handling area. This development also should bring relief from congestion in the port, if properly managed.

Berth Occupancy

Under an efficient operation, a vessel should be discharged and the incoming cargo removed to transit sheds or from the pier to storage outside the port working area or to onward road transport, in one continuous process.

Outgoing cargo should be loaded into the ship from the transit sheds on the pier or directly from delivery by road transport. The key to this operation is that the holding areas or sheds in the port are used for cargo in transit and not for cargo storage. With an efficiently run operation, when a vessel sails, another can come alongside and begin operations on the next shift. Consequently, the port can work effectively, if necessary, at a relatively high berth occupancy ratio, say, 85 percent when working around the clock. Ship waiting time and time alongside are reduced to a minimum.

With an assigned berth system, as in the North Harbor, the berths are not being used efficiently and ships are waiting to dock while empty berths lie idle. Only a detailed analysis of the port operations over a given period of time will provide an accurate picture of the cost in vessel time of the inefficiencies mentioned. Such an analysis will involve examination of berth occupancy records and the waiting time of ships contemporaneously in harbor, including the cumulative effects of vessels queueing. However, an idea of the potential gains that might be associated with an improved North Harbor can be approximated.

On the basis of average figures developed from the PPA Annual Report, the North Harbor may be performing as well as possible under the circumstances but could be developed to improve its performance. Figure 8-1 presents some statistics from 1989 for ships at berth.

Figure 8-1. Statistics on North Harbor

Number of ship calls		5,480
Total waiting time (at anchorage awaiting berth) (hr)		2,066
Total service time (between arrival at and departure from berth) (hr)		463,855
Cargo throughput (MT)		10,550,180
Noncontainerized		4,849,655
Inward		3,438,368
Outward		1,411,287
Containerized		5,700,525
Inward		2,733,100
Outward		2,967,425
Number of berths		45
Average service time per berth (463,855/45) (hr)		10,308
Total days per berth in 1989[a]		429.5
Average cargo handled per vessel (10,550,180/5,480) (MT)[b]		1,925[c]
Average service time per vessel (hr)		84.64
Average MT/hr[d]	22.74	

[a]This would appear to correspond to 118 percent berth occupancy, which is incorrect. The explanation for this exaggeration is that berths will sometimes be worked with double occupancy; that is, when vessels are small, one berth will serve two vessels at the same time, in which case the performance at the berth will be enhanced. It is not practicable, therefore, to use berth occupancy as a measure of overall efficiency, except by keeping daily records of length of wharf occupied and the duration for each year. This record keeping should start immediately.
[b]Average vessel deadweight = 1,000 tons.
[c]Total ship calls in and out.
[d]No allowance for simultaneous loading and discharging of the same vessel.

A comparison with reasonable hypothetical performance can be approximated as follows:

Noncontainerized cargo at 14 MT/gang hour with an average of three gangs per ship [4,849,655/(14 x 3)] (hr)	115,468
Containerized cargo at 80 MT/gang hour [5,700,525/(80 x 3)] (hr)	23,752
Total working hours	139,220
20 percent weather delays (hr)	27,844
20 percent waiting for cargo (hr)	27,844
Total time (hr)	194,908

With this scenario, average MT/hr should be closer to 10,550,180/194,908 = 54. This appears to confirm that productivity in the port is capable of improvement and, in fact, cargo handling rates might be doubled.

The desirability of maximum and efficient use of berths is common to all ports; although the North Harbor may be doing its best under existing conditions and practices, it is not operating at its peak.

Building on this discussion, it appears from the preceding figures that improved cargo handling rates could halve the service time. All other things being equal, this would mean a saving in ships' time, for the 5,480 ship calls, of 231,928 hours, or almost 10,000 ship days. On the basis of the data in Table 8-1, an average daily running cost for a ship with a 1,000-ton deadweight could be assumed to be a modest ₱50,000 for each ship. The potential saving in ships' time is at least 50,000 x 10,000 = ₱500 million/year, and could be more, depending on the actual mix of vessel sizes and types.

The route franchise system appears to inhibit faster turnaround of vessels because of the requirements to maintain regular schedules. However, provided that significant improvement in port times could be achieved, the schedule could be modified to suit the new pace and use the time saved in port by increasing the number of ship calls, with a corresponding reduction in freight costs.

Poor Condition of Port Facilities

As mentioned earlier in this chapter, rehabilitation of the North Harbor has begun and is scheduled for completion in 1994. It is desirable that the facilities at all domestic ports, along with the vessels that they serve, be well maintained. This applies particularly to dredging of berths, the condition of fendering, working surfaces, lighting, transit sheds, mooring arrangements, and the like. It applies even more critically to the availability of serviceable and reliable cargo-handling equipment and capable maintenance and repair personnel.

The total port environment needs to be conducive to the efficient handling, storage, and recovery of cargo and processing of passengers. This includes scrupulous "housekeeping" in the port in order to ensure organized access for goods and people.

Lack of Incentive Among Arrastre and Stevedore Firms

Arrastre and stevedore companies were granted certain working areas in the harbors by the PPA in exchange for 10 percent of their gross billings. These areas have become recognized under a type of grandfather clause. The system lacks an element of competition; however, there is, in fact, incentive for stevedore and arrastre companies to increase their handling speed. The income of the stevedore companies depends on the cargo tonnage handled. The cost of their operations is governed by the number of hours for which they have to pay their gangs. Hence, there is an incentive for them to handle the maximum tonnage in the

minimum number of hours, and it is in their interest to have functional equipment available in order to facilitate maximum output.

For conventional vessels functional equipment could mean the lifting gear, usually the ships' derricks or cranes, and for RORO vessels it could mean forklift trucks, or similar horizontal movers, working inside the vessel. Arrastre operators work on the same basis but the availability and reliability of their equipment is even more important because of the greater emphasis on mechanization in handling cargo to and from the ship's side. The new longer term contracts between the PPA and cargo handlers will provide the opportunity and incentive for acquisition of needed equipment.

A logical adjunct to this system is a bonus scheme, financed by the arrastre and stevedore companies, that benefits the individual worker and encourages increased production. The scheme could operate on the basis of a sliding scale of hourly wage, adjustable to the number of tons handled per gang hour, as an average over the shift. Such schemes are common, particularly in tramping operations.

High or Unnecessary Port and Cargo-Handling Charges

The PPA derives income from charges levied on the use of its ports by foreign and domestic shippers; a levy on private ports, for which it may provide some service; and a percentage of the gross revenue of cargo-handling operators.

The PPA is in conflict by having a vested interest in the magnitude of rates awarded to cargo handlers because it is the regulatory body responsible for calculating and proposing port charges and cargo handling charges. PPA recently succeeded in having a 20 percent increase in port and cargo-handling charges put in place in the face of critical comment from port users.

It should be incumbent on the PPA, particularly, to demonstrate that cost levels are not capable of being reduced or at least being maintained at current levels, through more efficient operation by all parties.

Certainly when no services are provided, there should be no charge, for example, when container or RORO operators require no actual participation by cargo handlers and the equipment used is either part of the vessel's gear or owned by the shipping companies and operated by their personnel. It would be more appropriate also for the PPA to charge stevedores a fixed annual sum for the use of their working areas instead of a percentage of their earnings. This effectively involves leasing of the piers to the cargo handlers instead of the ship operators and opening the berths to all operators on a first come, first served basis. With a fixed payment to the PPA, the arrastre and stevedore firms would have a greater incentive to improve their efficiency in cargo handling, because the PPA would have no claim on any additional revenue they earned.

Problems in Completing Clearance Documentation

In 1990, port integrated clearing offices (PICOs) were established in all major ports by Office of the President Memorandum Circular 129 to expedite processing of entrance and departure clearances for domestic vessels and cargoes.

The PICO involved the following agencies:

- Philippine Ports Authority
- Bureau of Customs
- Bureau of Quarantine
- Bureau of Animal Industry
- Forest Management Bureau
- Postal Services Office
- National Telecommunications Commission
- Philippine Coast Guard
- Philippine National Police

One permanent representative and one alternate representative were to be designated from each agency. The PPA representative was to act as officer-in-charge and coordinate day-to-day operations.

Where the PICO system has been established, it is not working well because the representatives of the various clearing agencies are not physically present in the PICOs when required. In June 1991, the collection of entrance and clearance fees from vessels involved in domestic trade nationwide was stopped by Customs Memorandum Circular No. 53-91,[15] in the wake of complaints from Visayan domestic shipowners and operators, among others, who claimed that the collection of the fees had become counterproductive as a result of delays in departures of vessels, as well as the additional costs.

The Cebu-based Visayan Association of Ferryboat and Coastwise Service Operators (VAFCSO) submitted a position paper to the PPA in 1990 questioning the propriety of the Bureau of Customs (BOC) in collecting the fees. The fees were collected on arrival and departure of a vessel after presentation of the following documents: coasting manifest, crew list, master's oath, and passenger manifest. Under Section 602 of the Tariff and Customs Code of the Philippines, the main function of the BOC is to ensure the payment of taxes due the government on the importation or exportation of goods. The PPA now agrees that this power should be exercised only in connection with vessels arriving from or departing for foreign countries.

The other port clearances are nevertheless still required. Very little appears to be said in favor of vessel clearances in a domestic shipping operation. According to reports, many times counts and inspections are carried out improperly or not at all, in return for payment, and the system is open to abuse.

[15]Issued by Bureau of Customs.

At most, one official clearance per sailing would appear to be sufficient, and responsibility for this could be delegated to the PPA representative. The PPA supports this practice but is having difficulty in obtaining the cooperation of other agencies to delegate the authority. Clearance of a vessel is a requirement by law and can be changed only by legislation. With so many individual clearances, some delays could be eliminated by a long-overdue simplification of traditional, and mostly unnecessary, practices.

Unsuitable Facilities for RORO Operations

In general, RORO vessels in the interisland service do not require any special shore facilities; there are no severe changes in tidal conditions. For example, only two shore ramps are available in the port of Manila (one in the South Harbor, formerly used by the Australia National Line, and one in the MICT), but vessels operating there using only their own ramps. Conversely, RORO ramps exist at Cagayan de Oro and Iloilo (the latter requires modification because of a 90° turn that blocks the movement of 40-ft containers).

In the event that true DODO operations are developed in the principal ports (as they should be), it will be necessary, in most cases, to ensure clear access and approaches to the berths only so that vehicles can be loaded and unloaded quickly and smoothly. Waiting areas should be arranged outside the port area.

Compulsory Pilotage

Compulsory pilotage was introduced by a presidential order during the Marcos regime. Pilotage is compulsory at Manila and Cebu. At other ports the master of the ship can function as the pilot, providing he or she has one year of experience in navigating the relevant approaches. Pilots operate through the Harbor Pilots Association (HPA), which is a rather powerful group. As a result, ship operators started their own Shipowners Pilots Association and legally won the right to provide their own pilots. The HPA has responded by securing an injunction against the use of non-HPA pilots.

The usual practice in arranging for the services of a pilot is to request that the pilot be available at the pilot station one hour before the ship is due to arrive or depart—anticipating that the pilot will be late. Knowing this, the pilot will take his time and may arrive an hour after the ship is ready to enter or leave port. Better communication between the pilots and the ship operators about boarding times could eliminate most of the delays. When rehabilitation of the North and South harbors is completed, it is likely that more frequent use of tugboats and pilots may be required when docking and undocking, in order to minimize damage to the refurbished wharves.

Vessel Operating Efficiency and Safety

Problems in vessel operation, as distinct from port-related problems as outlined earlier, were identified for the PTSR and the SRRS by operators of

interisland liner vessels and others, including nonvessel-owning or -operating carriers (NVOOC). Some of problems in vessel operation, which affect costs of operation, are listed in this section, but no attempt has been made to assess them in order of importance.

- Insufficient number of fully qualified ships' officers.
- Difficulty in obtaining, and high cost of financing, replacement vessels.
- Unsafe navigating conditions.
- Difficulty in obtaining spare parts and materials for maintenance of vessels.
- Excessive time requirements for vessel maintenance and repair at Philippine shipyards.
- High cost of fuel and lubricants.
- High cost of insurance.

The following paragraphs provide some individual commentary on these problems, as well as countermeasures that may be appropriate. The impact of some of the problems is already being lessened by remedial action on the part of operators; others are not easily solved and some are indigenous to the industry.

Insufficient Number of Fully Qualified Ships' Officers

Officers are sometimes recruited directly and individually by foreign-going lines, but switching by trained and qualified officers to foreign vessels has recently tapered off, and it is not very difficult to retain competent staff. A policy change now requires Philippine Merchant Marine Academy (PMMA) graduates to serve in the Philippine fleet for 2 years or pay the costs involved in their training and certification as officers. Service can be completed in the domestic or a foreign-going fleet, provided it is on a vessel with Philippine flag. Salaries have been raised in an effort to counteract wastage, although they are still far from matching competition overseas.

Table 4-10 (Chapter 4) presents figures showing progressive increases in officer minimum wages between January 1988 and December 1990. Salaries of Master Engineers and Chief Engineers show a total increase from ₱6,000 to ₱20,000/month (208 percent). Salaries of Third Mates and Fourth Engineers increased from ₱2,800 to ₱5,500/month (96 percent).

Even though many Philippine nationals prefer to work in the Philippines, operators report difficulty, at times, in finding qualified officers, particularly engineers. There is no problem with the supply of ratings, trained under the Standard of Training, Certification, and Watchkeeping (STCW) program.

Replacement Vessels

A solution to the problems of obtaining and high cost of financing replacement vessels is to facilitate the changeover from old, unsafe, and cost-inefficient vessels to newer, more cost-efficient units.

Domestic ship operators prefer to purchase secondhand ships, not only because of price, but because they can acquire a replacement vessel in 3 or 4 months instead of the 12 to 14 months it takes to build a new ship. A spokesman for the Philippine shipbuilding industry confirmed this, and said that Philippines ship operators could build ships more cheaply than their foreign competitors but are at a disadvantage when buyers want to acquire existing ships.

Given the funds to pay the purchase price of replacement vessels and time to explore the secondhand market, there is no real shortage of suitable ships. The problem lies in the financing of replacement tonnage and the availability of foreign currency.

In January 1991 the House Transportation Communication Committee endorsed passage of the Philippine Interisland Shipping Development Act (PISDA). The endorsement came in the wake of reports that despite heavy passenger and cargo traffic, the interisland shipping industry continues to deteriorate because of heavy losses incurred by shipowners and operators who can hardly maintain their ships or acquire new bottoms to modernize their fleets because of lack of government incentives.

The salient provisions of the act are summarized as follows:

- A state policy to encourage the healthy and safe development of the domestic shipping industry.
- Ready availability of foreign exchange to qualified Filipino shipowners and operators importing vessels and spare parts, or both, including cost of importation from their port of origin.
- Approval by MARINA, within 30 days, of all applications for importation of ships, spare parts, containers, and ancillary cargo-handling equipment, subject to proper documentation.
- Exemption of beneficiaries of the act from payment of import duties and taxes and value-added tax for 10 years from the date of approval.

The following conditions apply:

- The age of a vessel shall not be more than 12 years for a passenger ship and 15 years for a cargo ship when it enters Philippine waters.
- Vessels shall be classed by an internationally recognized classification society, and the vessels shall be maintained in class for the duration of their domestic operations.

- MARINA certifies that the imported spare parts are not locally produced in sufficient quantity and acceptable quality.
- An imported vessel may be resold only to another qualified Filipino investor approved by MARINA.

Provided the foregoing conditions are observed, all interisland shipping firms accredited by MARINA will be exempted for the next 10 years from payment of taxes on income derived from operation of imported vessels. Passage of the PISDA can be expected to assist in providing a more attractive arena for investment by domestic shipowners and operators, if it is given final approval. However, with borrowing rates at around 30 percent, even if the required foreign exchange were readily available, it still might not provide sufficient encouragement to stimulate investment.[16]

It is one thing to say that foreign exchange will be made readily available but in the Philippine economy there are many demands on available foreign exchange; ships and spare parts, containers, and ancillary cargo gear will undoubtedly have to compete with other priorities for the available currency. The need exists for a supply of foreign exchange in the region of about US$50 million initially, at a low rate of interest (5 percent), and with an extended payback period (20 years). Depending on the type and size of ship most in need of replacement, this would allow for the acquisition of 5 to 10 good secondhand vessels.

The question of fleet replacement requires a study that not only would include the future domestic transport needs for goods and passengers in the Philippines; the number, types, and costs of ships required, whether new or secondhand; and the domestic shipbuilding capability, but also would investigate financing alternatives and owning versus leasing.

Unsafe Navigating Conditions

The mandate of marine safety is not well defined because it has been shifted from the PCG to MARINA; however, the PCG is still technically and in practice acting as the responsible agency. The PCG is staffed by personnel seconded from the Navy and is not fully equipped to provide the professional inspection services needed. The SRRS recommends completion of the transfer of responsibility to MARINA, along with other institutional and structural changes included in Volume V.

Domestic shipping has had a poor safety record. Loss of life in passenger ship sinkings has been catastrophic and accidents continue to occur frequently and often needlessly. The reasons for the occurrence of such a large number of incidents are as follows:

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[16]Although currently, financing charges may be included in the operating cost of vessels. However, this does not help to reduce passage and freight rates.

- Insufficient number of fully qualified ships' officers and employment of inadequately trained seagoing personnel.
- Improper loading of ships, including exceeding permitted carrying capacity and lack of attention to cargo distribution, affecting intact transverse stability.
- Inadequate maintenance of vessels and equipment, especially in the integrity of the shell plating and the machinery, including navigational equipment such as radar, direction finder, echosounder, gyrocompass, and ship-to-ship and ship-to-shore radio communication.
- Lack of navigation aids (including lack of proper maintenance of existing lighthouses and buoys).
- Outdated nautical surveys and charts and inadequate dredging of ship channels and approaches, including removal or destruction of hazardous wrecks.
- Insufficient attention to traffic separation and shipping lanes.
- Insufficient attention to weather reports.

The measures required to correct each of these shortcomings involve adoption of the recommendations for improved training, maintenance, and institutional organization endorsed by the SRRS team. The SRRS team's recommendations on responsibility for maritime safety are detailed in Volume V. In addition, the Japan International Cooperation Agency (JICA) is developing a Master Plan for maritime safety in Philippine shipping with the objective of reducing maritime accidents.

In the view of the SRRS team, MARINA should be expanded to handle all safety functions related to vessels and their operation. A separate organization should be responsible for maritime safety infrastructure, including surveying and chart preparation, dredging, salvage of wrecks, development and maintenance of navigational aids, operation and maintenance of communications, and development and operation of search and rescue and other emergency services. It is suggested that this maritime safety infrastructure organization be a reconstituted PCG, transferred from the Department of National Defense to a civilian government department, preferably the DOTC because it already has legal responsibility for maritime safety.

Difficulty in Obtaining Spare Parts and Materials for Maintenance of Vessels

Problems in obtaining spare parts and materials to maintain vessels are mainly the result of foreign exchange and import restrictions. Earlier comments on the potential benefits of the PISDA to the domestic shipping industry are equally relevant to the acquisition of spare parts and materials required for maintenance of ships purchased abroad.

Excessive Time Requirements For Vessel Maintenance and Repair in Philippine Shipyards

With the daily running (fixed) costs of interisland vessels ranging from ₱15,000/day for a 1,000-DWT breakbulk vessel to ₱290,000/day for a 5,000-DWT combined passenger-container ship, the cost of delays may, at times, exceed the cost of the repairs. Unnecessary delays in carrying out repairs can be the result of inadequately trained and motivated ship repair personnel, lack of up-to-date methods and equipment, and lack of availability of spare parts for machinery and other mechanical and electrical equipment.

In regard to spare parts, vessel operators can significantly improve their situation by establishing and implementing a system of planned maintenance on board their vessels. Under such a system, each department head is responsible for keeping a schedule for opening up and maintaining operating units and for reordering spare parts and stores as soon as they are used up, in the course of a repair or refit. This includes all engine room equipment such as main and auxiliary machinery, pumps, and coolers; all deck machinery; navigating equipment; and kitchen equipment.

The vessel operators' Chief Superintendent has the final responsibility for seeing that each vessel under his supervision takes its own responsibilities seriously. Delays resulting from neglect of planned maintenance or the replacement of spare parts should be cause for disciplinary action. At the same time, training of ships' officers should stress the vital importance of planned maintenance in minimizing costly breakdowns, repairs, and delays, and the government should require that officers' examinations include testing of their recognition of the importance of this aspect of their training. Regarding the adequacy and motivation of shipyard personnel, much depends upon the quality of the training programs available to them, as well as their opportunities to improve their skills and earning capacity.

The ship repair industry appears to be occupied on a full-time basis, partly because of inefficiency, but also undoubtedly because the industry serves a captive market. Under these circumstances there may be little incentive for improvements in current labor practices, methods of working, and equipment. The current system, whereby ship operators schedule their classification surveys and repairs and reserve a drydock several months in advance, appears to work fairly well, except for the owner who is unfortunate enough to require an emergency drydocking because of underwater damage to a hull, propeller, or rudder.

In view of the long waiting periods that some ship operators must endure before they can dock, especially in an emergency, two courses of action are suggested:

- Encourage other shipbuilding countries in the region to invest in repair facilities in the Philippines, bringing with them their expertise, up-to-date equipment, and some temporary training personnel who could upgrade the knowledge and skills of local ship repair workers.

- Permit domestic vessels with Philippine flag to make a loaded voyage to Hong Kong or Singapore to participate in the classification survey and repair.

Either or both of these measures could help relieve the pressure on existing Philippine ship repair yards and at the same time provide them with an opportunity and incentive to improve their own efficiency by confronting outside competition. At the same time, the local ship repair firms should be given all possible encouragement, with a minimum of bureaucracy, by government legislation on imports of equipment from overseas and by availability of foreign exchange.

Like others, ship repair firms have to compete for available foreign exchange. A degree of priority reflecting the importance of transport, particularly interisland shipping, should be considered and is, in fact, a possibility through the PISDA, which has passed first reading in the House.

High Cost of Fuel and Lubricants

Unfortunately, shipowners and operators can do little about the price of oil, except perhaps ensure through their elected representatives that decreases (or increases) in price are passed on to them as consumers. When prices are artificially raised on a temporary basis, for example through an interruption of supplies by war or natural or other disaster, and can be expected to return to normal, the increase in cost should be applied to the freight rates and passenger fares through a temporary surcharge. Increases in price through inflationary pressures, including devaluation of currency, will be accounted for through the rate adjustment mechanisms.

In the short run, the ship operator has little flexibility in reducing the total bill for fuel and lubricants, except by maintaining his or her vessels' machinery in condition to ensure efficient combustion, using fuel additives as necessary, especially if he or she is using the blended fuel of the least expensive grade the engines can handle. In the long run, the ship operator's recourse is to replace his old ships with newer, more fuel-efficient vessels, fitted with fuel treatment equipment and purifiers that will permit use of a heavier and relatively less expensive grade of fuel.

High Cost of Insurance

The annual insurance premium for hull and machinery may constitute 8 or 9 percent of the operating cost of a vessel when it is old and not in class with a recognized classification society, such as Lloyd's, Norske Veritas, the American Bureau, or Bureau Veritas.

The obvious remedy is to repair and refurbish vessels and to have them surveyed for class. This is being done in some cases, but some older vessels were built to the old Japanese Industrial Standard and could never meet the requirements of a modern classification society without extensive reconstruction.

The only recourse is to replace such vessels with more modern tonnage in sound condition—which can be admitted to and maintained in the register of a recognized classification society—and reap the benefit of reduced insurance charges, along with the other advantages of more up-to-date tonnage, among them a real or relative reduction in fuel consumption and cost.

One result of the current drive to bring all vessels >500 GRT into class will be to improve their standing for underwriters and warrant a reduction in hull and machinery premiums. Vessels that cannot be classed will be phased out of liner service, and the general level of insurance costs, including P. and I., will decrease.

Improvements in Vessel Safety

One of the immediate aims of the maritime industry must be the upgrading of all vessels belonging to the interisland liner fleet to comply with the requirements of the SOLAS convention and to meet structural requirements for classification societies. The cost of equipping and reconditioning existing vessels and replacing obsolescent ships represents an additional burden on the ship operator that must be recovered through saving or an increase in revenue. Although there may be reductions in insurance costs and improvements in efficiency and productivity with newer ships, such reductions and improvements will most probably involve increases in freight and passage rates.

Chapter 9

OBSERVED EFFECTS OF DEREGULATION ON INTERISLAND SHIPPING RATES

Transit Cargoes

The MICT and the domestic liner services derive a considerable portion of their revenue from handling and carrying exports and imports originating at, or are destined for, Philippine ports other than Manila. When rates for export and import cargoes carried on the domestic leg (transshipment or transit cargoes), were deregulated in October 1990, it was logical to assume that the move was designed to permit operators to decrease such rates when necessary to counter direct overseas shipments to and from Philippine ports other than Manila. This is in fact the case.

Table 9-1 presents examples of container rates for transit cargoes from the CISO tariff effective May 20, 1991. The figures shown are only for transit cargoes routed through the North Harbor. "Auxiliary" charges cover such items, where applicable, as arrastre and wharfage (South Harbor and MICT); drayage (Manila); brokerage; and local arrastre and local wharfage (destination or origin).

The current regulated rates (in ₱) for routes to Manila (Table 9-1), calculated by the formulas dictated by Memorandum Circular 59, are as follows:

	Class	
Destination	*A*	*C (Basic)*
Cebu	347.7	201.0
Maasin	363.3	210.0
Davao	657.3	380.0

Applying these rates to a 20-ft (28 m^3) container yields

	Class	
Destination	*A*	*C (Basic)*
Cebu	9,736	5,628
Maasin	10,172	5,880
Davao	18,404	10,640

Table 9-1. Schedule of Thrumove Rates (₱/container)

		20'	40'	R20'	R40'
I.	CEBU				
Domestic Pier Discharge.					
A.	Empty				
	Freight only	2455	4910	4265	8535
	Auxiliary	1420	2060	1420	2060
	Total Thrumove	3875	6970	5685	10595
B.	Laden				
B.1	Export				
	Freight only	4555	9110	7925	15845
	Auxiliary	2900	4800	2900	4800
	Total Thrumove	7455	13910	10825	20645
B.2	Import				
	Freight only	4555	9110	7925	15845
	Auxiliary	4435	6670	4435	6670
	Total Thrumove	8990	15780	12360	22515
II.	VISAYAN PORTS				
A.	Empty				
	Freight only	2800	5600	5335	10550
	Auxiliary	1420	2060	1420	2060
	Total Thrumove	4220	7660	6755	12610
B.	Laden				
B.1	Export				
	Freight only	5205	10405	9905	19595
	Auxiliary	2900	4800	2900	4800
	Total Thrumove	8105	15205	12805	24395
B.2	Import				
	Freight only	5205	10405	9905	19595
	Auxiliary	4435	6670	4435	6670
	Total Thrumove	9640	17075	14340	26265
III.	MINDANAO PORTS				
A.	Empty				
	Freight only	3580	7170	6825	13650
	Auxiliary	1420	2060	1420	2060
	Total Thrumove	5000	9230	8245	15710
B.	Laden				
B.1	Export				
	Freight only	6660	13310	12680	25355
	Auxiliary	2900	4800	2900	4800
	Total Thrumove	9560	18110	15580	30155
B.2	Import				
	Freight only	6660	13310	12680	25355
	Auxiliary	4435	6670	4435	6670
	Total Thrumove	11095	19980	17115	32025

As can be observed, even the Class C (Basic) rate in each case is higher than the thrumove tariff. It is also relevant to note that the reduction in the thrumove tariff may not have the desired effect. However, by shipping directly from Cebu or Davao or other ports and bypassing Manila, thrumove costs can be avoided altogether, with considerable savings to the international shipper or consignee.

Presented in the following table are prevailing advertised rates (in US$ as of June 1, 1991) from Manila to container base ports that are members of the Association of Southeast Asian Nations (ASEAN).

Port	*20 ft*	*40 ft*
Singapore	300	580
Port Kelang	550	900
Penang	550	900
Jakarta	650	1,250
Subaraya	650	1,250

It should be noted that the low rate to Singapore could involve positioning of containers that might otherwise have to be carried empty. In this case, the figure shown is for a one-way rate and may not apply in the opposite direction. It is likely that rates similar to those in this table are, or soon will be, available on direct sailings from other Philippine international ports, such as Cebu, Davao, and General Santos.

Livestock Cargoes

The port of General Santos handles a throughput of 30,000 hogs (10 percent of the hog population) per month, in three-level containers or vans, each carrying 75 to 80 head. Even with deregulated rates, shutouts have been occurring since October 1990 because of lack of containers.

Before deregulation, the rate was ₱6,000/hog van from General Santos to Manila; after deregulation the rate increased to ₱9,000, then to ₱10,000 and to its current ₱14,500, an increase of 142 percent. Mindanao hog farmers are losing their battle to compete with the Manila price of hogs reared in Luzon and requiring only local transport.

Davao shippers report that hog vans are not empty because of the lack of capacity aboard the ship. Davao ships about 2,000 head weekly (about 25 or 26 vans). Even though rates are deregulated and have increased, service is still poor because of a lack of vans and drinking water and delays in delivery. Davao operators confirm that the deregulated rate amounts to ₱12,000 to ₱15,000/van.

The Southern Mindanao Shipowners' Association (SMSA) in Zamboanga claims that before deregulation of livestock, shipping companies charged Class C (Basic) rates. The current regulated basic rate from Zamboanga to Manila is ₱250.1.

With that rate, freight, at 28 m^3/hog van, is ₱7,003. Reports on cattle are similar to those for hogs. Rates have increased from ₱6,000 or ₱7,000/van to ₱14,000/van.

It should be pointed out that an increase in rates was to be expected after deregulation. The Class C (Basic) rate was too low for the carriage of live animals. The higher rates that have been charged since deregulation of livestock should have been accompanied by the provision of an adequate number of vans to handle the traffic. However, with the current rate levels, the future of the transport of livestock on the hoof is uncertain, and investment in handling equipment at this point may be ill-advised. A proposed 1992 study recommended by the SRRS team, the Interisland Agro-Transport Study (IATS), should shed light on future transport requirements and may well show that meat will not continue to travel to market as livestock.

Reefer Cargoes

A spokesman for a group with a major interest in shipping refrigerated cargoes, and others, have intimated that shipping lines dictated the rates even before reefer cargoes were deregulated. Box rates (in ₱ thousand) from Manila, quoted for September 1990, before deregulation, were as follows:

Destination	*Carrier*	*Box rate (₱ thousand)*
Cebu	A	16.5
	B	18.4
Davao	A	30
	B	31
Cagayan de Oro	A	20
	B	26
	C	15
Iloilo	A	15.2
	B	18.5
	C	12.1

Note that Carrier C serves only two destinations. Its rates did not change between August 1987 and October 1990.

For larger shippers, current rates are about 30 percent higher than they were in September 1990. Traveling from Manila to Cebu, Carrier B would pay 1.3 x ₱18,400 = ₱23,920.

Another indication that shipping lines had control before deregulation was that, since deregulation of reefer cargoes, freight rates charged per twenty-foot equivalent unit (TEU) are equivalent to two to three times the Class A commodity rate, depending on the carrier. For example, the Class A rate for a carrier traveling from Manila to Cebu would be 2.5 x 347.7 x 28 = ₱24,339, which corresponds closely to the 30 percent increase previously indicated. Again, an increase in the rates after deregulation was not unexpected, yet service has not improved. One large shipper

defined service as (1) availability of boxes, (2) condition of cargo on arrival, (3) speed of delivery, and (4) coordination with the carrier.

There is consumer demand for cargo requiring stowage in refrigerated containers, mainly consumer goods such as ice cream, dressed chicken, and prawns, and also for horticultural commodities requiring ventilated containers to minimize spoilage and pilferage.

In general, there is a shortage of reefer boxes in the domestic liner trades, especially for the small shipper. When reefer cargoes are destined for foreign ports, they are best handled through direct shipments in boxes provided by the ocean carrier, because such containers are more readily available and the direct shipment provides less opportunity for pilferage.

Because of lack of suitably cooled and ventilated container vans at Davao, bananas are stowed in available passenger cabins but arrive in better condition than they had when stowed in closed containers, which sometimes resulted in 80 percent spoilage. Bananas require ventilation mainly to prevent the fruit from spoiling during ripening.

No refrigerated containers are available in the open market; ship operators have tended to purchase secondhand boxes at the request of regular shippers, who are in a position to sign a firm 6-month contract. Some of the larger shippers are building branch plants in the provinces, and their requirements for reefer space are shrinking. This situation creates uncertainty for the carriers in future requirements for specialized containers. However, the needs of smaller shippers are not currently being met, and it is hoped that the deregulated rates will encourage carriers to invest in suitable containers.

A 20-ft reefer box costs about ₱200,000 to ₱250,000/unit (secondhand, about 5 years old). A new box, a dual-powered (diesel and electric mains) unit, which is desirable where electric power outlets are limited or nonexistent, costs about US$30,000 (₱825,000) in North America. The most suitable type of box is one that can provide a range of temperatures, from cooled to chilled to frozen, with reliable automatic control and a sufficient number of air changes per hour to deliver fruit and vegetables in good condition.

Appendix A

RECOMMENDED ANNUAL REPORT FORMATS

The following annual report for a liner shipping company and its corresponding formats, as described below and shown in the attachments, is recommended to provide the minimum database for rate regulation.

Reports

Report No. M-01

This report retains the information included on page 1 of the existing annual report form to provide a management profile and highlights capital stock detail as required by law.

Report No. M-02

This report provides information on the company's total fleet expressed in number of vessels, aggregate total gross registered tons (GRT), and deadweight tons (DWT) of all vessels operated. It also provides manpower profile expressed in average number of employees per month (or average year manning) and corresponding annualized personnel cost for each category of employees.

Report No. M-03

This report provides the necessary operations data for each vessel of the company and includes the following information.

- Selected vessel particular (service type, year built, GRT, DWT, passenger capacity, speed, and engine BHP);
- Vessel performance (days in commission, days out of commission, mileage for the period, and cargo and passenger load); and

- Vessel manpower (officers and crew).

Report No. M-04

The Vessel Income Statement provides comparative detail of operating revenue, voyage expense, running expense, and capital expense. This is to be prepared for each vessel operated.

Report No. M-05

The Statement of Income and Retained Earnings is prepared for the total company and provides comparative details of operating revenue, operating expense, overhead, interest, other income and expenses, profits, and retained earnings.

Report No. M-06

This report sets the balance sheet of the company or comparative statement of assets, liabilities, and stockholders' equity.

Report No. M-07

This report provides details of the company's fixed assets, particularly its vessels. Information is given for each vessel operated in terms of date acquired, start of operation, acquisition cost, capitalized expense, service life, salvage value, accumulated depreciation, net book value, and appraisal increment details.

Report No. M-08

This report provides the changes in fixed assets during the period. Of particular interest is cost of vessels added or retired during the year.

Report No. M-09

This report details the cargo and passenger traffic of noncontainer vessels during the year expressed by voyage, route, port leg, cargo carried in metric tons equivalent, passenger carried, freight, and passenger revenue.

Report No. M-10

This report details the cargo and passenger traffic of container vessels. In addition to details in Report No. M-09. Information on total twenty-foot equivalent units (TEU) is included.

As part of the annual report submission, the following needs to be submitted as required by law:

- Statement of significant events or occurrences of material importance during the year, including strike, accident, or injury to any person or damage to any property, the causes and results thereof;
- Oath by Chief Operating Officer; and
- Copy of the audited financial statements filed with the Securities and Exchange Commission.

The following existing reports are recommended for deletion, unless required for mere compliance of law.

- Depreciation fund account;
- Prepayments;
- Deferred charges;
- Loans and notes payable;
- Other accrued liabilities;
- Details of accumulated depreciation account;
- Investments;
- Marketable securities;
- Materials and supplies;
- Surplus accounts;
- Retained earnings account; and
- Loss from theft, robbery, fire, and the like.

These reports are not really required for rate regulation and monitoring purposes.

Guidelines in Preparing the Annual Report

1. General Instructions

1.1 All codes are for MARINA's use only.

1.2 Complete all required information. Indicate NA for information not applicable. Indicate NIL if figure is zero.

2. Reports

2.1 **M-01**

2.1.1. Indicate year covered by the report.
2.1.2. If position titles are different, show official title used.
2.1.3. Use additional sheet if necessary.
2.1.4. Include additional information, if any, to complete capital stock data.
2.1.5. Contact person should be able to coordinate responses to queries regarding the report.

2.2 **M-02**

2.2.1. Total company fleet ties up with all vessels reported in M-03.
2.2.2. Average employees can be derived by averaging the number of employees at the end of each month.
2.2.3. Annual personnel cost for each category includes wages, salaries, employee benefits, and governmental contributions (SSS, Medicare, etc.)

2.3 **M-03**

2.3.1. Provide data for each vessel operating during the year.
2.3.2. Explain days not accounted for by days in commission and days out of commission.
2.3.3. Nautical miles run and number of voyages should be consistent with the information in Reports M-9 and M-10.
2.3.4. Cargo and passenger load data are grand totals of Reports M-09 and M-10.

2.4. **M-04, M-05,** and **M-06**

2.4.1. Report amounts in thousand pesos only.
2.4.2. Freight and passenger revenues tie up with the figures in Reports M-09 and M-10.
2.4.3. Provide details if miscellaneous expenses exceeds 1 percent of total operating expense.
2.4.4. Prepare M-04 for each vessel operated. The sum of individual income statements should equal the amounts shown on the M-05 (i.e., operating revenue, vessel operating expense, gross operating profit).

2.4.5. Provide explanation (on separate sheet) if change between this year and last year is more than 10 percent in the following balance sheet accounts.

- Due to and from affiliated companies;
- Investments in shares and stocks;
- Long-term liabilities; and
- Capital stocks.

2.5. **M-07**

2.5.1. Complete all required information.

2.5.2. Report data for each vessel

2.5.3. Total net book value (historical cost) and net appraisal increment tie up with total property and equipment in the balance sheet (M-06).

2.6. **M-09 and M-10**

2.6.1. Prepare these reports for every vessel operating during the year.

2.6.2. Prepare page-by-page subtotal, total for each vessel, and grand total for all vessel data.

2.6.3. Indicate usual route sequence run.

2.6.4. Use the official MARINA port codes when reporting port legs or port pairs.

2.6.5. In reporting cargo carried:

- Show actual cargo carried expressed in either cubic meter or metric tons. Metric ton is not the equivalent of cubic meter.
- Convert cubic meters to metric tons, add the result to actual metric tons, and show the sum total under "total metric tons equivalent."
- Indicate conversion factor used in converting cubic meters to metric tons.

Appendix B

ROUTINE TO GENERATE ANALYSIS OF VESSEL COSTS AND RATE BASE USING MAINTEMP.DBF AND MAINTRAT.DBF AND GENERATING MAINANAL.DBF

```
  1 *  ************************************************************
  2 *         ANALYSIS OF VESSEL COSTS AND RATE BASE
  3 *           USING MAINTEMP.DBF AND MAINTRAT.DBF
  4 *               AND GENERATING MAINANAL.DSF
  5 *            by D D Santos Jr/Nathan Associates
  6 *  ************************************************************
  7 *  Filespec: VESANAL.PRG
  8 CLEAR
  9 CLOSE ALL
 10 CLEAR ALL
 11 SET TALK OFF
 12 SET DEBUG OFF
 13 SET SAFETY OFF
 14 SET ECHO OFF
 15 SET DEVICE TO SCREEN
 16 @1,10 SAY 'KINDLY WAIT A MOMENT. NOW INITIALIZING VARIABLES'
 17 X=1
 18 DO WHILE X<29
 19 M_F = 'F'+LTRIM(STR(X))
 20 M_P = 'P'+LTRIM(STR(X))
 21 M_E = 'E'+LTRIM(STR(X))
 22 M_T = 'T'+LTRIM(STR(X))
 23 PUBLIC &M_F, &M_P, &M_E, &M_T
 24 X=X+1
 25 ENDDO
 26 DO WHILE X<62
 27 M_F = 'F'+LTRIM(STR(X))
 28 PUBLIC &M_F
 29 X=X+1
 30 ENDDO
 31 PUBLIC MREV1, MREV2, VOEX1, VOEX2, RUEX1, RUEX2, BYEAR, EYEAR, TONS, TMS
 32 PUBLIC W1, W2, W3, DOPE, DRCA, DRCI, VCPM, CPDS, VT, RL, DLF1, DLF2, LINK, TPD
 33 PUBLIC MTMP, CLFA, PXMP, PLFA, R1, GREV1, GREV2, PERC, TOT, ROI, PAXS, PMS
 34 PUBLIC MILERUN, CASC, CASP, DCD, DRL, DOPEI
 35 SELECT C
 36 USE DEFPARA
 37 ZAP
 38 APPEND BLANK
 39 REPLACE BYEAR WITH 1989
 40 REPLACE EYEAR WITH 1991
 41 REPLACE DLF1 WITH ' '
 42 REPLACE DLF2 WITH ' '
 43 REPLACE ROI WITH 12
 44 REPLACE PERC WITH 0
 45 @1,1 SAY '***************** PLS DEFINE EXOGENOUS AND POLICY VARIABLES *****************'
 46 @3,1 SAY 'BASE YEAR OF FINANCIAL DATA: ' GET BYEAR PICTURE '9999'
 47 @3,50 SAY 'PROJECTED TO YEAR: ' GET EYEAR PICTURE '9999'
 48 @4,1 SAY 'ADJUSTMENT FACTORS FOR BASE YEAR: (in % Increase)'
 49 @5,1 SAY 'Freight      :' GET A1 PICTURE '99,999.99'
 50 @5,41 SAY 'Lubricants   :' GET A13 PICTURE '99,999.99'
 51 @6,1 SAY 'Passenger    :' GET A2 PICTURE '99,999.99'
 52 @6,41 SAY 'Crew Salaries:' GET A14 PICTURE '99,999.99'
 53 @7,1 SAY 'Charters     :' GET A3 PICTURE '99,999.99'
 54 @7,41 SAY 'Crew Benefits:' GET A15 PICTURE '99,999.99'
 55 @8,1 SAY 'Other Revenue:' GET A4 PICTURE '99,999.99'
 56 @8,41 SAY 'Food & Subsis:' GET A16 PICTURE '99,999.99'
 57 @9,1 SAY 'Comlar Tax   :' GET A5 PICTURE '99,999.99'
 58 @9,41 SAY 'Supplies     :' GET A17 PICTURE '99,999.99'
 59 @10,1 SAY 'Commission   :' GET A6 PICTURE '99,999.99'
 60 @10,41 SAY 'Drydock, R&M :' GET A18 PICTURE '99,999.99'
 61 @11,1 SAY 'Fuel-Diesel  :' GET A7 PICTURE '99,999.99'
 62 @11,41 SAY 'Insurance    :' GET A19 PICTURE '99,999.99'
 63 @12,1 SAY 'Fuel-Bunker  :' GET A8 PICTURE '99,999.99'
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 64 @12,41 SAY 'Claims       :' GET A20 PICTURE '99,999.99'
 65 @13,1 SAY 'Fuel-SFO     :' GET A9 PICTURE '99,999.99'
 66 @13,41 SAY 'Taxes & Licen:' GET A21 PICTURE '99,999.99'
 67 @14,1 SAY 'Port Charges :' GET A10 PICTURE '99,999.99'
 68 @14,41 SAY 'Misc Run Exp :' GET A22 PICTURE '99,999.99'
 69 @15,1 SAY 'Cargo Charges:' GET A11 PICTURE '99,999.99'
 70 @15,41 SAY 'Terminal Exp :' GET A23 PICTURE '99,999.99'
 71 @16,1 SAY 'Misc Voy Exp :' GET A12 PICTURE '99,999.99'
 72 @16,41 SAY 'Gen Admin Exp:' GET A24 PICTURE '99,999.99'
 73 @18,1 SAY 'DESIGN LOAD FACTOR FOR CARGO SERVICE : (default= Actual Cargo LF) ';
 74   GET DLF1 PICTURE 'XXXX'
 75 @19,1 SAY 'DESIGN LOAD FACTOR FOR PAX SERVICE : (default= Actual Pax LF) ';
 76   GET DLF2 PICTURE 'XXXX'
 77 @20,1 SAY 'ALLOWABLE RATE OF RETURN in % : ' GET ROI PICTURE '999'
 78 READ
 79 BYEAR = BYEAR
 80 EYEAR = EYEAR
 81 DLF1 = VAL(DLF1)
 82 DLF2 = VAL(DLF2)
 83 ROI = ROI
 84 CLEAR
 85 @1,1 SAY 'PLS. SPECIFY PERCENTAGE CHANGES (OVER THE PERIOD) IN:'
 86 @3,1 SAY '1) General Price Indices - ' GET A25 PICTURE '99,999.99'
 87 @5,1 SAY '2) Ship Sales Price Indices - ' GET A26 PICTURE '99,999.99'
 88 @7,1 SAY '3) New Building Price Indices - ' GET A27 PICTURE '99,999.99'
 89 @9,1 SAY '4) Currency Exchange Rate (P to USD) - ' GET A28 PICTURE '99,999.99'
 90 READ
 91 X=1
 92 DO WHILE X<29
 93 M_T= 'T'+LTRIM(STR(X))
 94 M_A= 'A'+LTRIM(STR(X))
 95 &M_T = &M_A
 96 X=X+1
 97 ENDDO
 98 CLEAR
 99 DO WHILE .NOT. (X=1 .OR. X=2 .OR. X=3)
100 @1,1 SAY 'PLS. SPECIFY WHAT PERCENTAGE ANALYSIS TO EXECUTE:'
101 @3,1 SAY '1 - Cost as % of Gross Revenue'
102 @5,1 SAY '2 - Cost as % of Net Revenue'
103 @7,1 SAY '3 - Cost as % of Total Operating Cost'
104 @10,1
105 INPUT 'Enter your choice (1, 2 or 3) ' TO X
106 ENDDO
107 CLEAR
108 @5,5 SAY 'PLS WAIT A MINUTE'
109 PERC=X
110 CLOSE ALL
111 ERASE MAINDATA.DBF
112 USE MAINTEMP
113 INDEX ON VESLDWT TO DWTMAI
114 COPY TO MAINDATA
115 USE MAINDATA
116 INDEX ON VESCODE TO VESMAI
117 SELECT B
118 USE MAINTRAT
119 INDEX ON VESCODE TO VESTRA
120 SELECT C
121 USE MAINANAL
122 ZAP
123 SELECT A
124 SET RELATION TO VESCODE INTO MAINTRAT
125 CLEAR
126 PS=' '
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127 DO WHILE .T.
128  @10,10 SAY 'NOW READY TO CREATE MAINANAL.DBF FOR COST ANALYSIS'
129  @14,10 SAY 'Press P to start Processing, or C to cancel' GET PS PICTURE '!'
130  READ
131 IF UPPER(PS)='P'
132 CLEAR
133 C1=RECCOUNT()
134 C2=0
135 GO TOP
136 DO WHILE .NOT. EOF()
137 @5,5 SAY 'NOW CREATING FILE FOR VESSEL COST ANALYSIS'
138 @8,10 SAY STR(C2/C1*100)+' % Completed'
139 C2=C2+1
140 *INITIALIZE DEPENDENT VARIABLES
141 X=1
142 DO WHILE X<27
143 M_F = 'F'+LTRIM(STR(X))
144 M_P = 'P'+LTRIM(STR(X))
145 M_E = 'E'+LTRIM(STR(X))
146 M_T = 'T'+LTRIM(STR(X))
147 &M_F=0
148 &M_P=0
149 &M_E=0
150 X=X+1
151 ENDDO
152 DO WHILE X<62
153 M_F = 'F'+LTRIM(STR(X))
154 &M_F=0
155 X=X+1
156 ENDDO
157 R1=' '
158 RL=0
159 * COMPUTING FOR VALUES
160 DO CASE
161  CASE VESLTYP=1
162   VT='CONVENTIONAL CARGO VSL'
163  CASE VESLTYP=2
164   VT='RORO VSL'
165  CASE VESLTYP=3
166   VT='CONTAINER VSL'
167  CASE VESLTYP=4
168   VT='PURE PASSENGER VSL'
169  CASE VESLTYP=5
170   VT='PAX-CONVENTIONAL CARGO'
171  CASE VESLTYP=6
172   VT='PAX-RORO VSL'
173  CASE VESLTYP=7
174   VT='PAX-CONTAINER VSL'
175  CASE VESLTYP=8
176   VT='FASTBOAT'
177  CASE VESLTYP=9
178   VT='VSL N.E.S.'
179 ENDCASE
180 * ASSUMED DESIGN VARIABLES
181 * - SPEED -
182 IF VESPEED = 0
183  DO CASE
184  CASE VESLTYP=1 .OR. VESLTYP=2 .OR. VESLTYP=9
185   REPLACE VESPEED WITH 10
186  CASE VESLTYP=3 .OR. VESLTYP=7 .OR. VESLTYP=4
187   REPLACE VESPEED WITH 14
188  CASE VESLTYP=5 .OR. VESLTYP=6
189   REPLACE VESPEED WITH 12
```

```
 190  CASE VESLTYP=8
 191   REPLACE VESPEED WITH 28
 192  ENDCASE
 193  R1 = R1+' SPEED WAS ASSUMED;
 194 ENDIF
 195 DRL=150
 196 DCD=320
 197 * - CARGO HANDLING RATES -
 198 DO CASE
 199  CASE (VESLTYP=1 .OR. VESLTYP=5 .OR. VESLTYP=9) .AND. VESLDWT)3500
 200    TPD=800
 201  CASE (VESLTYP=1 .OR. VESLTYP=5 .OR. VESLTYP=9) .AND. VESLDWT(=3500
 202    TPD=400
 203  CASE (VESLTYP=2 .OR. VESLTYP=4 .OR. VESLTYP=6) .AND. VESLDWT)3500
 204    TPD=1600
 205  CASE (VESLTYP=2 .OR. VESLTYP=4 .OR. VESLTYP=6) .AND. VESLDWT(=3500
 206    TPD=800
 207  CASE (VESLTYP=3 .OR. VESLTYP=7) .AND. VESLDWT(=3500
 208    TPD=12*8*10
 209  CASE (VESLTYP=3 .OR. VESLTYP=7) .AND. VESLDWT)3500
 210    TPD=12*8*10*2
 211  CASE VESLTYP=8
 212    TPD=1000
 213 ENDCASE
 214 * OPERATIONS ANALYSIS
 215 DO CASE
 216  CASE VOYAGES)0 .AND. MILERUN)0 .AND. CONDAYS)0 .AND. B-)DISTANCE)0
 217    RL=B-)DISTANCE
 218  CASE VOYAGES)0 .AND. MILERUN)0 .AND. CONDAYS)0 .AND. B-)DISTANCE=0
 219    R1=R1+'NO TRAF REPORT;
 220  CASE VOYAGES)0 .AND. MILERUN=0 .AND. CONDAYS)0 .AND. B-)DISTANCE)0
 221    RL=B-)DISTANCE
 222    REPLACE MILERUN WITH VOYAGES*RL
 223    R1=R1+'MILERUN ESTIM;
 224  CASE VOYAGES)0 .AND. MILERUN=0 .AND. CONDAYS)0 .AND. B-)DISTANCE=0
 225    IF B-)TOTLTONS)0
 226      REPLACE MILERUN WITH (CONDAYS - B-)TOTLTONS/TPD)*VESPEED*24
 227      RL=MILERUN/VOYAGES
 228    ELSE
 229      IF (FREIGHT+PASSREV))0
 230        RL=DRL
 231        REPLACE MILERUN WITH VOYAGES*RL
 232        R1=R1+'ASSUM RT LENGTH='+LTRIM(STR(DRL))+';
 233      ELSE
 234        RL=0
 235      ENDIF
 236    ENDIF
 237    R1=R1+'NO TRAF REPORT;
 238  CASE VOYAGES)0 .AND. MILERUN)0 .AND. CONDAYS=0 .AND. B-)DISTANCE)0
 239    RL=MILERUN/VOYAGES
 240    REPLACE CONDAYS WITH MIN((VOYAGES*RL/(VESPEED*24) + B-)TOTLTONS/TPD),365)
 241    R1=R1+'DEDUCED CONDAYS; '
 242  CASE VOYAGES)0 .AND. MILERUN)0 .AND. CONDAYS=0 .AND. B-)DISTANCE=0
 243    RL=MILERUN/VOYAGES
 244    REPLACE CONDAYS WITH DCD
 245    R1=R1+'ASSUMED CONDAYS='+LTRIM(STR(DCD))+'; NO TRAF REPORT; '
 246  CASE VOYAGES)0 .AND. MILERUN=0 .AND. CONDAYS=0 .AND. B-)DISTANCE)0
 247    RL=B-)DISTANCE
 248    REPLACE MILERUN WITH VOYAGES*RL
 249    REPLACE CONDAYS WITH MIN((VOYAGES*RL/(VESPEED*24) + B-)TOTLTONS/TPD),365)
 250    R1=R1+'DEDUCED MILERUN & CONDAYS; '
 251  CASE VOYAGES)0 .AND. MILERUN=0 .AND. CONDAYS=0 .AND. B-)DISTANCE=0
 252    IF FREIGHT+PASSREV)0
```

```
253       REPLACE CONDAYS WITH DCD
254       RL = DRL
255       REPLACE MILERUN WITH (VOYAGES*RL)
256       R1=R1+'ASSUMED CONDAYS='+LTRIM(STR(DCD))+' & RT LEN='+LTRIM(STR(DRL))+'; NO TRAF REPORT;
257     ELSE
258       RL= 0
259       R1=R1+'NO OPERATIONS;
260     ENDIF
261   CASE VOYAGES=0 .AND. MILERUN)0 .AND. CONDAYS=0 .AND. B->DISTANCE)0
262     RL= B->DISTANCE
263     REPLACE VOYAGES WITH (MILERUN/RL)
264     IF B->TOTLTONS)0
265       REPLACE CONDAYS WITH MIN((VOYAGES*RL/(VESPEED*24) + B->TOTLTONS/TPD),365)
266       R1=R1+'DEDUCED VOYAGES & CONDAYS; '
267     ELSE
268       REPLACE CONDAYS WITH DCD
269       R1=R1+'DEDUCED VOYAGES; ASSUMED CONDAYS='+LTRIM(STR(DCD))
270     ENDIF
271   CASE VOYAGES=0 .AND. MILERUN)0 .AND. CONDAYS=0 .AND. B->DISTANCE=0
272     RL= DRL
273     R1=R1+'ASSUMED RT LENGTH='+LTRIM(STR(DRL))
274     REPLACE VOYAGES WITH MILERUN/RL
275     IF B->TOTLTONS)0
276       REPLACE CONDAYS WITH MIN((VOYAGES*RL/(VESPEED*24) + B->TOTLTONS/TPD),365)
277       R1=R1+'DEDUCED VOYAGES & CONDAYS; NO RT DIST REPORT; '
278     ELSE
279       REPLACE CONDAYS WITH DCD
280       R1=R1+'DEDUCED VOYAGES & ASSUMED CONDAYS='+LTRIM(STR(DCD))+'; NO TRAF REPORT;
281     ENDIF
282   CASE VOYAGES=0 .AND. MILERUN=0 .AND. CONDAYS)0 .AND. B->DISTANCE)0
283     RL=B->DISTANCE
284     IF B->TOTLTONS)0
285       REPLACE VOYAGES WITH (CONDAYS- B->TOTLTONS/TPD)*VESPEED*24/RL
286       R1=R1+'DEDUCED VOYAGES; '
287     ENDIF
288     REPLACE MILERUN WITH (VOYAGES*RL)
289     R1=R1+'DEDUCED MILERUN; '
290   CASE VOYAGES=0 .AND. MILERUN=0 .AND. CONDAYS)0 .AND. B->DISTANCE=0
291     IF B->TOTLTONS)0
292       RL= DRL
293       REPLACE VOYAGES WITH (CONDAYS-B->TOTLTONS/TPD)*VESPEED*24/RL
294       REPLACE MILERUN WITH (VOYAGES*RL)
295       R1=R1+'DEDUCED VOYAGES AND MILERUN; NO RT DIST REPORT; '
296     ELSE
297       R1=R1+'NO TRAF & OPERATIONS REPORT;
298     ENDIF
299   CASE VOYAGES=0 .AND. MILERUN=0 .AND. CONDAYS=0 .AND. B->DISTANCE)0
300     RL=B->DISTANCE
301     REPLACE CONDAYS WITH DCD
302     R1=R1+'ASSUMED CONDAYS='+LTRIM(STR(DCD))+';
303     IF B->TOTLTONS)0
304       REPLACE VOYAGES WITH (CONDAYS-B->TOTLTONS/TPD)*VESPEED*24/RL
305       REPLACE MILERUN WITH (VOYAGES*RL)
306       R1=R1+'DEDUCED VOYAGES AND MILERUN;
307     ELSE
308       R1=R1+'NO VOYAGE & MILERUN DATA; '
309     ENDIF
310   CASE VOYAGES=0 .AND. MILERUN=0 .AND. CONDAYS=0 .AND. B->DISTANCE=0
311     IF B->TOTLTONS)0 .AND. (FREIGHT+PASSREV))0
312       RL= DRL
313       REPLACE CONDAYS WITH DCD
314       REPLACE VOYAGES WITH (CONDAYS-B->TOTLTONS/TPD)*VESPEED*24/RL
315       REPLACE MILERUN WITH (VOYAGES*RL)
```

```
316      R1=R1+'ASSUMED RT LENGTH='+LTRIM(STR(DRL))+' & CONDAYS='+LTRIM(STR(DCD))+';
317    ELSE
318      RL=0
319      R1=R1+'NO OPERATIONS & TRAF REPORT;
320    ENDIF
321  CASE VOYAGES=0 .AND. MILERUN)0 .AND. CONDAYS)0 .AND. B->DISTANCE)0
322    RL = B->DISTANCE
323    REPLACE VOYAGES WITH (MILERUN/RL)
324    R1=R1+'DEDUCED VOYAGE; '
325  CASE VOYAGES=0 .AND. MILERUN)0 .AND. CONDAYS)0 .AND. B->DISTANCE=0
326    RL = DRL
327    REPLACE VOYAGES WITH (MILERUN/RL)
328    R1=R1+'ASSUMED RT LENGTH='+LTRIM(STR(RL))+' & DERIVED VOYAGES; '
329 ENDCASE
330 * - TONS AND TONMILES SERVED -
331 IF B->TOTLTONS)0
332   TONS = B->TOTLTONS
333   TMS = B->TONMILES
334   CASC = 1
335 ELSE
336   TONS = FREIGHT*1000/257.57 &&CEBU-MLA 1989 RATE FOR CLASS A
337   TMS = MAX(TONS*RL, TONS*392)
338   CASC = 2
339   R1=R1+'CARGO TRAF WAS ASSUMED;
340 ENDIF
341 IF VESLDWT)0
342   MTMP = RL*VOYAGES*VESLDWT*.95
343   CLFA = TMS*100/MTMP
344 ELSE
345   MTMP = 0
346   CLFA = 0
347 ENDIF
348 IF DLF1=0
349   DLF3=CLFA
350 ELSE
351   DLF3=DLF1
352 ENDIF
353 * - PAX & PAXMILES SERVED -
354 IF B->PAXTRAF)0
355   PAXS = B->PAXTRAF
356   PMS = B->PAXMILES
357   CASP = 1
358 ELSE
359   PAXS = PASSREV*1000/252.20
360   PMS = MAX(PAXS*RL, PAXS*392)
361   CASP = 2
362   R1=R1+' PAXTRAF ASSUMED; '
363 ENDIF
364 IF VESLPAX)0
365   PXMP = RL * VOYAGES * VESLPAX
366   PLFA = PMS*100/PXMP
367 ELSE
368   PXMP = 0
369   PLFA = 0
370 ENDIF
371 IF DLF2=0
372   DLF4=PLFA
373 ELSE
374   DLF4=DLF2
375 ENDIF
376 *ASSIGN VALUES TO VARIABLES
377 LINK=B->LINK
378 F1=FREIGHT
```

```
379 F2=PASSREV
380 F3=CHRTREV
381 F4=OTHERREV
382 F5=COMCTAX*-1
383 F6=COMMEXP*-1
384 GREV1=F1+F2+F3+F4
385 NREV1=F1+F2+F3+F4+F5+F6
386 F7=FUEL_DO
387 F8=FUEL_BF
388 F9=FUEL_SF
389 F10=PILOTAG+PORTCHA
390 F11=STEVEDO
391 IF PASSREV)12
392   F12=0
393   F16=FOODSUB
394 ELSE
395   IF DECKOFF+ENGIOFF+DECKCREW+ENGICREW+DECKAPP+ENGIAPP(100
396     F12=FOODSUB - (DECKOFF+ENGIOFF+DECKCREW+ENGICREW+DECKAPP+ENGIAPP)*16*365/1000
397     F16=(DECKOFF+ENGIOFF+DECKCREW+ENGICREW+DECKAPP+ENGIAPP)*16*365/1000
398   ELSE
399     F12=FOODSUB - 25*16*365/1000
400     F16=25*16*365/1000
401   ENDIF
402 ENDIF
403 VOEX1=F7+F8+F9+F10+F11+F12
404 F13=LUBRICS
405 F14=SALWAGE
406 F15=EMPCOLA+OTHEMBE
407 F17=SUPPLDE+SUPPLST
408 F18=DRYDRNN
409 F19=HULLINS+PANDIPR+INSURAN
410 F20=CLAIMEX
411 F21=OTVTXLI
412 IF CHARHIR)365*2
413   F22=WATEREX+MISCVOE
414   R1 = R1+ ' CHR HIRE TREATED AS PART OF CAPEX; '
415 ELSE
416   F22=WATEREX+MISCVOE+CHARHIR
417 ENDIF
418 RUEX1=F13+F14+F15+F16+F17+F18+F19+F20+F21+F22
419 IF CVOYTOT)0 .OR. CRUNTOT)0 .OR. CFLTDEP)0
420 F23=(TERDEPS+TERCASA)*(VOEX1+RUEX1+VSLDEPC+VSLDEPA)/(CVOYTOT+CRUNTOT+CFLTDEP)
421 F24=(GAEDEPS+GAECASA)*(VOEX1+RUEX1+VSLDEPC+VSLDEPA)/(CVOYTOT+CRUNTOT+CFLTDEP)
422 ELSE
423 F23=0
424 F24=0
425 ENDIF
426 IF CHARHIR)365*2
427   F25=CHARHIR + VSLDEPC
428   R1= R1+ ' CHARHIRE CONSIDERED PART OF CAPEX; '
429 ELSE
430   F25=VSLDEPC
431 ENDIF
432 F26=VSLDEPA
433 F27=ACQCOST
434 F28=CAPIEXP
435 F29=F27+F28
436 F30=ACCUDEP*-1
437 F31=BOOKVAL
438 ' ADJUSTING BASE YR COSTS
439 X=1
440 E25=F25*(1+T28/100)
441 E26=F26*(1+T28/100)
```

```
442 DO WHILE X(25
443 M_E = 'E'+ LTRIM(STR(X))
444 M_F = 'F'+ LTRIM(STR(X))
445 M_T = 'T'+ LTRIM(STR(X))
446 &M_E = &M_F * (1 + &M_T/100)
447 X=X+1
448 ENDDO
449 GREV2=E1+E2+E3+E4
450 NREV2=E1+E2+E3+E4+E5+E6
451 VOEX2=E7+E8+E9+E10+E11+E12
452 RUEX2=E13+E14+E15+E16+E17+E18+E19+E20+E21+E22
453 F32 = (VOEX2+RUEX2+E23+E24-E4-E5)*2/12
454 F33 = F31+F32
455 RRET = F33*ROI/100
456 * COMPUTING PERCENTAGES
457 DO CASE
458  CASE PERC=1
459   TOT = GREV2
460  CASE PERC=2
461   TOT = NREV2
462  CASE PERC=3
463   TOT = VOEX2+RUEX2+E23+E24+E25+E26+RRET
464 ENDCASE
465 X=1
466 DO WHILE X(27
467 M_E = 'E'+LTRIM(STR(X))
468 M_P = 'P'+LTRIM(STR(X))
469 &M_P = &M_E*100/TOT
470 X=X+1
471 ENDDO
472 W1 = NREV2*100/TOT
473 W2 = VOEX2*100/TOT
474 W3 = RUEX2*100/TOT
475 *DAILY COST ANALYSIS
476 IF COMDAYS)0
477  DOPE = (VOEX2+RUEX2+E23+E24+E25+E26+RRET)*1000/COMDAYS
478  DRCA = (RUEX2+E23+E24+E25+E26+RRET)*1000/COMDAYS
479 ELSE
480  DOPE = 0
481  DRCA = 0
482  R1 = R1+' NO COMM. DAYS ; '
483 ENDIF
484 DOPEI = DOPE*COMDAYS/320
485 DRCI = (RUEX2+E23+E24+E25+E26+RRET)*1000/320
486 VCPM = VOEX2*1000/MILERUN
487 CPDS = (VOEX2*VESPEED*24*1000/MILERUN) + DRCI
488 *COST PER UNIT AND UNIT-MILE
489 DO CASE
490   CASE TMS)0 .AND. PMS)0
491     F34= VOEX2*1000*CLFA/(TMS*DLF3)
492     F35= F34*.8
493     F36= F34*.6
494     F37= F34*.4
495     F38= F34*.2
496     F39= 0
497     F40= F34*(F1/(F1+F2))
498     F46= VOEX2*1000*PLFA/(PMS*DLF4)
499     F41= 0
500     F42= F46*.2
501     F43= F46*.4
502     F44= F46*.6
503     F45= F46*.8
504     F47= F46*(F2/(F1+F2))
```

```
505   CASE TMS)0 .AND. PMS=0
506      F34= VOEX2*1000*CLFA/(TMS*DLF3)
507      F35= F34
508      F36= F34
509      F37= F34
510      F38= F34
511      F39= F34
512      F40= F34
513      X=41
514      DO WHILE X(48
515       M_F='F'+LTRIM(STR(X))
516       &M_F= 0
517       X=X+1
518      ENDDO
519   CASE TMS=0 .AND. PMS)0
520      X=34
521      DO WHILE X(41
522       M_F='F'+LTRIM(STR(X))
523       &M_F= 0
524       X=X+1
525      ENDDO
526      F46= VOEX2*1000*PLFA/(PMS*DLF4)
527      F41= F46
528      F42= F46
529      F43= F46
530      F44= F46
531      F45= F46
532      F47= F46
533   CASE TMS=0 .AND. PMS=0
534      X=34
535      DO WHILE X(48
536       M_F='F'+LTRIM(STR(X))
537       &M_F= 0
538       X=X+1
539      ENDDO
540 ENDCASE
541 DO CASE
542    CASE TONS)0 .AND. PAXS)0
543      F48= DRCI*320*CLFA/(TONS*DLF3)
544      F49= F48*.8
545      F50= F48*.6
546      F51= F48*.4
547      F52= F48*.2
548      F53= 0
549      F54= F48*(F1/(F1+F2))
550      F60= DRCI*320*PLFA/(PAXS*DLF4)
551      F55= 0
552      F56= F60*.2
553      F57= F60*.4
554      F58= F60*.6
555      F59= F60*.8
556      F61= F60*(F2/(F1+F2))
557    CASE TONS)0 .AND. PAXS=0
558      F48= DRCI*320*CLFA/(TONS*DLF3)
559      F49= F48
560      F50= F48
561      F51= F48
562      F52= F48
563      F53= F48
564      F54= F48
565      X=55
566      DO WHILE X(62
567       M_F='F'+LTRIM(STR(X))
```

```
568       &M_F= 0
569       X=X+1
570      ENDDO
571    CASE TONS=0 .AND. PAXS)0
572       X=48
573       DO WHILE X(55
574       M_F='F'+LTRIM(STR(X))
575       &M_F= 0
576       X=X+1
577      ENDDO
578      F60= DRCI*320*PLFA/(PAXS*DLF4)
579      F55= F60
580      F56= F60
581      F57= F60
582      F58= F60
583      F59= F60
584      F61= F60
585    CASE TONS=0 .AND. PAXS=0
586       X=48
587       DO WHILE X(62
588       M_F='F'+LTRIM(STR(X))
589       &M_F= 0
590       X=X+1
591      ENDDO
592 ENDCASE
593 CLEAR
594 a10,6 SAY OPENAME
595 a11,6 SAY VESNAME
596 a11,50 SAY 'DWT: '+LTRIM(STR(VESLDWT))
597 a13,6 SAY '========== ANALYSIS (AT'
598 a13,30 SAY EYEAR PICTURE '9999'
599 a13,35 SAY 'COSTS ) ============'
600 a15,6 SAY 'DAILY OPERATING COST:'
601 a15,38 SAY DOPE PICTURE '$( 999,999.99'
602 a17,6 SAY 'DAILY RUNNING COST:'
603 a18,9 SAY 'BASED ON REPORTED COMMDAYS '
604 a18,38 SAY DRCA PICTURE '$( 999,999.99'
605 a19,9 SAY 'BASED ON 320 DAYS PER YR'
606 a19,38 SAY DRCI PICTURE '$( 999,999.99'
607 wa20,6 SAY 'VOYAGE COST PER MILE:'
608 a20,38 SAY VCPM PICTURE '$( 99,999.9999'
609 *SAVE DATA TO MAINANAL
610 SELECT C
611 APPEND BLANK
612 REPLACE BYEAR WITH M->BYEAR
613 REPLACE EYEAR WITH M->EYEAR
614 REPLACE OPECODE WITH A->OPECODE
615 REPLACE OPENAME WITH A->OPENAME
616 REPLACE VESNAME WITH A->VESNAME
617 REPLACE VESCODE WITH A->VESCODE
618 REPLACE VESLGRT WITH A->VESLGRT
619 REPLACE VESLPAX WITH A->VESLPAX
620 REPLACE VESLDWT WITH A->VESLDWT
621 REPLACE ENGIBHP WITH A->ENGIBHP
622 REPLACE VESPEED WITH A->VESPEED
623 REPLACE OPECATE WITH A->OPECATE
624 REPLACE ASSETSC WITH A->ASSETSC
625 REPLACE VESLTYP WITH A->VESLTYP
626 REPLACE YRBUILT WITH A->YRBUILT
627 REPLACE CLASSED WITH A->CLASSED
628 REPLACE OPERATED WITH A->OPERATED
629 REPLACE DOPE WITH M->DOPE
630 REPLACE DOPEI WITH M->DOPEI
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631 REPLACE DRCA WITH M->DRCA
632 REPLACE DRCI WITH M->DRCI
633 REPLACE VCPM WITH M->VCPM
634 REPLACE CPDS WITH M->CPDS
635 REPLACE CLFA WITH M->CLFA
636 REPLACE PLFA WITH M->PLFA
637 REPLACE F40 WITH A->F40
638 REPLACE F47 WITH M->F47
639 REPLACE F54 WITH M->F54
640 REPLACE F61 WITH M->F61
641 REPLACE W1 WITH M->W1
642 REPLACE W2 WITH M->W2
643 REPLACE W3 WITH M->W3
644 REPLACE MREV1 WITH M->MREV1
645 REPLACE MREV2 WITH M->MREV2
646 REPLACE VOEX1 WITH M->VOEX1
647 REPLACE VOEX2 WITH M->VOEX2
648 REPLACE RUEX1 WITH M->RUEX1
649 REPLACE RUEX2 WITH M->RUEX2
650 REPLACE RRET WITH M->RRET
651 REPLACE TONS WITH M->TONS
652 REPLACE TOTLTONS WITH B->TOTLTONS
653 REPLACE PAXTRAF WITH B->PAXTRAF
654 REPLACE PAXS WITH M->PAXS
655 REPLACE LINK WITH B->LINK
656 REPLACE COMDAYS WITH A->COMDAYS
657 REPLACE DRYDOCK WITH A->DRYDOCK
658 REPLACE REPAIRS WITH A->REPAIRS
659 REPLACE LAID_UP WITH A->LAID_UP
660 REPLACE MILERUN WITH A->MILERUN
661 REPLACE VOYAGES WITH A->VOYAGES
662 REPLACE RTCAT WITH B->RTCAT
663 REPLACE TMS WITH M->TMS
664 REPLACE TONMILES WITH B->TONMILES
665 REPLACE MTMP WITH M->MTMP
666 REPLACE PMS WITH M->PMS
667 REPLACE PAXMILES WITH B->PAXMILES
668 REPLACE PXMP WITH M->PXMP
669 REPLACE RL WITH M->RL
670 REPLACE DISTANCE WITH B->DISTANCE
671 REPLACE F1 WITH M->F1, P1 WITH M->P1, E1 WITH M->E1
672 REPLACE F2 WITH M->F2, P2 WITH M->P2, E2 WITH M->E2
673 REPLACE F3 WITH M->F3, P3 WITH M->P3, E3 WITH M->E3
674 REPLACE F4 WITH M->F4, P4 WITH M->P4, E4 WITH M->E4
675 REPLACE F5 WITH M->F5, P5 WITH M->P5, E5 WITH M->E5
676 REPLACE F6 WITH M->F6, P6 WITH M->P6, E6 WITH M->E6
677 REPLACE F7 WITH M->F7, P7 WITH M->P7, E7 WITH M->E7
678 REPLACE F8 WITH M->F8, P8 WITH M->P8, E8 WITH M->E8
679 REPLACE F9 WITH M->F9, P9 WITH M->P9, E9 WITH M->E9
680 REPLACE F10 WITH M->F10, P10 WITH M->P10, E10 WITH M->E10
681 REPLACE F11 WITH M->F11, P11 WITH M->P11, E11 WITH M->E11
682 REPLACE F12 WITH M->F12, P12 WITH M->P12, E12 WITH M->E12
683 REPLACE F13 WITH M->F13, P13 WITH M->P13, E13 WITH M->E13
684 REPLACE F14 WITH M->F14, P14 WITH M->P14, E14 WITH M->E14
685 REPLACE F15 WITH M->F15, P15 WITH M->P15, E15 WITH M->E15
686 REPLACE F16 WITH M->F16, P16 WITH M->P16, E16 WITH M->E16
687 REPLACE F17 WITH M->F17, P17 WITH M->P17, E17 WITH M->E17
688 REPLACE F18 WITH M->F18, P18 WITH M->P18, E18 WITH M->E18
689 REPLACE F19 WITH M->F19, P19 WITH M->P19, E19 WITH M->E19
690 REPLACE F20 WITH M->F20, P20 WITH M->P20, E20 WITH M->E20
691 REPLACE F21 WITH M->F21, P21 WITH M->P21, E21 WITH M->E21
692 REPLACE F22 WITH M->F22, P22 WITH M->P22, E22 WITH M->E22
693 REPLACE F23 WITH M->F23, P23 WITH M->P23, E23 WITH M->E23
```

```
694 REPLACE F24 WITH M->F24, P24 WITH M->P24, E24 WITH M->E24
695 REPLACE F25 WITH M->F25, P25 WITH M->P25, E25 WITH M->E25
696 REPLACE F26 WITH M->F26, P26 WITH M->P26, E26 WITH M->E26
697 REPLACE F27 WITH M->F27, F28 WITH M->F28, F29 WITH M->F29
698 REPLACE F30 WITH M->F30, F31 WITH M->F31, F32 WITH M->F32
699 REPLACE F33 WITH M->F33, F34 WITH M->F34, F35 WITH M->F35
700 REPLACE F36 WITH M->F36, F37 WITH M->F37, F38 WITH M->F38
701 REPLACE F39 WITH M->F39, F41 WITH M->F41, F42 WITH M->F42
702 REPLACE F43 WITH M->F43, F44 WITH M->F44, F45 WITH M->F45
703 REPLACE F46 WITH M->F46, F48 WITH M->F48, F49 WITH M->F49
704 REPLACE F50 WITH M->F50, F51 WITH M->F51, F52 WITH M->F52
705 REPLACE F53 WITH M->F53, F55 WITH M->F55, F56 WITH M->F56
706 REPLACE F57 WITH M->F57, F58 WITH M->F58, F59 WITH M->F59
707 REPLACE F60 WITH M->F60, CASC WITH M->CASC, CASP WITH M->CASP
708 REPLACE R1 WITH M->R1
709 SELECT A
710 SKIP
711 ENDDO
712 ENDIF
713 EXIT
714 ENDDO
715 CLOSE ALL
716 ?CHR(7)
```

Appendix C

ROUTINE TO PRINT ANALYSIS OF VESSEL COSTS AND RATE BASE USING MAINTEMP.DBF AND MAINTRAT.DBF AND GENERATING MAINANAL.DBF

```
 1 *  ************************************************************
 2 *       PRINTING OF ANALYSIS OF VESSEL COSTS AND RATE BASE
 3 *           USING MAINTEMP.DBF AND MAINTRAF.DBF
 4 *               AND GENERATING MAINANAL.DBF
 5 *            by D D Santos Jr/Nathan Associates
 6 *  ************************************************************
 7 *  Filespec: ANALREPO.PRG
 8 CLEAR
 9 CLOSE ALL
10 CLEAR ALL
11 SET TALK OFF
12 SET DEBUG OFF
13 SET SAFETY OFF
14 SET ECHO OFF
15 SET DEVICE TO SCREEN
16 á5,5 SAY 'PLS GET YOUR PRINTER READY AND WAIT A MINUTE'
17 USE MAINANAL
18 INDEX ON VESLDWT TO DWTMAI
19 CLEAR
20 PS=' '
21 DO WHILE .T.
22  á10,10 SAY 'FATAL ERROR COULD OCCUR IF PRINTER IS NOT READY'
23  á14,10 SAY 'Press P to start printing if ready, or C to cancel' GET PS PICTURE '!'
24  READ
25 IF .NOT. PRINTSTATUS() .AND. UPPER(PS)='P'
26   LOOP
27 ENDIF
28 IF UPPER(PS)='P'
29 CLEAR
30 C1=RECCOUNT()
31 C2=0
32 GO TOP
33 DO WHILE .NOT. EOF()
34 á5,5 SAY 'NOW PRINTING VESSEL COST ANALYSIS'
35 á8,10 SAY STR(C2/C1*100)+' % Completed'
36 C2=C2+1
37 CLEAR
38 á10,6 SAY OPENAME
39 á11,6 SAY VESNAME
40 á13,6 SAY '========== ANALYSIS (AT'
41 á13,30 SAY EYEAR PICTURE '9999'
42 á13,35 SAY 'COSTS ) ============'
43 á15,6 SAY 'DAILY OPERATING COST:'
44 á15,38 SAY DOPE PICTURE 'á( 999,999.99'
45 á17,6 SAY 'DAILY RUNNING COST:'
46 á18,9 SAY 'BASED ON REPORTED COMNDAYS '
47 á18,38 SAY DRCA PICTURE 'á( 999,999.99'
48 á19,9 SAY 'BASED ON 320 DAYS PER YR'
49 á19,38 SAY DRCI PICTURE 'á( 999,999.99'
50 á20,6 SAY 'VOYAGE COST PER MILE:'
51 á20,38 SAY VCPM PICTURE 'á( 99.999.9999'
52 * COMPUTING FOR VALUES
53 DO CASE
54  CASE VESLTYP=1
55   VT='CONVENTIONAL CARGO VSL'
56  CASE VESLTYP=2
57   VT='BORG VSL'
58  CASE VESLTYP=3
59   VT='CONTAINER VSL'
60  CASE VESLTYP=4
61   VT='PURE PASSENGER VSL'
62  CASE VESLTYP=5
63   VT='PAX-CONVENTIONAL CARGO'
```

```
 64  CASE VESLTYP=6
 65   VT='PAX-RORO VSL'
 66  CASE VESLTYP=7
 67   VT='PAX-CONTAINER VSL'
 68  CASE VESLTYP=8
 69   VT='FASTBOAT'
 70  CASE VESLTYP=9
 71   VT='VSL N.E.S.'
 72   ENDCASE
 73 *PRINT REPORT
 74 ???CHR(27)+CHR(77)
 75 SET DEVICE TO PRINT
 76 @1,1 SAY 'COMPANY: ' + OPENAME
 77 @1,56 SAY 'CATEGORY: '+ OPECATE
 78 @1,80 SAY 'SCALE: ' + ASSETSC
 79 @2,1 SAY 'VESSEL : ' + VESNAME
 80 @2,56 SAY 'VESCODE : ' + VESCODE
 81 @2,80 SAY 'YRBUILT : ' + LTRIM(STR(YRBUILT))
 82 @3,1 SAY 'VESTYPE: '+LTRIM(STR(VESTYP))+' '+VT
 83 @3,56 SAY 'ENGINE BHP: '+ LTRIM(STR(ENGIBHP))
 84 @3,80 SAY 'SPEED : '+ LTRIM(STR(VESPEED))
 85 @4,1 SAY 'GRT : ' + LTRIM(STR(VESLGRT))
 86 @4,26 SAY 'DWT : ' + LTRIM(STR(VESLDWT))
 87 @4,56 SAY 'PAX : ' + LTRIM(STR(VESLPAX))
 88 @4,80 SAY 'CLASS :'
 89 @4,93 SAY CLASSED PICTURE 'L'
 90 @7,1 SAY '******************************** OPERATING/TRAFFIC DATA **********************************'
 91 @9,1 SAY 'DAYS IN COMMISSION: ' + LTRIM(STR(COMDAYS))
 92 @9,31 SAY 'DRYDOCK: ' + LTRIM(STR(DRYDOCK))
 93 @9,51 SAY 'REPAIRS: ' + LTRIM(STR(REPAIRS))
 94 @9,70 SAY 'LAID-UP: ' + STR(LAID_UP)
 95 @10,1 SAY 'ROUTE : '+ LINK
 96 @10,70 SAY 'ROUTE CATEGORY: '+ RTCAT
 97 @11,1 SAY 'MILES RUN : '+ TRIM(STR(MILERUN))
 98 @11,31 SAY 'NO. OF VOYAGES : ' + TRIM(STR(VOYAGES))
 99 @11,70 SAY 'AVE. ROUTE LENGTH: ' + LTRIM(STR(RL))
100 @13,1 SAY 'METRIC TONS SERVED  : ' + STR(TONS)
101 @13,51 SAY 'TON-MILES SERVED : ' + STR(TMS)
102 @14,1 SAY 'TON-MILES PERFORMED : ' + STR(MTMP)
103 @14,51 SAY 'CARGO LOAD FACTOR: ' + STR(CLFA)+' %'
104 @15,1 SAY 'PASSENGERS SERVED   : ' + STR(PAXS)
105 @15,51 SAY 'PAX-MILES SERVED : ' + STR(PMS)
106 @16,1 SAY 'PAX-MILES PERFORMED : ' + STR(PXMP)
107 @16,51 SAY 'PAX LOAD FACTOR  : ' + STR(PLFA)+' %'
108 @18,1 SAY '********************************** FINANCIAL DATA ***********************************'
109 @19,23 SAY BYEAR PICTURE '9999'
110 @19,39 SAY EYEAR PICTURE '9999'
111 @19,73 SAY BYEAR PICTURE '9999'
112 @19,88 SAY EYEAR PICTURE '9999'
113 @20,3 SAY '                P'+CHR(39)+'000      %    P'+CHR(39)+ '000   CAPITAL EXPENSES:        P'+CHR(39)+'000    %    P'+CHR(39)+'000
114 @21,1 SAY 'REVENUE:'
115 @21,48 SAY 'DEPRECIATION AT COST '
116 @21,69 SAY F25 PICTURE '@( $$$,$$$'
117 @21,78 SAY P25 PICTURE '@( $$.$'
118 @21,84 SAY E25 PICTURE '@( $$$,$$$'
119 @22,3 SAY 'FREIGHT '
120 @22,20 SAY F1 PICTURE '@( $$$,$$$'
121 @22,30 SAY P1 PICTURE '@( $$.$'
122 @22,36 SAY E1 PICTURE '@( $$$,$$$'
123 @22,48 SAY 'DEPRECIATION ON APPR '
124 @22,69 SAY F26 PICTURE '@( $$$,$$$'
125 @22,78 SAY P26 PICTURE '@( $$.$'
126 @22,84 SAY E26 PICTURE '@( $$$,$$$'
```

```
127 á23,3 SAY 'PASSENGER '
128 á23,20 SAY F2 PICTURE 'á( ###,###'
129 á23,30 SAY P2 PICTURE 'á( ##.#'
130 á23,36 SAY E2 PICTURE 'á( ###,###'
131 á24,3 SAY 'CHARTERS '
132 á24,20 SAY F3 PICTURE 'á( ###,###'
133 á24,30 SAY P3 PICTURE 'á( ##.#'
134 á24,36 SAY E3 PICTURE 'á( ###,###'
135 á24,46 SAY 'VSL ACQUISITION COST '
136 á24,78 SAY F27 PICTURE 'a( #,###,###'
137 á25,3 SAY 'OTHER REVENUE '
138 á25,20 SAY F4 PICTURE 'á( ###,###'
139 á25,30 SAY P4 PICTURE 'á( ##.#'
140 á25,36 SAY E4 PICTURE 'á( ###,###'
141 á25,46 SAY 'CAPITALIZED EXPENSES '
142 á25,78 SAY F28 PICTURE 'á( #,###,###'
143 á26,3 SAY 'LESS: CCTAX '
144 á26,20 SAY F5 PICTURE 'á( ###,###'
145 á26,30 SAY P5 PICTURE 'á( ##.#'
146 á26,36 SAY E5 PICTURE 'á( ###,###'
147 á26,46 SAY 'TOTAL INVESTMENT IN VSL'
148 á26,78 SAY F29 PICTURE 'á( #,###,###'
149 á27,3 SAY 'COMM. '
150 á27,20 SAY F6 PICTURE 'a( ###,###'
151 á27,30 SAY P6 PICTURE 'á( ##.#'
152 á27,36 SAY E6 PICTURE 'á( ###,###'
153 á27,46 SAY 'LESS: ACCUM DEPREC'+CHR(39)+'N '
154 á27,78 SAY F30 PICTURE 'á( #,###,###'
155 á28,6 SAY 'TOTAL REV NET'
156 á28,20 SAY NREV1 PICTURE 'á( ###,###'
157 á28,30 SAY W1 PICTURE 'á( ##.#'
158 á28,36 SAY NREV2 PICTURE 'á( ###,###'
159 á28,46 SAY 'NET BOOK VALUE OF VSL '
160 á28,78 SAY F31 PICTURE 'á( #,###,###'
161 a29,46 SAY 'ADD: WORKING CAPITAL'
162 á29,78 SAY F32 PICTURE 'á( #,###,###'
163 á30,1 SAY 'VOYAGES EXPENSES: '
164 á30,46 SAY 'TOTAL INVESTED CAPITAL'
165 á30,78 SAY F33 PICTURE 'á( #,###,###'
166 á31,3 SAY 'FUEL-DIESEL'
167 á31,20 SAY F7 PICTURE 'á( ###,###'
168 á31,30 SAY P7 PICTURE 'á( ##.#'
169 á31,36 SAY E7 PICTURE 'á( ###,###'
170 á32,3 SAY 'FUEL-BUNKER'
171 á32,20 SAY F8 PICTURE 'á( ###,###'
172 á32,30 SAY P8 PICTURE 'á( ##.#'
173 á32,36 SAY E8 PICTURE 'á( ###,###'
174 á32,46 SAY 'PROVN FOR RETURN ON INVSTMT'
175 á32,78 SAY RRET PICTURE 'á( #,###,###'
176 á33,3 SAY 'FUEL-SFO'
177 á33,20 SAY F9 PICTURE 'á( ###,###'
178 á33,30 SAY P9 PICTURE 'á( ##.#'
179 á33,36 SAY E9 PICTURE 'á( ###,###'
180 á34,3 SAY 'PORT CHARGES'
181 á34,20 SAY F10 PICTURE 'á( ###,###'
182 á34,30 SAY P10 PICTURE 'á( ##.#'
183 á34,36 SAY E10 PICTURE 'á( ###,###'
184 á34,46 SAY '========== ANALYSIS (AT'
185 á34,70 SAY EYEAR PICTURE '####'
186 á34,75 SAY 'COSTS ) ==========='
187 á35,3 SAY 'CARGO CHARGES'
188 á35,20 SAY F11 PICTURE 'á( ###,###'
189 á35,30 SAY P11 PICTURE 'á( ##.#'
```

```
190 á35,36 SAY E11 PICTURE 'á( ###,###'
191 á36,3 SAY 'MISC VOY EXP'
192 á36,20 SAY F12 PICTURE 'á( ###,###'
193 á36,30 SAY P12 PICTURE 'á( ##.#'
194 á36,36 SAY E12 PICTURE 'á( #,##,###'
195 á36,46 SAY 'DAILY OPERATING COST: Actual-'
196 á36,80 SAY DOPE PICTURE 'á( ###,###.##'
197 á37,6 SAY 'TOTAL '
198 á37,20 SAY VOEx1 PICTURE 'á( ###,###'
199 á37,30 SAY W2 PICTURE 'á( ##.#'
200 á37,36 SAY VOEx2 PICTURE 'á( ###,###'
201 á37,68 SAY '320 days-'
202 á37,80 SAY DOPE1 PICTURE 'á( ###,###.##'
203 á38,46 SAY 'DAILY RUNNING COST:'
204 á39,1 SAY 'RUNNING EXPENSES:'
205 á39,49 SAY 'BASED ON REPORTED COMNDAYS '
206 á39,80 SAY DRCA PICTURE 'á( ###,###.##'
207 á40,3 SAY 'LUBE '
208 á40,20 SAY F13 PICTURE 'á( ###,###'
209 á40,30 SAY P13 PICTURE 'á( ##.#'
210 á40,36 SAY E13 PICTURE 'á( ###,###'
211 á40,49 SAY 'BASED ON 320 DAYS PER YR'
212 á40,80 SAY DRCI PICTURE 'a( ###,###.##'
213 a41,3 SAY 'SALARIES'
214 á41,20 SAY F14 PICTURE 'á( ###,###'
215 á41,30 SAY P14 PICTURE 'á( ##.#'
216 á41,36 SAY E14 PICTURE 'á( ###,###'
217 á42,3 SAY 'BENEFITS'
218 á42,20 SAY F15 PICTURE 'a( ###,###'
219 á42,30 SAY P15 PICTURE 'á( ##.#'
220 á42,36 SAY E15 PICTURE 'á( ###,###'
221 á42,46 SAY 'VOYAGE COST PER MILE:'
222 á42,80 SAY VCPM PICTURE 'á( #,###.####'
223 á43,3 SAY 'FOOD & SUBSIST'
224 á43,20 SAY F16 PICTURE 'á( ###,###'
225 á43,30 SAY P16 PICTURE 'á( ##.#'
226 á43,36 SAY E16 PICTURE 'á( ###,###'
227 á43,46 SAY 'COST PER DAY AT SEA:'
228 á43,80 SAY CPDS PICTURE 'a( ###,###.##'
229 á44,3 SAY 'SUPPLIES'
230 á44,20 SAY F17 PICTURE 'á( ###,###'
231 á44,30 SAY P17 PICTURE 'á( ##.#'
232 á44,36 SAY E17 PICTURE 'á( ###,###'
233 á45,3 SAY 'DRYDOCK, R&M'
234 á45,20 SAY F18 PICTURE 'á( ###,###'
235 á45,30 SAY P18 PICTURE 'á( ##.#'
236 á45,36 SAY E18 PICTURE 'á( ###,###'
237 á45,46 SAY 'ASSUMING  (--ASSUMING'
238 á45,70 SAY DLF3 PICTURE '###'
239 á45,74 SAY '%'
240 á45,76 SAY DLF4 PICTURE '###'
241 á45,80 SAY '% LOAD FACTOR--)'
242 á46,3 SAY 'INSURANCE'
243 á46,20 SAY F19 PICTURE 'á( ###,###'
244 á46,30 SAY P19 PICTURE 'á( ##.#'
245 á46,36 SAY E19 PICTURE 'á( ###,###'
246 á46,46 SAY 'PAX SHARE  **VOYAGE COST PER**  ***FIXED COST*** '
247 á47,3 SAY 'CLAIMS'
248 á47,20 SAY F20 PICTURE 'á( ###,###'
249 á47,30 SAY P20 PICTURE 'á( ##.#'
250 á47,36 SAY E20 PICTURE 'á( ###,###'
251 á47,46 SAY 'IN COST    TONMILE    PAXMILE   PER TON  PER PAX'
252 á48,3 SAY 'TAXES & LICENSES'
```

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```
 253 á48,20 SAY F21 PICTURE 'a( 999,999'
 254 á48,30 SAY P21 PICTURE 'à( 99.9'
 255 á48,36 SAY E21 PICTURE 'a( 999,999'
 256 á48,47 SAY '  0%'
 257 á48,56 SAY F34 PICTURE '999.9999'
 258 á48,67 SAY F41 PICTURE '999.9999'
 259 á48,78 SAY F48 PICTURE '9999.99'
 260 á48,87 SAY F55 PICTURE '9999.99'
 261 á49,3 SAY 'MISC RUNNING EXP'
 262 á49,20 SAY F22 PICTURE 'á( 999,999'
 263 á49,30 SAY P22 PICTURE 'á( 99.9'
 264 á49,36 SAY E22 PICTURE 'á( 999,999'
 265 á49,47 SAY ' 20%'
 266 á49,56 SAY F35 PICTURE '999.9999'
 267 á49,67 SAY F42 PICTURE '999.9999'
 268 á49,78 SAY F49 PICTURE '9999.99'
 269 á49,87 SAY F56 PICTURE '9999.99'
 270 á50,7 SAY 'TOTAL'
 271 á50,20 SAY RUEX1 PICTURE 'á( 999,999'
 272 á50,30 SAY W3 PICTURE 'á( 99.9'
 273 á50,36 SAY RUEX2 PICTURE 'á( 999,999'
 274 á50,47 SAY ' 40%'
 275 a50,56 SAY F36 PICTURE '999.9999'
 276 á50,67 SAY F43 PICTURE '999.9999'
 277 a50,78 SAY F50 PICTURE '9999.99'
 278 a50,87 SAY F57 PICTURE '9999.99'
 279 á51,47 SAY ' 60%'
 280 a51,56 SAY F37 PICTURE '999.9999'
 281 á51,67 SAY F44 PICTURE '999.9999'
 282 a51,78 SAY F51 PICTURE '9999.99'
 283 á51,87 SAY F58 PICTURE '9999.99'
 284 a51,1 SAY 'ADMINISTRATIVE & OVERHEAD EXPENSES:'
 285 a52,47 SAY ' 80%'
 286 a52,56 SAY F38 PICTURE '999.9999'
 287 á52,67 SAY F45 PICTURE '999.9999'
 288 a52,78 SAY F52 PICTURE '9999.99'
 289 a52,87 SAY F59 PICTURE '9999.99'
 290 a53,3 SAY 'TERMINALS'
 291 á53,20 SAY F23 PICTURE 'á( 999.999'
 292 a53,30 SAY P23 PICTURE 'à( 99.9'
 293 á53,36 SAY E23 PICTURE 'á( 999,999'
 294 á53,47 SAY '100%'
 295 á53,56 SAY F39 PICTURE '999.9999'
 296 á53,67 SAY F46 PICTURE '999.9999'
 297 á53,78 SAY F53 PICTURE '9999.99'
 298 á53,87 SAY F60 PICTURE '9999.99'
 299 á54,3 SAY 'GENERAL ADMIN'
 300 á54,20 SAY F24 PICTURE 'á( 999,999'
 301 á54,30 SAY P24 PICTURE 'á( 99.9'
 302 á54,36 SAY E24 PICTURE 'á( 999,999'
 303 á54,46 SAY 'REV BASED'
 304 á54,56 SAY F40 PICTURE '999.9999'
 305 á54,67 SAY F47 PICTURE '999.9999'
 306 á54,78 SAY F54 PICTURE '9999.99'
 307 á54,87 SAY F61 PICTURE '9999.99'
 308 a56,1 SAY 'REMARKS: '
 309 á56,10 SAY SUBSTR(R1,1,80)
 310 IF LEN(R1)>80
 311  a57,10 SAY SUBSTR(R1,81,80)
 312 ENDIF
 313 IF LEN(R1)>160
 314  á58,10 SAY SUBSTR(R1,160,80)
 315 ENDIF
```

```
316 ???chr(10) &&line feed
317 _plineno=0
318 SET DEVICE TO SCREEN
319 SKIP
320 ENDDO
321 ENDIF
322 EXIT
323 ENDDO
324 CLOSE ALL
325 ?CHR(7)
```

Appendix D

ROUTINE TO GENERATE HARDCOPY OF ANALYSIS OF VOYAGE, RUNNING, AND OTHER OPERATING EXPENSES BY VESSEL TYPE AT 1991 PRICE LEVEL

```
*  ********** GENERATES HARDCOPY OF ANALYSIS OF **********
*       VOYAGE, RUNNING, & OTHER OPERATING EXPENSES
*           BY VESSEL TYPE AT 1991 PRICE LEVEL
*             by D D Santos Jr., Nathan Associates
*  ************************************************************
*  Filespec: COSTANA1.PRG
SET TALK OFF
CLOSE ALL
ERASE MAINANA.DBF
ERASE TEMP.NDX
USE MAINANAL
INDEX ON VESLOWT TO TEMP
COPY TO MAINANA
USE MAINANA
ERASE TEMP.NDX
INDEX ON VESLTYP TO TEMP
BYEAR = BYEAR
SET DEVICE TO PRINT
???CHR(27)+CHR(77)
@PROW()+1,1 SAY '*****  SUMMARY OF RATIO ANALYSIS (COSTANA1) *****'
???CHR(27)+CHR(77)+CHR(15)
X=1
DO WHILE X<10
M_A='TYPA'+LTRIM(STR(X))
M_B='TYPB'+LTRIM(STR(X))
M_C='TYPC'+LTRIM(STR(X))
M_D='TYPD'+LTRIM(STR(X))
M_E='TYPE'+LTRIM(STR(X))
M_F='TYPF'+LTRIM(STR(X))
M_G='TYPG'+LTRIM(STR(X))
M_H='TYPH'+LTRIM(STR(X))
M_I='TYPI'+LTRIM(STR(X))
M_J='TYPJ'+LTRIM(STR(X))
M_K='TYPK'+LTRIM(STR(X))
M_L='TYPL'+LTRIM(STR(X))
M_N='TYPN'+LTRIM(STR(X))
CALCULATE AVG(YRBUILT) TO &M_A FOR VESLTYP=X .AND. YRBUILT>0
CALCULATE AVG(CONDAYS) TO &M_B FOR VESLTYP=X .AND. CONDAYS>0
CALCULATE AVG(W1) TO &M_C FOR VESLTYP=X .AND. UPPER(OPERATED)='Y'
CALCULATE AVG(W2) TO &M_D FOR VESLTYP=X .AND. UPPER(OPERATED)='Y'
CALCULATE AVG(W3) TO &M_E FOR VESLTYP=X .AND. UPPER(OPERATED)='Y'
CALCULATE AVG(P23) TO &M_F FOR VESLTYP=X .AND. UPPER(OPERATED)='Y'
CALCULATE AVG(P24) TO &M_G FOR VESLTYP=X .AND. UPPER(OPERATED)='Y'
CALCULATE AVG(P25) TO &M_H FOR VESLTYP=X .AND. UPPER(OPERATED)='Y'
CALCULATE AVG(P26) TO &M_I FOR VESLTYP=X .AND. UPPER(OPERATED)='Y'
&M_J=100 - &M_D - &M_E - &M_F - &M_G - &M_H - &M_I
&M_A=BYEAR - &M_A
CALCULATE AVG(VESLOWT) TO &M_K FOR VESLTYP=X .AND. VESLOWT>0
CALCULATE AVG(DOPEI) TO &M_L FOR VESLTYP=X .AND. UPPER(OPERATED)='Y'
CALCULATE AVG(DRCI) TO &M_N FOR VESLTYP=X .AND. UPPER(OPERATED)='Y'
@PROW()+2,1 SAY    'VESSEL   AVE.  AVE.    <----- RATIOS FOR OPERATED VSLS ONLY ------>    AVE.   AVE.DAILY   AVE.DAILY'
@PROW()+1,1 SAY    ' TYPE     AGE  CONDAYS  NREV  VOYE  RUNE TERM  ADMI DEPC  DEPA  PROF    DWT    OPG COST    RUN COST'
@PROW()+2,1 SAY X PICTURE '##'
@PROW(),9 SAY &M_A PICTURE '####'
@PROW(),16 SAY &M_B PICTURE '###'
@PROW(),24 SAY &M_C PICTURE '###'
@PROW(),31 SAY &M_D PICTURE '###'
@PROW(),37 SAY &M_E PICTURE '###'
@PROW(),42 SAY &M_F PICTURE '###'
@PROW(),48 SAY &M_G PICTURE '###'
@PROW(),53 SAY &M_H PICTURE '###'
@PROW(),59 SAY &M_I PICTURE '###'
@PROW(),64 SAY &M_J PICTURE '###'
@PROW(),70 SAY &M_K PICTURE '##,###'
@PROW(),80 SAY &M_L PICTURE '###,###'
@PROW(),91 SAY &M_N PICTURE '###,###'
X=X+1
ENDDO
EJECT
SET DEVICE TO SCREEN
REPORT FORM COSTANA1 TO PRINT NOEJECT
```

OPERATOR DATA CODE	CAT	SCALE	VSL CODE	VSL TYP	GRT	DWT	PAX CAP.	YEAR BLT	OPE RAT?	CON DAYS	MILES RUN	**IN PROPORTION TO TOTAL OPERATING COST** MREV	VOYE	RUNE	TERM	ADMI	DEPM	PROF	DATA CARG	CASE PAX	AVG TRIP LENGTH	DAILY OPCOST	DAILY RUNCO
S0020	L	A	B0029	1	0	0	0	1966	N	0	0	0.0	1.3	58.5	13.3	6.2	13.3	7.3	2	2	0	0	1,429
S0020	L	A	H0002	1	0	0	0	1973	N	0	0	0.0	4.0	74.4	11.9	5.6	0.0	4.0	2	2	0	0	521
A0003	L	A	M0035	1	0	0	0	1980	N	0	0	0.0	7.3	59.4	16.0	14.4	1.0	1.8	2	2	0	0	630
K0002	S	D	K0028	1	35	19	0	1985	N	330	3,600	0.0	**.*	**.*	0.0	2.6	26.4	45.8	2	2	0	122	341
K0002	S	D	K0029	1	35	21	0	1976	Y	330	500	49.8	32.5	51.2	0.0	6.2	5.9	4.2	2	2	0	751	507
I0021	S	D	I0021	1	74	22	0	0	Y	215	0	86.1	41.2	41.1	0.0	0.0	16.1	1.6	2	2	0	1,529	899
S0020	L	A	D0078	1	98	180	10	1968	Y	34	938	17.8	-5.0	79.5	14.2	6.6	2.8	2.0	2	2	0	2,052	2,156
S0020	L	A	G0019	1	99	180	0	1969	Y	241	5,290	59.5	14.0	61.1	12.9	6.0	2.0	3.9	2	2	0	6,140	5,277
S0020	L	A	B0031	1	224	220	0	1960	Y	339	5,003	3.9	26.3	53.5	12.4	5.8	0.0	2.0	2	2	0	14,719	10,846
00009	S	D	T0041	1	0	272	0	1975	N	305	14,112	**.*	**.*	**.*	0.0	0.0	0.0	0.0	2	2	0	40	332
S0020	L	A	B0040	1	230	280	0	0	Y	94	1,018	28.1	2.8	74.7	14.0	6.5	0.0	2.0	2	2	0	4,587	4,458
S0010	S	C	J0033	1	240	284	0	1980	Y	0	0	85.2	48.5	46.2	0.0	0.0	3.4	2.0	2	2	0	0	3,442
E0015	S	D	D0039	1	230	350	0	0	N	0	0	48.6	0.0	88.4	0.0	0.6	7.5	3.6	2	2	0	0	694
P0010	S	C	P0041	1	431	560	0	1987	Y	353	93,456	**.*	36.8	40.7	4.7	13.9	1.8	2.1	2	2	0	26,375	16,680
S0010	S	C	J0034	1	499	591	0	1970	Y	0	0	86.3	47.2	47.8	0.0	0.0	3.0	2.0	2	2	0	0	4,275
A0025	M	D	W0027	1	487	1,000	0	1959	N	0	0	0.0	8.2	70.0	0.0	19.8	0.0	00.0	2	2	0	0	70
P0010	S	C	I0016	1	763	1,050	0	0	Y	122	2,500	**.*	5.9	68.1	4.9	14.6	4.5	2.0	2	2	0	6,730	6,331
S0010	S	C	J0081	1	958	1,135	0	1968	Y	0	0	94.6	55.7	39.1	0.0	0.0	3.2	1.9	2	2	0	0	3,623
A0025	M	D	M0129	1	874	1,200	0	1963	Y	194	900	50.4	13.6	53.1	0.0	17.2	14.4	1.7	2	2	0	13,432	11,601
A0025	M	D	J0071	1	701	1,250	0	1963	Y	269	1,950	**.*	19.1	56.1	0.0	16.5	6.3	1.9	2	2	0	13,798	11,161
B0010	S	D	L0086	1	896	1,351	0	0	Y	185	5,520	51.9	20.3	52.7	0.0	2.7	8.4	16.0	2	2	0	9,626	7,67
M0024	S	C	M0047	1	791	1,375	0	1965	Y	182	0	94.6	36.2	57.7	0.0	0.0	4.1	1.9	2	2	0	83,087	52,99
A0035	M	C	S0046	1	956	1,454	0	1971	N	0	0	64.3	29.3	48.1	0.0	7.4	13.5	1.7	2	2	0	0	16,63
S0024	L	A	S0085	1	844	1,564	6	1969	N	0	0	-2.4	1.6	59.8	10.6	14.8	6.3	6.9	2	2	0	0	17,11
A0035	M	C	A0080	1	988	1,734	0	1977	N	330	14,300	60.9	29.9	45.1	0.0	7.0	16.4	1.6	2	2	0	25,227	17,67
S0024	L	A	ASC80	1	988	1,734	0	0	Y	47	4,704	**.*	9.9	9.5	2.9	4.1	73.0	0.6	1	2	392	7,261	6,53
A0035	M	C	E0035	1	931	1,812	0	1971	N	281	11,860	75.4	31.1	44.7	0.0	7.0	15.5	1.7	2	2	0	23,961	16,50
S0013	L	B	S0039	1	947	1,880	10	1968	Y	195	50,383	**.*	36.4	35.8	17.4	8.3	0.0	2.1	1	2	816	77,279	49,16
E0005	M	B	L0002	1	990	1,930	0	1968	Y	206	13,245	**.*	46.3	11.7	6.3	13.8	7.7	14.1	1	2	418	21,228	11,40
E0005	M	B	V0010	1	997	1,938	0	1967	Y	115	6,128	64.0	38.8	12.6	6.1	13.3	10.6	18.6	1	2	409	15,609	9,54
C0010	L	C	C0016	1	980	2,000	25	1968	N	300	14,834	70.7	10.5	62.8	0.0	16.5	6.3	3.8	2	2	0	25,408	22,743
C0010	L	C	C0017	1	992	2,000	0	1969	N	338	10,915	87.2	4.8	69.2	0.0	17.2	5.7	3.0	2	2	0	28,329	26,968
A0035	M	C	D0135	1	1,111	2,000	0	1970	N	291	8,732	31.5	7.0	63.5	0.0	7.6	20.3	1.6	2	2	0	22,254	20,695
S0024	L	A	DS135	1	1,111	2,000	0	1970	Y	111	8,800	**.*	24.8	16.8	5.2	7.3	44.7	1.1	1	2	470	20,195	15,191
A0035	M	C	R0001	1	943	2,000	0	1970	N	308	8,759	69.9	27.3	55.7	0.0	8.3	4.5	4.1	2	2	0	17,994	13,073
S0024	L	A	RS001	1	943	2,000	0	1970	Y	26	2,170	**.*	**.*	85.3	13.2	18.4	0.0	2.0	2	2	0	2,168	2,575
S0013	L	B	SG040	1	986	2,004	0	0	Y	129	32,888	87.6	21.5	40.5	17.9	8.5	8.2	3.4	1	2	816	87,086	68,322
M0024	S	C	M0049	1	948	2,009	0	1967	N	210	0	0.0	**.*	**.*	0.0	0.0	0.0	0.0	2	2	0	60	498
E0005	M	B	K0021	1	947	2,011	0	0	Y	300	17,030	**.*	27.2	6.0	2.9	6.4	56.6	0.9	1	2	445	34,572	25,162
S0024	L	A	AS050	1	1,629	2,019	0	0	Y	366	26,128	**.*	26.6	16.1	5.6	7.8	42.8	1.2	1	2	466	52,857	38,807
A0035	M	C	V0041	1	1,357	2,147	0	0	N	312	12,288	**.*	-4.9	48.2	0.0	3.8	51.9	0.9	2	2	0	9,004	9,442
S0024	L	A	VS041	1	1,357	2,147	0	0	Y	366	26,806	**.*	39.0	5.7	5.4	7.6	41.2	1.2	1	2	556	59,454	36,290
A0035	M	C	A0050	1	1,627	2,157	19	1974	N	338	26,750	**.*	0.9	66.1	0.0	7.2	24.3	1.5	2	2	0	18,171	18,000
M0024	S	C	M0048	1	992	2,165	0	1967	N	185	0	0.0	**.*	**.*	0.0	0.0	0.0	0.0	2	2	0	60	498
E0005	M	B	F0018	1	1,000	2,194	0	0	y	315	16,340	**.*	26.9	6.4	2.9	6.4	56.6	0.9	1	2	431	25,942	18,971
E0005	M	B	G0023	1	991	2,194	0	0	Y	75	4,772	**.*	25.0	8.4	2.9	6.4	56.5	0.9	1	2	414	10,108	7,586
E0005	M	B	M0068	1	991	2,198	0	0	y	15	1,021	**.*	3.9	67.2	8.4	18.5	0.0	1.9	1	2	409	1,634	1,570
S0013	L	B	M0018	1	2,223	2,297	0	1969	Y	146	41,020	53.4	47.8	24.2	17.6	8.4	0.0	2.0	1	2	586	157,688	82,317
S0035	L	D	S0159	1	2,068	3,445	0	1967	Y	320	1,350	87.6	34.7	52.6	0.0	9.5	1.3	1.9	2	2	0	16,229	10,598
E0005	M	B	P0019	1	2,323	3,554	0	1960	Y	15	618	18.0	17.7	11.5	5.3	11.7	20.2	33.6	1	2	443	18,896	15,542
S0013	L	B	S0038	1	1,479	3,616	12	1970	Y	164	43,126	89.4	31.1	40.4	18.0	8.6	0.0	2.0	1	2	747	96,060	66,195
S0013	L	B	M0066	1	1,834	4,085	0	1977	Y	73	21,554	84.8	22.5	17.0	14.7	7.0	19.3	19.5	1	2	829	104,160	80,764
S0035	L	D	D0164	1	2,594	4,160	0	0	Y	320	150	52.7	7.8	21.1	0.0	9.4	47.7	14.1	2	2	0	8,539	7,871
C0010	L	C	D0163	1	2,503	4,240	0	0	N	165	8,654	58.7	15.7	54.2	0.0	17.0	7.2	5.9	2	2	0	54,946	46,294
S0013	L	B	P0035	1	2,671	4,436	0	1970	Y	176	54,914	**.*	41.2	31.4	17.2	8.2	0.0	2.1	1	2	829	107,533	63,252
I0009	S	C	I0009	1	2,949	4,830	0	0	Y	351	29,480	**.*	34.6	35.8	0.0	0.5	13.1	15.9	1	2	422	70,901	46,340
I0005	S	C	I0011	1	2,949	4,830	0	1982	Y	339	34,631	**.*	38.3	46.0	0.0	0.6	13.5	1.7	1	2	444	64,106	39,545
I0014	S	C	I0007	1	2,949	4,891	0	0	Y	357	36,362	**.*	34.7	36.9	0.0	0.5	12.2	15.8	1	2	449	70,866	46,304
I0011	S	C	I0008	1	2,949	4,891	0	0	Y	174	12,433	**.*	45.7	45.7	0.0	0.6	6.2	1.8	1	2	342	60,909	33,046
I0010	S	C	I0010	1	2,949	4,891	0	0	Y	313	24,175	**.*	34.3	38.6	0.0	0.5	10.5	16.1	1	2	399	71,596	47,034

OPERATOR DATA FCDE	CAT	SCALE	VSL CODE	VSL TYP	GRT	DWT	PAX CAP.	YEAR BLT	OPE RAT?	CON DAYS	MILES RUN	**IN PROPORTION TO TOTAL OPERATING COST** MREV	VOYE	RUNE	TERM	ADMI	DEPN	PROF	DATA CARG	CASE PAX	AVG TRIP LENGTH	DAILY OPCOST	DAILY RUNCO
S0035	L	D	D0155	1	2,992	4,918	25	1966	Y	320	1,500	93.1	43.7	44.9	0.0	9.5	0.0	2.0	2	2	0	25,710	14,478
S0035	L	D	D0156	1	3,118	5,028	19	1970	Y	320	1,350	93.3	38.1	50.4	0.0	9.5	0.0	2.0	2	2	0	21,210	13,120
C0010	L	C	C0106	1	2,988	5,350	0	1967	N	335	26,598	**.*	7.7	68.1	0.0	17.2	2.9	4.2	2	2	0	42,619	39,353
A0025	M	D	Q0008	1	1,935	5,500	0	1970	N	0	0	0.0	17.1	40.0	0.0	17.5	23.8	1.5	2	2	0	0	13,250
C0010	L	C	C0105	1	2,989	5,655	0	0	N	341	23,193	88.3	5.3	55.8	0.0	13.5	24.0	1.5	2	2	0	57,834	54,774
I0006	S	B	M0056	1	3,441	5,918	0	0	N	217	24,949	85.0	0.8	27.1	0.0	4.3	37.4	30.4	2	2	0	82,738	82,113
S0035	L	D	D0154	1	4,026	6,350	28	1967	Y	320	1,350	93.7	39.1	49.5	0.0	9.5	0.0	2.0	2	2	0	22,893	13,952
S0035	L	D	S0158	1	3,746	7,083	0	1972	Y	320	1,350	86.2	44.4	43.4	0.0	9.3	0.9	2.0	2	2	0	25,163	13,991
NO. OF SAMPLES:			68		91,883	160,597	154																
A0003	L	A	A0103	3	0	0	0	0	Y	0	0	**.*	84.9	**.*	15.3	13.7	0.0	00.0	2	2	0	0	-4
L0008	U	B	C0102	3	0	0	0	0	N	0	0	99.1	32.9	28.6	20.2	16.5	0.0	2.0	2	2	0	0	3,307
S0020	L	A	S0061	3	0	0	6	1967	N	0	0	0.0	30.1	6.2	14.3	6.7	38.9	3.8	2	2	0	0	2,364
M0004	L	A	A0038	3	642	442	0	0	Y	325	14,838	94.9	8.7	6.8	2.8	3.0	78.1	0.5	1	2	250	26,009	23,749
M0004	L	A	A0069	3	642	442	0	0	Y	339	13,367	**.*	11.2	10.8	4.0	4.3	69.0	0.7	1	2	166	25,765	22,867
L0008	U	B	L0034	3	1,109	1,416	0	1972	Y	320	102,284	45.5	19.0	38.2	18.5	15.2	4.1	5.1	1	2	562	46,090	37,346
S0020	L	A	S0218	3	915	1,759	10	1968	Y	365	17,235	59.9	42.9	33.8	13.3	6.2	1.7	2.1	2	2	0	76,449	43,658
L0008	U	B	L0031	3	1,034	1,800	0	1967	N	0	0	**.*	17.6	44.3	19.9	16.2	0.0	1.8	2	2	0	0	437
A0003	L	A	A0003	3	1,256	1,873	48	1965	Y	365	35,167	79.0	23.3	41.8	15.3	13.7	3.9	2.1	1	1	333	128,750	98,782
L0008	U	B	L0036	3	1,008	1,900	0	1968	Y	320	106,950	67.3	24.5	31.8	17.8	14.5	6.0	5.3	1	2	575	22,911	17,302
S0020	L	A	S0210	3	1,145	1,900	34	1967	Y	365	23,397	78.8	37.6	38.9	13.3	6.2	1.9	2.1	1	2	352	79,021	49,323
M0004	L	A	C0029	3	1,428	1,996	0	1971	Y	334	34,330	**.*	17.2	37.6	11.7	12.6	11.4	9.4	1	2	338	130,151	107,763
L0008	U	B	L0035	3	1,026	2,000	0	1968	Y	320	106,928	9.8	10.0	51.2	20.3	16.6	0.0	2.0	1	2	656	10,535	9,480
S0020	L	A	S0065	3	921	2,000	6	1967	Y	365	22,400	68.2	41.7	34.8	12.9	6.0	2.2	2.4	1	2	464	70,317	41,010
L0008	U	B	L0030	3	1,145	2,001	0	1968	Y	320	107,532	6.0	13.1	36.7	18.4	15.0	7.2	9.6	1	2	522	6,938	6,031
S0020	L	A	S0060	3	1,031	2,021	10	1968	Y	365	27,502	75.1	42.1	34.7	13.2	6.1	1.7	2.1	1	2	373	76,296	44,167
L0008	U	B	L0033	3	980	2,028	0	1968	Y	320	107,085	7.3	16.6	25.5	19.2	15.7	17.3	5.7	1	2	363	9,730	8,118
A0003	L	A	A0096	3	1,372	2,424	0	1957	Y	0	0	-0.9	1.9	46.6	16.0	14.4	18.3	2.9	2	2	0	0	50,887
L0008	U	B	L0039	3	1,489	2,600	0	1968	Y	320	104,894	56.2	17.7	27.1	17.4	14.2	11.5	12.0	1	2	586	27,737	22,827
L0008	U	B	C0002	3	2,331	2,996	0	1974	Y	320	99,220	**.*	32.7	24.6	17.6	14.4	5.0	5.8	1	2	605	66,263	44,609
L0008	U	B	L0038	3	1,866	3,192	0	1968	Y	320	90,750	**.*	30.5	33.6	18.6	15.2	0.0	2.1	1	2	750	64,018	44,503
W0003	L	A	W0011	3	2,185	3,220	0	1965	Y	365	37,738	**.*	24.1	35.3	15.5	10.6	**.*	1.8	1	2	433	139,371	105,850
60030	M	B	00010	3	2,348	3,249	0	1979	Y	347	34,176	**.*	37.1	38.9	0.0	20.1	2.0	1.9	1	1	423	253,872	159,767
W0003	L	A	W0009	3	4,210	3,275	11	1970	Y	365	43,284	**.*	36.2	36.9	14.8	10.1	0.0	2.1	1	2	489	161,266	102,875
L0008	U	B	D0059	3	1,968	3,285	37	1968	Y	320	95,904	**.*	32.7	31.0	18.6	15.2	0.5	2.0	1	2	666	62,405	41,996
A0003	L	A	A0002	3	1,997	3,287	50	1961	Y	329	35,598	81.3	23.3	38.4	15.4	13.8	6.9	2.2	1	1	389	170,711	130,884
W0003	L	A	W0010	3	2,249	3,405	11	1968	Y	299	35,274	**.*	27.8	44.6	15.2	10.4	0.0	2.1	1	2	480	107,333	77,544
S0020	L	A	S0062	3	2,312	3,500	11	1971	Y	315	34,903	**.*	42.8	30.2	12.2	5.7	4.8	4.3	1	2	575	116,782	66,822
W0003	L	A	W0015	3	1,990	3,500	11	1943	Y	365	42,303	**.*	38.2	35.2	14.6	9.9	0.0	2.0	2	2	0	100,281	61,951
W0003	L	A	W0014	3	1,858	3,738	11	1973	Y	362	40,695	**.*	26.8	32.3	15.4	10.5	13.1	1.8	1	2	335	141,796	103,777
S0020	L	A	S0057	3	3,506	4,003	0	1958	Y	365	27,770	**.*	52.7	27.0	12.4	5.8	0.0	2.1	1	2	544	129,212	61,081
S0020	L	A	S0059	3	2,678	4,175	0	1967	Y	202	22,730	**.*	36.8	37.1	13.4	6.2	4.1	2.5	1	2	500	90,634	57,326
A0003	L	A	A0008	3	2,665	4,293	11	1969	Y	365	45,479	**.*	25.9	32.0	15.2	13.7	11.0	2.3	1	1	477	188,299	139,577
A0003	L	A	C0058	3	2,609	4,387	11	1970	Y	311	32,936	**.*	27.3	29.4	15.1	13.5	12.4	2.4	1	1	539	150,609	109,520
M0004	L	A	S0018	3	2,750	4,432	0	1970	Y	352	32,184	**.*	19.7	37.0	12.0	12.9	10.9	7.6	1	2	337	162,564	130,549
W0003	L	A	W0012	3	3,464	4,632	12	1975	Y	294	43,017	**.*	23.5	35.9	15.5	10.6	12.8	1.8	1	1	703	214,355	163,956
L0008	U	B	D0004	3	2,488	4,880	0	0	Y	320	105,043	72.3	29.1	34.1	18.5	15.1	1.2	2.0	1	2	629	45,000	31,895
S0020	L	A	S0192	3	2,933	4,903	0	1971	Y	211	19,508	91.1	34.0	38.8	13.1	6.1	5.2	2.8	1	2	610	95,571	63,064
W0003	L	A	W0017	3	3,638	5,000	11	1975	Y	366	42,298	**.*	32.1	29.4	14.4	9.8	8.5	5.8	1	2	750	163,329	110,865
A0003	L	A	A0006	3	2,988	5,071	50	1970	Y	365	39,189	**.*	24.2	30.9	15.3	13.8	13.5	2.2	1	1	422	252,153	191,094
A0003	L	A	S0161	3	2,998	5,853	0	1970	N	365	42,833	**.*	34.6	25.4	12.8	11.5	13.9	1.8	1	1	500	189,007	123,672
S0020	L	A	S0058	3	2,835	5,950	0	1966	Y	365	26,971	**.*	37.3	37.4	13.1	6.1	3.7	2.5	1	2	694	123,012	77,176
A0003	L	A	W0018	3	3,742	6,000	0	1974	Y	300	36,745	**.*	26.4	42.3	15.0	10.2	2.4	3.7	1	2	739	190,643	140,339
A0003	L	A	S0154	3	3,793	6,382	0	1976	N	365	43,806	**.*	35.6	23.4	12.2	11.0	16.0	1.8	1	1	599	196,752	126,652
S0020	L	A	S0082	3	3,829	6,612	0	1974	Y	365	25,581	93.6	50.9	22.8	11.9	5.5	5.5	3.4	1	2	526	157,801	77,520
S0020	L	A	S0068	3	4,585	7,000	0	1975	Y	356	27,716	**.*	50.8	23.8	12.0	5.6	4.7	3.2	1	2	545	183,565	90,342
S0003	L	A	S0163	3	4,733	7,218	11	1970	N	365	41,105	**.*	39.0	30.1	14.3	12.8	1.9	2.0	1	1	615	216,684	132,271
S0003	L	A	W0019	3	4,567	8,513	0	1977	Y	264	33,076	94.9	19.8	30.0	14.3	9.7	16.0	10.2	1	2	747	251,380	201,594
S0003	L	A	M0102	3	7,259	12,247	0	1975	N	247	32,307	86.5	22.1	37.9	13.6	12.2	12.5	1.8	1	1	772	300,873	234,290
S. OF SAMPLES:			49		110.516	176.801	362																

OPERATOR DATA CODE	CAT	SCALE	VSL CODE	VSL TYP	GRT	DWT	PAX CAP.	YEAR BLT	OPE RAT?	CON DAYS	MILES RUN	**IN PROPORTION TO TOTAL OPERATING COST** MREV	VOYE	RUNE	TERM	ADMI	DEPN	PROF	DATA CARG	CASE PAX	AVG TRIP LENGTH	DAILY OPCOST	DAILY RUNCO
S0023	S	D	I0006	4	130	0	0	1978	Y	270	15,096	96.7	22.9	37.0	0.3	14.7	23.6	1.6	2	1	25	26,383	20,345
S0023	S	D	I0019	4	130	0	0	0	Y	19	1,021	33.7	13.8	61.9	0.5	21.5	0.4	2.0	2	1	25	5,183	4,468
C0049	S	B	P0077	4	318	0	0	1986	Y	0	0	31.6	21.2	36.4	0.0	13.2	27.7	1.4	2	2	0	0	15,109
M0004	L	A	P0053	4	543	292	1,187	1962	Y	349	24,686	**.*	16.3	55.2	12.4	13.3	0.6	2.2	2	1	24	94,884	79,454
A0036	S	C	M0093	4	2,142	313	1,018	1972	Y	50	17,846	30.5	57.8	23.0	0.0	7.9	9.5	1.8	2	1	378	42,400	17,902
A0036	S	C	M0103	4	2,136	358	1,035	1972	Y	74	5,696	51.0	56.1	18.3	0.0	7.4	16.6	1.7	2	1	356	33,328	14,645
A0036	S	C	M0100	4	1,992	474	950	0	N	2	0	0.0	18.4	66.5	0.0	11.2	2.0	1.9	2	2	0	5,839	4,763
M0004	L	A	D0043	4	1,065	577	1,202	1969	Y	341	24,544	**.*	16.8	50.8	12.5	13.4	4.5	2.0	2	1	24	118,220	98,342
NO. OF SAMPLES:			8		8,456	2,014	5,392																
L0001	S	D	A0017	5	25	0	0	1977	Y	320	6,205	80.5	14.9	60.3	0.0	16.9	6.6	1.9	2	2	0	2,480	2,109
B0031	U	U	B0024	5	0	0	0	0	Y	0	0	68.6	22.9	75.1	0.0	0.0	0.0	2.0	2	2	0	0	49,119
S0020	L	A	D0072	5	0	0	1,501	1966	N	0	0	0.0	0.0	71.3	18.2	8.5	0.0	2.0	2	2	0	0	6,089
S0020	L	A	D0121	5	0	0	0	0	N	0	0	0.0	0.0	71.3	18.2	8.5	0.0	2.0	2	2	0	0	87,398
S0005	U	D	M0132	5	0	0	0	0	Y	0	0	**.*	65.7	29.3	0.0	0.0	1.9	3.1	2	2	0	0	2,373
M0004	L	A	M0034	5	0	0	0	1969	N	0	0	0.0	13.4	60.4	11.7	12.6	0.0	2.0	2	2	0	0	2,628
A0003	L	A	P0126	5	0	0	0	0	N	0	0	0.0	0.0	0.0	0.0	0.0	0.0	**.*	2	2	0	0	2
S0005	U	D	V0047	5	0	0	0	0	Y	0	0	**.*	60.2	33.7	0.0	0.0	3.1	3.1	2	2	0	0	4,933
K0002	S	D	K0031	5	31	19	0	1976	N	320	400	0.0	**.*	**.*	0.0	2.2	22.6	00.0	2	2	0	53	345
K0002	S	D	K0005	5	97	54	0	1979	Y	330	5,000	89.1	31.7	53.8	0.0	7.0	3.0	4.5	2	*	0	3,183	2,173
K0002	S	D	K0002	5	119	71	0	1986	Y	330	6,000	**.*	33.0	42.8	0.0	6.8	9.6	7.8	2	2	0	4,544	3,045
T0018	M	C	A0074	5	490	219	330	1961	Y	255	20,984	**.*	40.7	47.5	0.0	7.3	2.5	2.0	1	1	43	15,760	9,341
S0024	L	A	S0075	5	503	225	373	1965	Y	366	30,240	**.*	29.9	42.1	9.8	13.7	1.8	2.7	1	1	52	36,066	25,269
T0018	M	C	A0083	5	685	235	0	1973	Y	77	3,672	49.7	42.4	37.9	0.0	6.2	1.4	12.0	1	1	43	15,947	9,178
S0010	S	C	J0032	5	226	268	0	1978	Y	0	0	90.3	47.8	46.3	0.0	0.0	4.0	1.9	2	2	0	0	3,239
D0005	S	D	D0007	5	480	272	0	0	N	358	10,494	0.0	**.*	**.*	0.0	0.0	0.0	0.0	2	2	0	45	374
S0024	L	A	S0017	5	934	282	516	1968	N	0	0	-2.2	0.0	41.7	7.5	10.5	0.0	40.4	2	2	0	0	6,303
D0005	S	D	D0104	5	490	308	0	0	N	111	3,498	0.0	**.*	**.*	0.0	0.0	0.0	3.8	2	2	0	80	664
T0018	M	C	A0087	5	964	318	0	1969	Y	25	5,280	28.9	34.6	45.7	0.0	6.6	1.0	12.2	1	1	95	11,834	7,742
T0018	M	C	T0011	5	884	393	669	1968	Y	330	47,022	**.*	58.7	27.3	0.0	6.5	2.6	5.0	1	1	135	51,361	21,223
T0018	M	C	A0076	5	921	401	546	1963	Y	255	30,750	**.*	57.5	31.0	0.0	6.7	2.8	2.0	1	1	135	35,462	15,074
S0024	L	A	S0079	5	446	425	312	1971	Y	87	58,632	82.1	22.7	49.0	10.1	14.2	1.5	2.5	1	1	82	37,530	29,016
T0018	M	C	A0041	5	1,030	444	668	1978	Y	355	34,090	93.9	59.3	26.1	0.0	6.4	2.2	5.9	1	1	116	65,167	26,503
A0003	L	A	P0024	5	569	458	500	1942	Y	90	6,198	31.7	13.0	50.2	15.6	14.1	4.8	2.3	1	1	63	29,464	25,632
A0003	L	A	R0004	5	1,039	492	855	1971	Y	337	27,217	90.0	19.3	45.5	15.0	13.5	4.7	2.1	1	1	65	91,568	73,940
S0010	S	C	L0008	5	416	493	0	1966	Y	0	0	86.3	44.8	48.3	0.0	0.0	5.0	1.9	2	2	0	0	5,335
G0030	M	B	D0034	5	686	505	701	1967	Y	302	35,640	69.1	28.3	49.0	0.0	19.9	0.6	2.3	1	1	135	102,981	73,881
T0018	M	C	A0043	5	1,078	532	555	1972	Y	356	42,897	79.5	59.0	28.0	0.0	6.5	1.6	4.8	1	1	99	62,791	25,727
S0010	S	C	D0067	5	489	579	0	1973	Y	0	0	86.0	45.4	47.8	0.0	0.0	5.0	1.9	2	2	0	0	5,304
W0003	L	A	E0007	5	680	625	328	1944	Y	178	10,144	26.9	16.3	55.5	15.5	10.6	0.0	2.0	1	1	269	55,384	46,329
M0004	L	A	S0023	5	1,110	652	970	1973	Y	332	61,640	55.5	26.3	34.9	11.7	12.6	9.9	4.6	1	1	279	190,990	140,749
A0003	L	A	00006	5	1,441	693	927	1960	Y	365	30,703	67.0	20.2	43.8	15.0	13.5	5.5	2.1	1	1	65	126,303	100,848
S0020	L	A	B0065	5	762	800	758	1970	Y	192	27,782	86.3	28.7	42.2	12.0	5.6	6.5	5.0	2	2	0	82,199	58,635
S0020	L	A	C0101	5	926	800	842	1973	Y	349	48,114	**.*	40.5	33.1	11.9	5.5	6.0	3.1	1	1	132	82,405	49,054
T0018	M	C	A0042	5	1,842	1,035	1,019	1971	Y	295	46,176	92.5	65.4	22.7	0.0	6.7	1.2	4.0	1	1	305	96,897	33,479
S0010	S	C	L0005	5	987	1,170	516	1961	Y	0	0	**.*	46.7	46.5	0.0	0.0	4.8	1.9	2	2	0	0	5,376
M0004	L	A	D0047	5	2,381	1,425	994	1967	Y	321	70,068	**.*	26.1	44.0	12.0	12.9	2.5	2.5	1	1	338	215,318	159,100
M0004	L	A	D0038	5	2,864	1,982	950	1966	Y	341	70,803	**.*	27.8	42.5	12.0	13.0	2.5	2.2	1	1	338	199,885	144,321
S0020	L	A	M0020	5	6,523	2,495	0	1970	Y	278	32,242	72.1	44.0	29.2	11.6	5.4	4.9	4.9	1	1	140	257,492	144,281
NO. OF SAMPLES:			39		32,119	18,668	14,830																
A0003	L	A	A0094	6	4,758	0	2,400	1974	N	0	0	0.0	5.5	33.1	9.1	8.2	43.0	1.1	2	2	0	0	86,898
P0041	U	C	K0006	6	0	0	248	0	Y	328	10,620	75.1	22.0	49.4	0.0	15.2	9.0	4.4	1	1	17	17,062	13,302
P0041	U	C	P0005	6	0	0	208	1965	Y	283	12,760	**.*	24.3	48.1	0.0	15.3	9.2	3.0	1	1	22	19,490	14,753
S0017	S	D	M0015	6	1,021	350	504	1982	Y	301	34,525	95.1	30.2	34.1	8.3	5.8	20.0	1.6	1	1	18	105,961	73,949
P0011	S	D	M0016	6	1,866	350	0	0	Y	340	18,432	96.4	35.4	28.9	9.3	7.9	16.8	1.7	1	1	33	55,362	35,753
G0030	M	B	D0069	6	856	554	732	1967	Y	350	50,706	79.4	25.4	52.1	0.0	20.4	0.1	2.0	1	1	134	140,328	104,627
G0030	M	B	D0035	6	881	569	671	1968	Y	326	47,764	66.9	26.1	51.7	0.0	20.1	0.1	2.0	1	1	142	131,836	97,439
G0030	M	B	D0062	6	821	704	619	1969	Y	352	46,734	**.*	25.6	44.9	0.0	18.2	9.5	1.8	1	1	131	139,294	103,629

OPERATOR DATA CODE	CAT	SCALE	VSL CODE	VSL TYP	GRT	DWT	PAX CAP.	YEAR BLT	OPE RAT?	CON DAYS	MILES RUN	**IN PROPORTION TO TOTAL OPERATING COST** WREV	VOYE	RUNE	TERM	ADMI	DEPN	PROF	DATA CARG	CASE PAX	AVG TRIP LENGTH	DAILY OPCOST	DAILY RUNCO
S0020	L	A	C0015	6	1,098	800	784	1971	Y	275	42,468	**.*	37.9	34.2	12.0	5.6	6.9	3.4	1	1	229	96,644	60,010
G0030	M	B	00009	6	938	819	824	1973	Y	333	36,230	83.4	28.1	46.2	0.0	19.0	4.8	1.9	1	1	264	168,694	121,325
G0030	M	B	00011	6	2,367	1,357	1,824	1972	Y	347	72,440	**.*	40.8	35.9	0.0	18.5	2.9	1.9	1	1	448	214,001	126,722
S0024	L	A	S0073	6	4,634	1,421	1,361	1971	Y	301	61,654	87.5	29.2	29.3	9.6	13.4	10.3	8.1	1	1	750	308,069	217,963
P0041	S	C	P0047	6	958	1,429	565	1965	Y	286	23,094	94.0	36.1	38.9	0.0	14.2	4.8	5.9	1	1	280	58,005	37,050
S0024	L	A	S0216	6	4,051	1,478	0	0	N	0	0	**.*	2.9	54.1	8.8	12.2	0.0	21.9	2	2	0	0	19,451
G0030	M	B	00008	6	2,367	1,481	1,824	1972	Y	349	43,160	**.*	34.0	41.9	0.0	19.1	3.1	1.9	1	1	282	205,013	135,352
S0024	L	A	S0072	6	4,546	1,538	1,550	1972	Y	262	58,176	**.*	33.8	35.7	9.6	13.4	4.6	2.7	1	1	392	357,878	236,839
M0004	L	A	S0047	6	6,131	1,658	1,840	1972	Y	314	80,735	**.*	35.3	27.7	10.9	11.8	5.2	9.1	1	1	376	459,331	237,063
M0004	L	A	S0022	6	4,343	1,700	1,840	1972	Y	337	66,739	**.*	32.6	32.1	11.4	12.2	5.6	6.2	1	1	337	365,271	246,434
S0020	L	A	C0036	6	7,977	2,495	2,145	1970	Y	351	72,764	**.*	50.0	23.9	11.7	5.5	5.0	4.0	1	1	511	482,926	241,559
W0003	L	A	S0199	6	6,525	3,322	2,006	1977	Y	14	2,325	30.0	10.9	24.7	7.4	5.1	0.0	51.9	2	2	0	91,741	81,735
S0020	L	A	F0031	6	13,705	4,278	2,960	1973	Y	209	33,712	**.*	51.9	17.2	10.5	4.9	8.6	6.9	1	1	392	433,074	208,376
W0003	L	A	M0036	6	6,497	5,000	1,334	0	Y	335	71,262	**.*	36.1	31.9	13.8	9.4	6.5	2.3	1	1	428	256,078	163,735
NO. OF SAMPLES:			22		76,339	31,303	26,239																
S0024	L	A	S0148	7	988	339	520	1965	Y	319	26,544	71.7	19.0	39.1	9.6	13.4	9.9	9.0	1	1	106	70,407	57,052
S0024	L	A	S0149	7	998	410	0	1968	Y	103	7,627	39.4	16.1	46.2	9.1	12.7	13.8	2.0	1	1	128	35,619	29,882
S0024	L	A	S0077	7	1,433	417	861	1974	Y	335	29,568	71.8	24.0	44.4	9.7	13.5	6.6	1.9	1	1	120	93,364	70,990
S0020	L	A	S0071	7	1,036	1,000	812	1971	Y	350	49,240	91.1	40.1	30.6	11.8	5.5	7.6	4.3	1	1	380	120,781	72,301
W0003	L	A	C0014	7	2,452	1,165	807	1972	Y	241	55,729	78.2	29.7	38.9	14.6	10.0	3.3	3.6	1	1	358	225,621	158,629
W0003	L	A	T0001	7	1,965	1,173	1,026	1963	Y	341	70,003	81.4	27.2	38.3	15.1	10.3	7.2	1.9	1	1	373	294,057	213,956
W0003	L	A	M0050	7	1,998	1,440	857	1970	Y	321	66,378	**.*	31.1	35.8	14.8	10.1	5.8	2.4	1	1	391	202,155	139,201
W0003	L	A	I0001	7	1,512	1,600	515	1969	Y	342	41,928	**.*	29.7	33.2	14.4	9.8	10.0	2.9	1	1	134	142,808	100,370
S0020	L	A	D0013	7	3,935	1,742	1,091	1973	Y	318	67,420	76.9	44.0	30.4	12.6	5.9	5.0	2.2	1	1	673	310,561	173,870
S0020	L	A	D0105	7	3,787	1,798	1,261	1969	Y	338	60,109	**.*	47.2	28.2	12.4	5.8	4.3	2.1	1	1	427	261,753	138,282
W0003	L	A	00012	7	2,740	1,929	1,089	1965	Y	355	69,373	**.*	33.5	39.8	14.7	10.0	0.0	2.0	1	1	352	218,297	145,210
S0020	L	A	P0095	7	1,497	2,000	630	1973	Y	268	46,652	97.3	37.7	40.4	13.0	6.1	0.8	2.0	1	1	423	118,761	73,961
A0003	L	A	E0010	7	2,048	2,080	893	1955	Y	257	55,509	87.0	28.2	36.2	14.6	13.1	5.9	2.1	1	1	253	148,846	106,875
A0003	L	A	L0018	7	2,048	2,080	912	1955	Y	365	59,947	86.7	28.0	37.6	14.6	13.1	4.6	2.0	1	1	399	178,842	128,687
W0003	L	A	Z0006	7	5,748	2,082	1,875	1975	Y	123	27,488	58.2	20.3	44.0	14.7	10.0	3.7	7.3	1	1	392	437,045	348,530
S0020	L	A	P0066	7	4,718	2,864	1,633	1971	Y	348	76,502	**.*	51.3	23.9	12.3	5.7	4.1	2.7	1	1	426	401,438	195,509
W0003	L	A	M0020	7	2,962	4,706	1,404	1969	Y	325	77,568	81.9	29.5	39.3	14.9	10.2	3.8	2.2	1	1	430	375,405	264,553
W0003	L	A	D0082	7	4,296	4,768	2,003	1973	Y	271	59,766	**.*	32.6	36.5	14.6	10.0	3.4	3.0	1	1	392	448,989	302,814
NO. OF SAMPLES:			18		46,221	33,592	18,189																
A0019	U	U	A0053	9	0	0	0	0	N	0	0	58.8	54.7	41.3	0.0	0.0	3.3	0.7	2	2	0	0	24,645
T0021	S	U	D0010	9	0	0	0	0	Y	0	0	98.0	50.2	44.6	0.0	0.0	3.3	1.8	2	2	0	0	614
S0004	U	U	E0023	9	0	0	0	0	Y	0	0	**.*	0.0	0.3	**.*	0.1	99.4	0.1	2	2	0	0	3,587
M0031	S	U	K0027	9	0	0	0	0	Y	0	0	**.*	39.3	41.1	0.0	4.7	13.1	1.9	2	2	0	0	396
S0004	U	U	M0131	9	0	0	0	0	Y	0	0	79.2	16.1	57.7	1.8	19.2	3.2	1.9	2	2	0	0	4,190
S0004	U	U	M0016	9	0	0	0	0	Y	0	0	77.9	27.7	47.6	1.8	19.1	1.8	2.0	2	2	0	0	8,052
K0006	L	C	P0127	9	0	0	0	0	N	0	0	0.0	7.3	90.6	0.0	0.2	0.0	2.0	2	2	0	0	20,993
K0007	L	C	T0042	9	0	0	0	0	N	0	0	0.0	0.0	97.9	0.0	0.2	0.0	2.0	2	2	0	0	5,896
A0003	L	A	V0045	9	0	0	0	0	Y	0	0	**.*	0.0	61.6	19.2	17.3	0.0	1.9	2	2	0	0	3,730
M0031	S	U	K0003	9	31	16	0	1976	Y	334	400	**.*	8.2	72.9	0.0	4.6	12.6	1.8	2	2	0	681	625
M0003	S	C	H0006	9	61	150	4	1986	N	191	0	0.0	**.*	79.2	0.0	0.0	0.0	90.0	2	2	0	157	266
C0004	S	C	A0026	9	180	241	10	1967	Y	269	10,516	65.3	6.1	68.2	0.0	10.0	12.7	2.9	2	2	0	33,815	31,744
C0004	S	C	D0025	9	230	296	0	1973	Y	362	12,160	**.*	14.3	48.2	0.0	10.3	24.5	2.7	2	2	0	26,283	22,526
H0003	S	C	H0004	9	166	300	0	1967	N	221	0	0.0	**.*	74.1	0.0	0.0	0.0	91.9	2	2	0	196	323
C0004	S	C	B0066	9	230	396	0	0	Y	306	12,224	**.*	18.3	38.0	0.0	7.2	11.2	25.3	2	2	0	22,664	18,514
H0003	S	C	H0005	9	221	400	0	1985	N	281	0	0.0	**.*	23.5	0.0	0.0	0.0	97.5	2	2	0	618	745
H0003	S	C	P0058	9	192	400	0	1987	N	299	9,235	0.0	**.*	20.9	0.0	0.0	0.0	97.5	2	2	0	992	1,175
H0003	S	C	M0127	9	160	450	0	1983	N	102	2,480	0.0	-8.6	9.7	0.0	0.0	0.0	98.8	2	2	0	2,131	2,314
S0016	S	C	S0043	9	233	500	0	1974	Y	326	10,546	**.*	45.1	29.9	0.0	14.6	1.6	8.7	2	2	0	25,976	14,248
S0016	S	C	S0042	9	327	530	0	1987	Y	246	3,601	86.1	30.2	46.0	0.0	15.9	2.1	5.8	2	2	0	27,587	19,264
H0003	S	C	P0029	9	349	650	0	1987	N	307	9,328	0.0	**.*	20.0	0.0	0.0	0.0	97.6	2	2	0	1,037	1,219
H0003	S	C	G0034	9	495	1,300	0	1989	N	197	5,588	0.0	-5.9	6.7	0.0	0.0	0.0	99.2	2	2	0	4,351	4,607
H0003	S	C	P0098	9	493	1,350	0	0	N	289	8,492	0.0	-6.4	7.3	6.0	0.0	0.0	99.1	2	2	0	3,975	4,230
H0035	M	C	S0150	9	943	1,607	0	1971	N	277	4,589	32.4	21.1	52.7	0.0	7.3	17.3	1.6	2	2	0	21,403	16,895

OPERATOR DATA			VSL	VSL			PAX	YEAR	OPE	CON	MILES	**IN PROPORTION TO TOTAL OPERATING COST**							DATA	CASE	AVG TRIP	DAILY	DAILY
CODE	CAT	SCALE	CODE	TYP	GRT	DUT	CAP.	BLT	RAT?	DAYS	SUM	NREV	VOYE	RUNE	TERM	ADMI	DEPN	PROF	CARG	PAX	LENGTH	OPCOST	RUNCO
M0012	S	D	M0018	9	1,087	2,195	0	0	Y	19	1,300	55.8	20.8	31.4	0.0	1.6	6.9	39.3	2	2	0	4,257	3,373
P0049	U	D	I0022	9	3,182	6,173	0	0	N	120	0	98.4	5.5	53.1	0.0	0.4	32.2	8.9	2	2	0	30,295	28,640
B0030	S	A	B0063	9	3,942	6,324	0	0	N	73	7,412	47.4	-0.2	13.1	0.0	0.6	21.9	64.6	2	2	0	55,834	55,953
P0024	L	A	A0110	9	14,165	11,977	0	0	N	209	0	64.5	1.5	68.5	0.0	4.4	24.1	1.5	2	2	0	95,460	94,041
P0024	L	A	L0085	9	14,155	12,003	0	0	N	197	0	68.8	1.2	71.8	0.0	4.6	20.6	1.6	2	2	0	80,295	79,327
P0048	M	C	R0075	9	12,377	12,169	0	0	N	202	0	69.5	3.0	73.5	0.0	0.6	21.3	1.5	2	2	0	60,608	58,798
P0048	M	C	I0024	9	12,376	12,200	0	0	N	222	0	74.0	2.2	73.0	0.0	0.6	22.7	1.5	2	2	0	62,734	61,377
P0024	L	A	E0068	9	36,257	13,683	0	0	N	313	0	71.0	2.7	54.4	0.0	3.5	38.2	1.3	2	2	0	82,501	80,279
P0050	M	C	H0027	9	14,659	15,370	0	0	N	0	0	71.4	0.8	70.7	0.0	0.1	27.0	1.5	2	2	0	0	107,990
P0050	M	C	H0025	9	14,659	15,382	0	0	N	0	0	73.1	1.2	69.7	0.0	0.1	27.6	1.4	2	2	0	0	113,132
P0024	L	A	C0104	9	16,710	15,500	0	0	N	249	0	67.4	1.4	63.9	0.0	4.2	29.1	1.4	2	2	0	108,300	106,781
P0024	L	A	K0035	9	12,552	15,603	0	0	N	270	0	61.6	1.0	65.5	0.0	4.4	27.6	1.4	2	2	0	114,291	113,100
K0007	L	C	H0022	9	9,127	16,325	0	0	N	301	0	68.1	3.5	76.6	0.0	0.1	18.2	1.6	2	2	0	76,525	73,858
K0006	L	C	H0020	9	10,397	16,910	0	0	N	74	0	56.1	-1.4	82.1	0.0	0.1	17.5	1.6	2	2	0	20,425	20,710
K0006	L	C	P0128	9	10,540	18,739	0	0	N	361	0	84.6	2.7	67.1	0.0	0.1	28.7	1.4	2	2	0	56,521	55,006
P0024	L	A	F0038	9	53,578	20,885	0	0	N	275	0	61.9	1.8	56.4	0.0	3.6	36.9	1.3	2	2	0	110,960	108,944
P0045	M	C	H0028	9	53,578	20,885	0	0	N	365	0	**.*	-0.7	40.9	0.0	0.1	58.9	0.9	2	2	0	69,519	69,993
K0006	L	C	H0018	9	13,037	22,577	0	0	N	365	0	72.3	0.7	71.6	0.0	0.1	26.1	1.5	2	2	0	84,265	83,645
K0007	L	C	H0024	9	11,929	22,829	0	0	N	293	0	74.4	2.7	71.0	0.0	0.1	24.7	1.5	2	2	0	72,252	70,300
K0006	L	C	H0021	9	14,179	23,900	0	0	N	247	0	72.9	1.7	68.5	0.0	0.1	28.2	1.4	2	2	0	59,422	58,426
P0051	L	C	P0130	9	12,965	23,934	0	0	N	0	0	74.9	4.3	68.0	0.0	0.5	25.7	1.5	2	2	0	0	32,954
K0006	L	C	P0129	9	13,962	25,281	0	0	N	123	0	87.7	1.5	65.5	0.0	0.1	31.5	1.4	2	2	0	28,339	27,906
K0007	L	C	H0023	9	16,666	27,083	0	0	N	284	0	61.4	2.1	70.2	0.0	0.1	26.1	1.5	2	2	0	83,793	82,000
K0006	L	C	P0126	9	14,534	27,439	0	0	N	325	0	80.0	1.8	62.8	0.0	0.1	34.0	1.3	2	2	0	74,316	72,968
K0006	L	C	H0019	9	16,874	31,255	0	0	N	80	0	63.9	-1.5	74.4	0.0	0.1	25.4	1.5	2	2	0	21,054	21,368
P0045	M	C	L0084	9	19,169	34,537	0	0	N	265	0	81.6	0.5	68.6	0.0	0.1	29.3	1.4	2	2	0	77,393	76,978
P0024	L	A	J0084	9	23,981	35,000	0	0	N	285	0	65.4	2.8	62.8	0.0	4.3	28.7	1.4	2	2	0	103,295	100,424
P0051	L	C	R0076	9	23,981	35,000	0	0	N	0	0	31.9	**.*	**.*	0.0	0.7	0.0	2.0	2	2	0	0	3,029
P0051	L	C	T0043	9	23,981	35,000	0	0	N	0	0	84.6	-2.2	71.1	0.0	0.5	29.2	1.4	2	2	0	0	14,981
P0051	L	C	B0086	9	19,562	37,609	0	0	N	0	0	95.3	0.7	64.2	0.0	0.4	33.3	1.3	2	2	0	0	58,152
P0024	L	A	G0043	9	26,267	41,585	0	0	N	283	0	66.6	0.8	52.6	0.0	3.4	42.0	1.2	2	2	0	112,353	111,429
P0024	L	A	S0221	9	26,257	42,300	0	0	N	319	0	68.8	2.5	56.4	0.0	3.6	36.2	1.3	2	2	0	87,019	84,868
P0050	M	C	H0026	9	20,885	53,578	0	0	N	0	0	71.0	1.3	66.0	0.0	0.1	31.2	1.4	2	2	0	0	130,975
P0045	M	C	M0130	9	33,346	61,898	0	0	N	365	0	68.4	1.0	65.3	0.0	0.1	32.2	1.4	2	2	0	126,963	125,731
P0046	M	D	V0046	9	36,269	63,418	0	0	N	243	0	71.7	2.8	68.4	0.0	0.4	26.9	1.5	2	2	0	77,295	75,116
P0024	L	A	S0222	9	35,513	66,091	0	0	N	277	0	73.2	2.1	50.2	0.0	3.2	43.3	1.2	2	2	0	91,862	89,699
K0007	L	C	00021	9	36,120	68,676	0	0	N	365	0	79.3	1.1	61.9	0.0	0.1	35.6	1.3	2	2	0	118,974	117,660
K0007	L	C	S0219	9	36,120	68,676	0	0	N	365	0	75.1	7.7	58.3	0.0	0.1	32.5	1.4	2	2	0	130,362	126,339
P0024	L	A	A0109	9	68,140	**,***	0	0	N	266	0	72.1	0.7	53.4	0.0	3.5	41.2	1.2	2	2	0	121,582	120,729
P0024	L	A	C0103	9	54,900	**,***	0	0	N	290	0	70.4	1.3	50.7	0.0	3.2	43.6	1.2	2	2	0	127,791	126,085
P0045	M	C	G0041	9	68,171	**,***	0	0	N	365	0	79.2	1.7	62.9	0.0	0.1	33.9	1.3	2	2	0	121,761	119,650
P0051	L	C	S0220	9	67,914	**,***	0	0	N	0	0	62.9	0.7	64.3	0.0	0.4	33.1	1.3	2	2	0	0	176,809
P0047	M	D	M0031	9	93,900	**,***	0	0	N	365	0	73.4	0.9	58.4	0.0	0.5	39.0	1.2	2	2	0	161,937	160,512
NO. OF SAMPLES:			67		1,125,375	1,732,178	14																
NO. OF SAMPLES:			271		1,490,908	2,155,151	65,180																

Appendix E

SUMMARY OF RATIO ANALYSIS (COSTANAL)

***** SUMMARY OF RATIO ANALYSIS (COSTANA1) *****

VESSEL TYPE	AVE. AGE	AVE. CONDAYS	(----- RATIOS FOR OPERATED VSLS ONLY ------) NREV	VOYE	RUNE	TERM	ADMI	DEPC	DEPA	PROF	AVE. DWT	AVE.DAILY OPG COST	AVE.DAILY RUN COST
1	19	236	98	29	39	5	7	14	0	5	2,471	35,015	23,350
VESSEL TYPE	AVE. AGE	AVE. CONDAYS	(----- RATIOS FOR OPERATED VSLS ONLY ------) NREV	VOYE	RUNE	TERM	ADMI	DEPC	DEPA	PROF	AVE. DWT	AVE.DAILY OPG COST	AVE.DAILY RUN COST
2	*****	***	***	***	***	***	***	***	***	***	**,***	***,***	***,***
VESSEL TYPE	AVE. AGE	AVE. CONDAYS	(----- RATIOS FOR OPERATED VSLS ONLY ------) NREV	VOYE	RUNE	TERM	ADMI	DEPC	DEPA	PROF	AVE. DWT	AVE.DAILY OPG COST	AVE.DAILY RUN COST
3	20	332	108	30	32	14	11	***	2	***	3,843	107,593	75,471
VESSEL TYPE	AVE. AGE	AVE. CONDAYS	(----- RATIOS FOR OPERATED VSLS ONLY ------) NREV	VOYE	RUNE	TERM	ADMI	DEPC	DEPA	PROF	AVE. DWT	AVE.DAILY OPG COST	AVE.DAILY RUN COST
4	16	158	73	29	40	4	13	12	0	2	403	45,771	35,752
VESSEL TYPE	AVE. AGE	AVE. CONDAYS	(----- RATIOS FOR OPERATED VSLS ONLY ------) NREV	VOYE	RUNE	TERM	ADMI	DEPC	DEPA	PROF	AVE. DWT	AVE.DAILY OPG COST	AVE.DAILY RUN COST
5	20	269	91	38	42	5	8	3	0	4	602	60,420	42,011
VESSEL TYPE	AVE. AGE	AVE. CONDAYS	(----- RATIOS FOR OPERATED VSLS ONLY ------) NREV	VOYE	RUNE	TERM	ADMI	DEPC	DEPA	PROF	AVE. DWT	AVE.DAILY OPG COST	AVE.DAILY RUN COST
6	18	300	100	32	36	6	13	6	1	6	1,648	205,308	130,881
VESSEL TYPE	AVE. AGE	AVE. CONDAYS	(----- RATIOS FOR OPERATED VSLS ONLY ------) NREV	VOYE	RUNE	TERM	ADMI	DEPC	DEPA	PROF	AVE. DWT	AVE.DAILY OPG COST	AVE.DAILY RUN COST
7	20	296	89	32	37	13	10	4	1	3	1,866	226,930	151,148
VESSEL TYPE	AVE. AGE	AVE. CONDAYS	(----- RATIOS FOR OPERATED VSLS ONLY ------) NREV	VOYE	RUNE	TERM	ADMI	DEPC	DEPA	PROF	AVE. DWT	AVE.DAILY OPG COST	AVE.DAILY RUN COST
8	*****	***	***	***	***	***	***	***	***	***	**,***	***,***	***,***
VESSEL TYPE	AVE. AGE	AVE. CONDAYS	(----- RATIOS FOR OPERATED VSLS ONLY ------) NREV	VOYE	RUNE	TERM	ADMI	DEPC	DEPA	PROF	AVE. DWT	AVE.DAILY OPG COST	AVE.DAILY RUN COST
9	10	261	94	21	45	***	10	12	2	***	29,865	10,866	10,066

Appendix F

ROUTINE TO GENERATE NEW MAINANAL FILE (MAINANA2.DBF) TO ALLOCATE DAILY OPERATING AND DAILY RUNNING COST TO CARGO AND PASSENGER OPERATION

```
 1 * ************************************************************************
 2 *                GENERATING NEW MAINANAL FILE (MAINANA2.DBF)
 3 *             TO ALLOCATE DAILY OPERATING AND DAILY RUNNING COST
 4 *                   TO CARGO AND PASSENGER OPERATION
 5 *                     O D Santos Jr./ Nathan Associates
 6 * ************************************************************************
 7 * Filespec: MAINANA2.PRG
 8 SET TALK OFF
 9 CLOSE ALL
10 CLEAR
11 ERASE TEMP.NDX
12 PUBLIC DPP5, DPP7, IOC5, IOC7, IRC5, IRC7
13 @2,1 SAY 'DEADWEIGHT REDUCTION PER PAX CAPACITY:'
14 INPUT '  CONVENTIONAL PAX-CARGO VESSEL - ' TO DPP5
15 INPUT '  PAX-CONTAINER VESSEL          - ' TO DPP7
16 @8,1 SAY 'INCREMENTAL DAILY OPERATING COST PER PAX CAPACITY:'
17 INPUT '  CONVENTIONAL PAX-CARGO VESSEL - ' TO IOC5
18 INPUT '  PAX-CONTAINER VESSEL          - ' TO IOC7
19 @14,1 SAY 'INCREMENTAL DAILY RUNNING COST PER PAX CAPACITY:'
20 INPUT '  CONVENTIONAL PAX-CARGO VESSEL - ' TO IRC5
21 INPUT '  PAX-CONTAINER VESSEL          - ' TO IRC7
22 USE MAINANA2
23 GO TOP
24 DO WHILE .NOT. EOF()
25 DO CASE
26 CASE VESLTYP=5 .OR. VESLTYP=1
27  REPLACE DRCCI WITH (DRCI-IRC5*VESLPAX) * VESLDWT/(VESLDWT+ DPP5*VESLPAX)
28  REPLACE DOCCI WITH (DOPEI-IOC5*VESLPAX) * VESLDWT/(VESLDWT+ DPP5*VESLPAX)
29  REPLACE DRCPI WITH (DRCI-IRC5*VESLPAX)*(VESLPAX*DPP5)/(VESLDWT+VESLPAX*DPP5) + IRC5*VESLPAX
30  REPLACE DOCPI WITH (DOPEI-IOC5*VESLPAX)*(VESLPAX*DPP5)/(VESLDWT+DPP5*VESLPAX) + IOC5*VESLPAX
31  REPLACE DRCCA WITH (DRCA-IRC5*VESLPAX) * VESLDWT/(VESLDWT+ DPP5*VESLPAX)
32  REPLACE DOCCA WITH (DOPE-IOC5*VESLPAX) * VESLDWT/(VESLDWT+ DPP5*VESLPAX)
33  REPLACE DRCPA WITH (DRCA-IRC5*VESLPAX)*(VESLPAX*DPP5)/(VESLDWT+VESLPAX*DPP5) + IRC5*VESLPAX
34  REPLACE DOCPA WITH (DOPE-IOC5*VESLPAX)*(VESLPAX*DPP5)/(VESLDWT+DPP5*VESLPAX) + IOC5*VESLPAX
35 CASE VESLTYP=7 .OR. VESLTYP=3
36  REPLACE DRCCI WITH (DRCI-IRC7*VESLPAX) * VESLDWT/(VESLDWT+ DPP7*VESLPAX)
37  REPLACE DOCCI WITH (DOPEI-IOC7*VESLPAX)* VESLDWT/(VESLDWT+ DPP7*VESLPAX)
38  REPLACE DRCPI WITH (DRCI-IRC7*VESLPAX)*(VESLPAX*DPP7)/(VESLDWT+VESLPAX*DPP7) + IRC7*VESLPAX
39  REPLACE DOCPI WITH (DOPEI-IOC7*VESLPAX)*(VESLPAX*DPP7)/(VESLDWT+DPP7*VESLPAX) + IOC7*VESLPAX
40  REPLACE DRCCA WITH (DRCA-IRC7*VESLPAX) * VESLDWT/(VESLDWT+ DPP7*VESLPAX)
41  REPLACE DOCCA WITH (DOPE-IOC7*VESLPAX) * VESLDWT/(VESLDWT+ DPP7*VESLPAX)
42  REPLACE DRCPA WITH (DRCA-IRC7*VESLPAX)*(VESLPAX*DPP7)/(VESLDWT+VESLPAX*DPP7) + IRC7*VESLPAX
43  REPLACE DOCPA WITH (DOPE-IOC7*VESLPAX)*(VESLPAX*DPP7)/(VESLDWT+DPP7*VESLPAX) + IOC7*VESLPAX
44 CASE VESLTYP=2 .OR. VESLTYP=6 .OR. VESLTYP=9
45  REPLACE DRCCI WITH (DRCI-IRC5*VESLPAX) * VESLDWT/(VESLDWT+ DPP5*VESLPAX)
46  REPLACE DOCCI WITH (DOPEI-IOC5*VESLPAX) * VESLDWT/(VESLDWT+ DPP5*VESLPAX)
47  REPLACE DRCPI WITH (DRCI-IRC5*VESLPAX)*(VESLPAX*DPP5)/(VESLDWT+VESLPAX*DPP5) + IRC5*VESLPAX
48  REPLACE DOCPI WITH (DOPEI-IOC5*VESLPAX)*(VESLPAX*DPP5)/(VESLDWT+DPP5*VESLPAX) + IOC5*VESLPAX
49  REPLACE DRCCA WITH (DRCA-IRC5*VESLPAX) * VESLDWT/(VESLDWT+ DPP5*VESLPAX)
50  REPLACE DOCCA WITH (DOPE-IOC5*VESLPAX) * VESLDWT/(VESLDWT+ DPP5*VESLPAX)
51  REPLACE DRCPA WITH (DRCA-IRC5*VESLPAX)*(VESLPAX*DPP5)/(VESLDWT+VESLPAX*DPP5) + IRC5*VESLPAX
52  REPLACE DOCPA WITH (DOPE-IOC5*VESLPAX)*(VESLPAX*DPP5)/(VESLDWT+DPP5*VESLPAX) + IOC5*VESLPAX
53 CASE VESLTYP=4 .OR. VESLTYP=8
54  REPLACE DRCCI WITH 0
55  REPLACE DOCCI WITH 0
56  REPLACE DRCPI WITH DRCI
57  REPLACE DOCPI WITH DOPEI
58  REPLACE DRCCA WITH 0
59  REPLACE DOCCA WITH 0
60  REPLACE DRCPA WITH DRCA
61  REPLACE DOCPA WITH DOPE
62 ENDCASE
63 SKIP
64 ENDDO
65 CLOSE DATA
```

Structure for database: B:NMAINANA2.DBF
Number of data records: 271
Date of last update : 20/05/91

Field	Field Name	Type	Width	Dec	Index
1	OPECODE	Character	5		N
2	OPECATE	Character	1		N
3	ASSETSC	Character	1		N
4	VESCODE	Character	5		N
5	VESLGRT	Numeric	9	2	N
6	VESLDWT	Numeric	9	2	N
7	VESLPAX	Numeric	6		N
8	YRBUILT	Numeric	4		N
9	VESLTYP	Numeric	1		N
10	OPERATED	Character	1		N
11	COMDAYS	Numeric	3		N
12	MILERUN	Numeric	6		N
13	VOYAGES	Numeric	4		N
14	RTCAT	Character	1		N
15	RL	Numeric	7	1	N
16	TONS	Numeric	12		N
17	TMS	Numeric	15		N
18	MTMP	Numeric	16		N
19	CLFA	Numeric	7	2	N
20	DLF3	Numeric	7	2	N
21	PAXS	Numeric	12		N
22	PMS	Numeric	15		N
23	PXMP	Numeric	16		N
24	PLFA	Numeric	7	2	N
25	DLF4	Numeric	7	2	N
26	BYEAR	Numeric	4		N
27	EYEAR	Numeric	4		N
28	NREV1	Numeric	7		N
29	NREV2	Numeric	7		N
30	VOEX1	Numeric	7		N
31	VOEX2	Numeric	7		N
32	RUEX1	Numeric	7		N
33	RUEX2	Numeric	7		N
34	W1	Numeric	5	1	N
35	W2	Numeric	5	1	N
36	W3	Numeric	5	1	N
37	P23	Numeric	5	1	N
38	P24	Numeric	5	1	N
39	RRET	Numeric	7		N
40	DOPE	Numeric	9	2	N
41	DOPEI	Numeric	9	2	N
42	DRCA	Numeric	9	2	N
43	DRCI	Numeric	9	2	N
44	DRCCI	Numeric	9	2	N
45	DOCCI	Numeric	9	2	N
46	DRCPI	Numeric	9	2	N
47	DOCPI	Numeric	9	2	N
48	DRCCA	Numeric	9	2	N
49	DOCCA	Numeric	9	2	N
50	DRCPA	Numeric	9	2	N
51	DOCPA	Numeric	9	2	N
52	VCPM	Numeric	9	3	N
53	CPDS	Numeric	9	2	N
54	F40	Numeric	9	4	N
55	F47	Numeric	9	4	N
56	F54	Numeric	7	2	N
57	F61	Numeric	7	2	N
58	TOTLTONS	Numeric	12		N
59	PAXTRAF	Numeric	12		N
60	TONMILES	Numeric	15		N
61	PAXMILES	Numeric	15		N
62	DISTANCE	Numeric	10		N
63	F1	Numeric	7	1	N
64	F2	Numeric	7	1	N

Appendix G

ROUTINE TO CALCULATE RATE ADJUSTMENTS USING REVENUE DEFICIENCY METHOD AND DETERMINE FORK RANGES

```
 1 *  ************************************************************************************
 2 *           CALCULATING RATE ADJUSTMENTS USING REVENUE DEFICIENCY METHOD
 3 *                          AND DETERMINING FORK RANGES
 4 *                        D D Santos Jr/Nathan Associates
 5 *  ************************************************************************************
 6 *  Filespec: FORKANA1.PRG
 7 close all
 8 clear all
 9 use mainanal
10 delete for upper(operated)='N'
11 set delete on
12 set unique on
13 index on opecode to temp
14 list opecode, opename to print
15 set unique off
16 set index to
17 go top
18 calculate sum(e1),sum(e2),sum(e3), sum(e4) to tfrev, tprev, tchre, torev
19 calculate sum(e5),sum(e6), sum(e7), sum(e8), sum(e9) to tctax, tcomm, tfdo, tfbo, tfso
20 calculate sum(e10),sum(e11), sum(e12), sum(e13), sum(e14) to tport, tcarg, tmvoy, tlube, tsala
21 calculate sum(e15),sum(e16), sum(e17), sum(e18), sum(e19) to teben, tfood, tsupl, tdrnm, tinsu
22 calculate sum(e20),sum(e21), sum(e22), sum(e23), sum(e24) to tclai, ttaxl, tmrun, tterm, tgadm
23 calculate sum(e25),sum(e26), sum(f29), sum(f30), sum(f31) to tdepc, tdepa, tinvv, tadep, tnbvv
24 calculate sum(f32),sum(f33), sum(rret) to tworc, tinvc, tret
25 tgrev=tfrev+tprev+tchre+torev
26 tnrev=tgrev+tctax+tcomm
27 tvoye=tfdo+tfbo+tfso+tport+tcarg+tmvoy
28 trunx=tlube+tsala+teben+tfood+tsupl+tdrnm+tinsu+tclai+ttaxl+tmrun
29 tadmi=tterm+tgadm
30 tdepr=tdepc+tdepa
31 texpe=tvoye+trune+tadmi+tdepr-tctax-tcomm
32 reqrev=texpe+tret
33 reqadj=(reqrev-tgrev)/tgrev*100
34 ???chr(27)+chr(65)+chr(7)
35 list memo to print
36 select 6
37 use forkana1
38 zap
39 select A
40 set device to print
41 ???chr(27)+chr(77)+chr(15)
42 ???chr(10)
43 go top
44 do while .not. eof()
45 grev=e1+e2+e3+e4
46 expe=voex2+ruex2+e23+e24+e25+e26+rret-e5-e6
47 adj=(expe/grev-1)*100
48 rroi= (grev-expe)*12/rret
49 aprow()+1,1 say vescode+'  '+ltrim(str(vesldut))+'  '+opecode+'  '+opename+'  '+ltrim(str(m->adj))+'  '+ltrim(str(distance))+'  '+link+' '+ltrim(str(rroi))
50 select B
51 append blank
52 replace vescode with a->vescode, vesname with a->vesname, opecode with a->opecode, rroi with m->rroi, vesldut with a->vesldut, veslpax with a->veslpax
53 replace distance with a->distance, adj with m->adj, link with a->link, comdays with a->comdays, opename with a->opename
54 select A
55 skip
56 enddo
57 ???chr(10)
58 set device to screen
59 set delete off
60 recall all
61 close all
```

65	F3	Numeric	7	1	N
66	F4	Numeric	7	1	N
67	F5	Numeric	7	1	N
68	F6	Numeric	7	1	N
69	F7	Numeric	7	1	N
70	F8	Numeric	7	1	N
71	F9	Numeric	7	1	N
72	F10	Numeric	7	1	N
73	F11	Numeric	7	1	N
74	F12	Numeric	7	1	N
75	F13	Numeric	7	1	N
76	F14	Numeric	7	1	N
77	F15	Numeric	7	1	N
78	F16	Numeric	7	1	N
79	F17	Numeric	7	1	N
80	F18	Numeric	7	1	N
81	F19	Numeric	7	1	N
82	F20	Numeric	7	1	N
83	F21	Numeric	7	1	N
84	F22	Numeric	7	1	N
85	F23	Numeric	7	1	N
86	F24	Numeric	7	1	N
87	F25	Numeric	7	1	N
88	F26	Numeric	7	1	N
89	P1	Numeric	3		N
90	P2	Numeric	3		N
91	P3	Numeric	3		N
92	P4	Numeric	3		N
93	P5	Numeric	3		N
94	P6	Numeric	3		N
95	P7	Numeric	3		N
96	P8	Numeric	3		N
97	P9	Numeric	3		N
98	P10	Numeric	3		N
99	P11	Numeric	3		N
100	P12	Numeric	3		N
101	P13	Numeric	3		N
102	P14	Numeric	3		N
103	P15	Numeric	3		N
104	P16	Numeric	3		N
105	P17	Numeric	3		N
106	P18	Numeric	3		N
107	P19	Numeric	3		N
108	P20	Numeric	3		N
109	P21	Numeric	3		N
110	P22	Numeric	3		N
111	P25	Numeric	5	1	N
112	P26	Numeric	5	1	N
113	E1	Numeric	7	1	N
114	E2	Numeric	7	1	N
115	E3	Numeric	7	1	N
116	E4	Numeric	7	1	N
117	E5	Numeric	7	1	N
118	E6	Numeric	7	1	N
119	E7	Numeric	7	1	N
120	E8	Numeric	7	1	N
121	E9	Numeric	7	1	N
122	E10	Numeric	7	1	N
123	E11	Numeric	7	1	N
124	E12	Numeric	7	1	N
125	E13	Numeric	7	1	N
126	E14	Numeric	7	1	N
127	E15	Numeric	7	1	N
128	E16	Numeric	7	1	N

129	E17	Numeric	7	1	N
130	E18	Numeric	7	1	N
131	E19	Numeric	7	1	N
132	E20	Numeric	7	1	N
133	E21	Numeric	7	1	N
134	E22	Numeric	7	1	N
135	E23	Numeric	7	1	N
136	E24	Numeric	7	1	N
137	E25	Numeric	7	1	N
138	E26	Numeric	7	1	N
139	F27	Numeric	8	1	N
140	F28	Numeric	8	1	N
141	F29	Numeric	8	1	N
142	F30	Numeric	8	1	N
143	F31	Numeric	8	1	N
144	F32	Numeric	8	1	N
145	F33	Numeric	8	1	N
146	F34	Numeric	9	4	N
147	F41	Numeric	9	4	N
148	CASP	Numeric	1		N
149	CASC	Numeric	1		N
150	R1	Character	254		N
** Total **			1252		

Appendix H

ROUTINE TO GENERATE THE COMPOSITE FIXED AND DISTANCE-RELATED COMPONENTS OF A COST-BASED FREIGHT RATE BY TRIP DISTANCE AND BY DEADWEIGHT RANGE

```
1 *   ************************************************************
2 *         GENERATING THE COMPOSITE FIXED AND DISTANCE-RELATED
3 *              COMPONENTS OF A COST-BASED FREIGHT RATE
4 *             BY TRIP DISTANCE AND BY DEADWEIGHT RANGE
5 *                 D D Santos Jr./Nathan Associates
6 *   ************************************************************
7 *   Filespec: COSTANA2.PRG
8 CLEAR MEMORY
9 CLEAR
10 CLOSE INDEX
11 ERASE TEMP.NDX
12 DELETE FOR DOPEI(=0 .OR. DRCCI(=0 .OR. DOCCI(=0 .OR. CONDAYS(=0 .OR. MILERUN=0
13 DELETE FOR VESLDWT=0 .AND. F1)0
14 DELETE FOR VESLPAX=0 .AND. F2)0
15 SET DELETE ON
16 INDEX ON VESLDWT TO TEMP
17 FILENAME=DBF()
18 GO TOP
19 M-)BYEAR = A-)BYEAR
20 NVSLO= RECCOUNT()
21 SET DEVICE TO PRINT
22 ???CHR(27)+CHR(15)
23 @PROW(),1 SAY FILENAME
24 @PROW(),15 SAY NVSLO
25 ???CHR(10)
26 LIST OPECODE, VESCODE, VESLDWT, VESLPAX, YRBUILT, CONDAYS, MILERUN, DOPEI, DRCI, DRCCI, DRCCA TO PRINT
27 VTYP=SUBSTR(FILENAME,7,1)
28 TLEN=SUBSTR(FILENAME,8,1)
29 SCAL=SUBSTR(FILENAME,9,1)
30 AGER=SUBSTR(FILENAME,10,1)
31 EJECT
32 @PROW(),1 SAY 'VESSEL TYPE:'+LTRIM(VTYP)+'  AVE. TRIP LENGTH: '+LTRIM(TLEN)+'   OPERATOR SCALE: '+LTRIM(SCAL)+'  AGE GROUP: '+LTRIM(AGER)
33 @PROW(),75 SAY 'BASE YEAR: '+LTRIM(STR(M-)BYEAR))
34 @PROW()+1,1   SAY    '=========================================================================================================='
35 @PROW()+2,1 SAY    'VESL  DAILY    DAILY     ACTUAL   ACTUAL   DESIGN FIXED COST  DESIGN VOYCOST   ACTUAL FIXED COST  ACTUAL VOYCOST'
36 @PROW()+1,1 SAY    'SIZE OP COST  RUN COST     DOC      DRC    PER TON  PER PAX   /TMILE  /PMILE   PER TON  PER PAX  /TMILE  /PMILE '
37 IF NVSLO)0
38 CALCULATE AVG(DOPEI), AVG(DRCI), AVG(DOPE), AVG(DRCA) TO ADOCIO, ADRCIO, ADOCAO, ADRCAO
39 CALCULATE AVG(DRCCI*320*CLFA/(TONS*DLF3)), AVG(DRCPI*320*PLFA/(PAXS*DLF4)) TO AFCCIO, AFCPIO
40 CALCULATE AVG((DOCCI-DRCCI)*320*CLFA/(TMS*DLF3)), AVG((DOCPI-DRCPI)*320*PLFA/(PMS*DLF4)) TO AVCCIO, AVCPIO
41 CALCULATE AVG(DRCCA*CONDAYS/TONS), AVG(DRCPA*CONDAYS/PAXS) TO AFCCAO, AFCPAO
42 CALCULATE AVG((DOCCA-DRCCA)*CONDAYS/TMS), AVG((DOCPA-DRCPA)*CONDAYS/PMS) TO AVCCAO, AVCPAO
43 ELSE
44  ADOCIO=0
45  ADRCIO=0
46  ADOCAO=0
47  ADRCAO=0
48  AFCCIO=0
49  AFCPIO=0
50  AVCCIO=0
51  AVCPIO=0
52  AFCCAO=0
53  AFCPAO=0
54  AVCCAO=0
55  AVCPAO=0
56 ENDIF
57 @PROW()+2,1 SAY 'ALL'
58 @PROW(),6 SAY ADOCIO PICTURE '$$$,$$$'
59 @PROW(),16 SAY ADRCIO PICTURE '$$$,$$$'
60 @PROW(),26 SAY ADOCAO PICTURE '$$$,$$$'
61 @PROW(),35 SAY ADRCAO PICTURE '$$$,$$$'
62 @PROW(),45 SAY AFCCIO PICTURE '$$$.$$'
63 @PROW(),53 SAY AFCPIO PICTURE '$$$.$$'
```

```
 64 @PROW(),62 SAY AVCCI0 PICTURE '99.999'
 65 @PROW(),70 SAY AVCPI0 PICTURE '99.999'
 66 @PROW(),81 SAY AFCCA0 PICTURE '999.99'
 67 @PROW(),89 SAY AFCPA0 PICTURE '999.99'
 68 @PROW(),98 SAY AVCCA0 PICTURE '99.999'
 69 @PROW(),106 SAY AVCPA0 PICTURE '99.999'
 70 ???CHR(10)
 71 COUNT TO MVSL1 FOR VESLDWT)0 .AND. VESLDWT(250
 72 IF MVSL1)0
 73 CALCULATE AVG(DOPEI), AVG(DRCI), AVG(DOPE), AVG(DRCA) TO ADOCI1, ADRCI1, ADOCA1, ADRCA1 FOR VESLDWT)0 .AND. VESLDWT(250
 74 CALCULATE AVG(DRCCI*320*CLFA/(TONS*DLF3)), AVG(DRCPI*320*PLFA/(PAXS*DLF4)) TO AFCCI1, AFCPI1 FOR VESLDWT)0 .AND. VESLDWT(250
 75 CALCULATE AVG((DOCCI-DRCCI)*320*CLFA/(TNS*DLF3)), AVG((DOCPI-DRCPI)*320*PLFA/(PNS*DLF4)) TO AVCCI1, AVCPI1 FOR VESLDWT)0 .AND. VESLDWT(250
 76 CALCULATE AVG(DRCCA*COMDAYS/TONS), AVG(DRCPA*COMDAYS/PAXS) TO AFCCA1, AFCPA1 FOR VESLDWT)0 .AND. VESLDWT(250
 77 CALCULATE AVG((DOCCA-DRCCA)*COMDAYS/TNS), AVG((DOCPA-DRCPA)*COMDAYS/PNS) TO AVCCA1, AVCPA1 FOR VESLDWT)0 .AND. VESLDWT(250
 78 ELSE
 79  ADOCI1=0
 80  ADRCI1=0
 81  ADOCA1=0
 82  ADRCA1=0
 83  AFCCI1=0
 84  AFCPI1=0
 85  AVCCI1=0
 86  AVCPI1=0
 87  AFCCA1=0
 88  AFCPA1=0
 89  AVCCA1=0
 90  AVCPA1=0
 91 ENDIF
 92 @PROW()+1,1 SAY ' 1'
 93 @PROW(),6 SAY ADOCI1 PICTURE '999.999'
 94 @PROW(),16 SAY ADRCI1 PICTURE '999,999'
 95 @PROW(),26 SAY ADOCA1 PICTURE '999,999'
 96 @PROW(),35 SAY ADRCA1 PICTURE '999,999'
 97 @PROW(),45 SAY AFCCI1 PICTURE '999.99'
 98 @PROW(),53 SAY AFCPI1 PICTURE '999.99'
 99 @PROW(),62 SAY AVCCI1 PICTURE '99.999'
100 @PROW(),70 SAY AVCPI1 PICTURE '99.999'
101 @PROW(),81 SAY AFCCA1 PICTURE '999.99'
102 @PROW(),89 SAY AFCPA1 PICTURE '999.99'
103 @PROW(),98 SAY AVCCA1 PICTURE '99.999'
104 @PROW(),106 SAY AVCPA1 PICTURE '99.999'
105 ???CHR(10)
106 COUNT TO MVSL2 FOR VESLDWT)=250 .AND. VESLDWT(500
107 IF MVSL2)0
108 CALCULATE AVG(DOPEI), AVG(DRCI), AVG(DOPE), AVG(DRCA) TO ADOCI2, ADRCI2, ADOCA2, ADRCA2 FOR VESLDWT)=250 .AND. VESLDWT(500
109 CALCULATE AVG(DRCCI*320*CLFA/(TONS*DLF3)), AVG(DRCPI*320*PLFA/(PAXS*DLF4)) TO AFCCI2, AFCPI2 FOR VESLDWT)=250 .AND. VESLDWT(500
110 CALCULATE AVG((DOCCI-DRCCI)*320*CLFA/(TNS*DLF3)), AVG((DOCPI-DRCPI)*320*PLFA/(PNS*DLF4)) TO AVCCI2, AVCPI2 FOR VESLDWT)=250 .AND. VESLDWT(500
111 CALCULATE AVG(DRCCA*COMDAYS/TONS), AVG(DRCPA*COMDAYS/PAXS) TO AFCCA2, AFCPA2 FOR VESLDWT)=250 .AND. VESLDWT(500
112 CALCULATE AVG((DOCCA-DRCCA)*COMDAYS/TNS), AVG((DOCPA-DRCPA)*COMDAYS/PNS) TO AVCCA2, AVCPA2 FOR VESLDWT)=250 .AND. VESLDWT(500
113 ELSE
114  ADOCI2=0
115  ADRCI2=0
116  ADOCA2=0
117  ADRCA2=0
118  AFCCI2=0
119  AFCPI2=0
120  AVCCI2=0
121  AVCPI2=0
122  AFCCA2=0
123  AFCPA2=0
124  AVCCA2=0
125  AVCPA2=0
126 ENDIF
```

```
127 @PROW()+1,1 SAY ' 2'
128 @PROW(),6 SAY ADOCI2 PICTURE '999,999'
129 @PROW(),16 SAY ADRCI2 PICTURE '999,999'
130 @PROW(),26 SAY ADOCA2 PICTURE '999,999'
131 @PROW(),35 SAY ADRCA2 PICTURE '999,999'
132 @PROW(),45 SAY AFCCI2 PICTURE '999.99'
133 @PROW(),53 SAY AFCPI2 PICTURE '999.99'
134 @PROW(),62 SAY AVCCI2 PICTURE '99.999'
135 @PROW(),70 SAY AVCPI2 PICTURE '99.999'
136 @PROW(),81 SAY AFCCA2 PICTURE '999.99'
137 @PROW(),89 SAY AFCPA2 PICTURE '999.99'
138 @PROW(),98 SAY AVCCA2 PICTURE '99.999'
139 @PROW(),106 SAY AVCPA2 PICTURE '99.999'
140 ???CHR(10)
141 COUNT TO NVSL3 FOR VESLDWT)=500 .AND. VESLDWT(750
142 IF NVSL3)0
143 CALCULATE AVG(DOPEI), AVG(DRCI), AVG(DOPE), AVG(DRCA) TO ADOCI3, ADRCI3, ADOCA3, ADRCA3 FOR VESLDWT)=500 .AND. VESLDWT(750
144 CALCULATE AVG(DRCCI*320*CLFA/(TONS*DLF3)), AVG(DRCPI*320*PLFA/(PAXS*DLF4)) TO AFCCI3, AFCPI3 FOR VESLDWT)=500 .AND. VESLDWT(750
145 CALCULATE AVG((DOCCI-DRCCI)*320*CLFA/(TMS*DLF3)), AVG((DOCPI-DRCPI)*320*PLFA/(PMS*DLF4)) TO AVCCI3, AVCPI3 FOR VESLDWT)=500 .AND. VESLDWT(750
146 CALCULATE AVG(DRCCA*COMDAYS/TONS), AVG(DRCPA*COMDAYS/PAXS) TO AFCCA3, AFCPA3 FOR VESLDWT)=500 .AND. VESLDWT(750
147 CALCULATE AVG((DOCCA-DRCCA)*COMDAYS/TMS), AVG((DOCPA-DRCPA)*COMDAYS/PMS) TO AVCCA3, AVCPA3 FOR VESLDWT)=500 .AND. VESLDWT(750
148 ELSE
149  ADOCI3=0
150  ADRCI3=0
151  ADOCA3=0
152  ADRCA3=0
153  AFCCI3=0
154  AFCPI3=0
155  AVCCI3=0
156  AVCPI3=0
157  AFCCA3=0
158  AFCPA3=0
159  AVCCA3=0
160  AVCPA3=0
161 ENDIF
162 @PROW()+1,1 SAY ' 3'
163 @PROW(),6 SAY ADOCI3 PICTURE '999,999'
164 @PROW(),16 SAY ADRCI3 PICTURE '999,999'
165 @PROW(),26 SAY ADOCA3 PICTURE '999,999'
166 @PROW(),35 SAY ADRCA3 PICTURE '999,999'
167 @PROW(),45 SAY AFCCI3 PICTURE '999.99'
168 @PROW(),53 SAY AFCPI3 PICTURE '999.99'
169 @PROW(),62 SAY AVCCI3 PICTURE '99.999'
170 @PROW(),70 SAY AVCPI3 PICTURE '99.999'
171 @PROW(),81 SAY AFCCA3 PICTURE '999.99'
172 @PROW(),89 SAY AFCPA3 PICTURE '999.99'
173 @PROW(),98 SAY AVCCA3 PICTURE '99.999'
174 @PROW(),106 SAY AVCPA3 PICTURE '99.999'
175 ???CHR(10)
176 COUNT TO NVSL4 FOR VESLDWT)=750 .AND. VESLDWT(1000
177 IF NVSL4)0
178 CALCULATE AVG(DOPEI), AVG(DRCI), AVG(DOPE), AVG(DRCA) TO ADOCI4, ADRCI4, ADOCA4, ADRCA4 FOR VESLDWT)=750 .AND. VESLDWT(1000
179 CALCULATE AVG(DRCCI*320*CLFA/(TONS*DLF3)), AVG(DRCPI*320*PLFA/(PAXS*DLF4)) TO AFCCI4, AFCPI4 FOR VESLDWT)=750 .AND. VESLDWT(1000
180 CALCULATE AVG((DOCCI-DRCCI)*320*CLFA/(TMS*DLF3)), AVG((DOCPI-DRCPI)*320*PLFA/(PMS*DLF4)) TO AVCCI4, AVCPI4 FOR VESLDWT)=750 .AND. VESLDWT(1000
181 CALCULATE AVG(DRCCA*COMDAYS/TONS), AVG(DRCPA*COMDAYS/PAXS) TO AFCCA4, AFCPA4 FOR VESLDWT)=750 .AND. VESLDWT(1000
182 CALCULATE AVG((DOCCA-DRCCA)*COMDAYS/TMS), AVG((DOCPA-DRCPA)*COMDAYS/PMS) TO AVCCA4, AVCPA4 FOR VESLDWT)=750 .AND. VESLDWT(1000
183 ELSE
184  ADOCI4=0
185  ADRCI4=0
186  ADOCA4=0
187  ADRCA4=0
188  AFCCI4=0
189  AFCPI4=0
```

```
 190  AVCCI4=0
 191  AVCPI4=0
 192  AFCCA4=0
 193  AFCPA4=0
 194  AVCCA4=0
 195  AVCPA4=0
 196 ENDIF
 197 @PROW()+1,1 SAY ' 4'
 198 @PROW(),6 SAY ADOCI4 PICTURE '999,999'
 199 @PROW(),16 SAY ADRCI4 PICTURE '999,999'
 200 @PROW(),26 SAY ADOCA4 PICTURE '999,999'
 201 @PROW(),35 SAY ADRCA4 PICTURE '999,999'
 202 @PROW(),45 SAY AFCCI4 PICTURE '999.99'
 203 @PROW(),53 SAY AFCPI4 PICTURE '999.99'
 204 @PROW(),62 SAY AVCCI4 PICTURE '99.999'
 205 @PROW(),70 SAY AVCPI4 PICTURE '99.999'
 206 @PROW(),81 SAY AFCCA4 PICTURE '999.99'
 207 @PROW(),89 SAY AFCPA4 PICTURE '999.99'
 208 @PROW(),98 SAY AVCCA4 PICTURE '99.999'
 209 @PROW(),106 SAY AVCPA4 PICTURE '99.999'
 210 ???CHR(10)
 211 COUNT TO NVSL5 FOR VESLDWT)=1000 .AND. VESLDWT(1500
 212 IF NVSL5>0
 213 CALCULATE AVG(DOPEI), AVG(DRCI), AVG(DOPE), AVG(DRCA) TO ADOCI5, ADRCI5, ADOCA5, ADRCA5 FOR VESLDWT)=1000 .AND. VESLDWT(1500
 214 CALCULATE AVG(DRCCI*320*CLFA/(TONS*DLF3)), AVG(DRCPI*320*PLFA/(PAXS*DLF4)) TO AFCCI5, AFCPI5 FOR VESLDWT)=1000 .AND. VESLDWT(1500
 215 CALCULATE AVG((DOCCI-DRCCI)*320*CLFA/(TMS*DLF3)), AVG((DOCPI-DRCPI)*320*PLFA/(PMS*DLF4)) TO AVCCI5, AVCPI5 FOR VESLDWT)=1000 .AND. VESLDWT(1500
 216 CALCULATE AVG(DRCCA*CONDAYS/TONS), AVG(DRCPA*CONDAYS/PAXS) TO AFCCA5, AFCPA5 FOR VESLDWT)=1000 .AND. VESLDWT(1500
 217 CALCULATE AVG((DOCCA-DRCCA)*CONDAYS/TMS), AVG((DOCPA-DRCPA)*CONDAYS/PMS) TO AVCCA5, AVCPA5 FOR VESLDWT)=1000 .AND. VESLDWT(1500
 218 ELSE
 219  ADOCI5=0
 220  ADRCI5=0
 221  ADOCA5=0
 222  ADRCA5=0
 223  AFCCI5=0
 224  AFCPI5=0
 225  AVCCI5=0
 226  AVCPI5=0
 227  AFCCA5=0
 228  AFCPA5=0
 229  AVCCA5=0
 230  AVCPA5=0
 231 ENDIF
 232 @PROW()+1,1 SAY ' 5'
 233 @PROW(),6 SAY ADOCI5 PICTURE '999,999'
 234 @PROW(),16 SAY ADRCI5 PICTURE '999,999'
 235 @PROW(),26 SAY ADOCA5 PICTURE '999,999'
 236 @PROW(),35 SAY ADRCA5 PICTURE '999,999'
 237 @PROW(),45 SAY AFCCI5 PICTURE '999.99'
 238 @PROW(),53 SAY AFCPI5 PICTURE '999.99'
 239 @PROW(),62 SAY AVCCI5 PICTURE '99.999'
 240 @PROW(),70 SAY AVCPI5 PICTURE '99.999'
 241 @PROW(),81 SAY AFCCA5 PICTURE '999.99'
 242 @PROW(),89 SAY AFCPA5 PICTURE '999.99'
 243 @PROW(),98 SAY AVCCA5 PICTURE '99.999'
 244 @PROW(),106 SAY AVCPA5 PICTURE '99.999'
 245 ???CHR(10)
 246 COUNT TO NVSL6 FOR VESLDWT)=1500 .AND. VESLDWT(2000
 247 IF NVSL6>0
 248 CALCULATE AVG(DOPEI), AVG(DRCI), AVG(DOPE), AVG(DRCA) TO ADOCI6, ADRCI6, ADOCA6, ADRCA6 FOR VESLDWT)=1500 .AND. VESLDWT(2000
 249 CALCULATE AVG(DRCCI*320*CLFA/(TONS*DLF3)), AVG(DRCPI*320*PLFA/(PAXS*DLF4)) TO AFCCI6, AFCPI6 FOR VESLDWT)=1500 .AND. VESLDWT(2000
 250 CALCULATE AVG((DOCCI-DRCCI)*320*CLFA/(TMS*DLF3)), AVG((DOCPI-DRCPI)*320*PLFA/(PMS*DLF4)) TO AVCCI6, AVCPI6 FOR VESLDWT)=1500 .AND. VESLDWT(2000
 251 CALCULATE AVG(DRCCA*CONDAYS/TONS), AVG(DRCPA*CONDAYS/PAXS) TO AFCCA6, AFCPA6 FOR VESLDWT)=1500 .AND. VESLDWT(2000
 252 CALCULATE AVG((DOCCA-DRCCA)*CONDAYS/TMS), AVG((DOCPA-DRCPA)*CONDAYS/PMS) TO AVCCA6, AVCPA6 FOR VESLDWT)=1500 .AND. VESLDWT(2000
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```
253 ELSE
254  ADOCI6=0
255  ADRCI6=0
256  ADOCA6=0
257  ADRCA6=0
258  AFCCI6=0
259  AFCPI6=0
260  AVCCI6=0
261  AVCPI6=0
262  AFCCA6=0
263  AFCPA6=0
264  AVCCA6=0
265  AVCPA6=0
266 ENDIF
267 @PROW()+1,1 SAY ' 6'
268 @PROW(),6 SAY ADOCI6 PICTURE '999,999'
269 @PROW(),16 SAY ADRCI6 PICTURE '999,999'
270 @PROW(),26 SAY ADOCA6 PICTURE '999,999'
271 @PROW(),35 SAY ADRCA6 PICTURE '999,999'
272 @PROW(),45 SAY AFCCI6 PICTURE '999.99'
273 @PROW(),53 SAY AFCPI6 PICTURE '999.99'
274 @PROW(),62 SAY AVCCI6 PICTURE '99.999'
275 @PROW(),70 SAY AVCPI6 PICTURE '99.999'
276 @PROW(),81 SAY AFCCA6 PICTURE '999.99'
277 @PROW(),89 SAY AFCPA6 PICTURE '999.99'
278 @PROW(),98 SAY AVCCA6 PICTURE '99.999'
279 @PROW(),106 SAY AVCPA6 PICTURE '99.999'
280 ???CHR(10)
281 COUNT TO NVSL7 FOR VESLDWT)=2000 .AND. VESLDWT(3000
282 IF NVSL7)0
283 CALCULATE AVG(DOPEI), AVG(DRCI), AVG(DOPE), AVG(DRCA) TO ADOCI7, ADRCI7, ADOCA7, ADRCA7 FOR VESLDWT)=2000 .AND. VESLDWT(3000
284 CALCULATE AVG(DRCCI*320*CLFA/(TONS*DLF3)), AVG(DRCPI*320*PLFA/(PAXS*DLF4)) TO AFCCI7, AFCPI7 FOR VESLDWT)=2000 .AND. VESLDWT(3000
285 CALCULATE AVG((DOCCI-DRCCI)*320*CLFA/(TMS*DLF3)), AVG((DOCPI-DRCPI)*320*PLFA/(PMS*DLF4)) TO AVCCI7, AVCPI7 FOR VESLDWT)=2000 .AND. VESLDWT(3000
286 CALCULATE AVG(DRCCA*CONDAYS/TONS), AVG(DRCPA*CONDAYS/PAXS) TO AFCCA7, AFCPA7 FOR VESLDWT)=2000 .AND. VESLDWT(3000
287 CALCULATE AVG((DOCCA-DRCCA)*CONDAYS/TMS), AVG((DOCPA-DRCPA)*CONDAYS/PMS) TO AVCCA7, AVCPA7 FOR VESLDWT)=2000 .AND. VESLDWT(3000
288 ELSE
289  ADOCI7=0
290  ADRCI7=0
291  ADOCA7=0
292  ADRCA7=0
293  AFCCI7=0
294  AFCPI7=0
295  AVCCI7=0
296  AVCPI7=0
297  AFCCA7=0
298  AFCPA7=0
299  AVCCA7=0
300  AVCPA7=0
301 ENDIF
302 @PROW()+1,1 SAY ' 7'
303 @PROW(),6 SAY ADOCI7 PICTURE '999,999'
304 @PROW(),16 SAY ADRCI7 PICTURE '999,999'
305 @PROW(),26 SAY ADOCA7 PICTURE '999,999'
306 @PROW(),35 SAY ADRCA7 PICTURE '999,999'
307 @PROW(),45 SAY AFCCI7 PICTURE '999.99'
308 @PROW(),53 SAY AFCPI7 PICTURE '999.99'
309 @PROW(),62 SAY AVCCI7 PICTURE '99.999'
310 @PROW(),70 SAY AVCPI7 PICTURE '99.999'
311 @PROW(),81 SAY AFCCA7 PICTURE '999.99'
12 @PROW(),89 SAY AFCPA7 PICTURE '999.99'
13 @PROW(),98 SAY AVCCA7 PICTURE '99.999'
14 @PROW(),106 SAY AVCPA7 PICTURE '99.999'
15 ???CHR(10)
```

```
316 COUNT TO NVSL8 FOR VESLDWT)=3000 .AND. VESLDWT(4000
317 IF NVSL8)0
318 CALCULATE AVG(DOPEI), AVG(DRCI), AVG(DOPE), AVG(DRCA) TO ADOCI8, ADRCI8, ADOCA8, ADRCA8 FOR VESLDWT)=3000 .AND. VESLDWT(4000
319 CALCULATE AVG(DRCCI*320*CLFA/(TONS*DLF3)), AVG(DRCPI*320*PLFA/(PAXS*DLF4)) TO AFCCI8, AFCPI8 FOR VESLDWT)=3000 .AND. VESLDWT(4000
320 CALCULATE AVG((DOCCI-DRCCI)*320*CLFA/(TMS*DLF3)), AVG((DOCPI-DRCPI)*320*PLFA/(PMS*DLF4)) TO AVCCI8, AVCPI8 FOR VESLDWT)=3000 .AND. VESLDWT(4000
321 CALCULATE AVG(DRCCA*COMDAYS/TONS), AVG(DRCPA*COMDAYS/PAXS) TO AFCCA8, AFCPA8 FOR VESLDWT)=3000 .AND. VESLDWT(4000
322 CALCULATE AVG((DOCCA-DRCCA)*COMDAYS/TMS), AVG((DOCPA-DRCPA)*COMDAYS/PMS) TO AVCCA8, AVCPA8 FOR VESLDWT)=3000 .AND. VESLDWT(4000
323 ELSE
324  ADOCI8=0
325  ADRCI8=0
326  ADOCA8=0
327  ADRCA8=0
328  AFCCI8=0
329  AFCPI8=0
330  AVCCI8=0
331  AVCPI8=0
332  AFCCA8=0
333  AFCPA8=0
334  AVCCA8=0
335  AVCPA8=0
336 ENDIF
337 @PROW()+1,1 SAY ' 8'
338 @PROW(),6 SAY ADOCI8 PICTURE '###.###'
339 @PROW(),16 SAY ADRCI8 PICTURE '###,###'
340 @PROW(),26 SAY ADOCA8 PICTURE '###,###'
341 @PROW(),35 SAY ADRCA8 PICTURE '###,###'
342 @PROW(),45 SAY AFCCI8 PICTURE '###.##'
343 @PROW(),53 SAY AFCPI8 PICTURE '###.##'
344 @PROW(),62 SAY AVCCI8 PICTURE '##.###'
345 @PROW(),70 SAY AVCPI8 PICTURE '##.###'
346 @PROW(),81 SAY AFCCA8 PICTURE '###.##'
347 @PROW(),89 SAY AFCPA8 PICTURE '###.##'
348 @PROW(),98 SAY AVCCA8 PICTURE '##.###'
349 @PROW(),106 SAY AVCPA8 PICTURE '##.###'
350 ???CHR(10)
351 COUNT TO NVSL9 FOR VESLDWT)=4000 .AND. VESLDWT(5000
352 IF NVSL9;0
353 CALCULATE AVG(DOPEI), AVG(DRCI), AVG(DOPE), AVG(DRCA) TO ADOCI9, ADRCI9, ADOCA9, ADRCA9 FOR VESLDWT)=4000 .AND. VESLDWT(5000
354 CALCULATE AVG(DRCCI*320*CLFA/(TONS*DLF3)), AVG(DRCPI*320*PLFA/(PAXS*DLF4)) TO AFCCI9, AFCPI9 FOR VESLDWT)=4000 .AND. VESLDWT(5000
355 CALCULATE AVG((DOCCI-DRCCI)*320*CLFA/(TMS*DLF3)), AVG((DOCPI-DRCPI)*320*PLFA/(PMS*DLF4)) TO AVCCI9, AVCPI9 FOR VESLDWT)=4000 .AND. VESLDWT(5000
356 CALCULATE AVG(DRCCA*COMDAYS/TONS), AVG(DRCPA*COMDAYS/PAXS) TO AFCCA9, AFCPA9 FOR VESLDWT)=4000 .AND. VESLDWT(5000
357 CALCULATE AVG((DOCCA-DRCCA)*COMDAYS/TMS), AVG((DOCPA-DRCPA)*COMDAYS/PMS) TO AVCCA9, AVCPA9 FOR VESLDWT)=4000 .AND. VESLDWT(5000
358 ELSE
359  ADOCI9=0
360  ADRCI9=0
361  ADOCA9=0
362  ADRCA9=0
363  AFCCI9=0
364  AFCPI9=0
365  AVCCI9=0
366  AVCPI9=0
367  AFCCA9=0
368  AFCPA9=0
369  AVCCA9=0
370  AVCPA9=0
371 ENDIF
372 @PROW()+1,1 SAY ' 9'
373 @PROW(),6 SAY ADOCI9 PICTURE '###,###'
374 @PROW(),16 SAY ADRCI9 PICTURE '###,###'
375 @PROW(),26 SAY ADOCA9 PICTURE '###,###'
376 @PROW(),35 SAY ADRCA9 PICTURE '###,###'
377 @PROW(),45 SAY AFCCI9 PICTURE '###.##'
378 @PROW(),53 SAY AFCPI9 PICTURE '###.##'
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 379 @PROW(),62 SAY AVCCI9 PICTURE '99.999'
 380 @PROW(),70 SAY AVCPI9 PICTURE '99.999'
 381 @PROW(),81 SAY AFCCA9 PICTURE '999.99'
 382 @PROW(),89 SAY AFCPA9 PICTURE '999.99'
 383 @PROW(),98 SAY AVCCA9 PICTURE '99.999'
 384 @PROW(),106 SAY AVCPA9 PICTURE '99.999'
 385 ???CHR(10)
 386 COUNT TO NVSL10 FOR VESLDWT)=5000 .AND. VESLDWT(6000
 387 IF NVSL10)0
 388 CALCULATE AVG(DOPEI), AVG(DRCI), AVG(DOPE), AVG(DRCA) TO ADOCI10, ADRCI10, ADOCA10, ADRCA10 FOR VESLDWT)=5000 .AND. VESLDWT(6000
 389 CALCULATE AVG(DRCCI*320*CLFA/(TONS*DLF3)), AVG(DRCPI*320*PLFA/(PAXS*DLF4)) TO AFCCI10, AFCPI10 FOR VESLDWT)=5000 .AND. VESLDWT(6000
 390 CALCULATE AVG((DOCCI-DRCCI)*320*CLFA/(TMS*DLF3)), AVG((DOCPI-DRCPI)*320*PLFA/(PMS*DLF4)) TO AVCCI10, AVCPI10 FOR VESLDWT)=5000 .AND. VESLDWT(6000
 391 CALCULATE AVG(DRCCA*CONDAYS/TONS), AVG(DRCPA*CONDAYS/PAXS) TO AFCCA10, AFCPA10 FOR VESLDWT)=5000 .AND. VESLDWT(6000
 392 CALCULATE AVG((DOCCA-DRCCA)*CONDAYS/TMS), AVG((DOCPA-DRCPA)*CONDAYS/PMS) TO AVCCA10, AVCPA10 FOR VESLDWT)=5000 .AND. VESLDWT(6000
 393 ELSE
 394  ADOCI10=0
 395  ADRCI10=0
 396  ADOCA10=0
 397  ADRCA10=0
 398  AFCCI10=0
 399  AFCPI10=0
 400  AVCCI10=0
 401  AVCPI10=0
 402  AFCCA10=0
 403  AFCPA10=0
 404  AVCCA10=0
 405  AVCPA10=0
 406 ENDIF
 407 @PROW()+1,1 SAY '10'
 408 @PROW(),6 SAY ADOCI10 PICTURE '999,999'
 409 @PROW(),16 SAY ADRCI10 PICTURE '999,999'
 410 @PROW(),26 SAY ADOCA10 PICTURE '999,999'
 411 @PROW(),35 SAY ADRCA10 PICTURE '999,999'
 412 @PROW(),45 SAY AFCCI10 PICTURE '999.99'
 413 @PROW(),53 SAY AFCPI10 PICTURE '999.99'
 414 @PROW(),62 SAY AVCCI10 PICTURE '99.999'
 415 @PROW(),70 SAY AVCPI10 PICTURE '99.999'
 416 @PROW(),81 SAY AFCCA10 PICTURE '999.99'
 417 @PROW(),89 SAY AFCPA10 PICTURE '999.99'
 418 @PROW(),98 SAY AVCCA10 PICTURE '99.999'
 419 @PROW(),106 SAY AVCPA10 PICTURE '99.999'
 420 ???CHR(10)
 421 COUNT TO NVSL11 FOR VESLDWT)=6000 .AND. VESLDWT(8000
 422 IF NVSL11)0
 423 CALCULATE AVG(DOPEI), AVG(DRCI), AVG(DOPE), AVG(DRCA) TO ADOCI11, ADRCI11, ADOCA11, ADRCA11 FOR VESLDWT)=6000 .AND. VESLDWT(8000
 424 CALCULATE AVG(DRCCI*320*CLFA/(TONS*DLF3)), AVG(DRCPI*320*PLFA/(PAXS*DLF4)) TO AFCCI11, AFCPI11 FOR VESLDWT)=6000 .AND. VESLDWT(8000
 425 CALCULATE AVG((DOCCI-DRCCI)*320*CLFA/(TMS*DLF3)), AVG((DOCPI-DRCPI)*320*PLFA/(PMS*DLF4)) TO AVCCI11, AVCPI11 FOR VESLDWT)=6000 .AND. VESLDWT(8000
 426 CALCULATE AVG(DRCCA*CONDAYS/TONS), AVG(DRCPA*CONDAYS/PAXS) TO AFCCA11, AFCPA11 FOR VESLDWT)=6000 .AND. VESLDWT(8000
 427 CALCULATE AVG((DOCCA-DRCCA)*CONDAYS/TMS), AVG((DOCPA-DRCPA)*CONDAYS/PMS) TO AVCCA11, AVCPA11 FOR VESLDWT)=6000 .AND. VESLDWT(8000
 428 ELSE
 429  ADOCI11=0
 430  ADRCI11=0
 431  ADOCA11=0
 432  ADRCA11=0
 433  AFCCI11=0
 434  AFCPI11=0
 435  AVCCI11=0
 436  AVCPI11=0
 437  AFCCA11=0
 438  AFCPA11=0
 439  AVCCA11=0
 440  AVCPA11=0
 441 ENDIF
```

```
442 @PROW()+1,1 SAY '11'
443 @PROW(),6 SAY ADOCI11 PICTURE '###,###'
444 @PROW(),16 SAY ADRCI11 PICTURE '###,###'
445 @PROW(),26 SAY ADOCA11 PICTURE '###,###'
446 @PROW(),35 SAY ADRCA11 PICTURE '###,###'
447 @PROW(),45 SAY AFCCI11 PICTURE '###.##'
448 @PROW(),53 SAY AFCPI11 PICTURE '###.##'
449 @PROW(),62 SAY AVCCI11 PICTURE '##.###'
450 @PROW(),70 SAY AVCPI11 PICTURE '##.###'
451 @PROW(),81 SAY AFCCA11 PICTURE '###.##'
452 @PROW(),89 SAY AFCPA11 PICTURE '###.##'
453 @PROW(),98 SAY AVCCA11 PICTURE '##.###'
454 @PROW(),106 SAY AVCPA11 PICTURE '##.###'
455 ???CHR(10)
456 COUNT TO NVSL12 FOR VESLDWT)=8000 .AND. VESLDWT(1000(
457 IF NVSL12)0
458 CALCULATE AVG(DOPEI), AVG(DRCI), AVG(DOPE), AVG(DRCA) TO ADOCI12, ADRCI12, ADOCA12, ADRCA12 FOR VESLDWT)=8000 .AND. VESLDWT(10000
459 CALCULATE AVG(DRCCI*320*CLFA/(TONS*DLF3)), AVG(DRCPI*320*PLFA/(PAXS*DLF4)) TO AFCCI12, AFCPI12 FOR VESLDWT)=8000 .AND. VESLDWT(10000
460 CALCULATE AVG((DOCCI-DRCCI)*320*CLFA/(TMS*DLF3)), AVG((DOCPI-DRCPI)*320*PLFA/(PMS*DLF4)) TO AVCCI12, AVCPI12 FOR VESLDWT)=8000 .AND. VESLDWT(1000(
461 CALCULATE AVG(DRCCA*CONDAYS/TONS), AVG(DRCPA*CONDAYS/PAXS) TO AFCCA12, AFCPA12 FOR VESLDWT)=8000 .AND. VESLDWT(10000
462 CALCULATE AVG((DOCCA-DRCCA)*CONDAYS/TMS), AVG((DOCPA-DRCPA)*CONDAYS/PMS) TO AVCCA12, AVCPA12 FOR VESLDWT)=8000 .AND. VESLDWT(10000
463 ELSE
464  ADOCI12=0
465  ADRCI12=0
466  ADOCA12=0
467  ADRCA12=0
468  AFCCI12=0
469  AFCPI12=0
470  AVCCI12=0
471  AVCPI12=0
472  AFCCA12=0
473  AFCPA12=0
474  AVCCA12=0
475  AVCPA12=0
476 ENDIF
477 @PROW()+1,1 SAY '12'
478 @PROW(),6 SAY ADOCI12 PICTURE '###,###'
479 @PROW(),16 SAY ADRCI12 PICTURE '###,###'
480 @PROW(),26 SAY ADOCA12 PICTURE '###,###'
481 @PROW(),35 SAY ADRCA12 PICTURE '###,###'
482 @PROW(),45 SAY AFCCI12 PICTURE '###.##'
483 @PROW(),53 SAY AFCPI12 PICTURE '###.##'
484 @PROW(),62 SAY AVCCI12 PICTURE '##.###'
485 @PROW(),70 SAY AVCPI12 PICTURE '##.###'
486 @PROW(),81 SAY AFCCA12 PICTURE '###.##'
487 @PROW(),89 SAY AFCPA12 PICTURE '###.##'
488 @PROW(),98 SAY AVCCA12 PICTURE '##.###'
489 @PROW(),106 SAY AVCPA12 PICTURE '##.###'
490 ???CHR(10)
491 COUNT TO NVSL13 FOR VESLDWT)=10000
492 IF NVSL13)0
493 CALCULATE AVG(DOPEI), AVG(DRCI), AVG(DOPE), AVG(DRCA) TO ADOCI13, ADRCI13, ADOCA13, ADRCA13 FOR VESLDWT)=10000
494 CALCULATE AVG(DRCCI*320*CLFA/(TONS*DLF3)), AVG(DRCPI*320*PLFA/(PAXS*DLF4)) TO AFCCI13, AFCPI13 FOR VESLDWT)= 10000
495 CALCULATE AVG((DOCCI-DRCCI)*320*CLFA/(TMS*DLF3)), AVG((DOCPI-DRCPI)*320*PLFA/(PMS*DLF4)) TO AVCCI13, AVCPI13 FOR VESLDWT)= 10000
496 CALCULATE AVG(DRCCA*CONDAYS/TONS), AVG(DRCPA*CONDAYS/PAXS) TO AFCCA13, AFCPA13 FOR VESLDWT)= 10000
497 CALCULATE AVG((DOCCA-DRCCA)*CONDAYS/TMS), AVG((DOCPA-DRCPA)*CONDAYS/PMS) TO AVCCA13, AVCPA13 FOR VESLDWT)= 10000
498 ELSE
499  ADOCI13=0
500  ADRCI13=0
501  ADOCA13=0
502  ADRCA13=0
503  AFCCI13=0
504  AFCPI13=0
```

```
 505  AVCCI13=0
 506  AVCPI13=0
 507  AFCCA13=0
 508  AFCPA13=0
 509  AVCCA13=0
 510  AVCPA13=0
 511 ENDIF
 512 @PROW()+1,1 SAY '13'
 513 @PROW(),6 SAY ADOCI13 PICTURE '999,999'
 514 @PROW(),16 SAY ADRCI13 PICTURE '999,999'
 515 @PROW(),26 SAY ADOCA13 PICTURE '999,999'
 516 @PROW(),35 SAY ADRCA13 PICTURE '999,999'
 517 @PROW(),45 SAY AFCCI13 PICTURE '999.99'
 518 @PROW(),53 SAY AFCPI13 PICTURE '999.99'
 519 @PROW(),62 SAY AVCCI13 PICTURE '99.999'
 520 @PROW(),70 SAY AVCPI13 PICTURE '99.999'
 521 @PROW(),81 SAY AFCCA13 PICTURE '999.99'
 522 @PROW(),89 SAY AFCPA13 PICTURE '999.99'
 523 @PROW(),98 SAY AVCCA13 PICTURE '99.999'
 524 @PROW(),106 SAY AVCPA13 PICTURE '99.999'
 525 ???CHR(10)
 526 EJECT
 527 SET DEVICE TO SCREEN
 528 PAR=SUBSTR(FILENAME,7,4)
 529 FILENAME = 'COST'+PAR+'.MEM'
 530 ERASE &FILENAME
 531 SAVE TO &FILENAME
 532 SET DELETE OFF
 533 RECALL ALL
 534 CLOSE ALL
```