社会開発調査部報告書

THE REPUBLIC OF THE PHILIPPINES
MARITIME INDUSTRY AUTHORITY
THE STUDY ON MASTER PLAN
ON MARITIME SAFETY IN
THE REPUBLIC OF THE PHILIPPINES

FINAL REPORT
(SUMMARY)

AUGUST 1992

JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA)

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MARITIME INDUSTRY AUTHORITY

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Preface

In response to a request from the Government of the Republic of the Philippines, the Government of Japan decided to conduct a master plan study on Maritime Safety in the Republic of the Philippines and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to the Philippines a study team headed by Mr.Kenji YANO, Excecutive Director, The Japan Association for Preventing Marine Accidents, three times between March 1991 and June 1992.

The team held discussions with the officials concerned of the Government of the Philippines, and conducted field surveys at the study area. After the team returned to Japan, further studies were made and the present report was prepared.

I hope that this report will contribute to the promotion of the project and to the enhancement of the friendly relations between our two countries.

I with to express my sincere appreciation to the officials concerned of the Government of the Republic of the Philippines for their close cooperation extended to the team.

August 1992

Kensuke Yanagiya

Kensuke Yanagiya
Presidet
Japan International Cooperation Agency

LETTER OF TRANSMITTAL

Mr. Kensuke Yanagiya
President
Japan International Cooperation Agency

Dear Mr. Yanagiya:

We have the honor to submit to you our final report for the Study on Master Plan on Maritime Safety in the Republic of Philippines. It is with great pleasure that this Study has been completed under the close cooperation of the two governments of Japan and Philippines.

The final report has been prepared during the past 17 months by the Study Team organized by members of the Japan Association for Preventing Maritime Accidents in association with Yachiyo Engineering Co., Ltd., and headed by Mr. Kenji Yano. It comprises a Summary, Main Report, Technical Report, and Data Base.

In preparing this Report, our Team benefited a great deal of the cooperation of officials and experts of the Japan International Cooperation Agency and other authorities concerned of the Government of Japan.

On behalf of the Study Team, I would like to express my deepest appreciation to the officials concerned and to other related agencies of the Republic of Philippines for their enormous cooperation, assistance and warm hospitality extended to the Study Team members.

We sincerely hope that this Report will contribute to the further development of the Republic of Philippines.

Sincerely yours,

Kenji Yano
Team Leader
Study Team of the Study
on Master Plan on
Maritime Safety in the
Republic of Philippines

SUMMARY REPORT
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I. INTRODUCTION

1. BACKGROUND AND OBJECTIVES

Development and safety improvement of maritime transportation system are always critical factors for national socio-economic development of such an archipelago as the Philippines.

Especially maritime safety became of urgent concerns in wake of the frequent maritime accidents in recent years. While inter-islands shipping in the country have been fundamentally provided by the private sector, Government involvement is required in the field of safety measures, administrative system and vessel improvement for securing maritime safety.

In this regard the Philippine Government requested the Japanese Government for the technical co-operation for Master Plan Study on Maritime Safety in The Republic of The Philippines.

In response to the request of the Government of the Philippines, The Government of Japan dispatched the Japanese Study Team through The Japan International Co-operation Agency (JICA) for the implementation of study.

The principal objective of the study is therefore to review, update and consolidate all factors relevant to domestic marine transportation, to identify specific problems and formulate realistic and practical improvement plans/programs from the short, medium and long term viewpoints.

The study comprises of two (2) phases which are defined to

(1) formulate the Master Plan on Maritime Safety in the Republic of the Philippines, and

(2) conduct the Pre-Feasibility Study on the selected priority projects.

2. STUDY AREA AND ITEMS

The study covering all waters and related facilities on land under the jurisdiction of the Philippines is divided into two phases:

(1) In the first phase, based on the survey and analysis on the current situation of the Philippine maritime transport and safety, safety improvement plan covering seafarer, vessels, safety navigation measures, aid to navigation, maritime communication and search and rescue was formulated.

(2) In the second phase, priority project packages were

selected through the general evaluation of the projects contained in the safety improvement plan as set up above. Subsequently Pre-Feasibility Study was conducted on the selected priority project packages.

3. STUDY ORGANIZATION

The study was executed in co-operation between JICA Study Team and Philippine Counterpart Team. Advisory Committee on the Japanese side and Inter Agency Committee on the Philippine side were established to provide advice on the study course and activities.

Master Plan Study consists of General Plan Study and Sector Plan Study. The latter is integrated and incorporated into the former.

(1) Major items of Master Plan Study are;

i) Overview on National Economic Structure and National Transportation System as an overall for the maritime safety
ii) Analyses and perspectives of Maritime Transport
iii) Maritime accident analysis and future prospect
iv) Bases structure of maritime accidents
v) Maritime safety improvement plan
vi) General evaluation
vii) Implementation program with priority project packages.

(2) Major items of Sector plan Study are;

i) Maritime safety education
ii) Fleet improvement for safety
iii) Aids to navigation
iv) Maritime search and rescue
v) Maritime safety communication
vi) Organization for Maritime safety

After the completion of Master Plan study, Pre-Feasibility Studies were carried out on;

i) Regional Maritime Transportation Safety Project Plan
ii) Vessel Inspection system Upgrading Project
iii) Aids to Navigation Improvement Project

4. STRUCTURE OF REPORTS

The study report consists of the following three volumes.

(1) MAIN REPORT

This report is "General Plan Study Report," into which all the study items were summarized.

(2) TECHNICAL REPORT

This report contains the results of Sector Plan Study and Pre-Feasibility Study in detail.

(3) DATA BASE REPORT

This report is composed of the results of supplementary survey including;

i) Shipping Company Survey
ii) Port Traffic Survey
iii) Survey On Aids To Navigation

It also contains other design and engineering data.

STUDY ORGANIZATION

1. JICA STUDY TEAM

1)	Mr. Torami NOMA	: Team Leader
	Mr. Kenji YANO	: Team Leader
2)	Mr. Kenji TANAKA	: Safety Planning
3)	Mr. Kenji YANO	: Maritime Accident Analysis
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6)	Mr. Yoshio NAWA	: Aids to Navigation
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9)	Mr. Yasushi TACHIYASHIKI	: Transport Forecast
10)	Mr. Hajime TANAKA	: Safety Organization
11)	Mr. Ken KUMAZAWA	: Economic/Financial Evaluation

2. JICA ADVISORY COMMITTEE

1)	Mr. Yukio ISHII	: Team Leader, MSA
2)	Mr. Hiroshi NAKATA	: Team Leader, MSA
3)	Mr. Toshitaka ISHIMA	: Maritime Safety Agency (MSA)
4)	Mr. Takayuki YAMAKAWA	: MSA
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4)	Cdr.Ruben S.DORIA	: PCG
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14)	Capt.Ruben F.LAVRE	: PCG (Chief of Staff)
15)	Cdr.Ruben S.DORIA	: PCG
16)	Cdr.Robert V.GARCIA	: PCG
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18)	Lt.Ciriaco G.MAMALAYAN	: PCG
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3)	Mr.Shoichiro INOUE	JICA - MARINA
4)	Mr.Masahiro SHINTO	JICA - MARINA
5)	Mr.Soichi KOKUTA	JICA - NAMRIA
6)	Mr.Tadayoshi WATANABE	JICA - MARINA
7)	Mr.Toshitaka ISHIMA	

6. JICA

1)	Mr.Noriki ASAHI	JICA H/Q
2)	Mr.Toshiyuki EZUKA	JICA H/Q
3)	Mr.Naoya SHIMIZU	JICA - MANILA

II. MASTER PLAN STUDY

1. OVERALL FRAMEWORK OF PHILIPPINE MARITIME TRANSPORTATION

A summary of the national economic structure and national transportation system regulating maritime transportation is given in the following.

1.1 National Socio-economic Structure

The Philippine economy enjoyed sustained growth throughout the 1960s and 1970s, however, during the 1980s growth slowed due to worldwide recession, the oil crisis and domestic political problems along with natural disasters. At one point of time economic recovery was expected but the Philippines are still in a state of stagnation entering the 1990's.

The average annual increase in population is 2.5% and in 1990 the population reached 60.5 million of which 15%, 9 million people, are inhabitants of Metro Manila.

The Philippines are basically an agricultural and semi-industrial country. Agriculture accounts for one third of the GNP, making up 60% of export revenue and employing 50% of the population. Industry accounts for 30% of the GNP of which 90% are manufacturing industries.

The Philippine economy is concentrated in the Metro Manila area and Region IV (Southern Tagalog). Other regions with higher domestic outputs, are Region III (Central Luzon), Region VII (Central Visayas) and Region XII (Southern Mindanao). Metro Manila and the surrounding areas have continued to grow but the pace has slowed due to government decentralization policies.

The Philippines have had a persistent balance of trade deficit for the last 15 years. This is because the country depends largely on imported crude oil and petroleum products while on the other hand, exports are dominated by five traditional export products, namely, coconuts, bananas, sugar, forest products and copper. In recent years however, the balance of trade has improved slightly due to the export of non-traditional export products such as electronics and garments.

1.2 Philippine Transportation System

The Philippines are made up of over 7,100 islands and domestic transportation is carried out by use of roads for intra-island and sea and air for inter-island as the principle transportation modes. Transportation allotments are in tons-km and passenger-km with roads accommodating for 65% and 90% respectively while maritime transportation makes up 35% and 7%. Land transportation makes up the bulk of intra-island transportation while long haul transportation

is dominated by maritime transportation. (The Japan-Philippines Friendship Highway traverses the country from Luzon to Mindanao but the volume of transportation making use of it compared to maritime transportation is extremely small.)

As stated in the 1987-1992 MTPDP, the available infrastructure is considered sufficient in terms of capacity and coverage. However, there is still a need for substantial rehabilitation, upgrading and improvement.

Transportation, as a sub-sector of the service sector, comprises only a small percentage, approximately 5.4% of the GNP and around 13% of the service sector. In addition, the breakdown for transportation sector Gross Value Added Production is 69.1% for land, 19.0% for sea and 11.8% for air in 1989 with land transportation making up the bulk of the transportation industry production. Maritime transport maintained a rate of 27.9% in 1975 but as noted above, in 1989 this had fallen to 19.0%. This trend shows a lag in the shipping industry with development of the national economy.

2. GENERAL CONDITION OF PHILIPPINE MARITIME TRANSPORTATION

2.1 Maritime Transportation

2.1.1 Outline of Philippine Maritime Transportation

The Philippine Maritime Transportation System is outlined in the light of 1. Framework of Maritime Transportation, 2. Maritime Transportation Network and 3. The Institutional System of Maritime Transportation.

(1) Framework of Maritime Transportation

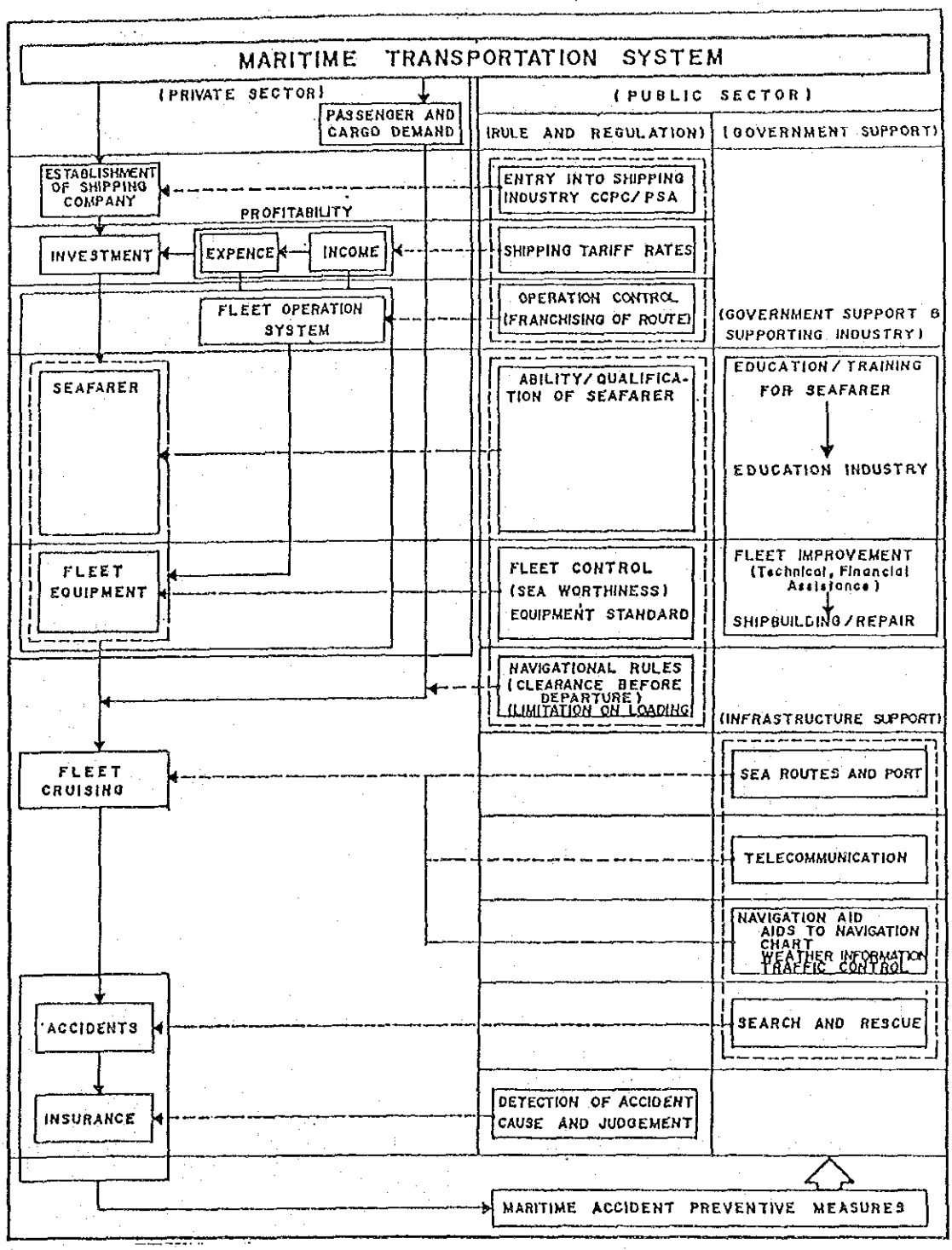
The Philippine Maritime Transportation System is basically made up of the shipping industry (private sector) which is the common carrier and the government (public sector) which supervises, protects and promotes the shipping industry.

If looked at in terms of the shipping business which establishes and invests in shipping companies, provides and maintains vessels and seafarers and actually operate the ships, the framework of the maritime transportation system is constituted of the following 3 sectors.

1) The Domestic Shipping Business

The shipping business is run by private enterprise according to market economics. However, the government, on the other hand, carries out industrial regulation on domestic shipping as public transportation policies focusing on the orderly development of the shipping industry (preventing destructive competition etc.) and ensuring public benefits.

Figure II.1
Framework of Maritime Transportation



2) Seafarers and Vessels

The responsibility of keeping the shipping industry, maintaining and improving the quality of seafarers and vessels in order to ensure safety and the prevention of maritime accidents, is that of the government.

For this reason, along with the implementing of regulations to maintain the quality of seamen and vessels above a set standard, technological and financial assistance is to be provided for the educating of seafarers and upgrading of vessels.

3) Navigation

In addition to the above measures, in order to achieve safe navigation of vessels, along with navigation safety regulations (ex. Vessel Departure Clearance), maritime transportation infrastructure services for navigation is to be provided.

Consequently basic Philippine Maritime Transportation problems have been generally identified in the 3 following points.

1. Adverse Effects of Shipping Industry Regulations

   The above shipping industry regulations which have discouraged free and fair competition and deprived the shipping industry of free-market-economy principles and along with other problems (ex. harbor inefficiency) are causing a decline in shipping efficiency and profitability. Accordingly there is a lack of reinvestment and it is this that is hindering the modernization of Philippine shipping.

2. Non-compliance with Safety Regulations

   On the other hand, safety regulations are not being strictly complied to and this is becoming a serious problem in navigation safety.

3. Poor condition of the Maritime Transportation Infrastructure

   Philippine Maritime Transportation has been neglected for many years and because of a lagging of investment in Maritime Transportation, the infrastructure made up of aids to navigation etc., has been left in an extremely poor state of effectiveness.

(2) Maritime Transportation Network

The Maritime Network makes possible the safe and efficient operation of vessels and in general consists of; sea routes/ports network on which vessels navigate and anchor,

Figure II.2
Navigation System

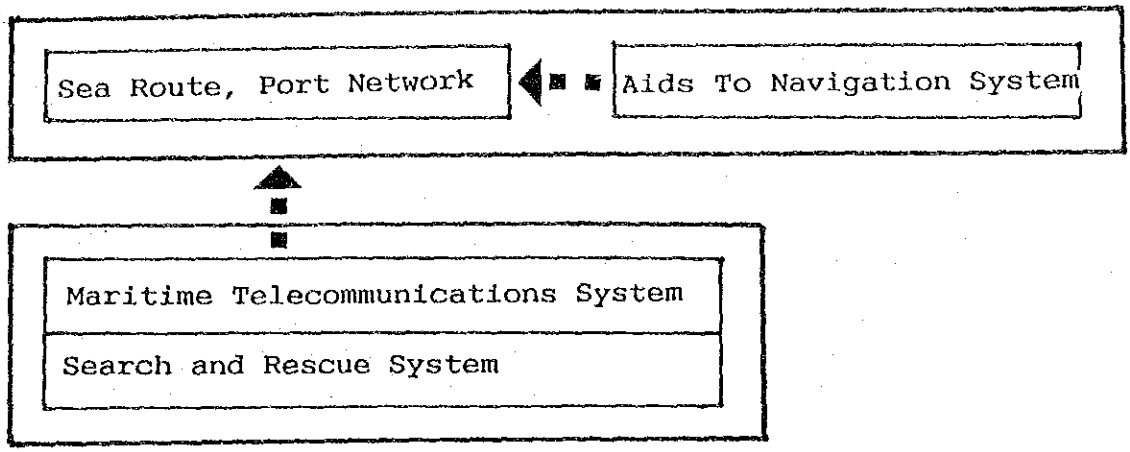
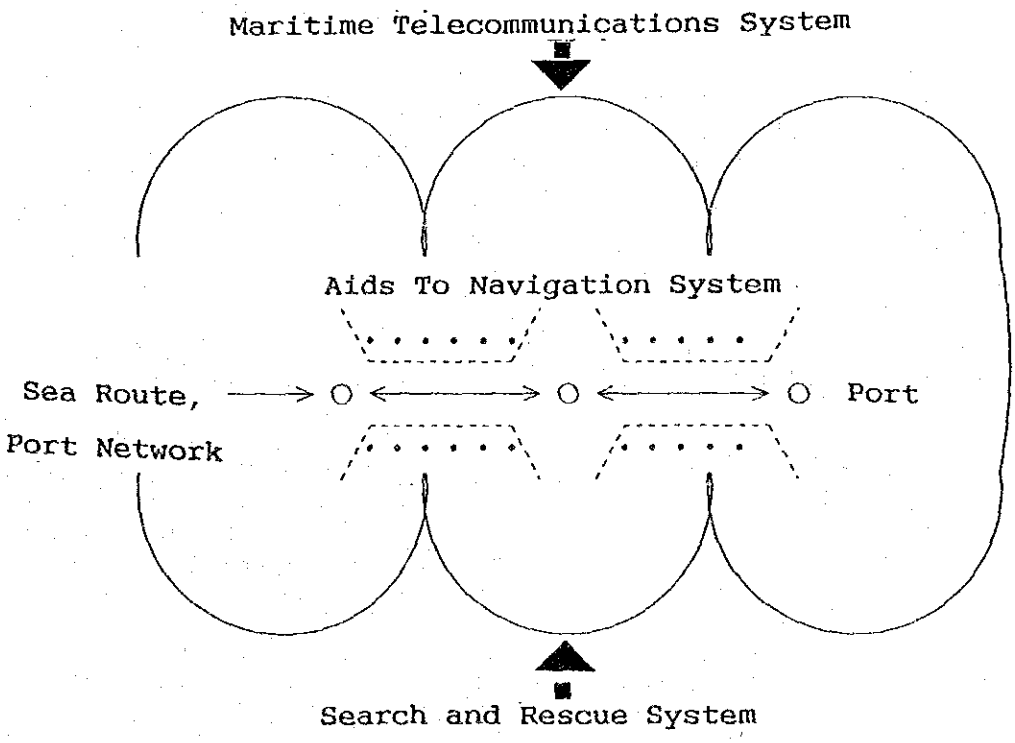


Figure II.3
Maritime Transportation Network



aids to navigation which used by vessels in confirming their location on the sea routes, telecommunication systems by which vessels communicate while at sea and search and rescue system in the event of an accident.

Vessels carry out operations checking their positions on the sea routes/port networks using aids to navigation and linking up with land bases by way of maritime telecommunications and when an accident does occur, are aided by the search and rescue system.

(3) Basic Components of the Institutional System Maritime Transportation

As indicated previously, the Philippine Maritime Transportation System consists of 3 areas. In other words,
1) Shipping Industry System, to promote orderly development of the shipping industry,
2) Seafarer, Vessel System, and
3) Systems related to the Maritime Transportation Infrastructure services, in order to achieve safe and efficient operation of vessels.

1)Shipping Industry System

MARINA is responsible for the development of the shipping industry and in order to protect and promote this industry as well as protect the public interests it regulates entry into inter-island shipping, approves the acquisition of vessels; controls the franchising of sea transportation routes; audits shipping lines (keeping profit rates below 12%); controls tariffs (regular cargo and 3rd class passengers).

2)Seafarer, Vessel System

For seafarers and vessels there is the regulation and control system and the support and assistance system.

MARINA oversees the skills and qualifications of the seafarers while PCG inspects vessels and issues certificates of seaworthiness, thus regulating and controlling seafarers and vessels. On the other hand, the Ministry of Education, while at the same time providing a public seafarers school education program, guides and oversees private schools for seafarer education.

Furthermore, MARINA guides and oversees the development of seafarer training programs and vessel repair programs.

3) Systems related to Maritime Transportation

In order to achieve safe and efficient operation of vessels, along with PCG implementation of a vessel departure clearance system, the government has instituted the following development and management system for the Maritime

Transportation Infrastructure.

(Sea Route, Port Network)
1. MARINA carries out the development of sea routes and gives government approval to the sea routes.
2. PPA carries out the development of ports, maintains and controls public ports and oversees private ports. Regardless of whether inside or outside the port, PPA is responsible for maintaining the water routes.

(Aids to Navigation System)
3. PCG is responsible for the maintaining and controlling of navigation aids.
4. NAMRIA carries out the surveying of water routes, the drawing up and publishing of maritime charts and notifies the shipping industry of navigational hazards.
5. PAGASA is responsible for meteorological reports.

(Maritime Telecommunications)
6. DOTC maintains and operates the maritime telecommunications network.

(Search and Rescue)
7. PCG is the central body for search and rescue.

2.1.2 Condition of the Maritime Transportation Infrastructure

(1) Sea Route, Port Network

The Philippine sea route and port network is made up of 215 sea routes (6 primary, 9 secondary and over 200 tertiary sea routes) and 397 ports (national ports consisting of 19 base ports and 75 sub ports).

The primary sea routes link Manila and the main ports in the regional areas and form the axis of the Philippine Maritime Traffic flow. The secondary sea routes form the regional trunk lines between the sub ports while the tertiary sea routes are feeder routes.

The following 2 points are indicated for the sea route and port network:

1) From the point of view of the large number of islands and the vastness of the sea of the Philippines, sea routes are still insufficiently developed and as a result unlicensed vessels and trampers outside the jurisdiction of the government are operating.

2) To date, port development and maintenance has been carried out in a positive manner and facility capacity is considered sufficient. However, it is said that port efficiency is bad and that this efficiency should be improved to handle future transportation requirements.

(2) Aids to Navigation System

The aids to navigation system is made up of the following

1) Navigation Aids

There are currently 393 navigation aids, however, 1/3 of these aids are not operating at all. This is because of damage to the aids or because of equipment malfunction. Moreover the light intensity of the majority of these navigation aids is insufficient making night operation of vessels extremely dangerous.

Because there is no system to report on the condition of the navigation aids, prompt action to rectify the condition is not possible. Furthermore, because there is less government financial support for suitable maintenance and management, it is not possible to improve the current worsening conditions.

2) Maritime Charts

Of the 94 water routes in the Philippines, 34 are indicated as being navigationally hazardous. However, the charts currently in use are old, scaled down charts produced using surveying methods of the 1940s.

3) Meteorological Information

PAGASA is in charge of port meteorological liaison offices and visual storm signal stations. Weather forecasts are broadcast twice daily and tropical storm warnings hourly. These meteorological reports are reported by way of general broadcasting, 12 privately run public coastal stations, telephone, fax and telex.

4) Traffic Control

TSS has been put into effect in the Verde-Tablas Strait between Mindoro and Luzon islands which is very narrow and presently the most congested sea routes in the Philippines.

(3) Maritime Telecommunications

Radio Telecommunications between coastal stations and vessels are managed and maintained by either public or private sectors or government. Of these, the private coastal stations have the most extensive Telecommunications network and modern facilities. Compared to this government coastal stations run by PCG have extremely limited radio Telecommunications power. This is because of a lack of suitable facilities and necessary number of frequencies for the monitoring of distress signals.

Public Coastal Stations; Established by private enterprise and licensed by NTC, used for international

public correspondence and official Telecommunications of government agencies.

Private Coastal Stations; Used by shipping companies and fishing companies for Telecommunications pertaining to the needs and safety of their vessels and crews and for navigation requirements.

Government Coastal Stations; Operated by government agencies such as PCG and PFC and handling only official Telecommunications.

In addition the PPA also has coastal stations which facilitate the control of vessel entries to and departures from the ports.. PCG coastal stations handle emergency Telecommunications such as for search and rescue.

(4) Search and Rescue

Search and rescue, with PCG as the main body, is a coordinated effort of a number of government agencies, non-government organizations and individuals.

Participating government agencies include DND, PILG, DOH, DOJ, DFA, DSWD, and DOTC. On the other hand non-government organizations include shipping companies and PCG auxiliary agencies (made up of ship owners). The following 3 points are listed as current problems with the search and rescue system.

1) Insufficient telecommunications facilities are causing a hindrance in search and rescue activities.

2) PCG search and rescue vessels are not suitable for prompt search and rescue missions.

3) Due to frequent PCG personnel changes, search and rescue activities can not be effectively maintained.

2.2 Shipping Industry

2.2.1 Basic Characteristics of Philippine Shipping Industry

(1) Industry Characteristics

Domestic shipping industry ranges from large scale shipping companies operating up to 30 ships to small private enterprises operating 1 ship. This composition is made up as follows.

Major shipping companies	17	146 ships
Small, middle sized license companies	300	apprx 900 ships
Unlicensed operators		apprx 3000 ships

Amongst these there are a number of shipping organizations including CISO (17 companies) made up of mainly majors,

VAFSCO (33 companies based in Cebu) made up of mainly small and middle sized companies and SMSA (6 companies).

The major shipping companies have an established financial base and are a major force in Philippine maritime transportation controlling almost all passenger shipping on the main routes and the greater part of freight transportation.

The financial base of the small and middle sized shipping companies is fragile, operating along local sea routes using small wooden hulled vessels.

(2) Type of Shipping

Domestic shipping is divided up into liner shipping, trampers, tankers and barges providing the following business services.

Scheduled liner shipping operates on franchised sea routes with a set number of ships and to a regular schedule while collecting fares authorized by MARINA. On the other hand, trampers do not have fixed routes and operate on a charter basis. Barges and tugboats operate in and out of the ports and tankers transport specific liquid (petroleum products etc.) products. Industrial/Contract type operators operate unit load carriers for transporting industrial products such as bottled cargo, cement and paper etc.

The basic characteristics of the Philippine shipping industry are as shown below.

1) Liner shipping accounts for the majority of maritime freight transportation while the rest is shipped using unscheduled contract vessels (trampers).

2) Liner service is the most important domestic shipping service and is monopolized by 11 (CISO member) companies. In 1989 8.2 million tons of freight and 7.0 million passengers were transported by 10 CISO members.

(3) Financial Condition

The financial condition of the Philippine shipping industry management is represented by high costs and low profitability.

1) Low Profitability

Of the 1989 financial reports of the 10 major shipping companies, 3 reported losses while the other 7 reported profits of between 3.7 and 11.4%.

2) High Costs

Philippine shipping fares and management costs are said to

be higher than they should be. This is said to be because of; the cost of longshoremen, loading/unloading is high; the unnecessary involvement of PPA fees and customs for domestic inspections; the fact that in addition to heavy taxes, port charges and licensing fees are also levied; the existence of alleged cartels on the liner routes as a result of government regulation.

The main part of operating costs is fuel and dry dock costs. The continually aging vessels use more fuel and more repair costs and in addition delays in the approval of rate adjustment are causing a forcing low profitability.

2.2.2 Seafarer Situation

The Philippines is a supplier of seafarers and it is said that there are up to 100,000 Filipinos on foreign vessels (of which about 25% are officers). In the Philippines, the required number of seafarers is 6,310 while the actual number is estimated at 8,000 (including those on leave). Within these given conditions the shipping industry has the following problems.

(1) Along with the increase in demand for crews for foreign vessels, the wage standards are higher and the working conditions are better leading to a drain of seafarers away from domestic shipping and toward working on foreign vessels. This results in a lack of skilled and experienced seafarers for domestic shipping.

(2) A lot of private seafarer training institutions lack facilities and a proper system while training excessive numbers of people and leading to an excessive number of seafarers with low levels of skill.

2.2.3 Vessel Condition

The total number of vessels in the Philippines is estimated at 9,392. Of these there are 4,975 fishing boats. The type of vessels most common (with the exception of fishing boats) are general freight carriers (2,737) of which 86% are wooden hulled vessels.

Using 250 GRT as the standard for dividing large and small vessels, the following characteristics become apparent.

- The number of smaller vessels is overwhelmingly greater than that of larger vessels.
- Small vessels are of domestic construction and wooden hulled while large vessels are imported used vessels.
- Accordingly, small vessels are relatively new while large vessels are old and dilapidated.
- Large ships enter service on the long distance main routes where transportation demands are concentrated while small ships operate on short distance local routes, where transportation demands are low and dispersed.

Within these given conditions Philippine vessels have the following problems

1) Substandard construction of small vessels

Small vessels under 250G/T are almost all constructed at local shipyards. This construction is done without weight and center of gravitation calculations and plans and totally dependent on the shipbuilders experience. Due to this the draft is too deep and the required free board is not secured.

In addition the vessels are not provided with watertight bulkheads. For this reason, once there is damage (such as cracks) to the hull and flooding occurs, all stability of the vessel is lost very quickly and when there is not enough free board this results in sinking.

2) Overconversion of large vessels

Used steel hulled vessels imported from overseas have all been overconverted to increase the passenger carrying capacity. Accordingly the ships seaworthiness is hindered creating a loss of stability and with on-board congestion, early emergency procedure and passenger guidance is difficult. In addition, because of the congestion there is lag in taking refuge resulting in serious consequences.

2.2.4 Philippine Shipping Summary

The above is summarized and shown in the following:

(1) The Philippine shipping industry is made up of 2 parts; the major shipping companies handling transportation on the main routes and the regional shipping enterprises handling local and non-regular sea routes.

(2) The former is, to a certain extent, established as a shipping business and system whereas the latter regional shipping industry is not established. Accordingly, the regional shipping industry is mainly made up of small/middle sized and informal enterprises.

(3) While the major shipping companies are organized (CISO), the regional shipping companies are unorganized.

(4) The make up of the 2 types of fleet for the industry divisions is completely different. The majors have small numbers of large vessels while the regions have large numbers of small vessels, reflecting the difference between used steel hulled vessels that have been imported and converted and domestically built wooden hulled vessels that have design problems.

Table II.1
Philippine Shipping Summary

Regional Shipping Industry	Major Shipping Industry
Shipping Industry	
Small/middle sized enterprises Individually run	Large scale enterprises
Unorganized	Organized (CISO)
Local, feeder sea routes	Main sea routes
Vessels	
Larger numbers of small vessels (built by problem plagued domestic shipbuilding industry)	Small numbers of large vessels (imported used steel hulled vessels converted to increase capacity)
Seafarers	
Haven't completed school education	Finished school education but low level techniques

(5) In addition for the seafarers, there are those working for the major shipping companies that have received a certain degree of seamanship education (albeit that the technique and skill level is low) and the regional shipping company seafarers of which few have finished their obligatory education.

2.3 Maritime Transportation Market

The Philippine Maritime Transportation volume was depressed in 1984 because of a downturn in the economy but since 1986 that has transferred into an increase, passenger and freight increasing respectively by 14% and 16% and in 1990 had reached 14.9 million passengers and 29.4 million tons respectively.

2.3.1 Passenger Traffic

The Philippine maritime passenger traffic has the following 2 basic characteristics

(1) Seasonal fluctuation

The maritime passenger traffic peaks in the summer (March through May) and Christmas seasons with the rainy season (June through November) being the off-season thus having an extremely seasonal influence.

(2) Geographical distribution

80% of passenger traffic passes through the national ports or base and terminal ports concentrating on 5 main ports (Manila, Cebu, Zamboanga, Batangas and Iloilo respectively claiming percentages of 26.8%, 12.4%, 10.5%, 9.2%, 9.1%). Of these 2 ports (Batangas, Iloilo and Cebu) are showing definite increases in transportation volume.

2.3.2 Cargo Traffic

The Philippine maritime cargo traffic has the following basic characteristics.

(1) Maritime cargo classifications

The 4 main maritime cargo categories are; 1. mining and fuel resources (30.3%), 2. natural resources (20.1%), 3. food products and animals (18.3%), 4. industrial products (15.7%).

Considering this in terms of direction of traffic flow, that flowing north (to Manila) consists largely of agricultural products (grains, meats, fruits) and that flowing south consists largely of industrial products (machinery) and so on.

(2) Geographical distribution

As previously mentioned, passenger traffic is concentrated on the public ports but in the case of cargo traffic, 50% of all traffic volume is handled by private ports. Seen in terms of percentages per port, Manila stands out with 46.3% and then Cebu with 11.4%.

3. FUTURE PROSPECTS FOR MARITIME TRAFFIC

3.1 National Socio-economic Development

(1) Population Frame

According to NEDA (National Economic and Development Authority) projections, the 1990 population of 61 million will increase to a range 97 to 117 million by the year 2030. This translates to an average annual increase of 1.2 to 1.6% and is a decline from the 1980s rate of 2.5%.

(2) Economic Indicators

As a national overall development plan, NEDA created the "Medium-term Philippine Development Plan 1987 - 1992" (hereafter referred to as the "Mid-term Plan") and this is currently the only economic indicator that can be used for projections. The plan is still in execution but a comparison of plan values and actual values shows 110.8 billion pesos and 107.5 billion pesos for the 1989 GDP thus plan values were almost achieved in spite of the economic

recession in 1986. The next development plan which will give future projections is currently being made up, will indicate stable growth.

3.2 Maritime Transportation Development Policy, Planning and Investment

The Mid-Term Plan indicates the share of the sector of maritime transport in the Transportation Infrastructure Investment Plan and if the transportation model split is studied, it is obvious that the investment for maritime transportation is small relative to the expectations for it and this is evidence that maritime transportation is taken lightly.

The Ports category is made up of the various types of ports and navigational aids. The Investment Plan places importance on the development of main ports which makes up 52% of the total investment. On the other hand the navigational aids projects are made up totally of lighthouse maintenance and these costs account for about only 2%.

The maritime transportation investment is made up of 57% foreign funds and 43% domestic funds. Of the domestic funds, 64% is planned to come from the income derived from main port usage fees.

3.3 Maritime Transportation Demand Forecast

This study has determined that maritime transportation volume is closely related to the increase in population and economic activity. Accordingly future transportation volumes projected using population and GDP as variables in a regression formula, show that freight and passengers will increase steadily by 4 to 6% annually.

3.4 Future Shipping Forecast

Depending on the steady increase of maritime transportation volume, it is anticipated that the following qualitative and qualitative changes will occur in Philippine domestic shipping.

- Increase in the number and size of ships
- The increase of sea routes
- Upgrading of port services, specifically the increase of berths and reduction of freight handling time

The number of ships in operation (more than 100 GRT) are projected with these changes as the fluctuation factor and this result, with increases in ship size and efficiency of port services, is forecast at between 1,004 and 1,891 vessels. With consideration to future scrapping of dilapidated vessels and investment in new and used vessels, it is estimated that number of ships by the 2010 will be 1,500 (average 1700 DWT).

4. MARITIME ACCIDENT ANALYSIS AND FUTURE PROSPECTS

4.1 Maritime Accident Summary

(1) The Occurrence and Safety Standards of Maritime Accidents

The average occurrence level of maritime accidents over the last 9 years has been 224 with the number of people involved being 2,300 and the number of deaths at 661 per year.

When considering the number of deaths for Japan (262/year) and Indonesia (224/year), it must be noted that the Philippine maritime accident death rate of 661/year is extremely high.

The ratio of accident occurrence to the number of ships owned in the Philippines (1986 - 1990 Total Loss Maritime Accidents/No. of Vessels Owned over 5 years - Lloyds Data) is 0.5468 which is more than 2 times that of Japan (10th of 12 countries) and the United States indicating a low level of safety.

(2) Yearly Change

The yearly change for the period from 1982 to 1990 shows that with the exception of 1984 which stands out, there has been a continuous growth trend in the number of maritime accidents. In 1990 this reached 421 occurrences/year.

(3) Types of Maritime Accidents

Looking at the proportion of types of accidents occurring in the 9 year period from 1982 to 1990, the main types of accidents consist of sinking at the top with 27.2%, running aground with 19.4%, missing with 18.9%, capsizing with 14.9% and drifting with 10.9%.

In Japan running aground and collision make up about 40% of maritime accidents indicating different accident elements.

(4) Accident Occurrence Periods

Looking at the number of accidents in terms of monthly totals from 1982 to 1990, there are increases in the period from August to December with the peak in November (the average occurrence of accidents for the 9 year period is 19/month whereas for November the rate of occurrence is 2.7 times greater at 52/month).

Moreover, comparing the good weather conditions to bad weather conditions (tropical cyclones) from 1986 to 1990, the yearly occurrence of accidents for good weather conditions is 100 - 200/year while there is a steady increase in the occurrence of accidents during bad weather conditions making up half the total number of accidents in

1990.

From the above it can be stated that bad weather conditions during the tropical cyclone season of August to December are the greatest factor in the increasing number of Philippine maritime accident occurrences.

4.2 Patterns of Maritime Accident Occurrence

A clear understanding of the patterns involved in Philippine maritime accident occurrences can be gained by studying "what kind of vessels (vessel size; large or small) in what kind of conditions (natural conditions; good weather or bad weather) are involved in what kind of accidents (sinking, capsizing, drifting etc. involving problems with the vessel itself and running aground, collision involving navigation problems)"

The following is an analysis of Philippine maritime accident occurrence patterns based on the above 3 factors.

(1) Small versus large

The number of accidents in 1989 and 90 were 279 and 421 respectively. Of that the small vessel : large vessel ratio was 85% : 12% and 75%:24% showing that the number of accidents for small vessels is overwhelmingly greater.

(2) Good weather versus bad weather

The ratio of good weather : bad weather for the total number of accidents annually is 51% : 49% (1989) and 44% : 56% (1990) with accidents occurring in bad weather making up half of the total accidents. As shown previously, the number of bad weather accidents is undergoing a large growth trend and this is one of the big problems faced by Philippine shipping.

(3) Type of Accident Occurrence Pattern

Looking at the number of accidents categorized into the above mentioned 4 cases (small : large and good weather : bad weather), various kinds of accidents occur in each case but from that the following trends are indicated.

1) There are variety of accidents in good weather conditions

1. Small vessels going adrift and missing are one of the the main types of accident. This is almost non-existent in large vessels

2. At the top are capsizings and sinkings, leading running aground and collisions for small vessels while running aground and collisions lead capsizings and sinkings for large vessels.

2) Bad weather conditions

Compared to the above various types of accidents in normal conditions, the types of accidents are limited:

1. Both large and small vessels run aground and sink
2. However, while small vessel capsizing occurrences are numerous, occurrences of capsizing large vessels are extremely few.

Table II.2
Type of Accident Occurrence Pattern
(1989 - 1990 Total Accidents)

		Small Vessels		Large Vessels	
Normal Weather	Aground	28	> 19.9%	16	> 45.3%
	Collision	25		13	
	Capsizing	45	> 32.7%	2	
	Sinking	42		12	— 18.8%
	Fire	13		6	
	Drifting	31	— 11.7%	9	
	Missing	82	— 30.8%	6	
	Total	266		64	
Abnormal Weather	Aground	38	— 13.3%	58	— 67.4%
	Collision	2		0	
	Capsizing	64	— 22.5%	3	
	Sinking	135	— 47.5%	21	— 24.4%
	Fire	0		0	
	Drifting	29		4	
	Missing	16		0	
	Total	284		86	

The following is a summary of the Philippine maritime accident occurrence patterns as shown above

(1) The majority of maritime accident occurrences (80%) involve small vessels. This is constant from year to year.

(2) Maritime accidents involving large vessels are relatively few compared to small vessels but once an accident occurs (such as with the Dona Paz and Dona Marilyn), the scale of the disaster (human and property) and the resulting damage is great.

(3) The number of maritime accidents doubles with tropical cyclones.

(4) In the case of small vessels, there are many occurrences of all types of accidents but it is capsizings and sinking which are especially common and compared to this it is running aground, collision and sinking which are common for large vessels. Under bad weather conditions this becomes

limited to running aground, sinking and capsizing.

4.3 Maritime Accidents Forecast

Using relatively accurate maritime accident data from the last 4 years, the number of maritime accidents in the future have been forecast in the following 2 cases.

(1) Case 1 - Forecast based on the average number of accidents annually from the last 4 years as bench mark data

Statistics for each of the last 4 years contain peculiar data such as the number of maritime accidents due to tropical cyclones in 1989 and 1990, which are supposed to be statistically irregular. Therefore, benchmark data for forecasting is set at the average number of accidents for the last 4 years to give a standardized number. This number is multiplied by the future growth rate(*1) in the no. of vessels (1200 vessels / 683 vessels = 1.76) and future maritime accidents numbers are forecast.

Average no. accidents for 4 year period
x future growth rate in no. of vessels = 486

(267) x (1.76) = 486

*1 This assumes the growth rate for the no. of vessels over 100t forecast in the last chapter is approximately equal to that for the total number of vessels in the country.

(2) Case 2 - Forecast by extending the trend of no. annual accident occurrences during good weather conditions for the last 4 years

The number of accident occurrences during good weather conditions deems to show regular statistics after extracting accident data in bad weather conditions such as tropical cyclones, from the total number of maritime accidents. In this case, firstly the number of accidents under good weather conditions is forecast by simply extending the past trend for the number of accidents in good weather conditions up to the year 2010.

As seen in the previous chapter, the number of accidents during good weather conditions annually for the past 4 years shows a straight line increase (from 1987 to 1990 there was an average annual increase of 20 accidents) and if this is extended to the year 2010, the result will be 589 accidents.

No. of accidents during good weather conditions (1990)
+ Annual increase value = 589

(189 vessels) + 20 accidents x 20 years = 589

If the average number of tropical cyclone related accidents for the past 4 years increases according to the increase in

the number of vessels (as in case 1), the number of accidents during tropical cyclones will be 229.

Average annual tropical cyclone related accidents for last 4 years x Future growth rate in no. of vessels = 229

(130 accidents) x (1.76) = 229

Accordingly the total number of accidents forecast for the year 2010 is 818.

In Case 1 the level of accident occurrences is forecast according to present conditions whereas Case 2 estimates the number of maritime accidents in the event that present conditions worsen.

Accordingly the safety plan supposes a worst case of 818 accidents and assumes the necessity to at least make an effort to decrease the present level to under 486 accidents.

5. BASIC STRUCTURE OF MARITIME ACCIDENTS

In order to understand why maritime accidents occur in the Philippines, past maritime accident must be investigated and direct and indirect cause factors must be clarified.

The agency for investigating factors in maritime accidents is BMI. However, rather than examining maritime accident cause factors, inquiry hearings focus on disciplining crews, stripping seamanship qualifications and sentencing the vessel owner/operator management responsible. They are not concerned with making public material which clarifies the realities of the accidents causes. Accordingly, this study has no choice but to consider the basic structure of maritime accident occurrences such as follows. In other words without knowing maritime accident cause factors, it is clear that Philippine maritime transportation problems analyzed earlier are directly and indirectly related to the mentioned Philippine maritime accidents. By relating the maritime accident and maritime transportation problems, this study has attempted to grasp the basic structure of accident occurrences.

5.1 Basic Mechanism for Maritime Accident Occurrence

Philippine shipping, in spite of currently operating with substandard maritime transportation users and insufficient maritime transportation infrastructure, operates daily almost without mishap (this does not indicate safe conditions).

This is helped by the fact that almost all Philippine sea routes pass through inland seas and the sea is normally calm.

This situation is supposed to have caused the following serious problems with Philippine maritime safety.

(1) Lowering of safety consciousness of shipping industry related people

A psychological situation has been created giving way to slack attitudes toward the risks involved.

(2) Emergence of a trend against safety related investment and costs

The present lack of improvements and backwardness in the Philippine maritime transportation system is not only because of the above points (1) and (2), but also because of low profitability resulting from the low financial ability of the beneficiaries to pay for shipping charges and the low efficiency of the shipping industry leading to a low standard of re-investment. This along with the large size of the sea area and difficulty in maintaining facilities is recognized as being the basic factor in the backwardness of Philippine maritime transportation readiness.

As mentioned above, the non-occurrence of accidents does not mean that maritime transportation is safe. Given conditions such as the bad state of maritime transportation users and insufficient infrastructure, it can be said that maritime accidents are being avoided only on the verge of occurrence, safety standards are low and vessel operation is carried out under fragile conditions where accidents could occur at any time.

With these conditions, the ability to evade and cope with unforeseen accidents is low and when collisions, sinkings, fires etc., occur, the resulting damage is unable to be minimized leading to great tragedy.

Furthermore, vessels used to operating safely in calm conditions have little consideration for safety and because readiness for and ability to cope with bad weather is insufficient, this results in numerous occurrences of maritime transportation accidents.

In addition to the insufficient investigation of maritime transportation accident factors it can be concluded that cause factors for these kinds of accidents are determined to be

1) human error
(it is said that 70 to 80% of collisions and running aground incidents are the result of human factors)

2) tropical cyclones
(unavoidable)

The above manner of handling of accidents hinders the investigation of accident causes and accordingly, because no proper accident prevention countermeasures can be set out without such investigations, it can be said that maritime transportation accidents are following a course of expansion and repetition.

5.2 Basic Structure of Maritime Accidents

Maritime transportation suffers from structural problems as shown in Table and these make up the cause factors of maritime transportation accidents.

Moreover, it is considered that one of these causes directly, or a number of these causes indirectly related, brings about the occurrence of various maritime transportation accidents.

(1) Basic Maritime Transportation Problems

As already mentioned, there are 2 maritime transportation systems in the Philippines which are different in terms of development and operational levels. The fundamental problems in maritime transportation which make up the cause factors for accidents can be seen as problems with the maritime transportation system which has these differences in development.

The fundamental causes of the Philippine maritime transportation accidents are

1) Large scale shipping which is has been organized through national shipping policy, operates according under a standard maritime transportation system but maritime transportation renovation, modernization and quality improvement are lagging.

2) On the other hand, national policies still fail to cover the local areas where maritime shipping remains unestablished and in a primitive form.

In conclusion, the lag in both modernization of existing maritime transportation and systemization in local shipping is recognized as the fundamental problem in the occurrence of accidents.

(Small shipping)
The government has implemented policies covering safer operation regulation and guidance, maritime transportation user safety standards (seamanship qualification system, safety standards for shipbuilding etc.) and maritime transportation infrastructure services but these still do not cover all the regions. This means that there is no safe operations system, safety awareness is not developed (backward), local supply of seafarers and vessels are below standard (seafarers with low education levels, local ship

building not based on any safety standards etc.) and the navigation aids system is primitive and undeveloped. This is what is surmised as being the cause of accidents for small vessels.

(Large Shipping)
On the other hand, with a safety operations standard system, educated seafarers, foreign built steel hulled vessels and a maritime transportation infrastructure being provided, a shipping system has been established exclusively for organized large shipping.

However, with the backwardness of

1) negligence safety regulations

2) lagging seafarer skills and techniques

3) dilapidation of vessels, facilities and overconversion of structures, and

4) non-maintained, dilapidated and outdated maritime transportation infrastructure etc.,

as a maritime nation, modernization of the maritime transportation is lagging. This is surmised as being the cause of accidents for large vessels.

(2) Structure of Maritime Accident Occurrences

The above Philippine maritime transportation fundamental problems are the background giving rise to the causes for accidents.

The structure of Philippine maritime transportation accident occurrences (what the causes are, what kink of accidents occur, what kind of factors lead to the occurrence of accidents), can be clarified by analyses of accidents by vessel size (small:large) and weather conditions (good:bad). This is because, for example, depending on whether the vessel is large or small and whether the weather is good or bad, cases of running aground or sinking have completely different causes.

Corresponding to the previous chapter's "Patterns of Maritime Transportation Accident Occurrence", the Philippine maritime transportation accident occurrence structure basics are summarized into the following 3 points.

1) Maritime transportation user (seafarers, vessels) related problems are the primary cause of small vessel accidents. In other words, capsizings and sinkings which make up the majority of small vessel accidents include other causes but the main problem are the maritime transportation users themselves. For example, as shown in the following chart (Basic Structure of Philippine Maritime Accident

Occurrence) of, accidents involving safe operations and maritime transportation user factors are given as the main causes but the navigation aids system problem is the secondary cause.

2) For large vessels, navigation aids system related problems are the primary cause of maritime accidents. For example, there are more incidents of running aground and collision than of capsizing and sinking and in these cases it is estimated that the navigation aids system (aids to navigation etc.) problems are the most important cause factor.

3) Causes for accidents occurring in bad weather conditions (running aground, sinking, capsizing) are of course related to the above maritime transportation user problem (underdeveloped seafarer navigation skills, vessel stability, seaworthiness) but differing from good weather conditions, considering most accidents occurring in bad weather conditions occur inside port areas, it is not a case of problems with safe operation, maritime transportation users or the navigation aids system etc., but rather the fundamental cause is a lack of suitable tropical cyclone counter measures (weather alert system, rough weather counter measures, breakwaters, etc.).

Table II.3
Basic Structure of Philippine Maritime Accident Occurence

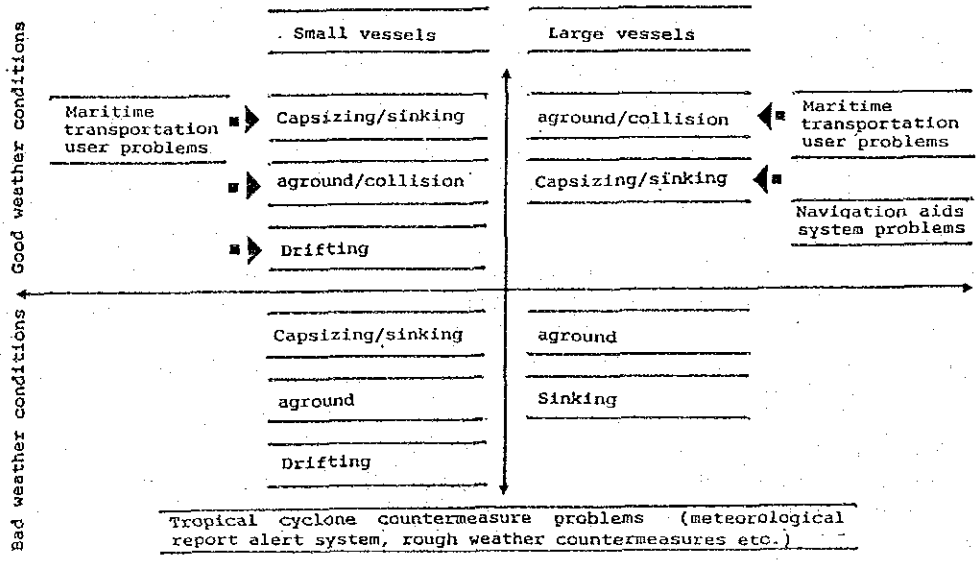


Table II.4
Structural Problems of Domestic Marine Transportation

Basic Maritime Transportation Problems			Main Causes	Types of Accident
	Small Shipping	Large Shipping	1. Small 2. Large	Sinking, Capsizing, aground, Collision, Drifting, Missing
Safe Operation	Naturally occurring no rules and systemization of safe operations	Safe operations systemized but not strictly enforced	1) Insufficient safety management by ship owners/operators (1) Insufficient safety education of crew (safety consciousness, morals, seamanship) (2) Insufficient operations management (loading, operating standards) 2) Insufficient supervisory authority guidance, regulation (1) Insufficient regulation concerning passengers/freight (2) Insufficient tropical cyclone alert system	●●● ●●● ●●●
Maritime Transportation Users — Seafarers	No education/low level of education, non-systemized seamanship qualifications/skills	Seamanship qualification system with set education/skill standards but knowledge/skill levels low	Navigation techniques/safe operation skills undeveloped	●●
Maritime Transportation Users — Vessels	Construction using local techniques and non-structural standards	Imported steel hull but dilapidated or over converted	No seaworthiness or stability. 1. Non-standard construction 2. Over conversion	●●
	No navigation instruments or telecommunications equipment on-board.	Have navigation instruments and telecommunications equipment but dilapidated or outdated	Dilapidated, badly maintained 1. Cracks, holes, engine trouble Unable to communicate 1. No telecommunications equipment	● ● ● ●
Maritime Transportation Infrastructure	Natural ports/aids, naturally dependent system	In operational state concerning ports however, aids to navigation, telecommunications, SAR etc., dilapidated and outdated, poor reliability	Ports lack high wave handling capabilities Insufficient navigation aids 2. Insufficient aids to navigation and charts	●●● ●●

6. MARITIME TRANSPORTATION SAFETY IMPROVEMENT PLAN

6.1 Basic Concepts

(1) Basic Recognition

In order to bring about maritime transportation safety, the first thing above all others is the raising of safety standards on vessels and the improvement of the quality of the seafarers that operated them. Along with this, the facilities assisting transportation traffic (sea routes, ports, telecommunications system, navigation aids system, search and rescue system etc.) must be completely upgraded. Add to this management of safe operation of vessels and for the first time maritime safety can be realized.

Scrutinizing Philippine maritime transportation from this point of view shows that port facilities, that until now have been one of the maritime transportation infrastructures, have received considerable financial investment but other areas have been long neglected and even when improvements have been made they have only been partial and patchwork in nature.

Analysis of current conditions as is detailed in Part 2, shows the respective elements supporting maritime transportation safety are dilapidated and are not functioning sufficiently. Moreover, responsibility for maritime transportation safety is divided up between many government organizations resulting in overlapping authority. In recent years the government has taken up the following as important maritime transportation policy subjects;

1) revision of shipping policy (stimulation of the shipping industry by induction of competitive principles)

2) maritime telecommunications system improvement projects

3) aids to navigation improvement projects

This thrust is being viewed favorably as an attempt to revise maritime transportation policies that have been long neglected.

This master plan can be viewed as assisting this policy thrust. The basic plan, along with the improving of telecommunications and aids to navigation, introduces improvements to the seafarer education system, shipbuilding and repair and the search and rescue system.

Even if these policies are implemented, it will take a considerably long time before the effects become apparent. For example, in order to raise the level of seafarer navigation skills, even with the upgrading of the education system, it will probably take more than 10 years before it

will transfer into an improvement in quality of seafarers and results can be seen. Even if dilapidated vessels with inferior seaworthiness are to be replaced, the ship owner's (shipping company) financial stability must first be considered and take priority over replacing vessels. Sea route and aids to navigation improvements will also take time before results can be seen.

In conclusion, maritime transportation safety policies are long term and although necessary, the effects are delayed and Philippine maritime transportation will continue to operate for considerable time at as low a level of safety as today.

In order to minimize maritime accidents and the resulting loss of human life and property under these kinds of conditions, it is desirable to give priority to improvement measures that will have immediate effect for seafarers, vessels and the navigation infrastructure.

(2) Basic Policies

Based on the above, the following basic policies have been set forth for the formulation of a safety plan.

1) Short term and long term plans

The short term plan should have immediate effect in bringing about maritime transportation safety and moreover should include urgently required improvement projects.

The long term plan, although slow to bring results, will ensure a rise in the level of maritime transportation safety. There is urgency but it will involve projects with huge budgetary measures in order to achieve the goals.

It is forecast that by the year 2010 Philippine passenger and freight traffic will double the present volume. With this there will be an increase in the number, size, speed and diversification of ships and it is necessary to have a maritime transportation safety plan that will accommodate these new conditions.

2) Size of vessels and types of maritime accidents

The vessels in the Philippines are grouped into 2 types, used steel hulled vessels imported from overseas which are relatively large in scale and small wooden hulled vessels built locally. According to maritime accident analysis, approximately 80% of all maritime accidents involve small vessels (under 250GRT). The number of large vessel incidents are few but of major scale when they do occur.

Even when analyzing maritime accidents in good and bad weather, the types of accidents involving large and small vessels are clearly different. Accordingly the vessel renewal plan will need to differentiate between large and small vessels in realizing its goals.

3) Trunk sea routes and local sea routes

Philippine maritime transportation routes can be classified as shown in Fig. , with trunk routes joining Manila, Cebu, Puerto Princessa, Zamboanga and Davao and local routes branching out from these 5 points.

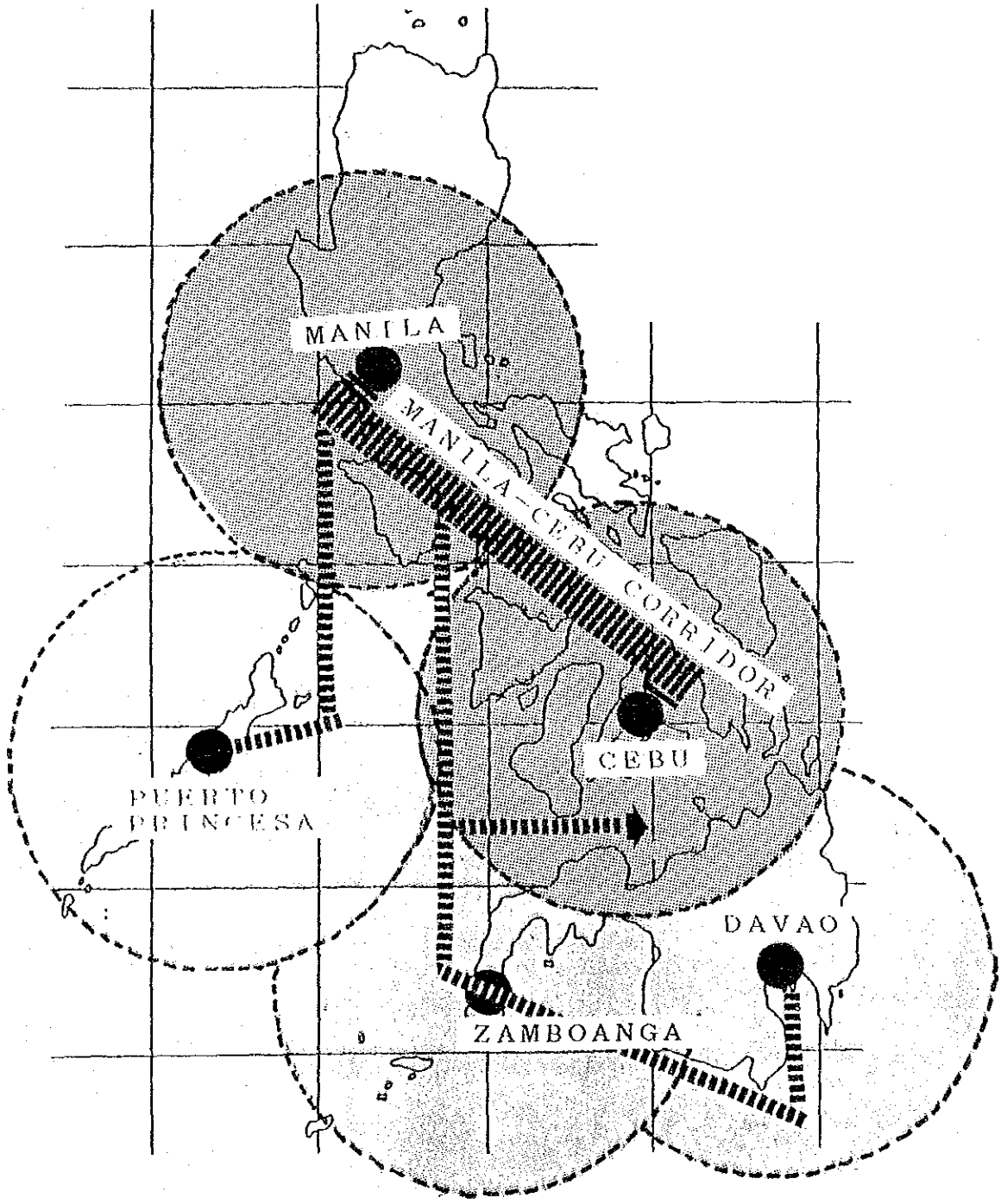
Vessels making use of the trunk routes are relatively large steel hulled vessels which are operated by major shipping companies. Vessels using the local routes are mainly made up of small wooden hulled vessels operated by small and medium scale shipping enterprises although occasionally large vessels can be seen on these routes.

Big differences can be seen in the business scale of these large and small/middle sized shipping enterprises. Accordingly, the skills of the seafarers, structure, capacity and equipping of the vessels, the attitude of the operators towards safety vary and measures to be taken need to be diverging to accommodate this situation.

6.2 Maritime Safety Improvement Plan

Based on the basic concept in the previous section, a maritime transportation safety plan has been designed for each sector. However, ports, weather information and sea routes are being worked on separately and a plan will be presented as a result of this, while this safety plan will cover only a minimal area considered to be necessary. Consequently it is made up of education, vessel upgrading, safe operations management, aids to navigation, search and rescue and communications.

Figure II.4
Main trunk sea routes and local sea routes



List of Proposed Projects

SECTOR	GOAL	PROJECTS
Upgrading quality of Seafarer	Goverment support Improvement of school education for seafarer Retraining seafarer	① Upgrade Training Facilites [101] in parallel to streamlining schools [102] 2 Retraining of teaching staff and seafarers ① Retraining of teaching staff and seafarers [104] 2 Practical training ① Formulation of curriculum for practical training on private shipping [103] 2. Best use of the current training ship (Filippinas) [107] 3. Construction of training ships[108] ④ Establishment of an organization for training ship operation and management[109]
Upgrading of Fleet	Regulation Expansion/Strengthening of Seafarer qualifi -cation System	① Licensing System for crew menbers on Small Vessels[105]
	Strict enforcement of Safety regulation	① Revision of PMMRR and Establishment of structure safety standards for Wooden hulled vessels and FRP Vessels[201][205] ② Reinforcement of the Vessel inspection System[202] → ※
	Government support Assistance/support for Vessel renewal and shipbuilding	1 Relaxation of duty on imported goods for maintenance and repair[203] 2 Financial assistance for Vessel renewal[204] 3 National ship building policy 1. Production of steel material, casting for large vessels[206] 2. Fostering of ship scrapping industry[207] 3. Equipment modernization assistance[208] 4. Standardized ship design[209] 5. Establishment of shop technology resarch center[211] 6. Fostering of ship builders 7. Fostering of related industry
Safe navigation	Safety measures for Small Wooden Vessels Safety measures for large steel Vessels Tropical cyclone counter measures	① Setting out operation management regulation[601] 1. Approval of operation manager for operation plan, crewing assignments 2. Operating standard —operation routes, speed etc, weather and sea condition reguiring suspension of operation 3. Reporting system (Meteorological, water route Port condition) for obtaining and passing on of emergency information 4. Assignment of on-board responsibilities, duty post locations 5. Drills for duty post, strict observance of passenger capacity, on-board inspections 6. Observing of maritime laws, Regular contact with office 7. Passenger Drgulation, operation method for berthing confirming of safety for vessel, handling of accidents ② Safety counter measures for accidents during bad weather conditions. 1. Establishment of meteorological reporting system 2. Establishment of committee for tropical cyclone counter measures and inplementation of sheltering measures. → ※ ③ Safe Operation Countermeasures 1. Strict compliance with operation control regulution 2. On-board safety guidance by 3rd party experts 3. Implementing of safety measures based on vessel inspection. 4. Others (Use of fold-down beds be avoided, equilibrium be lowered, stopgap waterproofing measures, powerful water drainage for small vessels) ④ Measures for diffusion of maritime accicdent prevention philosophy. 1. Maritime safety campaign 2. Maritime accident prevention conferences. 3. Engine maintenance conferences.
Maritime Transportation Infrastructure	Aids to Navigation (No. of aids/100mile (2(Existing) → 4(the year 2010) 1. One ligh signal can be seen 2. 2 or more at the point of direction change 3. Mark/on Harzard close to sea routes 4. Mark/on Channel in, Out port	① Light aids improvement Lighthouses 22, Light beacons 223 2 Radio frequency aids improvement Racon 20 Loran c 1 Meteorological system 7 ③ Support system workshop/buoy base, buoy/Lighthouse tender aids supervision/communication line, training facility → ※
	Search and Rescue 1. Upgrading of SAR Vessel and OP -timum stationing 2. a/search and	1 SAR vessel improvement (small sized 6, medium sized 10, large sized 4) ① 2 Medium sized SAR vessels replacing the vessels in Manila, Cebu (until 1995) 2. 4 Medium sized SAR vessels in Manila, Cebu

Assistance/support for Vessel renewal and shipbuilding

1 Relaxation of duty on imported goods for maintenance and repair[203]

2 Financial assistance for Vessel renewal[204]

3 National ship building policy
1. Production of steel material, casting for large vessels[206]
2. Fostering of ship scrapping industry[207]
3. Equipment modernization assistance[208]
4. Standardized ship design[209]
5. Establishment of shop technology resarch center[211]
6. Fostering of ship builders
7. Fostering of related industry

Safe navigation

Safety measures for Small Wooden Vessels

Safety measures for large steel Vessels

Tropical cyclone counter measures

① Setting out operation management regulation[601]
1. Approval of operation manager for operation plan, crewing assignments
2. Operating standard —operation routes, speed etc, weather and sea condition reguiring suspension of operation
3. Reporting system (Meteorological, water route Port condition) for obtaining and passing on of emergency information
4. Assignment of on-board responsibilities, duty post locations
5. Drills for duty post, strict observance of passenger capacity, on-board inspections
6. Observing of maritime laws, Regular contact with office
7. Passenger Drgulation, operation method for berthing confirming of safety for vessel, handling of accidents

② Safety counter measures for accidents during bad weather conditions.
1. Establishment of meteorological reporting system
2. Establishment of committee for tropical cyclone counter measures and inplementation of sheltering measures.

→ ※

③ Safe Operation Countermeasures
1. Strict compliance with operation control regulution
2. On-board safety guidance by 3rd party experts
3. Implementing of safety measures based on vessel inspection.
4. Others (Use of fold-down beds be avoided, equilibrium be lowered, stopgap waterproofing measures, powerful water drainage for small vessels)

④ Measures for diffusion of maritime accicdent prevention philosophy.
1. Maritime safety campaign
2. Maritime accident prevention conferences.
3. Engine maintenance conferences.

Maritime Transportation Infrastructure

Aids to Navigation
(No. of aids/100mile
(2(Existing) →
4(the year 2010)
1. One ligh signal can be seen
2. 2 or more at the point of direction change
3. Mark/on Harzard close to sea routes
4. Mark/on Channel in, Out port

① Light aids improvement
Lighthouses 22, Light beacons 223

→ ※

2 Radio frequency aids improvement
Racon 20 Loran c 1 Meteorological system 7

③ Support system
workshop/buoy base, buoy/Lighthouse tender aids supervision/communication line, training facility

Search and Rescue
1. Upgrading of SAR Vessel and OP -timum stationing
2. a/search and rescue personnel training system
3. Improvement of Information and Communication System
4. Reinforcement ofcivillian relief organization

1 SAR vessel improvement
(small sized 6, medium sized 10, large sized 4)
① 2 Medium sized SAR vessels replacing the vessels in Manila, Cebu, (until 1995)
2. 4 Medium sized SAR vessels in Manila, Cebu, Dabao, Puerto Princessa (up to 2010)
3. Remaining number of SAR vessels to be installed (after 2010)

2 Air crafts, Special Rescue Team, Maritime Safety Training Center (after 2010)

(Telecommunication System)

Maritime Telecommunication System
Development of national maritime telecommunication network

① HF Network linking PCG and regioual headquarters and 133 bases

② Upgrading of MCP/TELOF to reinforce functionality of maritime safety telecommunication

3 INMARSAT Earth Ship Station Installation

④ Installation of land-based COMPASS/SARSAT receiver station

5 Construction of PCG Coastal station

6 Installation of electronic equipment to RCC

○ : Priority Project
※ : Projects for Pre F/S

6.2.1 Maritime Safety Education

(1) Issues

Crews working large vessels have completed formal maritime education and moreover large vessels have crew members that have obtained qualifications by national examination and use navigation and telecommunications equipment in navigation. The object of navigation is to safely transport passengers and freight to their destination points.

Small vessels, linking local areas separated by short distances, also transport passengers and freight. The crews of these vessels are thought to be the same as crews of large vessels when it comes to responsibility of the passengers and freight. Therefore, these crews will be considered together with the crews of large vessels.

Small motor bancas and fishing boats are piloted and operated by crew members and in the event of an accident do not pose a direct threat to the lives of other civilians and property. Moreover, in a lot of cases operations are limited to certain areas.

Of these crew members, the only group to have completed their education are a section of the crews of large vessels. In the future, even if the application of concerned laws is expanded, a formal education , will play a role in the ensuring of safety in large vessels (and including small vessels that carry passengers).

As for small vessels, safety instruction and guidance on a community level is of great importance for maritime safety. While community level safety instruction and guidance is covered in 6-2-3 Safety Navigational Measures, here, emphasis will be placed on measures to raise the level of crew education that can directly concern the lives of civilians and property.

There is an established formal education system but that system is not functioning sufficiently. The plan will focus on making the existing education system sufficiently functional.

(2) Plan

The problem is that the level of school education is low and opportunities for practical training at sea are limited. There are 2 major reasons for the school education level being low;

1. The machinery and facilities used for practical training are old and in a lot of cases broken,

2. Teaching staff lack sufficient knowledge necessary to use

new machinery.

1) Streamlining of schools and upgrading of training equipment

Training equipment must be upgraded and updated in parallel to trimming down the number of schools from 60 to 30 to meet actual demands.

2) Retraining of teaching staff and seafarers

With regard to retraining teaching staff and seafarers, a system for facilitating the participation in training programs, including scholarships for students must be introduced in addition to expansion of the existing NMP training curriculum. In addition, the establishment of other training centers in local areas will be studied in the future based on the performance of NMP.

With regard to practical training, it is necessary to elaborate improvement programs in stages such as follows.

1. Using the current practical training opportunities to obtain maximum benefits

Currently there are opportunities for trainees to crew on private shipping company vessels for seaboard training but because the practical training curriculum is not set out, trainees are treated as extra crew members being paid lower wages and are not receiving sufficient practical training. Because training on private shipping vessels has potential into the future for providing lots of practical training opportunities, it is thought that by setting out a curriculum, practical training can play an important role.

2. Use of the current training ship (Filippinas) in her original role

The reason for the change in duties was given as an insufficient budget but it is planned that by providing the necessary financial assistance she will be able to return to her original role. For the time being, operations costs can be funded as is being done now, by working as an non-regular freight carrier and assistance shall be rendered in the funding of travel costs of trainees to and from the training port as well as wages and food expenses.

3. New training ship construction

In the future, the building and operation of three 5,000 ton class training ships will provide students and graduates with sufficient training opportunities.

4. Establishment of a organization for training ship

operation and management

In order to operate efficiently and effectively the training ships mentioned in 2. and 3. above, the establishment of an organization for carrying out the operations and management of the training ships should be elaborated on.

3) The Implementing of a Licensing System for Crew Members of Passenger Carrying Small Vessels

It is necessary to note that from the point of view of ensuring safety on small vessels carrying passengers, regulation on vessels and seafarers is not sufficient. Proposed regulation for vessels is detailed in 6-2-2 and it is necessary to introduce a seafarer licensing system.

4) Maritime education of fishing boat crews

It is actually impossible to introduce a system for seamanship education for fishing boat crews etc. Under these conditions a safety campaign is to be carried out at an appropriate time and as an extension of this, a safety education system plan is to be set out for each region. This is outlined in detail in 6-2-3 Safe Navigation Management.

6.2.2 Fleet Safety Improvement

(1) Issues

The following 2 items must be highlighted in the formulation of a fleet safety improvement plan:

1) Prevention measures for accidents resulting from vessel related causes

2) Measures for minimizing damage (to human life and property) when an accident does occur.

From accident analysis results, it is judged that the type of accidents differ according to whether vessels are large or small, the weather is good or bad and the quality (steel or wooden hulled) and type of vessel. Therefore this plan will have to consider each of these elements.

(2) Identification of problems and introduction of countermeasures

1) Preconditions

Vessels used in Philippine maritime transportation are divided up into steel and wooden hulled. Accident analysis classifies vessels greater than 250GRT as large and those less than 250GRT as small. If this classification is used, all large vessels are steel

hulled while most small vessels are wooden hulled.

Ship uses are divided up between passenger ferries, passenger/cargo carriers, general freight carriers, special freight carriers, fishing boats and others. The types of accidents hitting these vessels are drifting, running aground, collision, fire, capsizing, sinking and going missing.

Looking at these accidents in general terms, running aground, collision and fire are mainly due to human error factors while drifting, capsizing and sinking are generally due to boat related problems.

2) Problems and countermeasures for steel hulled vessels

Almost all domestically operating steel hulled vessels are second hand and imported from overseas. All passenger and cargo carrying vessels have undergone some kind of conversion in order to increase carrying capacities. Because of this there are ships that seem to be lacking in seaworthiness and stability. However, more important than this is the fact that large increases in passenger loading greatly affect the safety of the vessel.

A large number of accidents involving steel hulled vessels over 250GRT involve running aground and collision. Here high priority countermeasures will be geared for minimization of damage when an accident does occur and ensuring the safety of human life and property. For this reason it is necessary to strengthen PMMRR and reinforce vessel inspections and regulate passenger capacities.

The other main types of accidents are sinking and drifting. This is the result of dilapidation and weakening of the hull and lack of equipment maintenance. To arrest these problems, repair and maintenance work must be enforced by the carrying out of vessel inspections.

3) Problems and countermeasures for wooden hulled vessels

Domestic wooden hulled vessels are divided up into ordinary wooden hulled vessels and the relatively light construction vessels called motor bancas. These vessels are built to a uniform design regardless of use.

Plans are not used in their construction and the vessels constructed in this manner have insufficient freeboard. This results in low freight carrying capacity and low seaworthiness.

Watertight bulkheads are not built into the hulls resulting in the rapid lowering of stability when

flooding occurs on vessels.

In addition to the above, in the case of motor bancas, the hull is very thin and in a lot of instances, does not have the strength to endure the beating of waves.

Vessels transporting passengers are identified with problems such as over-capacity passenger loading inappropriate life saving facilities as discussed with steel hulled vessels.

These small vessel accidents are dominated by capsizings and sinkings regardless of sea conditions and from this, it is judged that problems indicated above with wooden hulled vessel construction and maritime transportation accidents are closely related.

Countermeasures should be taken so that PMMRR is to include construction and safety standards established for wooden hulled vessels (including motor bancas).

The secondary causes of maritime transportation accidents are drifting and running aground and this indicates a necessity for maintenance of equipment and appropriate installation of life saving facilities in order to minimize damage when a maritime transportation accident does occur.

Apart from this, it is forecast that FRP boats will appear in the future and it will become necessary for a structure safety standard.

(3) Plan

A vessel improvement plan was formulated taking into consideration domestic vessel problems and countermeasures and future large increases in demand for maritime transportation.

1) Short term plan

1. Revision of PMMRR and establishment of structure safety standards for wooden hulled vessels and FRP vessels

   In addition to revising PMMRR to conform to international regulations, structure safety standards are to be established for substandard wooden hulled vessels and FRP vessels.

2. Reinforcement of the vessel inspection system

   Along with the reorganizing of the vessel inspection system, the level of inspection techniques will be raised and instruction in shipbuilding and repair skills will be given.

3. Relaxation of duty on imported goods and simplification of import paperwork

All aspects of ship building are reliant on imports from steel used in vessel construction to the installed equipment. This creates a situation where maintenance and repair does not proceed as it should due to the high rates of duty applied to imports. Therefore duties are to be abolished and import paperwork is to be greatly simplified.

4. Financial assistance

Long term, low interest financing is to be made available to ship owners to facilitate vessel renewal and if necessary, aid in the form of interest grants for loans should also be considered.

5. National ship building policy

Uniting with the steel industry to locally produce the steel materials used in ship building and to carry out casting for large vessels is recommended.

6. The fostering of a ship scrapping industry

Along with bringing about the replacement of dilapidated vessels, it is conducive to the recycling of resources and conservation.

This plan can be quickly implemented and be operational within a short time frame and once operational should be kept progressive in nature. As stopgap measures to ensure safety until this plan is operational, fold-away beds and bunks should be removed from passenger carriers, strict enforcement of passenger capacities should be carried out and vessels which are largely dilapidated and weakened and for which repairs (replacement of outer hull plating etc.) are not carried out, should be severely limited in their operations.

2) Long term plan

1. Measures for facilitating the modernization of the ship building industry

Going to the trouble of providing incentives to ship owners for vessel renewal is a waste of effort if the new vessels are supplied from overseas. It is therefore necessary to establish the following measures to create a competitive ship building industry in terms of value and technology.

- Equipment modernization assistance
- Standardized ship design
- Establishment of a ship technology research center