Chapter 2 FORMULATION OF DEVELOPMENT PLANS

2.1 Coastal Shipping Ports and Sea-cum-Riverways

2.1.1 Selection of Coastal Shipping Ports in Accordance with Traffic Forecast

(a) Regions Defined and General Coastal Shipping Ports

Two prominent structural characteristics of Vietnam are its length which extends 1,600 km north to south, and the concentration of population and industries along the Mekong and Dong Nai River in the south and in the Hong River and Thai Binh River in the north. The large central area between these two is less developed.

Mineral resources, such as coal and limestone, and agricultural products, such as rice, are abundant in the north and the south. In these areas, large and small rivers and waterways form fine networks (hereinafter referred to as inland waterways).

In the north and the south, sea ports and river ports have been developed because of the waterway networks. This is the difference between the north/south region and the central area as shown in the volume of freight handled in three major ports:

Table 2.1.1
VOLUME OF FREIGHT HANDLED IN THREE (3) MAJOR PORTS

Port	Cargo Handling Volume, (million tons)
Saigon	600
Haiphong	452
Danang port	83

The number of ports handling, mainly coal, oil, and cement of more than 500,000 tons/year is twelve, excluding the major ports. They are all located either in the north or the south except for one, which is in the central area.

In the near future, freight volume, consisting mainly of manufactured goods, is expected to increase very rapidly with the increase of economic growth and wealth of citizens. To resolve regional imbalance in socioeconomic development, industrial development in the central area has to become a priority in the political agenda. The overall economic development and policy of the central area will affect ports, especially in the central area. The central area is demanded as the maritime gateway from the neighbouring countries such as Laos and other countries in Indo-China. In this regard, the significance of the central area as the maritime gateway will be recognized. Currently, the port functions are concentrated in the north and the south, but a more equitable distribution of functions will be necessary.

Vietnam is divided into five regions (hereinafter referred to as blocks), and for each block, the future visions of ports are analyzed and discussed.

Table 2.1.2
DELINEATION OF FIVE (5) REGIONS IN VIETNAM

Name	Range
North Block	20 provinces and two special cities from Hoa Bihn to Ninh Binh
North Central Block	Four provinces from Thanh Hoa to Quang Binh
Central Block	Seven provinces from Quang Tri to Binh Dinh, Gia Lai
South Central Block	Five provinces from Phu Yen and Dac Lac, to Binh Thue and Lam Dong
South Block	15 provinces and special city including Song Be and Dong Nai, Ba Ria-Vung Tau.

The five blocks are delineated according to regional structural similarity, economic linkage, equivalency of coastal line extension, distribution of major ports, and the factor of equitable development in the central area, even though there are large discrepancies in population and industry in these five blocks.

Table 2.1.3
POPULATION OF EACH BLOCK

Block	Population
North	25.0
North Central	8.3
Central	7.2
South Central	5.2
South	25.4

Table 2.1.4
MAJOR PORTS

Block	Range
North	Haiphong, Cai Lan, Quang Ninh Transshipment, Hanoi, Viet Tri, Ha Bac, Nam Dinh
North Central	Thanh Hoa, Cua Lo, Vung Ang (Planned)
Central	Cua Viet (under construction), Thuan An, Danang, Qui Nhon
South Central	Nha Trang, Ba Ngoi
South	Saigon, Tan Cang, Ben Nghe, Dong Nai, Can Tho, My Tho, Dong Thap, Vinh Long, My Thoi

In the next section, each port, planned ports included, is generally reviewed by block. Then, studies are conducted on the general characteristics of a port, function, condition of facilities, possible ships for entry (access waterways), possibility of expansion, scale and activities of hinterland, distances among ports, possibility of transshipment, and environmental protection. From projected demand on volumes of coastal shipping, the general studies are analyzed to formulate goals and objectives of port development. It is to be noted that special ports for private corporations are not included in the discussion.

(b) North Block

The population of the North Block is about 2.7 million. Despite the large population, since the area extends to the northern and western mountain regions, the coastal area is not necessarily large. There is a coal reserve widely known as Hong Gai Coal along the coastal area in the eastern area of the block. The port in the area is developed due to the presence of coal. The national capital, Hanoi, is located in the block. The concentration of population and industry is high, including surrounding areas like Haiphong. In addition, inland waterway transport is active in the Thai Binh catchment area where extensive waterway networks are developed. The existence of major ports and their functions distinguish the block.

Port Profile

1) Haiphong Port

The role of the second largest port in the nation is significant not only for the Local cargo distribution between Hanoi and Haiphong, but also as an international freight center in the north of the nation. The major concern of a port at a mouth of a river is to sustain the depth of the port. For larger vessels unable to enter, the Cai Lan port is being developed. There are two ports: one is the Haiphong port operated by VINALINES; another is Cua Cam port, operated by Haiphong City. Unless it is required, they are called the Haiphong port in this report.

2) Cai Lan Port
To support activities in Haiphong port, this port is being developed.

3) Hanoi Port
This port services the city of Hanoi and surrounding areas directly. The total freight volume of 72,000 tons (1995) is the largest among river ports in the nation excluding specialized ports.

4) Biet Tri, Ha Bac, Hoa Binh, Nam Dinh, Ninh Binh Ports
These are major river ports servicing surrounding areas.

5) Quang Ninh Transshipment Port

The offshore transshipment port is located in the Ha Long Bay and is used for international/domestic freight shipment without any port facility. There are some ports of this type in Vietnam. An example is that LASHs from Russia transship cargo to barges.

Over View

The Quang Ninh Transshipment port deals with international freight. Therefore, it is excluded from major port development planning. The Haiphong and Cai Lan ports are two large sea ports which must function as major ports. In fact, there is no factor inhibiting them from acting as such. Hanoi port is preferred as a major port. However, because it is a river port away from the mouth from any route, its waterways have a limited depth.

Viet Tri, Ha Bac, Hoa Binh, Nam Dinh and Ninh Binh ports are important river ports. When limitations on facility, scale of freight handling, scale of activities in the hinterland, and depths of access waterways are comprehensively considered, only the Viet Tri and Ninh Binh ports should be selected as major ports. The Viet Tri port is not free of limitations. It has a problem with depth of access waterways as in the Hanoi port. Since the Hong River has shallow parts, vessels need to be selected within realistic plans for solving the problem of depth. At the Ninh Binh port, development of new berths in the Ninh Phuc district is an advantage; however, the depths of access waterways and the Day river are not adequate to accommodate vessels with deep drafts. The vessels permitted to enter need to be selected as in the case of Viet Tri port.

The five ports selected as the major ports are, therefore, the Haiphong, Cai Lan Hanoi, Viet Tri and Ninh Binh ports. The geographical distribution is also preferable in the North Block.

Freight Volume Projection by O-D Estimate

The nation was divided into 20 zones, and O-D volumes of freight were estimated.

Five ports are selected as the major ports for the following reasons:

1) Haiphong Port

According to the O-D estimate, the annual volume of coastal shipping will reach 1.2 to 1.6 million tons for the years 2000 and 2010 . The development direction and targeted freight volumes were identified by the precedent JICA studies (Haiphong Port Rehabilitation Plan, 1993 and Cai Lan Port Expansion Plan, 1995). Assuming that all the rehabilitation work will be done by the year 2000, the expected cargo volume will affirm the port as one of the major ports in the nation. By the year 2010, the freight

volume of coastal shipping is expected to reach 1.5 million tons per year. In addition to volume, volumes for international freight are expected to increase. Unless the expansion plans are implemented, the total volume in the future will exceed the current capacity of the port. Therefore, it is recommended that a detailed study will be conducted on domestic and international freight handling capacity and management measures for expansion toward the year 2010. In the future detailed plan, the vision of the port will be clarified.

It is to be noted that there was no appropriate port found in the two zones specified in the O-D estimate. Therefore, demand (50,000 tons for the year 2000 and 90,000 tons for the year 2010) will be allocated to Haiphong port.

2) Cai Lan Port

In the future, annual freight volumes from coastal shipping are expected to reach 0.8 and 1.2 million tons for the years 2000 and 2010 at Cai Lan port. Even with additional volume generated within the North Block, the port will function as one of the major ports under the condition that appropriate expansion measures will be taken as specified in the port development plan by the JICA Study in the past.

3) Hanoi Port

Annual freight volumes from coastal shipping are expected to reach 0.15 and 0.3 million tons for the years 2000 and 2010 at Hanoi port. Even with additional volume generated within the North Block, the port will function as one of the major ports under the condition that appropriate measures will be taken.

4) Viet Tri and Ninh Binh Ports

The Viet Tri port is expected to handle 0.4 and 0.3 million tons of freight annually in the years 2000 and 2010. The volumes for the Ninh Binh port will be 0.2 and 0.5 million tons per year for the same years. Additional freight generated within the North Block would not have substantial effects to the Viet Tri port, if appropriate measures are taken. The Ninh Binh port will be able to handle additional freight generated within the North Block when the on-going facility development is completed at Ninh Phucu district. Both ports qualify as major ports in the block.

(c) North Central Block

The total population of the North Central Block is about 8.3 million. In the north, Thanh Hoa and Nghe An provinces, the second and third most populous provinces in the nation, are located. In the south, the other two provinces extend from north to south. The north is characterized by a high concentration of population and industries. Its coastal area extends 400 km. Inspite of these, however, there is no major port in the block because of close linkage with the North Block, and geographical and marine conditions.

There are several large-scale development projects being planned in the block for regional economic development. Detailed design of a large-scale cement factory, a joint-venture project, is on-going. Plans for a steel factory and related industrial/port development are being prepared. The proximity from the north and central parts of Laos, centering around the national capital Vientiane, north-eastern part of Thailand and other parts in Indo-China, and expansion of economic intercourse with the countries in Indo-China will signify the location of the North Central Block as those countries demand accessibility eastward.

1) Cua Lo Port

The largest port in the block is located in the Nghe An province close to Vinh City. It is currently handling 0.2 to 0.25 million tons annually including about 0.15 international transshipment freight, mainly logs from Laos. Since 1995, the port has been handling containers.

2) Thanh Hoa Port

Located near Thanh Hoa City in Thanh Hoa province, the port serves surrounding regions including cement factories. The annual cargo handling volume is approximately 0.1 million tons or slightly higher.

3) Viet Tri and Xuan Hai Ports

The ports are along the same river. The annual freight handling volume is 0.1 million ton or slightly lower for both ports. Both ports serve regionally. A part works as a transshipment port which transfer logs from Laos. In Viet Tri port, logs are processed to boards and lumber.

4) Vung Ang Port (planned)

A deep port is planned for iron ore shipment from Thach Khe mountain in the Ha Tinh province.

Out of the four ports described above, the Cua Lo port is selected as the major port for the following reasons:

Cua Lo port is the largest port in the block. It is located at the mouth of a river, but its potential to become a major port is high when appropriate port facilities are developed. Its proximity to Vinh City and accessibility to major cities in Laos through routes No. 7 and No. 8 would give the port locational advantage. The Thanh Hoa, Viet Tri and Xuan Hai ports are located 16 to 26 km upstream from the mouths of rivers. The access waterways have limited depths. Port facilities have deteriorated. Areas for expansion are limited.

Cua Lo port is the only port which is expected to handle 0.4 to 0.7 million tons of freight annually in the future. The port will handle not only the volume in Zone 9, but also the volumes of Zone 8 and 10. With appropriate facility development, the

potential of the port to be a major port is high. A further study is recommended on international freights since expected volume will reach 0.6 to 1.7 million tons in the future and more transshipment from Laos is expected.

(d) Central Block

The total population of the Central Block is 7.2 million which is about 10 percent of the total population of the nation. The land in the north part is narrow while the south part is relatively wide. Two major ports are located in the center and the south along the 500 km coastline: Danang port in the center and Qui Nhon port in the south. In the north, Cua Viet port is being constructed. There are smaller ports, the Thuan An, Sa Ky and Thi Nai ports in the block.

The current two-core port structures, Danang and Qui Nhon ports, is proposed to be changed to a three-core structure in the future. The Chan May district in Thua Tien-Hue province, the Lien Chieu district at the Danang Bay, and the Dung Quat district in the north of the Quang Ngai province have deep port project plans in conjunction with industrial and urban development project plans.

The proximity from the north and central parts of Laos centering around the national capital Vientiane, north-eastern part of Thailand and other parts in Indo-China, and expansion of economic intercourse with the countries in Indo-China will signify the location of the North Central Block as these countries demand accessibility eastward.

Ports in the Central Block

1) Danang Port

The third largest port in Vietnam represents the Central Block. The Danang port includes the Tien Sa district facing the ocean and the Song Han district in the river section. Both districts function together in handling international and domestic freight which reached 0.82 million tons in 1995.

2) Qui Nhon Port

The port is a natural port which is the largest in the south of Danang port in the Central Block. The total freight handling volume in 1995 was 0.45 million tons, including 0.32 tons of international freight.

3) Thuan An, Sa Ky, Thi Nai Ports

These ports serve surrounding areas locally. Boats entering these ports have 600 to 2,000 DWT only.

4) Cua Viet Port

The Cua Viet port at the mouth of a river is under construction. The firth berth, which will be completed in 1997, will accommodate ships with 3,000 DWT.

Three deep port projects mentioned are planned at the provincial level. The project in the Duang Quat district is related to the first oil refinery project in Vietnam. The provincial government is preparing the plan in close coordination with the Ministry of Construction, the Ministry of Transport and other agencies in the central government. Out of the four ports described above, the Danang, Qui Nhon, and Thuan An ports were selected as the major ports for the following reasons:

The Danang port is the largest in the Central Block. The capacity of the port to handle freight is sufficient at current level, and additional berth is planned to be constructed within this year. The Qui Nhon port is the second largest. The capacity is large and land for expansion is available. There is no inhibiting factor to its becoming one of the major ports. Even though the Thuan An port is small, its freight handling volume is 80,000 tons per year. The depths of the access waterways allow only boats up to 1,000 DWT, but compared with other ports, the port has the potential to become a major port. The Cua Viet port, far from the Cua Lo port and close to the southern part of Laos, is locationally advantageous from a regional perspective. But the sedimentation observed by the Study Team members is hazardous to navigation.

Annual freight volumes from coastal shipping are expected to reach 0.2 to 1.0 million tons for the years 2000 and 2010 at Danang port. This port will continue to function as a major port in the central area as the freight volume is expected to rise. Construction of a new breakwater at Tien Sa district and other measures will expand capacity in the future. The Qui Nhon port will have annual freight volumes of 0.5 to 0.9 million tons annually in the years 2000 and 2010 from coastal shipping. When the international freight volume is added, some expansion measure will be required. The available space for expansion will satisfy this requirement. The depth of the access waterway to Thuan An port is shallow. However, when two new berths are completed, the port will be able to handle 0.15 to 0.3 million tons annually.

The only major port selected between the Cua Lo and Danang ports is the Tu An An port which can accommodate vessels of 1,000DWT. This selection may necessitate the selection of another port. Tentatively, the port shall be named as Ha Tinh-Quang Binh port. Although, the Vun Ang and Cua Viet ports are the candidates, the decision shall be based from a long-term perspective.

The direction of the three deep port development projects will have impacts to the formation of the Central Block. Not only to the Central Block, it will have strategic meaning to the central area as a whole. A detailed and comprehensive study should be conducted as soon as possible. For this reason, the selection of the major ports in the Central Block may be reviewed and changed after the study.

(e) South Central Block

The South Central Block is relatively small with a population of 5.2 million. The coastline is relatively long and some areas surrounded by bays and islands exist. Naturally, the ports in the block are located in areas which are not being affected by waves and wind. The distribution of ports are skewed. All three large ports, Nha Trang, Ba Ngoi, Hon Khoi, are located in Khanh Hoa Province among four provinces in the block. There are no large-scale industrial and port development projects in the block.

1) Nha Trang Port

The largest port in the block handled 0.34 million tons of freight in 1995, including 0.23 international freights. Faced with a large island, the port is naturally protected from wind and waves.

2) Ba Ngoi Port

The natural port does not have large port facilities, but it handles 0.3 million tons of sand annually mainly for export.

3) Hon Khoi Port

The center of the natural port in Van Phong bay has a depth of 20 meters, but the depth of the access waterway is shallow. Only vessels below several hundred DWT can enter the port. This port is a special port managed by the Salt Public Corporation under the provincial government. General freight is handled to meet local needs.

Out of the three ports described above, the Nha Trang port is selected as a major port for the following reasons:

The Nha Trang port is the largest port in the Block. Concentration of population, availability of port facilities, and adequate depths of access waterway qualify the port as a major port. The only limiting factors are that land for expansion is small and the surrounding area is a tourism area with pine trees and white sand. The Ba Ngoi port, an important port, is naturally protected and is serving its surrounding areas. Facilities, on the other hand, have deteriorated and are already obsolete. Warehouses and yards are not available. The depth of the access waterway to Hon Khoi port is inadequate.

Annual freight volumes from coastal shipping are expected to reach 0.2 and 0.6 million tons for the years 2000 and 2010 at Nha Trang port. The international freight volume may reach up to 0.5 million tons or more. Additional facilities would be necessary to handle increasing freight volume. However, such expansion would not be big enough to qualify it as a major port.

(f) South Block

The South Block, along the Mekong and Dong Nai rivers, has a population of 25 million. It is the largest region for agricultural production in Vietnam. The flows from the Mekong and Dong Nai rivers form extensive inland waterway networks in the block.

Generally, the depths of inland waterways which flow parallel to the coastline are shallow, except in the Tien Giang (the Mekong river) and Hau Giang (the Bassac river) branching out from the Mekong river and Saigon river, and Thi Vai river. Large ports are located along the four major rivers, and medium to small ports are located along the branches of the four major rivers. At large ports, large vessels up to 20,000DWT can enter, along other boats and barges. At medium to small ports, smaller freight vessels and barges are in operation.

1) Saigon Port

The Saigon port is the largest port in Vietnam with a freight volume of 6 million tons in 1995. It is located along the Saigon river in the Dong Nai river system. The distance from the mouth is 85 km.

2) Tan Cang Port

The port is located several kilometers upstream from Saigon port. It is owned by the Ministry of Defense, but it also serves the public. The volume of international containerized freight handled is the largest in the nation. The total freight handled in 1995 was 3 million tons. Out of the 3 million tons handled, 90% are containers.

3) Ben Nghe Port

The port is located several kilometers downstream from Saigon port. The port handled about 1.7 million tons of freight—mostly international freight including containers.

4) Vung Tau Port

The Vung Tau district has a large-scale deep port plan - the Cat Lo port owned by Oil and Gas Exporting Public Corporation and the base port to support the Bach Ho offshore-oil-drilling.

5) Thi Vai Port

The Thi Vai river, a deep access waterway, allows entry and exit of the largest vessels. Because of this advantage, there is a large-scale port development plan, but current development is limited to individual factories developing their own mooring facilities.

6) My Tho, Dong Thap (Cao Lanh), Vinh Long Ports

Located along the Mekong river, these ports service surrounding areas. Each port handles about 0.1 to 0.2 million tons of cargo annually, allowing entry/exit of vessels

with about 2,000 to 3,000 DWT. The shallow parts at Cua Tieu have been the common problem for these ports. Some rice is handled at Dong Thap port.

7) Can Tho and My Thoi (Long Xuen) Ports

Both ports are located along the Bassac river, serving surrounding areas with some international trade function of rice export. Each port handled about 0.15 to 0.2 million tons of freight in 1995. The maximum vessels to/from Can Tho port is up to 5,000 DWT level because of the shallow areas at Cua Dinh An. This limitation is one of the factors inhibiting the port's development. Because the My Thoi port is located 70 km upstream from Can Tho port, the depth of the river allows vessels only up to the 3,000 DWT level. There is an international waterway to Phnompenh, Cambodia. Vessels allowed weigh up to about 3,000 DWT.

8) Dong Nai Port

The Dong Nai port serves the provincial capital of Bien Hoa. Annual freight volume handled is about 0.15 million tons. The largest vessels to/from the port weigh about 2,000 DWT. Its capacity is limited, but its potential for development is relatively high because the largest city, Ho Chi Minh, is located across the river and industrial development is in continuous progress.

9) Ca Mau and Nam Can Ports

These ports serve the south-end area of the block. Since these are located at a small river, only small boats use the ports. There is not much significant development activities in the port.

10) Hon Chong Port

The port is located close to the east-end of Vietnam facing the Thai bay. There is not significant development activities in the port.

11) Nha Be Vegetable Port

This is a specialized port managed by a public corporation under the Ministry of Agriculture and Rural Development. It also handles fertilizer imports and contributes to general cargo logistics.

Out of 11 ports described above, the Saigon, Dong Nai, My Tho, Dong Thap, Can Tho, and My Thoi ports are selected as the major ports for the following reasons:

General Review

1) The Saigon port is the largest port in Vietnam. The significance of the port as a major port cannot be denied along with its major function as an international port. The expansion potential is in the Nha Rong district which could handle containers in the future.

2) The Tan Cang port specializes in international container freights. More general functions as a major port will not be satisfied.

3) Since the Ben Nghe port is located close to Saigon port, the major port function will be absorbed by Saigon port. A function to serve the Special City of Ho Chi Minh would qualify it as a major port, however.

4) The conditions of the Vung Tau and Thi Vai ports are not preferred, since these are far from the major demand centers of coastal shipping. A large-scale port development plan has not been prepared for these ports, therefore, it is not advisable to select these ports as major ports.

5) Industrial development near the Dong Nai port continues, and the concentration of population is high. Even though access waterways and port facilities have room for improvement, its core function as a major port should not be denied.

6) The location between Ho Chi Minh City and Can Tho—major cities in the South Block—and proximity to the ocean are advantageous for My Tho port. The condition of Dong Thap port is relatively good, and the fact that the area is the second largest rice producing province necessitates the port to function as one of the major ports in Vietnam. Both ports still have some access limitation at Cua Tieu, however.

7) The Can Tho port, located along the Bassac river in the middle of the Mekong Delta Area, has land for expansion. The My Thoi port, also located in the middle of the Mekong Delta Area, has a locational advantage over other ports. The condition of both ports are relatively good.

Demand

1) Saigon Port

The Saigon port will function as the largest port in Vietnam and is expected to handle 1.8 to 3.1 million tons from coastal shipping for the years 2000 and 2010. The total handling volumes from coastal shipping in Zone 15 are 2.2 and 3.9 million tons. About 20% of the total is expected to be handled at Ben Nghe port and other private ports in the city of Ho Chi Minh.

The international freight should be handled at Saigon, Vung Tau, and Thi Vai ports, as the allocation to these ports incorporates such factors as volume and kind, level of containerization, expansion of container fleets in sizes of vessels, and industrial development activities at the Vung Tau and Thi Vai districts.

As far as coastal shipping is concerned, the Nha Rong district in the port should function as the center of freight transport.

2) Dong Nai Port

About 0.1 and 0.4 million tons of freight from coastal shipping are expected to be handled at the Dong Nai port for the years 2000 and 2010. With appropriate improvement measures to the existing port facilities, it should function as a major port.

3) My Tho Port

Freight, from the coastal shipping, handled at My Tho port will be around 0.1 million annually in the future. Even with expected increase in international freight, the handling capacity is considered to be adequate.

4) Dong Thap Port

About 0.1 million tons is the future freight from coastal shipping at the Dong Thap port. The volume can be handled without any upgrading of port facilities. On the other hand, according to a study, international freight is expected to reach 0.5 to 0.9 million tons per year. In order to handle increasing international freight, the existing facilities need to be expanded. An appropriate plan incorporating the neighboring port will be necessary when handling capacity reaches the maximum limit.

5) Can Tho Port

The freight volume from coastal shipping will be about 50,000 tons annually. The volume of international freight, on the other hand, is expected to reach 0.2 to 0.5 million tons per year. Since there is available land for expansion, the additional volume will be handled with facility expansion.

6) My Thoi Port

About 0.1 to 0.5 million tons of freight from coastal shipping and about 0.1 million tons from international shipping will be handled at My Thoi port. The current capacity does not require any expansion to meet the demand.

2.1.2 Selection of Sea-cum-Riverways and Vessels to be Deployed

Out of 17 general ports, the major waterways and appropriate vessel types and fleet are selected.

1) Haiphong Port

The access water way is the Cam river. The freight vessels with 5,000 DWT, the largest in Vietnam, are proposed to be the same as existing vessels entering/exiting the port. No dredging work will be required to accommodate the vessels.

2) Hanoi Port

The waterway route, Lach Giang-Ninh Co river-Hong river-Hanoi port, is selected among several routes. The route is advantageous for central and south transport and allows larger vessels than other routes.

The depth at Mom Ro is about two meters. A development plan in Vietnam indicates that the maximum tonnage of vessels is 600 DWT for the year 2000 and 1,000 for the year 2010. To maintain these depths, a detailed engineering study will be necessary, especially at Lach Giang.

Unit transportation cost by type of vessels, the cost of initial dredging work, dredging works for maintenance, facility development and others need to be considered, but since detailed data and methods of maintaining the depths are not available, the selection of types of vessels are based on existing documents and interviews.

3) Viet Tri Port

The selected route is Lach Giang-Ninh Co river-Hong river-Hanoi port-Viet Tri port. This is based on the route selected for the Hanoi port.

Proposed vessels for navigation in the segment from Hanoi port to Viet Tri port have 1,000 DWT because of some shallow areas and the Long Bien bridge. In the shallow sections, large-scale dredging work will not be necessary judging from the 1996 data on the depths. Further studies will be needed for the Long Bien bridge where the clearance becomes small during the rainy season.

4) Ninh Binh Port

When shipment to/from central and south Vietnam is considered, the Cua Day-Day river-Ninh Binh port route is the best, and is selected as the route.

Vessels with 2000 DWT are planned on the condition that studies will be conducted to clarify the changes of depths especially at Cua Day. In this case, the costs for the initial dredging work and dredging works for maintaining the depths will be high.

5) Saigon Port

The major route selected for larger vessels is Vung Ganh Rai-Long river-Dong Nai river-Saigon river-Saigon port. Vessels with 5,000 DWT are planned for coastal shipping. No major dredging work is required, since currently vessels with 20,000 DWT are capable of passing the route.

6) Dong Nai Port

The major route is the same as for Saigon port: Vung Ganh Rai-Long river-Dong Nai river-Dong Nai port. Current conditions reportedly allow vessels with 2,000 DWT. According to interviews, 5,000 DWT is possible without major dredging works. Vessels with 2,000 DWT are planned for now. When new data becomes available, the planned tonnage should be revised.

7) My Tho Port

The route is Cua Tieu-Mekong river-My Tho port.

The depth of the shallowest part of the route is estimated to be about 2.5 meters. With the tide condition being considered, the maximum vessel tonnage is 3000 DWT. An engineering study for the time series data and mechanism of depth change at Cua Tieu would be required. When available, results from a study funded by World Bank on this matter should be a useful source on this matter.

8) Dong Thap Port

The route is the same as for My Tho port. The Dong Thap port is further upstream along the Mekong river. The route is Cua Tieu-Mekong river-(My Tho port)-Dong Thap port.

The same 3,000 DWT tonnage, as in the My Tho port major waterways, is planned. The areas taken into consideration in the plan are also the same. The clearance for the proposed My Thuan bridge must be discussed among related agencies and stakeholders.

9) Can Tho Port

Cua Dinh An-Bassac river-Can Tho port is the route. There is some limitation due to the depth at Cua Dinh An. Cua Dinh An, by the way, is called "big mouth" and is the largest mouth of the Mekong river. However, for a long period of time, a large vessel has been having problems passing through the shallow section at Cua Dinh An. Dredging works were conducted in 1991 to make the depth 4.5 meters. Since then, during high tide, vessels with 5,000 DWT enter the port. How sand is accumulated in this section and how the underwater landscape changes will have to be studied in detail along with the World Bank study being conducted.

10) My Thoi Port

The Bassac river is the major access waterway to the My Thoi port. The route selected is Cua Dinh An-Bassac river-(Can Tho port)-My Thoi port.

It is reported that there are shallow section between the Can Tho and My Thoi ports that prevent vessels with 5,000 DWT from passing. Therefore, even though, the information is not conclusive, tonnage of 3,000 DWT is planned. When data and studies are available 5,000 DWT vessels should be considered for the major waterways.

2.1.3 Past Studies on Major Inland Waterways

(a) Lach Giang-Hanoi Port

Depths

Mom Ro (merging point of the Hong and the Ninh Co rivers): 1.5 meter deepest
Ninh Co river: 3 to 5 meters
Lach Giang: 2.1 meter at the shallowest point

Depths at Lach Giang have been changing every year. Navigation has also been changing. In 1996, TEDI reported the amount of dredging work required by tonnage. The result is as follows:

Table 2.1.5
COST OF DREDGING WORK REQUIRED AT LACH GIANG PORT

Tonnage (DWT)	Required Depth (m)	Initial Dredging Work (million m^3)	Dredging Work for Maintenance (million m^3)
500	2.9	0.55	0.17
1,000	3.5	1.1	0.32
2,000	4.5	2.0	0.4

The interval of the dredging work for maintenance is not specified in the report. Generally, rainy/dry season and high/low tide affect the depths of rivers, but the assumptions to the report are not known. In other words, the report does not indicate days in a year and time of day. According to interviews, it seems that the study assumes that the location is passable 70% of the year, 24 hours a day.

Cost is calculated for developing two leading moles for vessels with 2,000 DWT. The result is as follows:

Table 2.1.6
CONSTRUCTION COST FOR TWO LEADING MOLES

Work	Cost (million U.S. dollars)
Construction cost for two leading jetties (3 km):	3.9
Amount of initial dredging work, 410,000 m^3	0.54
Amount of dredging work for maintenance	0.14

2) Cua Dinh An- Can Tho Port

Depths
Bassac river: 5.2 meters at the shallowest point
Cua Dinh An: 4.5 meters when the dredging work was conducted in 1991

In 1992, TEDI reported the amounts of dredging work by tonnage. The volumes of the dredging work for the Bassac river is five million m^3 and four million m^3 for Cua Dinh An. The World Bank reported relationships between the distances from the mouth and the amounts of dredging in graphs for every mouth of the Bassac river by tonnage . The results interpreted from the graphs for 5,000 DWT vessels are as follows:

to the Can Tho port: 1.1 million m^3
to the My Thoi port: 2.0 million m^3
from the Can Tho port to the My Thoi port: 0.9 million m^3

The all amounts seem to indicate the initial amount of dredging works.

The NTSR (National Transport Sector Review) funded by UNDP reported amounts of dredging works and costs to make vessels of 10,000DWT passable at Cua Dinh An.

Table 2.1.7
COST OF DREDGING WORK AT CUA DINH AN PORT

Work	Cost (million U.S. dollars)
Amount of initial dredging work to the depth of 7.5 meter, 30 million m^3	24
Amount of dredging work for maintenance 5 to 10 million m^3	4 to 8

3) Cua Day-Ninh Binh Port

TEDI/WECCO reported the initial amount of dredging works for vessels of 1,000 DWT. For the river portion, the amount is 50,000 m^3, and for the Cua Day the amount is 450,000 m^3.

2.2 Plans for Sustaining Coastal Shipping Development

2.2.1 Measures on the General Coastal Shipping Ports

(a) Improvement of Port Operation and Management

1) General Policies on Ports

Generally, shipping is more cost effective than other modes, for large handling capacity and long distance trips. In Vietnam also, the coastal shipping is considered to be the effective method of transportation for the land of Vietnam extends about 3,000 km from north to south.

The general coastal shipping ports in Vietnam have limited service areas except in metropolitan regions. Often, these ports are faced with competition against land transport and even neighbouring ports. In order to be established as core transportation and logistics nodes, the ports need to be bases to supply goods to citizens consistently and to support nation's economic development.

More specifically, through activities of ports, investment to local industry should be promoted and developed. With guidance and co-operation from local governments, various factories, port related private corporations, and shipping industry should be promoted and invited. By developing local socioeconomy, revenues to local governments will be significant. Then, funding for port management and operation would become available. Well-managed ports and availability of good transportation network are the keys to locate businesses.

In most ports in Vietnam, cargo handling volumes are relatively small and most of the costs of freight are less expensive. To deal with the competition against land transport, the coastal shipping industry itself needs to become competitive. Higher efficiency and low costs of shipping become the key to raise the freight volumes. Also, since ports are significant parts of basic infrastructure for the nation, appropriate maintenance and repair, and expansion according to the demand in the shipping market should be taken. The government sector should look after shipping and port related businesses to sustain quality services and equality of competition. Enforcement of laws, rate of fees charged for shipping, and re-conciliation of different stakeholder are other roles of the public sector. In sum, reliability, efficiency, and low costs are the keys to supply goods constantly and to lead nation's economy.

2) Fundamental Direction of Management and Operation

Public roles of ports as basic infrastructure are high; therefore, government intervention is necessary. The areas of intervention on operation and management are policy related subjects such as redistribution and consistency with economic policies. In addition to the policy related matters, inspecting presence of illegal activities and

efficiency of operation and management are important role of governments. From these view points, items which the government of Vietnam should control are as follows:

1. Formulation of National Port Development Policy
2. Deliberation on Port Development Plan
3. Co-ordination of Related Government Agencies
4. Delineation of Port Areas
5. Technological Development on Ports
6. Setting Tariff Rates
7. Allocating Port Development Budget
8. Preparation and Enactment of Port Related Laws
9. Standard Setting on Port Technology
10. Disposition of Port Properties
11. Enforcement of Port State Control against Illegal Vessels
12. National Defence and Foreign Affairs

Intervention of the government on one hand, minimising government intervention for efficient operation, management and investment is preferable. In the future, each port should work its own way to be competitive and to provide its own services. By doing this, ports shall function effectively and will be able to provide high quality services. Such port development will eventually benefit the nation's economy as well as wealth of individuals. Therefore, the intervention from the central government should be minimal and decision making functions are to be granted to each port operation and management organisation as much as possible.

Operation and management of ports should be conducted according to the principles of local autonomy, financial independence, and private sector management. A port is preferably managed by an independent organisation under the governments' guidance and inspection. Authority to make decision on their ports shall be granted as much as possible. Therefore, a port manager and operator should be responsible for developing management, operation , planning , and development. Finance of the organisations for management and operation should be independent to be autonomous. To achieve the end, the organisations need to have their own revenue sources from fees charged for their services. The revenue must be adequate to finance operation and management of ports and repair and maintenance of port facilities. In other words, the management organisations must be keen to revenue and expenditure of port management and operation. Port operation is a business; it should be treated accordingly. The operation should be practical and at the same time flexible to generate enough income to run the business. The managing body always has to tackle financial difficulties. The demand of port services change; managers need to reacted to changes by reducing costs or taking other measures. Rational organisation management would be required with clear delineation of authorities and functions.

3) Introduction of Market Economy Mechanism and Privatisation on Operation Administration

Port operation is a service business which requires modern enterprise management of efficiency and cost effectiveness. Especially, in the area of loading and unloading (storage included), the concept of modern enterprise management is necessary. It is said that service businesses are not the areas which government provides. In fact, in Japan and other western countries, often, port services are provided by private enterprises.

In Vietnam, loading and unloading services are provided by port operators themselves. Efficiency and cost effectiveness, and safety of services are not pursued to the maximum extent. For this reason, the cost of the services is considered to be higher than quality of services provided. Generally, the reasons are that the operators do not pay enough attention to the business part of port operation and users are not aware of quality of services to be provided. More specific reasons are following two: One, the operators need to hold on to in-house staff through out of the year even though the demand to the services is low. Two, workers' perceptions to quality services are low. Illegal activities, low level of morality, theft, damages to freight and others are causing loss, inefficiency, and low quality of services in the business.

Considering the discussion above, it is preferable that the port operation and management are gradually shifted to the hands of private enterprises. Privatisation should be completed by the year 2010, if not earlier. Current monopoly condition on loading and unloading business needs to be changed by employing market economy and competition concepts. After employing the concept, the environment of competitive market eventually creates efficiency, cost effectiveness, and safety in conducting the port business. Then, privatisation would become easier. Upon introduction of market mechanism, the public sector (MOT and port operators) should invite private sectors and quasi-public corporations to provide diversity of services to shippers and carriers.

For the public sector to provide efficient, low cost, and safe loading and unloading service is difficult. This type of services is suited for private sectors that are flexible to respond to changing environment, effective in marketing promotion, creative in improving services. Aiming at the year 2010, the section of port industry should be privatised. Solid waste collection, cleaning, towing and berthing services could be privatised if demand to the services are high enough. Since tug boats are expensive and demand is not high enough, privatisation of towing and berthing is difficult.

Water supply does not have enough financial incentive for the private sector to provide. Port operators could collect user charges with service charges on port facilities and equipment. Therefore, water supply should be operated and managed port operators.

Operation, management, and ownership of major facilities such as mooring facilities, storage and yards should be under the ownership of port operators. Cranes on wharves should be operated and managed by the port operator at reasonable costs in a way not to intervene the mooring facilities. Other cranes and lifts should be acquired by private companies which provide loading and unloading services. Other machinery and equipment should be sold to private corporations upon privatisation, or the public sector could hold on to them until they are 100 % depreciated.

The role of the national government is to create an environment where market economy functions. The area where such environment should be created is in the logistic services. At the same time, the government should encourage and promote port related industries to increase the handling and freight volumes. The government should also keep inspection functions such as issuing permits and licenses. Also, the government should standardise the charges of loading and unloading services. With all these authorities, the government could assure equitable services to consumers.

4) Finance and Port User Fees

Financial independence is the key to autonomy as mentioned. Fees collected by national agencies and redelivered to port operators is not the type of financing mechanism to be pursued. Keeping the rate of fees at a reasonable level is significant and reducing operation and management expenses is essential for port operators to be financially viable. It is a fact that financial capacity of many ports in the nation are not large enough to make substantial investment. Therefore, until such time when port operators become financially capable, subsidies and low interest loans from the government may be necessary.

When privatisation of loading and unloading section of the port is realised, the composition of revenues to a port operator will be changed. Expenditure on employees, equipment and machinery for loading and unloading will be reduced. On the other hand, revenue from loading and unloading will be reduced as well. The revenue will come mainly from releases of storage, yard, and equipment.

Before privatisation, a financial strategy should be formulated on efficiency and cost reduction, formulation of port development plan based on demand estimate and projection, infrastructure development plan, and promotion of freight. Along with the implementation of these plans, organisational capability should be strengthened and database and information systems and training and seminar systems should be established.

Charges at the port shall be established incorporating the following consideration:

- All expenditure operation and maintenance, and facility development costs are included. Nationally significant port infrastructure may be subsidised or low interest loans should be provided.

- The charges are equivalent to the services provided.

- The system of charges are directed toward efficient operation of a port. This includes the internalisation of inhibiting factors of long term mooring or storing freight.

- The charges should be internationally competitive and reasonable compared with other modes of shipping business. The port fee should be as low as possible.

- The collection method should be as simple as possible.

With the consideration above, the fee system shall be improved in a following manner. The port user fees are the major source of revenue for the port operators, and the revenue need to support continuous operation of a port. Therefore, the fee system must be prepared by the port operators themselves. Still, at some ports, a fee schedule is not available to users. This needs to be changed, and the fee schedule should be open to all the users.

The national government is responsible for reviewing and approving port user fees and port entry fees each port operator prepared. The approved fee schedule must be followed by port operators. The national government is also responsible for the practice of the port charges. It is recommended that the government reviews and approves fee schedules for loading and unloading prepared by private enterprise as privatisation progresses. The approval system of charges will provide equitable services to users. The reasons for reviews and approvals are as follows:

- The charges are to be equivalent to the services provided.

- In order to increase freight volume, the charges must be reduced as much as possible.

- Currently, port user charges are set by negotiation basis between carriers and shippers. Since the coastal shipping industry is premature, negotiation base of charge setting would become a source of dispute. Therefore, the national government should show appropriate charged to both parties.

- All port operators should have a fee schedule open to all users.

- A revised fee schedule is sometimes not informed to all port operators; an old fee schedule is used. To retain equitable services to all users, a revised fee schedule

from the national government should be informed to all port operators with the effective date and duration and presented to all port users.

- Port user charges should be clearly written on fee schedule, but sometimes, additional fees are charged. Seemingly reasonable charges to port operator may not be clear to users. In order to keep good credibility of port operation, such unclear billing should be avoided. If additional charges are required, the detailed items should be clearly stated.

Port user charges should be based on unit prices. The charges must be clear and equivalent to services provided. The fee system should be flexible for future freight as well. With these factors taken into consideration, the fee system should be improved.

Charges on loading and unloading should be based on kind, type, range, and method; the fee schedule must be clearly presented. Indicators of ranges of loading and unloading are specified within places and among places. For example, fees within ships, within storage, and within yards, are specified, or among locations such as to/from ship to wharf, or to/from ship to barges. Methods are by facilities and equipment used such as cranes on a ship or wharf or forklift and so forth.

Charges for handling containers are specified by sizes, types, and loaded/unload. Storage or yard uses should be charged according to facilities stored and type of cargo. Long term mooring and storage should be charged. Since long-term mooring and storing hamper smooth flow of freight, the fees should be incorporated.

In Vietnam, fees for vessels for overseas and coastal services are charged differently. In principle, fees for the same services should be charged the same. But in some countries, to protect and nurture domestic shipping industry, different fees may charged. In most countries that exercise different fees, the level of difference is up to twice of the domestic fees. In Vietnam, the different fee setting may not be helped, since the industry is still immature; however, the current level of difference in Vietnam is way to large. The difference should be corrected.

In the future, when privatisation will be implemented on loading/unloading services, the current fee system will have to be changed. The fees for loading/unloading will be paid to private operators directly, and port operators will charge user fees on storage, yard and loading/unloading machinery and equipment from the private operator. Therefore, port operators need to establish fees on storage, yard, and loading/unloading machinery and equipment. For storage and yard, the fee schedule should be based on areas occupied by freight and periods of freight being stored. Other services such as water will be charged by port operators directly. Upon privatisation of waste collection, cleaning, pilotage, berthing and other services, fees paid directly to private companies which provides these services. Wharf user fees will be charged by port operators.

5) Works for Port Development and Promotion

Development of database and organisation and utilisation of statistics are the important work to formulate long-term development and improvement plan, facility management and operation plan, financial plan and others. At present, such data is not present nor organised. Examples of data and information to be prepared are as follows:

- Origin/destination, type of cargo and volume (TEU for containers)
- Vessel type, specification (length, width, draft, and others)
- Data on freight handling efficiency: berthing time, items and volume of loading/unloading, loading/unloading time, machinery and equipment for loading/unloading, number of workers, and others
- Conditions and uses of wharves, loading/unloading machinery and equipment, warehouse, yard, and others
- Financial data (detailed items on income and expenditure)
- Environmental data
- Traffic volume around a port
- Locations and plans of industrial land use and development

At many ports, data input is done manually; statistical analyses are not done periodically nor systematically. The items listed above should be encoded, processed and analysed. In order to make the work smoothly, it is recommended that computers will be introduced. Human resource development for computer operation will be necessary.

Promotion work will be required to vitalise port related industry, to retain well-managed operation, and to develop local industry in a way to augment freight volume. User needs should be grasped timely, widely, and systematically to achieve this end. The user needs should be reflected to management, operation and development port, and at the same time, useful information should be provided to users to promote wider use of port.

The database mentioned is not only for formulating plans for port improvement and development and operation and management, but also to promote more freight. The data will be useful to formulate strategic marketing plans and to select market segment to be targeted. Users always demand new information. Providing information will create good images of ports, and become advantageous to compete against other modes. Preparation of promotion materials such as pamphlets and conducting seminars and marketing will be good methods. It is urgent that ports have a system to provide accurate and timely data and information services.

6) Improvement of Storage and Loading/unloading Systems

Major loading/unloading machinery and equipment in Vietnam are: cranes at wharves (called key cranes); mobile cranes; forklifts, trucks and trailers for cargo transport to/from wharves to/from warehouses and yards; forklifts, shovel loaders, bulldozers, top-lifters used in warehouses and yards. Most of theses machinery and equipment have been used more than 15 years. The deterioration is more than apparent. Because of the deterioration, break-down of the machinery/equipment and inefficient operation of loading/unloading works became a port-wide problem. Some of them are no longer being produced; availability of parts are limited; repairing time becomes longer. The parts production by users themselves is inefficient and even dangerous. In Japan, the planned durable periods of machinery and equipment are: mobile cranes, 7 years; mobile tower-cranes, 17 years; forklifts, 7 years; trailers, 7 years; straddle carriers, 7 years; and container cranes, 17 years. The years may not be applicable to Vietnam situation; however, old machinery and equipment will have to be replaced as soon as possible. It is note that forklifts in warehouses and yards are short in numbers.

The nation-wide solution to the problem is to introduce appropriate loading/unloading machinery and equipment according to volume, kind, and scale of handling works. Once appropriately placed, handling works will be more efficient; costs of repair and maintenance will be reduced; expenditure on handling works will be reduced; and required workers will be less and better.

Introducing small forklifts and use of pallets should be promoted. Generally, small forklifts and pallets, necessary for handing works between wharves and warehouse/yard, are lacking. The operation of loading/unloading works is inefficient. The use of pallets reduces the number of loading/unloading works, when freights are temporarily placed at wharves, yards and warehouses. If carrying distance is less than 150 meters, transport by small forklifts are more efficient than by trucks.

The structure and composition gangs handling cargo within vessels should match the kinds and types of freight, and handling machines. An example, in Japan, for general cargo, the composition of a gang is: one boss, one signal person, one to two hoist person(s), and about 13 workers. To every gang, one to two manager(s) is (are) placed to watch safety of the works.

For full-container-vessels, most of the work is done by machines. The composition of the gang is: two crane operators for one crane; one deck-man (including safety management task), and five to six workers who attach and detach containers.

Storage has a room for improvement. In many ports, storing condition is not satisfactory. Often freight to be stored in warehouses is kept in open yards. Or, because of lack of maintenance and repair of facilities, sometimes, freight is damaged while being stored. The storage system should be improved as follows:

- Repair damaged and/or inadequate facilities in warehouses and yards;

- Incorporate factors of existing facilities, items and volume of cargo being stored, flow of cargo, and period of storage to facility development plans;
- Demolish dilapidated and unused warehouses;
- Pave unpaved yards and develop drainage facilities;
- Enforce storage guidelines by type of cargo

Loading/unloading works are not planned as much as they should: Managers' orders may be disregarded; Co-ordination of works is lacing; labour hour is wasted; and safety measures are not enforced.

Managers and leaders of handling works must keep eyes on works and workers at all times, and accelerate delayed works. According to work plans, the managers guide the works. In order to make loading/unloading works more efficiently, the managers shall:

- prepare a work plan for handling works;
- notify and enforce work objectives and orders to workers and among managers in a meeting; and
- prepare work reports.

The chief of the managers shall: manage the managers, strengthen authorities and train managers.

Workers and operators of cargo handling machines must obey the order of managers. Co-operation and co-ordination of work items are needed for efficient handling works. To learn safe, sure, and fast methods of handling works is important.

Contents, degree and frequency of maintenance works need to be clarified at each port. There are ports equipped with large scale maintenance facilities and ports without. At ports with maintenance facilities, costs on investment and workers are high enough to aggravate the financial condition of a port. Even worse, since new technology and facilities are not introduced, reliability and credibility of repair and maintenance works are low. At ports without such facilities, routines repair and maintenance are either absent or inadequate. Frequent malfunctions and major breakdown lead to longer overall repair and maintenance time, or even lead to accidents during handling works. Negative impacts to port operation are substantially big.

The general policy is preventive repair and maintenance. Routine inspection should be conducted periodically. Disregarding degrees of problems, repairs should be done by experts. To avoid the negative conditions described in the previous paragraph, following repair and maintenance policy and guidelines are recommended:

- Daily inspection and periodical inspection should be conducted. Daily inspection should be conducted before any handling works. Other periodical inspection

should conducted by hours of machinery operation such as every 100, 500, and 1000 hours.

- Replacement of spare parts should be conducted periodically. Even when there is no problem, spare parts should be replaced to prevent malfunctions.

- Spare parts should be stored. To minimise replacement time, adequate spare parts should be stored. Generally, the stocks of spare parts are about 10% of the total parts used in a year. If located in a remote area, the stock should be about 15% of the total parts used in a year. It is noted that spare parts shall not be produced by themselves.

- Equipment and machinery for repair and maintenance work should be prepared. The minimum tools to be prepared are: compressors, battery chargers, welder, cutting machines, grinders, chain blocks, and jacks.

- A preventive maintenance manual should be produced.

- Following items should be recorded and analysed: machine operation record; machine repair record (contents, period, and costs); daily and periodical inspection record (inspection items, time and date, parts replaced); uses and stocks of spare parts. By analysing the data, a preventive maintenance system is established. A computer should be introduced for encoding and analyses.

- It is preferred that the total inspection and maintenance days does not exceed 55 days (356 days x 15%).

- Training should be conducted for human resource development to do the works above.

7) Improving Perception on Safety of Work

Despite the fact that works at ports are dangerous, safety measures are not strictly implemented. Not only workers welfare, but also, efficiency of port operation is reduced. Therefore, following improvement measures are recommended:

- Preparation of a work-safety manual
  In order to implement safety measures, a manual should be prepared including items: safety equipment, safety conduct, organising and cleaning of work places, and traffic rules in a port.

- Safety equipment
  Appropriate work attire (helmet, work clothes, safety shoes and gloves) must be mandatory. It not followed, a worker must not be allowed to work.

- Placement of safety managers
  One to two safety manger(s) should be place to each work group. Before working, safety measures should be reminded.

- Organising and cleaning work places in ports
  Work areas should be organised and cleaned to remove obstacles for works. Freight, mobile equipment, machinery and equipment should be placed as specified.

- Traffic management within a port
  Roads and lanes in a port should be indicated. The maximum speed (about 20km/.h), parking areas, other traffic rules should be established and enforced by managers and traffic enforcement officers.

- Training of workers
  Training should be conducted to all workers to notify, educate and to promote safety measures and significance of such measures.

8) Improvement and Maintenance of Port Facilities

- Pavement
  Apron, yard, and road in a port should be paved to prevent damages to freight, dust, and poor drainage. Already damaged sections (gaps and holes) should be repaired as soon as possible.

- Drainage
  When rainwater is not properly drained, efficiency of handling works reduces and cargo may be damaged. Paved surface should have an appropriate grade so that rainwater drains. If rainwater does not drain to rivers and ocean, drainage facilities such as ditches and pipes need to be developed.

- Lighting
  Lighting facilities need to be developed to secure night time handling works.

- Repair and maintenance of warehouses
  Repair and maintenance of warehouses including lighting and ventilation are needed to keep the facility clean. To protect freight inside of warehouse from theft, doors and openings of warehouses must be secured with locks.

- Fenders
  Currently, in most port, fenders to protect ships and wharves are absent or inadequate. Substituting materials such as tires and wood are used instead. Since the substitute materials are chained, the chain may damage wharves and

ships. The standard fenders with sufficient quantity should be used. Not only for wharves of sea ports, they should be introduced to river ports which have high degree of being affected by waves by wind and vessels.

- Preparation of a manual on facility repair and maintenance
  A manual indicating methods of inspection, repair and maintenance on major facilities such as wharves, warehouses, yards, roads, and lighting should be prepared.

- Securing budgets for repair and maintenance
  An annual repair and maintenance plan should be prepared according to the manual, and the budget must be secured.

9) Other Area of Improvement

Theft must be prevented. Ports where theft of freight is frequent, port operators should recognise that security of freight is the responsibility of the port itself. In those port, security measures need to be strengthened. Security must be tight at warehouses where high-valued freight is stored. Generally, guards are present in most ports; security measures at gates, fences, and entry to ports needs to be improved. Users of ports are aware of wrong doing of workers of ports. Seminars and moral education would be necessary.

To improve work environment, following measures are recommended:

- Instalment of welfare facilities (toilet, rest room, and shower).
  These facilities should be equitably distributed and at the same time placed not to distract handling works.

- Improvement of works in dusty environment
  When works must be conducted in dusty environment, dust-proof masks should be provided to workers. If such work is to be conducted inside of a warehouse, ventilation facilities should be installed in such a warehouse.

- Development of open space with plants
  Even if a large enough open space is not secured, at least, plants should be planted around buildings and along roads.

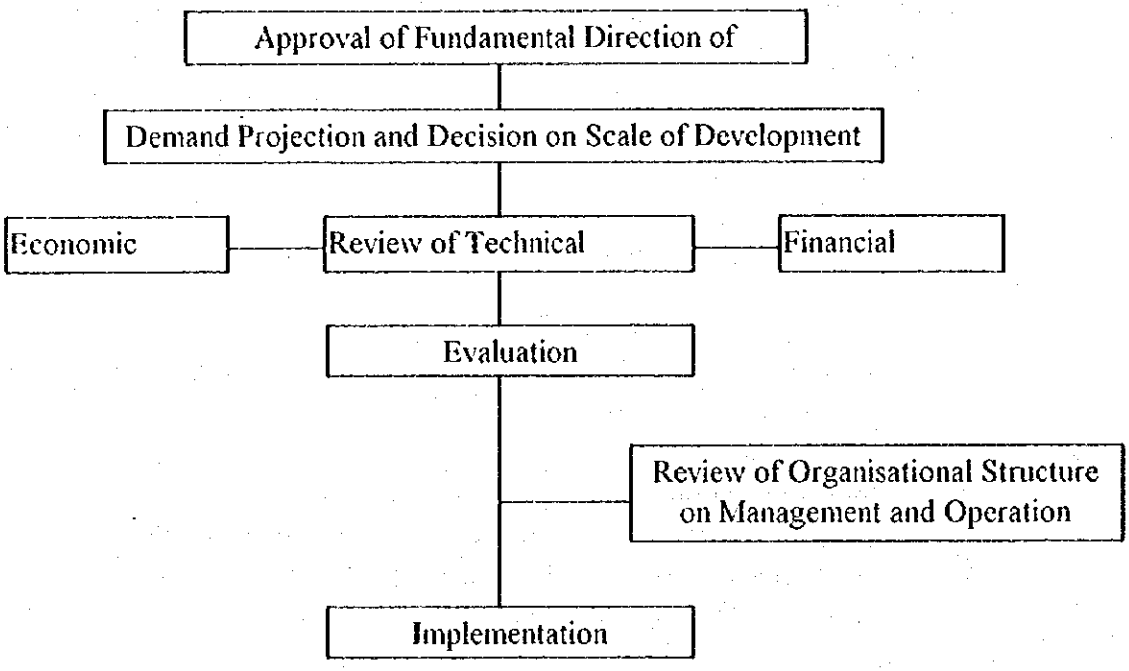
10) Human Resource Development

Staff supports quality of port services. Higher quality and capability of staff will lead to improvement of port services users are satisfied. In ports where regular training and

seminar are conducted, delivery of higher quality of services is possible. In the end, training activities lead to promotion of port services.

- Managerial staff
  To managerial staff, a self-improvement concept should be introduced. Through training sessions, efficient management and adaptability to new tasks should be learned. Some of the themes to be covered are: significance maritime transportation network to regional socioeconomic growth; to be a good public servant as well as a good marketing staff; competitive edge, management skills with business foresight; reduction of operation costs and practice; database and statistical analyses; introduction of computers in database analyses, and financial and information management. According to the level of staff, training should be conducted and roles and responsibility of the staff are clarified.

- Port planning and technology
  Port operators and managers will have to plan and implement feasible port development based on technical knowledge. A general flow of port development is indicated in the following chart:



As shown in the chart, in order to prepare a port development plan and implement the plan, technical knowledge in different fields is required. Also, a development plan needs to be systematically operated for it to be implemented. Therefore, training in different field will be required. This type of training may be conducted through international expert exchanges. The possible areas of training are as follows:

- Demand projection: Cargo volume and fleet requirement
- Development planning and site planning
- Technical feasibility studies: design, cost estimate, construction planning, scheduling
- Economic analysis
- Financial analysis
- Organisational planning on management and operation
- Port development plan: systematic planning
- Operation Staff

Training of operation staff aims for fast, sure, safe, and cost effective cargo handling services. Work plan preparation is a type of training program for managers of handling workers. The training should be conducted by inviting loading/unloading managers of shipping companies or sending the managers to shipping companies and shipping agencies.

A training program on efficient loading/unloading methods should be provided for all workers. The training should be conducted by each gang. Also, to all workers, seminars to prevent wrong-doing should be provided.

To operators of loading/unloading machinery and equipment, signal-men, and load-attaching and detaching men, a training should be provided on each work and co-operative elements of works.

A training program on new technological information and fast-sure-efficient maintenance methods should be provided to repair and maintenance workers.

11) Improvement of Organisational Structure

Clear definition of roles and responsibilities is a condition to efficient management. When they are clarified to the lowest level in a organisation, co-operation and co-ordination among related agencies are strengthened, and controlling organisations becomes easier. Since each port operator needs to react to constantly changing business environment, an operator needs to have power to make decisions. To certain extent, the central government needs to look over port operators activities; however, authority to make decisions should be granted to each operator as much as possible.

As privatisation of loading/unloading section of port services progresses, management of cargo handling needs to be shifted to the private sector. For example, collection and calculation of fees and personnel management of workers handling cargo will be in the hands of the private sector.

With these factors stated above, an example of organisational structure for port operation and management is presented:

General affairs department: administration, book keeping, personnel management, training and seminar

Port operation department: works on uses of port facilities (Use permit and specifying berth and other port facilities)

Port promotion department: statistics, promotion, public relations

Development and planning department: preparation of port development plans, demand projection

Facility development department: design of port facilities, construction, repair and maintenance (sub-contracted)

Port operation is a profit making business based on efficiency of its operation. A manager of a port need to have authority to place personnel appropriately. In most ports, a port operator organise a cargo handling corporation and other port related corporations, and hire may workers and operators.

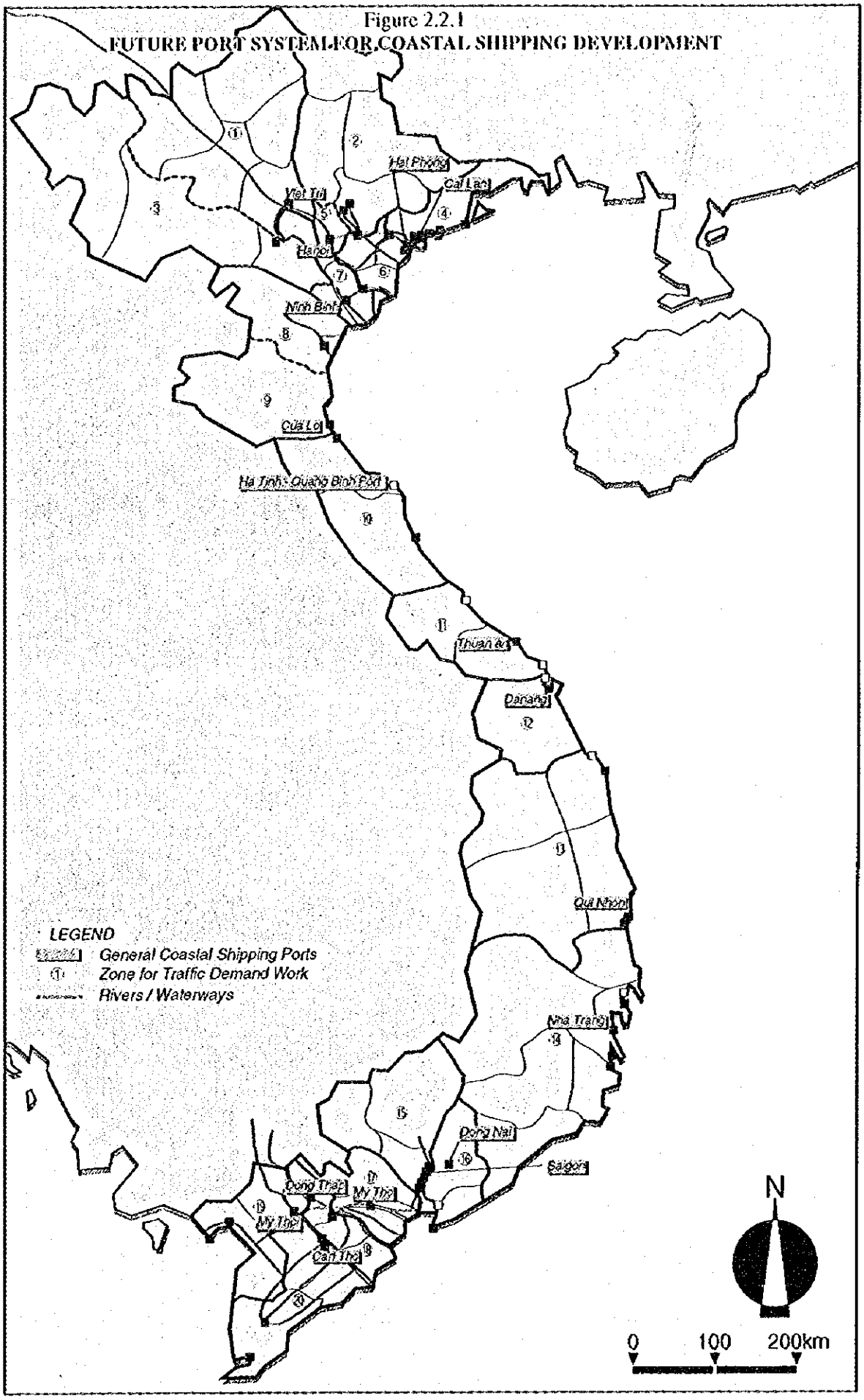
An operator need to grasp the quantity of work and place appropriate number of workers and operators to proper locations. If it is necessary, an organisational structure itself needs to be changed. As far as personnel management is concerned, there may be a conflict with unions; however, to be competitive against othertransport modes, the issue must be resolved in some way or another.

In order to conduct proper personnel management, objective evaluation and promotion systems should be introduced. Each staff should be evaluated objectively. And based on the evaluation, individuals are trained and motivated for appropriate placement. A specific example is by preparing an evaluation table. To make the evaluation on the table as objective as possible, type of work and rank must be defined in detail and items of evaluation on the table must be as detailed as possible. When an individual is evaluated to be capable of conducting a certain task, the individual may be placed in different department or promoted to a managerial position. Working conditions and compensations should be sustained appropriate levels. These objective evaluation and promotion systems will encourage workers to work harder and better. The system will facilitate to raise the retention level of employees.

(b) Development of General Coastal Shipping Ports

In the previous section, general coastal shipping ports, 17 port in total, have been duly analyzed and selected. (Refer to Figure 2.2.1)

Figure 2.2.1
FUTURE PORT SYSTEM FOR COASTAL SHIPPING DEVELOPMENT



The Master Plan designates them to sustain future coastal shipping traffic in cooperation with othert specialized ports. For this purpose, individual port development plans to the target years of 2000 and 2010 are prepared in this section.

1) Port Development Policy

North

Haiphong
- Implementation of the proposed projects in the JICA/Haiphong Port Urgent Rehabilitation Study
- In addition, the Study identified the following measures to be taken urgently:
  - Main Port : acquisition of adequate cargo handling equipment
  - Doan Xa : acquisition of adequate cargo handling equipment/building of new warehouses/improvement of existing wharves/creation of additional apron space
- Conducting a further study regarding both foreign and domestic trade and subsequent implementation

Cai Lan
- Implementation of the proposed projects in the JICA's feasibility study on Cai Lan Port Construction Project on schedule
- Conducting a further study regarding both foreign and domestic trade and its implementation

Hanoi
- Construction of a new berth for coastal shipping (2,000 dwt)
- Replacement of aged cargo handling equipment
- Building of new warehouses and pavement of yards

Viet Tri
- Construction of a new berth for coastal shipping (1,000 dwt)
- Renewal of one existing warehouse and purchase of new cargo handling equipment
- Pavement of yards

Ninh Binh
- Construction of Ninh Phuc area and designation of two coastal shipping berths within the area (existing one and another under construction, both 2,000 dwt)
- Creation of additional apron space by covering vacant sections with concrete surface up to existing bridged wharves
- Renewal of existing warehouses (Ninh Phuc area)
- Acquisition of adequate cargo handling equipment

Central

Cua Lo
- Construction of three new berths for coastal shipping (5,000 dwt)
- Construction of a mole against siltation (approx. 1km)
- Execution of dredging work at anchorage area and access route
- Expansion of the port compound by means of reclamation
- Pavement of yards

	• Construction of several new warehouses and installation of cargo handling equipment • Conducting a long-term port development study taking account of foreign trade and transhipment with Laos, etc.
Ha Tinh-Quang Binh Port	• Conducting a further study on port development taking account of regional socio-economic development
Thuan An	• Pavement of yards • Construction of a warehouse • Purchase of new cargo handling equipment
Danang	• Construction of a breakwater at Tien Sa area • Execution of dredging work at anchorage area of Tien Sa (270,000 m^3) • Construction of two new berths mainly for coastal shipping at Tien Sa (jetty type, 20,000 dwt) • Replacement of old cargo handling equipment • Removal of three old warehouses and construction of a three-storeyed warehouse at Song Han area • Construction of one new warehouse at Tien Sa • Yard pavement at Song Han • Conducting a long-term port development study in connection with possible deep seaport areas such as Cahn May, Line Chieu and Dung Quat.
Qui Nhon	• Removal of existing warehouses and construction of two warehouses • Removal of aged cranes and installation of mobile cranes • Construction of a wide, paved yard • Procurement of additional forklifts and trucks • Change in port road configuration
Nha Trang	• Construction of two new berths for coastal shipping (jetty type, 5,000 dwt) • Expansion of yard and other land area by reclamation • Construction of paved yards and warehouses • Installation of big mobile cranes

<u>South</u>

Saigon	• Installation of adequate cargo handling equipment (mobile cranes, forklifts, etc.) • Removal of seven small, old warehouses and office buildings, and development of two large warehouses instead • Conducting a long-term regional port development study for both foreign and domestic transport in connection with Vung Tau and Thi Vai ports
Dong Nai	• Construction of two new berths for coastal shipping (2,000 dwt)

	• Installation of cargo handling equipment (mobile cranes and forklifts)
	• Construction of paved yards and two warehouses
My Tho	• Replacement of outdated cargo handling equipment
	• Construction of paved yards and warehouses
	• Extension of existing wharves and creation of additional apron space by covering vacant sections with concrete surface up to existing bridged wharves
Dong Thap	• Creation of additional apron space by covering vacant sections with concrete surface up to existing bridged wharves, and extension of existing wharves
	• Pavement of yards
	• Installation of cargo handling equipment (mobile cranes and forklifts)
Can Tho	• Restructure old warehouses
	• Overlay of pavement of yards
	• Procurement of additional mobile crane and forklifts
My Thoi	• Creation of additional apron space by covering vacant sections with concrete surface up to existing bridged wharves, and extension of existing wharves
	• Installation of cargo handling equipment (mobile cranes and forklifts)

2) Port Facility Improvement Plan

To materialize the above policies, wharves and apron quays are designed based on the assumptions of ships and berths. (Refer to Table 2.2.1 and 2.2.2) All the ports except Cai Lan need additional and/or new space in warehouse and on yard. Table 2.2.3 shows the required space. Other permanent structure such as breakwater and mole against siltation, reclamation and dredging work are also quantitatively determined. (Refer to Table 2.2.3 and 2.2.4)

Table 2.2.1WHARF AND APRON QUAYS

Name	Wharf / Apron Quay	Length (m)	Width (m)	Area (m^2)	Size (DWT)	Structure	Target Year
Haiphong	-				5,000		
(Doan Xa)	Apron Quay	180	30	5,400		Concrete Pile	2000
Cai Lan	-				5,000		
Hanoi	Wharf 1B	90	20	1,800	2,000	Concrete Pile	2000
Viet Tri	Wharf 1B	80	20	1,600	1,000	Concrete Pile	2000
Ninh Binh	Wharf (exten.)	59	25	1,475	2,000	Concrete Pile	2010
(Ninh Phuc)	Apron Quay	42.5	8	340		Concrete Pile	2000
Cua lo	Wharf 3B	330	30	9,900	5,000	Horiz. Steel Pile	2000 (1B0 2010 (2B)
Thuan An	-						
Danang	Quay	200	40	8,000	20,000	Horiz. Steel Pile	2010
(Tien Sa)	-						
Qui Nhon	-						
Saigon	-						
Dong Nai	Wharf 2B	180	20	3,600	2,000	Concrete Pile	2000 (1B) 2010
My Tho	Wharf (exten.)	37	26	962	3,000	Horiz. Steel Pile	2010
	Apron Quay	54	14	760		Concrete Pile	2000
Dong Thap	Wharf (exten.)	32	20	640	3,000	Horiz. Steel Pile	2010
	Apron Quay	53	10	530		Concrete Pile	2000
Can Tho	-						
My Tho	Wharf (exten.)	24	14	336	3,000	Horiz. Steel Pile	2010

Table 2.2.2SHIP AND BERTH PARTICULARS

Ship Type (DWT)	Ships						Berths		
	Ttl. Length (m)	Width (m)	Draft (m)	Mother Ship Crane No.	Mother Ship Crane Capacity (t)	No. of decks	Length (m)	Depth (m)	Apron Width (m)
300	45	8.6	2.9	1	3	1			
500	48	8.3	3.1	1	3	1			
1,000	69	12.0	3.2	1	5	2	80	4.0	20
2,000	76	12.5	3.8	2	10	2	90	4.5	20
3,000	90	14.5	5.0	2	10	2	100	5.5	20
5,000	103	17.0	6.5	3	15	3	110	7.0	20
10,000	146	22.0	7.5				165	8.5	20
20,000	177	23.4	10.0				200	11.0	20

Table 2.2.3 **WAREHOUSES AND YARDS**

Location	Warehouse				Yard	
	Req. Area (m^2)		Development Area (m^2)		Development Area (m^2)	
	2000	2010	2000	2010	2000	2010
Haiphong						
Main Port	6,880	11,720	Existing Available Space (EAS)		0	0
Doan Xa	5,240	5,240	5,250 (35x75x2)	0	5,000	0
Hanoi	2,500	5,000	5,000 (40x75x2)	0	5,000	0
Viet Tri	1,380	1,330	1,500 (25x60x1)	0	5,000	0
Ninh Binh	3,220	8,000	4,000 (50x80x1)	4,000 (50x80x1)	0	0
Cua Lo	3,800	11,000	3,800 (40x95x1)	7,600 (40x95x2)	16,000	32,000
Thuan An	2,500	4,820	EAS (1,800)	3,000 (40x75x1)	0	10,000
Danang						
Tien Sa	0	6,080	0	8,000 (50x160x1)	0	0
Song Han	4,110	4,730	0	5,000 (20x125x2flrs)	3,000	0
Qui Nhon	8,750	16,790	16,800 (56x150x2)	0	70,000 (350x200)	0
Nha Trang	2,260	7,150	7,500 (50x150x1)	0	4,000	0
Saigon	18,260	18,260	18,000	0	0	0
Dong Nai	1,430	4,900	2,500 (31.25x80)	2,500 (31.25x80)	9,000	9,000 (100x90)
My Tho	1,430	1,970	2,000 (25x80x10	0	5,000	0
Dong Thap	900	1,810	Existing Available Space		0	0
Can Tho	410	480	EAS (3,420)	0	5,000	0
Mt Thoi	1,020	1,340	Existing Available Space		5,000	0

Table 2.2.4 **BREAKWATER (Danang) AND MOLE (Cua Lo)**

Location	Extension Length (m)	Depth (m)	Structure	Target Year
Cua lo	1,000	-1.0 ~ -7.0	Mixed (block type)	2000
Danang	600	0 ~ -11.0	Wave absorbing blocks (caisson type)	2000

Table 2.2.5 **RECRAMATION**

Location	Area (m2)			(m^3)	Target Year
		Extension Length	Structure		
Cua Lo	330*200 = 66,000m^2	860	gravity (block)		2010
Nha Trang	11,000m^2	200	gravity (block)		2000

Dredging Volume at Anchorage Area and Port Access Route

- Cua Lo Port 800,000 cubic meters by the year 2000
- Danang Port 270,000 cubic meters by the year 2010

3) Cargo Handling Equipment Installation Plan

Placement of equipment and methods are specified as follows:

A. Truck crane

Loading and unloading of general cargo, bagged cargo (cement, fertiliser, rice and other agricultural products) are done by ships' cranes. Under the following conditions, one truck crane per one berth is placed: 1) when a ship is not equipped with a crane; 2) when a crane on a ship is out of order; 3) when work loads exceed ship's capacity at peak.

Capacity

General cargo:	2 t x 60/4 (cycle) x 0.8	=24t/hour/gang
Bagged cargo:	2 t x 60/4 x 0.8	=24t/hour/gang
Cargo on pallets	2 t x 60/3 x 0.8	=32t/hour/gang

B. Crawler crane

Generally, loading and unloading of coal and phosphate rock are done by ships' crane. Under the following conditions, one crawler crane per one berth is placed: 1) when a ship is not equipped with a crane; 2) when a crane on a ship is out of order; 3) when work loads exceed ship's capacity at peak.

Capacity

Coal:	2 t x 60/2.5 x 0.7	=33.6t/hour/gang
Phosphate rock	3 t x 60/2.5 x 0.7	=50.4t/hour/gang

C. Forklift

Forklifts are allocated according to the following requirement: 1) all cargo handling work to/from and within warehouses; 2) transport cargo to/from warehouses to/from ships, if the distance is less than 150 meters; 3) loading and unloading to/from trucks when trucks are used for warehouse-wharves transport; 4) 10% of the total number of forklifts.

D. Truck

A truck is used when a transport distance to/from warehouse/yard to/from wharves is longer than 150 meters, and for bulk cargo.

E. Shovel wheel loader

A shovel wheel loader is used for loading and unloading of lime and phosphate rocks.

F. Pallets

Pallets should be used for transporting bagged and packaged cargoes (general cargo, cement, fertiliser, rice and other agricultural products) that are once stored in warehouses.

(1) **Haiphong Harbor**

(i) Main Port

	Year 2000	Year 2010
Loading Agricultural Products	3000,000	490,000
Unloading Cement	210,000	90,000
General Cargo	170,000	520,000
Total	680,000	1,100,000
No. Berths Used	2	3

Designed Vessel Size: 5,000 DWT (3 gangs)

Cargo Handling Time: 18 hours (6 hrs. x 3 shifts)

Required Equipment

Year	Truck Cranes		Forklifts		Pallets
	Size	No.	Size	No.	1.3m²(each)
2000	40t	2	3t	22	7,400
2010	40t	3	3t	33	12,600

(ii) Doan Xa Cargo Load (t)

	Year 2000	Year 2010
Loading Agricultural Products	300,000	300,000
Unloading Cement	200,000	200,000
Total	500,00	500,000
No. Berths Used	2	2

Designed Vessel Size: 5,000 DWT (3 gangs)
Cargo Handling Time: 18 hours (6 hrs. x 3 shifts)

Required Equipment

Year	Truck Cranes		Fork Lifts		Pallets
	Size	No.	Size	No.	1.3m²(each)
2000	40t	2	3t	21	5,700
2010	40t	2	3t	21	5,700

(2) Hanoi Cargo Load(t)

	Year 2000	Year 2010
General Cargo	140,000	280,00
No. Berths Used	1	1

Designed Vessel Size: 2,000 DWT (2 gangs)
Cargo Handling Time: 18 hours (6 hrs. x 3 shifts)

Required Equipment

Year	Truck Cranes		Fork Lifts		Pallets
	Size	No.	Size	No.	1.3m²(each)
2000	20t	1	3t	8	2,700
2010	20t	1	3t	9	5,400

(3) **Viet Tri** Cargo Load (t)

	Year 2000	Year 2010
Loading Agricultural Products	140,000	140,000
Unloading Cement	250,000	100,000
General Cargo	30,000	70,000
Total	420,000	310,000
No. Berths Used	2	2

Designed Vessel Size: 1,000 DWT
Cargo Handling Time: 12 hours (6 hrs. x 2 shifts)

Required Equipment

Year	Truck Cranes		Crawler Cranes		Dump Trucks		Wheel Loaders		Wheel Loaders 1/	
	Size	No.	Size	No.	Size	No.	Size	No.	Size	No.
2000	20t	1	40t	1	10t	3	$3m^3$	2	$2m^3$	1
2010	20t	1	40t	1	10t	3	$3m^3$	2	$2m^3$	1

1/ Wheel Loaders ($2m^3$) are for gathering and collection.

(4) **Ninh Binh** Cargo Load (t)

	Year 2000	Year 2010
Unloading Cement	0	210,000
General Cargo	180,000	280,000
Total	180,000	490,00
No. Berths Used	1	2

Designed Vessel Size: 2,000 DWT
Cargo Handling Time: 18 hours (6 hrs. x 3 shifts)

Required Equipment

Year	Truck Cranes		Fork Lifts		Pallets
	Size	No.	Size	No.	$1.3m^2$(each)
2000	(20t)	(1)*	3t	7	3,400
2010	20t	2	3t	15	8,600

* Use of existing mobile crane is possible

(5) **Cua Lo** Cargo Load (t)

	Year 2000	Year 2010
Agricultural Products	40,000	50,000
Unloading Cement	0	30,000
Loading of Coal	60,000	90,000
General Cargo	330,000	560,000
Total	430,000	730,000
No. Berth Used	1	3

Designed Vessel Size: 5,000 DWT

Cargo Handling Time: 18 hours (6 hrs. x 3 shifts)

Required Equipment

Year	Truck Cranes		Fork Lifts		Crawler Cranes		Wheel Loaders		Dump Trucks		Pallets
	Size	No.	Size	No.	Size	No.	Size	No.	Size	No.	$1.3m^2$ (each)
2000	40t	1	3t	12	-	-	-	-	-	-	4,100
2010	40t	3	3t	34	50t	1	$3m^3$	1	10t	4	12,300

(6) **Thuan An** Cargo Lad (t)

	Year 2000	Year 2010
General Cargo	140,000	270,000
Total	140,000	270,000
No. Berths Used	1	1

Designed Vessel Size: 1,000 DWT

Cargo Handling Time: 16 hours (8 hrs. x 2 shifts)

Required Equipment

Year	Truck Cranes		Fork Lifts		Pallets
	Size	No.	Size	No.	$1.3m^2$(each)
2000	20t	1	3t	8	1,900
2010	20t	1	3t	9	5,200

(7) **Danang Cargo Load (t)**

(i) Song Han

	Year 2000	Year 2010
Cement Unloading	0	200,00
General Cargo	230,000	200,00
Total	230,000	400,000
No. Berths Used	1	2

Designed Vessel Size: 5,000 DWT

Cargo Handling Time: 18 hours (6 hrs. x 3 shifts)

Required Equipment

Year	Truck Cranes		Fork Lifts		Bridge-type Crane for 2-Story Warehouse			Palletss
	Size	No.	Size	No.	Size	No.	Outreach	$1.3m^2$(each)
2000	40t	1	3t	14	5t	4	10m	4,400
2010	40t	2	3t	22	5t	4	10m	5,200

(ii) Tien Sa Cargo Load (t)

	Year 2000	Year 2010
Coal Loading	-	90,000
Cement Unloading	-	250,00
General Cargo	-	260,00
Total	0	600,000
No. Berths Used	0	2

Designed Vessel Size: 5,000 DWT

Cargo Handling Time: 18 hours (6 hrs. x 3 shifts)

Required Equipment

Year	Truck Cranes		Fork Lifts		Crawler Cranes		Wheel Loaders		Flat-bed Trucks	
	Size	No.	Size	No.	Size	No.	Size	No.	Size	No.
2000	-	-	-	-	-	-	-	-	-	-
2010	40t	2	3t	28	50t	1	$3m^3$	1	10t	5

Year	Pallets
	$1.3m^2$(each)
2000	-
2010	7,600

(8) **Qui Nhon** Cargo Load (t)

	Year 2000	Year 2010
General Cargo	490,000	940,000
Total	490,000	940,000
No. Berths Used	2	3

Designed Vessel Size: 5,000 DWT
Cargo Handling Time: 18 hours (6 hrs. x 3 shifts)

Required Equipment

Year	Truck Cranes		Fork Lifts		Flat-bed Trucks		Pallets
	Size	No.	Size	No.	Size	No.	1.3m^2 (each)
2000	40t	2	3t	15	10t	12	9,4000
2010	40t	3	3t	22	10t	18	18,100

(9) **Nha Trang** Cargo Load (t)

	Year 2000	Year 2010
General Cargo	190,00	600,00
Total	190,000	600,000
No. Berths Used	1	2

Designed Vessel Size: 5,000 DWT
Cargo Handling Time: 18 hours (6 hrs. x 3 shifts)

Required Equipment

Year	Truck Cranes		Fork Lifts		Flat-bed Trucks		Pallets
	Size	No.	Size	No.	Size	No.	1.3m^2 (each)
2000	40t	1	3t	7	10t	6	2,500
2010	40t	2	3t	15	10t	12	8,100

(10) **Saigon** Cargo Load (t)

	Year 2000	Year 2010
Unloading Agricultural Products	-	260,000
Loading Cement	-	160,000
General Cargo	-	1,140,000
Total		1,560,000
No. Berths Used	4	4

Designed Vessel Size: 5,000 DWT
Cargo Handling Time: 22 hours

Required Equipment

Year	Truck Cranes		Fork Lifts		Pallets
	Size	No.	Size	No.	1.3m²(each)
2000	40t	4	3t	49	16,200
2010	40t	4	3t	49	16,200

(11) **Dong Nai** Cargo Load (t)

	Year 2000	Year 2010
General Cargo	120,000	410,000
Total	120,000	410,000
No. Berths Used	1	2

Designed Vessel Size: 2,000 DWT
Cargo Handling Time: 18 hours (6 hrs. x 3 shifts)

Required Equipment

Year	Truck Cranes		Fork Lifts		Pallets
	Size	No.	Size	No.	1.3m²(each)
2000	20t	*(1)	3t	9	1,500
2010	20t	2	3t	18	5,400

* Existing mobile crane may be used

(12) **My Tho** Cargo Load (t)

	Year 2000	Year 2010
General Cargo	80,000	110,000
Total	80,000	110,000
No. Berths Used	1	1

Designed Vessel Size: 3,000 DWT
Cargo Handling Time: 12 hours (6 hrs. x 2 shifts)

Required Equipment

Year	Truck Cranes		Fork Lifts		Pallets
	Size	No.	Size	No.	1.3m²(each)
2000	25t	1	3t	9	1,500
2010	25t	1	3t	9	2,200

(13) **Dong Thap**

	Year 2000	Year 2010
General Cargo	50,000	90,000
Total	50,00	90,000
No. Berths Used	1	1

Designed Vessel Size: 3,000 DWT
Cargo Handling Time: 8 hours (8 hrs. x 1 shift)

Required Equipment

Year	Truck Cranes		Fork Lifts		Pallets
	Size	No.	Size	No.	1.3m²(each)
2000	(25t)	*(1)	3t	9	1,000
2010	25t	1	3t	9	1,700

* Existing mobile crane may b used

(14) **Can Tho**

	Year 2000	Year 2010
General Cargo	40,000	50,000
Total	40,000	50,000
No. Berths Used	1	1

Designed Vessel Size: 5,000 DWT
Cargo Handling Time: 18 hours (6 hours x 3 shifts)

Required Equipment

Year	Truck Cranes		Fork Lifts		Pallets
	Size	No.	Size	No.	1.3m²(each)
2000	40t	1	3t	10	*400
2010	40t	1	3t	10	500

* 500 pallets will be imported by 2000

(15) **My Tho**

	Year 2000	Year 2010
General Cargo	100,000	140,000
Total	100,000	140,000
No. Berths Used	1	1

Designed Vessel Size: 3,000 DWT
Cargo Handling Time: 16 hours (8 hours x 3 shifts)

Required Equipment

Year	Truck Cranes		Fork Lifts		Pallets
	Size	No.	Size	No.	$1.3m^2$(each)
2000	25t	1	3t	8	1,100
2010	25t	1	3t	8	1,400

2.2.2 Measures on the Sea-cum-Riverways

(a) Directions for Development and Maintenance of Major Waterways

Out of 17 general ports, the major waterways are selected to the 10 river ports, and for each major waterway, ships and ship types are allocated for the future coastal shipping. This section deals with fundamental directions for development and maintenance of those major waterways.

The allocation of fleet and its ship types and development and maintenance of the major waterways should be determined in a comprehensive way to minimise the costs by analysing relationships between: ship types and their transportation cost; ship types and initial dredging costs; and ships and their drafts. Unfortunately, because of the limitation of available data on depths of rivers, all the relationships stated are not included. In this section, existing data and related studies and researches are used as much as possible, and the directions for development and maintenance of major waterways are limited to fundamental directions by formulating based on the allocated ship types.

1) Haiphong Port

Freight vessels with 5,000 DWT are planned; there is no measure needed for development and maintenance on the major waterways.

2) Hanoi Port

Since the designed depth of waterways is 1.8 meter, only barges are able to navigate. According to TEDI, the maximum tonnage of vessels are 500 DWT for the year 2000 and 1,000 for the year 2010. The tonnage is lower than 2000 DWT the study team is proposing. Past studies suggest that to make a navigation possible for a vessel with 2,000 DWT, provided that a 20 year dredging work which costs about 10 to 15 million U.S. dollars. The investment would make the coastal shipping smoother, and when the benefits of the Viet Tri and surrounding areas are counted, the investment would not be unreasonable. (When the cost is converted to per ton freight cost, it would be 1 to 1.5 U.S. dollars.) This estimate is based on past studies. In reality, the exact costs are not known; therefore, even though navigation of 2000 DWT vessels are planned,

studies on engineering and transportation economics which include Lach Giang would be necessary. The final decision should be based on these detailed studies.

3) Viet Tri Port

Planned vessels for navigation in the segment from the Hanoi port to the Viet Tri port have 1,000 DWT, because there are some shallow areas and the Long Bien bridge is critical during rainy season. Further studies will be needed for the Long Bien bridge where the clearance becomes small during the rainy season. Also, the depths of the waterways should be measure to figure out amounts of dredging work.

4) Ninh Binh Port

Vessels with 2000 DWT are planned with a condition that studies will be conducted to clarify the changes of depths. According to the designed depth, current depth is estimated to be 1.8 meter. A plan of Vietnam is to make it to 3.5 meters to make vessels with 1,000 DWT passable. Fore 1,000 DWT vessels, a large-scale dredging work is not required. Current bottlenecks for vessels with 2000 DWT are at 7 km offshore and 8 to 12km inland. The initial dredging work is about 1.5 million m^3.

5) Saigon Port

Vessels with 5,000 DWT are planned; no major dredging work is required.

6) Dong Nai Port

Current condition, reportedly, allow vessels with 2,000 DWT. According to interviews, 5,000 DWT would be possible without major dredging works. Vessels with 2,000 DWT are planned for now. When new data becomes available, the planned tonnage should be revised.

7) My Tho Port

Currently, vessels permitted to enter the port are 3000 DWT or less. The planned vessel tonnage is 3,000 with the following consideration: the cost of reducing the effect of passing Cua Tieu by using tide for vessels with 3000 DWT; trend and mechanism of depths change at Cua Tieu for determining appropriate ship types. The UNDP study is useful for the changes of underwater landscape.

8) Dong Thap Port

The same tonnage, as in the My Tho port major waterways, 3,000 DWT is planned. The consideration to the plan is also the same. The clearance of the planned My Thuan bridge must be discussed among related agencies and stakeholders.

9) Can Tho Port

There are some limitation due to the depth at Cua Dinh An, but using high tide, vessels with 5,000 DWT enter the port at present. Therefore, the planned tonnage is 5,000 DWT with the following considerations: the cost of reducing the effect of passing Cua Dinh An by using tide for vessels with 3000 DWT; trend and mechanism of depths change at Cua Dinh An for determining appropriate ship types. The World Bank study is useful for the changes of underwater landscape.

10) My Thoi Port

The tonnage of 3,000 DWT is planned, since there are shallow sections between the Can Tho port and the My Thoi port. When data and studies are available 5,000 DWT vessels should be considered for the major waterways.

(b) Conditions for Development and Maintenance of Waterways

Measuring depths and conducting dredging works are significant to sustain and develop waterways for general river ports.

Availability of data on depths are beneficial for the following reasons:

- Accidents of running on to the shallow parts can be avoided;
- Unnecessary detouring of small boats can be avoided;
- Appropriate dredging work plans can be formulated;

Accumulation of time series data on depths from periodical measurements will be necessary to judge economically rational waterway development and maintenance planning. Relationships between: ship types and unit transportation costs; ship types and initial dredging costs; and ship types and costs of maintaining appropriate depths, need to be studied comprehensively. Decisions on the initial dredging volume and measures on sustaining constant depths, development of barricades to prevent sand accumulation and current controlling jetties require the data on depths.

To conduct accurate and efficient measuring, acquisition of a new survey ship and survey equipment will be necessary. The NTSR study indicates that:

- In the south, most of survey equipment are old. To conduct network-wide survey, the survey equipment needs to be ten times more efficient.
- It took one year to measure the 50 km segment from On-Mange and Thit. At this rate, measuring depths of major waterways in the south along would take 34 years.

Locations of dredging work (both initial dredging works and dredging for sustaining an appropriate depth) to be conducted should be determined by engineering and transportation economics perspectives. Periods of dredging works should be prioritised within a budget, also. In order to conduct efficient and operational dredging works, acquisition of new dredgers will be necessary. Some budget should be allocated for purchasing new dredgers. The NTSR study indicates that:

- The problem is lack of budget on dredging works. The existing dredgers are old, but more dredging works can be done even with existing dredgers;

- No dredging works have been conducted at the Cho Gao canal, which shares large portion of volume in Ho Chi Minh and the Mekong Delta, for four years;

- The capacity of dredging works is only 30% of the total works required. Even worse, only 50% of the capacity is at work because of the financial short fall;

- There is virtually no periodical dredging works for inland waterways;

- 50% of dredges owned by two dredging companies are beyond the condition of being repaired to make any economic sense. The old ones should be demolished and new dredgers will have to be purchased; and

- The efficiency of dredgers are too low from the modern standards.

2.2.3 Preliminary Cost Estimate of the Measures

The measures for better coastal shipping are categorised into: 1) improvement on port management and operation; 2) development and improvement of major ports; and 3) development and maintenance of major waterways. 1) is not suited for cost estimates, since they are more on concept, perception change and regulations. Cost estimates on 3) is, as stated, not possible because of limitation on time and available data. Therefore, cost estimates are limited to the category 2) development and improvement of major ports. The tables do not include the Cai Lan and Ha Tinh-Quang Binh ports. The reasons are:

- In Cai Lan port, already, facility development with the Yen loan is possible without new development measures.
- The Ha Tinh-Quang Binh port is planned but does not exist.

The total cost of development and improvement for the 15 major ports from now to the year 2010 is 238 million U.S. dollars. The major ports which require large amount of investment are the Danang port (54.6 million dollars), the Cua Lo port (51.7 million dollars), the Nha Trang port (20.8 million dollars), the Qui Nhon, Nha Trang, Saigon ports with 11 to 12 million dollars. All the figures are based on construction costs.

The conditions of cost estimates are as follows: 1) the total number of ports are 15 excluding the Cai Lan and Ha Tinh-Quang Binh ports; 2) facilities to be included are wharves, warehouses, yards, and loading/unloading equipment; and 3) dredging costs are not included.

Table 2.2.6 **COST FOR GENERAL COASTAL SHIPPING PORT DEVELOPMENT**
(Target Year: 2010)

Port	Facility	Works (Spec.)	Quantity	Unit	Amount (USD)
(1) HAIPHONG					
Main Port	Cargo Handling Equipment	Truck Crane (40t)	3	vehicles	1,350,000
		Forklift (3t)	33	vehicles	759,000
		Palette(1.3m^2)	12,600	pieces	252,000
Doan Xa	Jetty with Apron	Jetty (180*30)	5,400	m^2	4,320,000
		Revetment	180	m	97,200
	Warehouse	35m*75m*2	5,250	m^2	2,362,500
	Pavement of Yard	As	5,000	m^2	165,000
	Cargo Handling Equipment	Truck Crane (40t)	2	vehicles	900,000
		Forklift (3t)	21	vehicles	483,000
		Palette (1.3m^2)	5,700	pieces	114,000
	Sub-Total				**10,802,700**
(2) HANOI	Berth (1B) (2,000 DWT)	Jetty (90*20)	1,800	m^2	1,710,000
		Revetment	90	m	48,600
	Warehouse	40m*125m*1	5,000	m^2	2,250,000
	Pavement of Yard	As	5,000	m^2	165,000
	Cargo Handling Equipment	Truck Crane (20t)	1	vehicles	278,000
		Forklift (3t)	9	vehicles	207,000
		Palette (1.3m^2)	5,400	pieces	108,000
	Sub-Total				**4,766,600**
(3) VIET TRI	Berth (1B) (1,000 DWT)	Jetty (80*20)	1,600	m^2	1,520,000
		Revetment	80	m	43,200
	Warehouse	25m*60m*1	1,500	m^2	675,000
	Pavement of Yard	As	5,000	m^2	165,000
	Cargo Handling Equipment	Truck Crane (20t)	1	vehicles	278,000
		Crawler Crane (40t)	1	vehicles	423,000
		Dump Truck (10t)	3	vehicles	327,000

		Wheel Loader 3m³	2	vehicles	526,000
		Wheel Loader 2m³	1	vehicles	189,000
	Sub-Total				**4,146,200**
(4) NINH BINH	Berth (Extension)	Jetty (59*25)	1,475	m²	1,401,250
	(2,000 DWT)	Revetment	59	m	31,860
	Jetty with Apron	Jetty (42.5*8)	340	m²	272,000
		Revetment	43	m	22,950
	Warehouse	50m*80m*2	8,000	m²	3,600,000
	Cargo Handling	Truck Crane (20t)	2	vehicles	556,000
	Equipment	Forklift (3t)	15	vehicles	345,000
		Palette (1.3m²)	8,600	pieces	172,000
	Sub-Total				**6,401,060**
(5) CUA LO	Berth (38)	Jetty (330*30)	9,900	m²	13,662,000
	(5,000 DWT)	Revetment	860	m	4,988,000
	Mole		1,000	m	18,000,000
	Dreading		800,000	m³	3,200,000
	Reclamation		350,000	m³	1,400,000
	Site Preparation	220*330	66,000	m²	85,800
	Warehouse	40m*95m*3	11,400	m²	5,130,000
	Pavement of Yard	As	48,000	m²	1,584,000
	Cargo Handling	Truck Crane (40t)	3	vehicles	1,350,000
	Equipment	Crawler Crane (50t)	1	vehicles	585,000
		Dump Truck (10t)	4	vehicles	436,000
		Wheel Loader (3m³)	1	vehicles	263,000
		Forklift (3t)	34	vehicles	782,000
		Palette (1.3m²)	12,300	pieces	246,000
	Sub-Total				**51,711,800**
Port	Facility	Works (Spec.)	Quantity	Unit	Amount (USD)
(6) THUAN AN	Warehouse	40m*75m*1	3,000	m²	1,350,000
	Pavement of Yard	As	10,000	m²	330,000
	Cargo Handling	Truck Crane (20t)	1	vehicles	278,000
	Equipment	Forklift (3t)	9	vehicles	207,000
		Palette (1.3m²)	5,200	pieces	104,000
	Sub-Total				**2,269,000**
(7) DANANG					
Tien Sa	Pier (2,000 DWT)	40*200	8,000	m²	12,000,000
	Breakwater (A)	Block Type	100	m	2,900,000
	Breakwater (B)	Mixed	500	m	28,250,000
	Dreading		270,000	m³	1,080,000
	Warehouse	50m*160m*1	8,000	m²	3,600,000
	Cargo Handling	Truck Crane (40t)	2	vehicles	900,000
	Equipment	Crawler Crane (50t)	1	vehicles	585,000

		Truck (10t)	5	vehicles	445,000
		Wheel Loader (3m³)	1	vehicles	263,000
		Forklift (3t)	28	vehicles	644,000
		Palette (1.3m2)	7,600	pieces	152,000
Song Han	Warehouse (2 Stories)	20m*125m*1	2,500	m²	2,125,000
	Pavement of Yard	As	3,000	m²	99,000
	Cargo Handling Equipment	Truck Crane (40t)	2	vehicles	556,000
		Forklift (3t)	22	vehicles	506,000
		Palette (1.3m²)	5,200	pieces	104,000
		Crane for Warehouse	4	vehicles	364,000
	Sub-Total				**54,573,000**
(8) QUI NHON	Warehouse	56m*150m*2	16,800	m²	7,560,000
	Pavement of Yard	As:350*200	70,000	m²	2,310,000
	Cargo Handling Equipment	Truck Crane (40t)	3	vehicles	135,000
		Forklift (3t)	22	vehicles	506,000
		Truck (10t)	18	pieces	1,602,000
		Palette (1.3m²)	18,100	vehicles	362,000
	Sub-Total				**12,475,000**
(9) NHA TRANG	Pier (2B, 5,000 DWT)	220*40	8,800	m²	11,880,000
	Reclaimed Revetment		200	m	2,600,000
	Reclamation		80,000	m³	320,000
	Site Preparation		11,000	m²	14,300
	Warehouse	50m*150m*1	7,500	m²	3,375,000
	Pavement of Yard	As	4,000	m²	132,000
	Cargo Handling Equipment	Truck Crane (40t)	2	vehicles	900,000
		Truck (10t)	12	vehicles	1,068,000
		Forklift (3t)	15	vehicles	345,000
		Palette (1.3m²)	8,100	pieces	162,000
	Sub-Total				**20,796,300**
(10) SAI GON (Nha Rong)	Warehouse	90m*100m*2	18,000	m²	8,100,000
	Cargo Handling Equipment	Truck Crane (40t)	4	vehicles	1,800,000
		Forklift (3t)	49	vehicles	1,127,000
		Palette (1.3m²)	16,200	pieces	324,000
	Sub-Total				**11,351,000**
(11) DONG NAI	Berth (2B) (2,000 DWT)	Jetty (130*20)	3,600	m²	3,420,000
		Revetment	180	m	97,200
	Warehouse	31.25m*80m*2	5,000	m²	2,250,000
	Pavement of Yard	As:180*100	18,000	m²	594,000
	Cargo Handling	Truck Crane (20t)	2	vehicles	556,000

	Equipment	Forklift (3t)	18	vehicles	414,000
		Palette (1.3m²)	5,400	pieces	108,000
	Sub-Total				**7,439,200**
Port	Facility	Works (Spec.)	Quantity	Unit	Amount (USD)
(12) MY THO	Berth (Extension)	Jetty (37*26)	962	m²	1,154,400
	(3,000 DWT)	Revetment	37	m	19,980
	Jetty with Apron	54*14	760	m²	608,000
		Revetment	54	m	29,160
	Warehouse	25*80*1	2,000	m²	900,000
	Pavement of Yard	As	5,000	m²	165,000
	Cargo Handling	Truck Crane (25t)	1	vehicles	298,000
	Equipment	Forklift (3t)	9	vehicles	207,000
		Palette (1.3m²)	2,200	pieces	44,000
	Sub-Total				**3,425,540**
(13) DONG THAP	Berth (Extension)	Jetty (32*20)	640	m²	768,000
	(3,000 DWT)	Revetment	32	m	17,280
	Jetty with Apron	53*10	530	m²	424,000
		Revetment	53	m	28,620
	Pavement of Yard	As	5,000	m²	165,000
	Cargo Handling	Truck Crane (25t)	1	vehicles	298,000
	Equipment	Forklift (3t)	9	vehicles	207,000
		Palette (1.3m²)	1,700	pieces	34,000
	Sub-Total				**1,941,900**
(14) CAN THO	Warehouse (repair)	1	3,420	m²	855,000
	Pavement of Yard	As	5,000	m²	165,000
	Cargo Handling	Truck Crane (40t)	1	vehicles	450,000
	Equipment	Forklift (3t)	10	vehicles	230,000
		Palette (1.3m²)	500	pieces	10,000
	Sub-Total				**1,710,000**
(15) MY THOI	Berth (Extension)	Jetty (24*14)	336	m²	403,200
	(3,000 DWT)	Revetment	24	m	12,960
	Pavement of Yard	As	5,000	m²	165,000
	Cargo Handling	Truck Crane (25t)	1	vehicles	298,000
	Equipment	Forklift (3t)	8	vehicles	184,000
		Palette (1.3m²)	1,400	pieces	28,000
	Sub-Total				**1,091,160**
Total Cost					**194,900,460**
Contingency					**29,235,069**
Consultant Fee	Construction				**13,373,317**
	Perches of Machine				**832,020**

Grand Total	**238,340,866**

Chapter 3 RECOMMENDATION

The port section of the report was covered in line with the objective of smoother coastal shipping of the study. The study team members learned great deal about current situations and issues on ports and inland waterways in Vietnam. Most of the issues were analysed and discussed in this report; however, because of the scope of the study, some of them were not covered. In this section, some of the issues are highlighted to show study team's opinions which are to be reviewed by persons in related agencies of the government.

3.1 Significant Views toward Promoting Port Development Policies in Vietnam

(a) Preparation of Port Distribution Plan and Implementation of Investment to Major Ports Based on the Plan

Every ports have large-scale development plans prepared by the port or the government of the jurisdiction, except in a few cases. The consensus on the significance on and enthusiasm toward port development is understandable and also necessary. The central government, also has large-scale port development plans. But what are the basis of the plans? Where do the funds come from?

Except for small ports, generally, port development involves multi-jurisdictional, the costs of development is large. Therefore, major port development should be planned in regional and national levels with specific functions and necessity in mind. In other words, the central government needs to prioritise development plans, in spite of the fact that port improvement demand comes from every port in the nation. Base on the national port development plan, the central government should allocate funds for development and improvement.

For private ports, the government role is to regulate for the private port activities not to impair general public welfare. However, for public ports which serve various shippers and carriers, investment or improvement of facilities and services should be prioritised based on the national port development plan to maximise the effectiveness of fund allocation.

The major ports for coastal shipping are parts of the national port development plan. With the general functions, the major ports have roles of industrial development, foreign trade, and international transhipment centres. Taking these into consideration, a national port development plan should be prepared as soon as possible.

(b) Appropriate Public Investment on Port Development and Improvement

The key to port investment by the public sector is the appropriate judgement on necessity of public funds, based on political and economic considerations. It is repeatedly said that the advantage of maritime shipment is in the distance and cost of

delivery. If Vietnam is to take advantage of coastal shipping, in the process of rapid economic growth which generates manufactured good and requires cost effective ways of transporting them, and if one port is strategically qualify to satisfy the role for economic growth, a drastic and large-scale development with public funds may be necessary.

A port is a fundamental infrastructure which supports various economic activities. Because of its public nature, national or local government(s) allocate(s) funds for port development. However, if a port is to financially independent, a public fund does not have to allocated. Disadvantage of independent finance on port development is that funding requirement to take advantage of scale-economy may be too large for a single port operator to burden. If it were to finance large-scale port development, fees and charges of port services may have to high. The highly priced port services would become unreasonable in international markets. Often in developing countries, ports have not only logistics functions but also industrial development functions. If funding came only from a port operator, industrial development projects themselves would be denied.

(c) Guiding Private Development Based on Public Plan

To guide private port development, the government should prepare overall port development plans and regulate private activities to certain extent.

There are case of private port development in the world including cases of developing a specialised port for one corporation. In Vietnam, there are cases of specialised private port development by coal mining and cement producing companies. In addition to specialised port development by private enterprises, recently, a part of a public port is developed by private enterprises and used as a specialised private port. Or even, there are cases of whole public port development by private enterprises for public purposes. Diversification of development and project financing methods should be welcomed.

As long as a development project is financed by the private sector, private profit making is naturally pursued. However, roles of public ports shall not be impaired. When a part of a public port is developed and used by a private corporation, the ownership and use by the private enterprise should not affect the activities in a public port negatively. When a public port is developed by a private corporation, facilities in the port should equitably used by the public.

3.2 Future Visions of Inland Waterways and Development Plans

In Vietnam, inland waterway transport is active using the web-like network. In the north, fleets of two to four steel barges with 100 to 400 DWT capacity are in operation. In the south, self-propelled barges with several tons to several hundred tons are in operation. The total cargo volume has reached to several million tons. In this

study, cargo remaining within waterways is out side of the scope. How will the handy and low cost inland waterway transport be envisioned against transport by trucks and environmental disputes over water quality of waterways?

Inland waterway has a potential to function as a mode of feeder transportation, also. It is hoped that the visions of inland waterway development policies be clarified in ever changing environment of inland water transport.

3.3 Research for Planning on International Trade Functions of Coastal Shipping

In this study, coastal shipping, long-distance domestic water transport, was focused. Major ports were identified. Since some of the identified ports have international trade functions as well as regular port functions, international trade parts needed to be incorporated to the study. For these cases, the international trade functions were considered; however, the basis of the international freight volume was not as solid as it should have been. In some ports, international freight volumes were projected very high, compared with domestic freight volumes. In such cases, scale of facilities for international freight was assumed to be given to plan facilities for the coastal shipping.

Plans for new large-scale port development projects are already existing or on-going. Directions of the planned port development may affect the concept of the major ports from its roots. Therefore, international trade functions or ports should be studies further. Specific areas to be studied are as follows:

Haiphong Port
International and domestic trade functions and required facilities should be studied in detailed after the year 2000.

Cual Lo Port
International trade functions (general and transhipment functions among Laos and other neighbouring countries) and required facilities should be studied.

Chan May District, Lien Tieu District, and Dung Quat District
Comprehensive and detailed studies should be conducted on the three deep port projects, which affect strategic development plans not only to the central block but to the middle area, as soon as possible.

Saigon Port Area
A study on long-term international functions of the Saigon district should be conducted including the Saigon, Tan Cang, Ben Nghe, Vung Tau, Thi Vai ports. The study should aim for consolidation and efficiency of the container handling functions currently diversified to the Saigon, Tan Cang, Ben Nghe ports and industrial development at the Vung Tau and Thi Vai ports in conjunction with the general port functions.