will be 938 per year. On the other hand if the figure from table 7-1-1 is adopted,average cargo volume per ship is 2,030 tons,number of ships becomes 1,500. This means that 2.6-4.1 ships would enter per day based on a simple average of two figures. This is much less than 8 ships that are able to enter the port at the same sequence of time.

As already mentioned in chapter 4-3, the ship size distribution will be increased because of the deep navigation channel.Therefore annual throughput of 3 million tons at Main Port can be achieved from the scheduled number of ship calls.

A list of the ships which are actually entering Hai Phong Port or are likely to enter in the near future is given in table 7-1-3. It should be noticed that container ship over 500TEU cannot enter fully loaded from the point view of channel depth. Therefore, representative planning ship size for container ships is around 450TEU in the table.

Table 7-1-3 Dimensions of Representative Ship

Name of Ship	Flag	Ship Type	DWT	LAO(m)	Draft	Capacity
Mekong Vitesse	Denmark	Sem-Con.	5,230	115.5	5.36	414TEU
Hau Giang	Viet Nam	Ro-Ro	12,800	122.3		354TEU
Viet Nam		Full-Con.		92	6.6	260TEU
Maritime		Full-Con.		102	7.4	320TEU
Development		Full-Con.		114	8.5	450TEU
Co.		Full-Con.		120	8.8	520TEU
		Full-Con.		140	9.2	650TEU
Song Saigon	Viet Nam	General	10,785	151.4	9.0	15,180TON
Long An	Viet Nam	General	9,639	118.6	7.7	10,329TON
Long Thanh	Viet Nam	General	11,832	125.3	8.5	14,580TON
Long Hai	Viet Nam	General	8,610	118	7.4	9,869TON
Leninskaja	CIS		7,390	135.2	6.5	6,280TON
Nikolaj	CIS		7,700	136.8	7.5	6,667TON

7-1-3 Cargo flow in Main Port

In order to consider future cargo flow and to make the facilities allocation plan, present cargo flow by commodity has been examined based on information provided by staffs. Present typical cargo flow is shown below.

		Handling Ratio		Handling Ratio
Container	Unloading	70%	Truck to Container Yard	95% Truck 5% Rail
		30%	Truck 28% Direct Delivery to VICONSHIP Rail 2%	
	Loading	60%	Truck from Container Yard	
		40%	Truck Direct Delivery from outside	
General Cargo	Loading	100%	Truck to Warehouse Forklift	90% Truck 10% Rail
		20%	Truck from Warehouse Forklift	
Bagged Cargo (Chemical Fertilizer)	Unloading	10%	Truck to Warehouse Forklift	50% Truck
		30%	Lighter Direct Delivery	
		55%	Truck Direct Delivery	
		5%	Rail Direct Delivery	
Bagged Cargo (Cement)	Loading	95%	Truck Direct Delivery	
		5%	Truck from Warehouse Forklift	
Bulk Cargo (Pellet,Copper)	Unloading	100%	Crane to Open Yard	100% Rail to outside
Bulk Cargo (Zinc)	Loading	100%	Crane from Open Yard	100% Rail from outside

These figures show distinctively that cargo flows to a large extent directly between ships and trucks or other transport means and that low utilization of warehouses or open yards prevails. In case of container handling,30-40 percent of total volume is directly handled from(to) ship to(from) Truck due to the narrowness of marshalling yard and other reasons.

These features shall be taken into consideration in formulating the Rehabilitation Plan,in addition,container yard should be enlarged to raise stacking capacity for meeting container handling volume at quay side.

On the basis of above mentioned actual condition and planning concept and according to the planning principle mentioned in Chapter 5, the Rehabilitation Plan has been formulated in the following Chapter.

7-2 Cargo Handling Volume in Target Year

According to the planning principle, the allocation of cargo throughput in the year of 1998 to each berth is shown in table 7-2-1. Berths No.1-3 are integrated to form a specialized container wharf. Berths No.4-6 are converted to three bulk berths. Berths No.7-11 are improved general cargo (including bagged cargo) berths.

Table 7-2-1 Present and Planning Cargo Handling Volume by Each Berth

1992		Thousand ton	1998		Thousand ton
No.1 Berth	125m	Container General Cargo	120	Container	Container Handling Enterprise
No.2 Berth	125m	Bulk Cargo Clinker Apatite	148	Container 600 75,000 TEU	〃
No.3 Berth	163m	Bulk Cargo Pellet Copper Ore General Cargo	171	Container	〃
No.4 Berth	165m	Steel Product Cable Drum General Cargo	154	Bulk Cargo	No.1 Cargo Handling Enterprise
No.5 Berth	165.8m	Steel Product Cable Drum General Cargo	157	900	〃
No.6 Berth	165.8m	Chemi.Fertilizer Cement General Cargo Passenger Ship	138		〃
No.7 Berth	163.6m	Container Ro-Ro ship	130	General Cargo	No.2 Cargo Handling Enterprise
No.8 Berth	163.6m	Chemi.Fertilizer Cement Zinc Ore General Cargo	133		〃
No.9 Berth	163.6m	Wheat Flour Rice Ro-Ro ship	132	1,270	〃
No.10Berth	158.5m	Wheat Flour Rice General Cargo	135		〃
No.11Berth	158.5m	Vegetable Refrigerated Foods	98		〃
11	1717.4m		1,516	2,770	

7-3 Cargo Handling System

(1) Cargo volumes and capacity of equipment

The future estimated cargo volume excluding container cargo will reach 2,170 thousands tons and this cargo must be handled by 8 berths. The cargo volume that 8 berths can handle is calculated be under the following conditions.

The conditions for estimation;

Productivity;

General cargo	15 t/g/hr.
bagged cargo	30 t/g/hr.
Average	20 t/g/hr.
Steel products	50 t/g/hr.
Bulk cargo	50 t/g/hr.
Average	50 t/g/hr.

Numbers of berth and berth occupancy rate;

General cargo and bagged cargo	5 berths (0.65)
Steel products and bulk cargo	3 berths (0.55)

1) General cargo and bagged cargo

5 berths x 20 t/g/hr. x 3.5 gangs x 22 hours x 365 days x 0.65 x 0.8 =1,461,460 tons

2) Steel products and bulk cargo

3 berths x 50 t/g/hr. x 3.5 gangs x 22 hours x 365 days x 0.55 x 0.8 =1,854,930 tons

The cargo volumes,both planned and calculated,are shown in Table 7-3-1.

The cargo volume possibly handled by 8 berths are more than the planned cargo volume. The cargo volumes by calculation represent the maximum volume because the gang number was considered to 3.5, which is little bit higher than the actual gang number.

Table 7-3-1 Comparison of planned cargo volume and calculated cargo volume unit: thousand tons

	Cargo Volume (1998)	
	Planned	Calculated
General cargo and bagged cargo	1,270	1,461
Steel products and bulk cargo	900	1,855

(2) Necessary equipment

1) Bagged cargo

The principal bagged cargoes consist of cement and fertilizer, and they are expected to increase greatly. The flow of bagged cargoes is mainly divided into two ways, one being direct dispatch from ship to truck, and the other being cargo through warehouse and delivered to land side about import cargo. The flow of export bagged cargoes are opposite ways of the import cargo.

In case of cargo through warehouse, the fork-lift truck plays an important role in transport between apron and warehouse, and required number of fork-lift trucks is estimated as in Table 7-3-2.

Table 7-3-2 Required Number of Fork-lift Trucks

	Number of Fork-lifts		
	Enterprise I	Enterprise II	Container Enterp.
Required Nos.	16	16	5
Present Owned	7	16	0
Nos of Discard	5	16	0
Nos of Purchase	14	12	5

The details of fork-lift trucks for purchase are shown in Table 7-3-3.

Table 7-3-3 Details of Fork-lift Trucks

Owner	Capacity	Q'ty
Enterprise I	1.5ton 3 ton 5 ton 10 ton	6 3 4 1
Enterprise II	1.5ton 3 ton 5 ton 10 ton	6 3 2 1

All these fork-lift trucks should be diesel types. The fork-lift trucks with 5.0 tons capacities should have special attachments for handling of paper rolls.

The costs of fork-lift truck are shown in Table 7-3-4.

Table 7-3-4 Cost of Fork-lift Trucks Unit: Million US$

Capacity	Q'ty	Unit Price	Amount	Rematks
1.5 ton	12	0.02	0.24	
3 ton	6	0.03	0.18	
5 ton	6	0.07	0.42	
10 ton	2	0.13	0.26	
Total	26		1.10	All Diesel Type

2)Steel products

Steel products (steel bars, steel plates, etc.) are discharged from ship and loaded to truck in case of direct transport. There is another case in which steel cargo is once stocked on the yard after being discharged from ship and then later is transported by trucks.

The flow of export cargo is opposite that of import cargo above. Trucks are widely used for transporting steel cargo to consignees.

The required number of trucks for delivering cargoes for one ship using a gang number of 3.5 is calculated as follows :

Transport distance (round trip) :100 km
Number per hour :0.37 units/hr.
Cargo volume per hour :50 t/g/hr.
Cargo volume per ship :180 /t/ship
(equals to 15 units of 12 ton trucks)
Total required number : 15/0.37 = 40 units
Presently owned number :11 units
Discard number : 6 units
Number for purchase :35 units
Price of trucks :
35 units x 0.093 = 3.255 million US$

Some steel products are stocked in the warehouse and tractors(and tractors head)are needed to transport these cargoes between warehouse and ship. The required number of trailers for this purpose is calculated as follows;

Cycle time : 200 minutes
Number of cycles per hour : 0.6
Cargo volume per ship : 50 t/g/hr. x 3.5=180 t/ship
(equals to 6 units of 30 ton tractor)
Required number of tractor : 6/0.6 = 10 units
Required number of tractor head : 5 units
(one tractor head for two tractors)

The prices of tractors and tractor heads are as follows:

Table 7-3-5 Price of Tractor and Tractor Heads Unit:Million US$

	Total Unit	Unit Price	Amount	Remarks
Tractor	10	0.09	0.9	30t
Tractor Heads	5	0.20	1.0	500HP
Total			1.9	

3) Bulk cargo

Loose bulk cargoes are mostly transported by wagons. Export cargoes are mostly stocked in the yard at one time and then are loaded onto ship by quay side jib crane. The flow loose import cargoes is opposite to that of export described above. The discharge of the bulk cargo from wagon is carried out by quay side jib crane but this handling is very ineffective. Introducing a new system such as the car damping method would be very efficient but the amount of bulk cargo cannot justify the adoption of such a system. Therefore the present method of discharge must be continued in this port.

The collecting works of loose bulk cargo in yards and in the ship holds are carried out manually due to the lack of necessary equipment. Bulldozers are very effective in to collecting bulk cargoes. Bulldozers with 15 tons pull and 5 tons pull are used usually in the yard and in the ship hold respectively. The required numbers of bulldozers for Enterprise I and Enterprise II is as shown in Table 7-3-6.

Table 7-3-6 Required Number of Bulldozers

	Yard 15t pull	Ship inside 5t pull	Total
Enterprise I	2	2	4
Enterprise II	2	2	4
Total	4	4	8

The cost of these bulldozers is shown as follows:
4 x 0.085 +4 x 0.035 = 0.48 million $ (US).

4) Container transported by combined cargoes with general cargo

The containers are transported in combined conditions with general cargo on one ship. These containers are at present handled by two quay side jib cranes of 10 ton capacity by cooperated ways. However, this kind of handling of containers is very ineffective and dangerous.

When berth allocation for handling containers is moved from berth No.7 to berth No.2, the containers transported in combined condition should be handled by the quay side jib cranes on berth No.7. As most of those combined containers are less than 20 ' containers, the jib crane on berth No.7 could easily handle them.

(3) VHF equipment for port use

Units of equipment should be distributed as follows.

Table 7-3-7 Required Number of VHF Units

	VHF Unit	Remarks
Enterprise I	6	Office:1, Foreman:1, Crane Opc:1, Yard:1, Mainte.:1 Checker:1
Enterprise II	6	Same as above
Total	12	

Cost of VHF Units: 12x0.00025 = 0.003 million US$

(4) Pallet

Palletization is very effective way to improve the productivity of general cargo handling. At present, transportation of general cargoes is carried out manually due to the lacks of pallets and lacks of fork-lift trucks. Pallet can play a great part in cargo handling work for their prices and enough number of pallets should be prepared. The required number of pallets are calculated as follows:

Area of warehouse : 5,000 square meter
Use rate of area : 60 %
Unit area per pallet : 1.0mx1.3m=1.3 sq. meter
Average stocking : 2.5
Required number : 3,000/1.3 x 2.5 = 5,769 units

Total number of required pallets for Enterprise I and Enterprize II will be double that calculated above.

Total pallets :11,538 units

Price of pallet :70$(US)x11,538= 0.8 million $(US)

(5) Summary of Prices for Equipment

Table 7-3-8 Summary of Equipment Cost Unit: Million US$

Type of Equipment	Amount	Remarks
Fork-lift Truck	1.10	General Cargo, Container
Truck	3.26	Steel Products, Bagged Cargo
Tractor & Tractor H.	1.90	Steel Products
Bulldozer	0.48	Bulk Cargo
V H F Unit	0.003	For Communication
Pallet	0.8	General Cargo
Total	7.5	

(6) Electric power sub station

1) Present situation

The electric power for jib cranes, lights for yards and warehouses, etc. is supplied from 5 electric sub stations. The main specifications of electricity are as follows:

The present sub station and junction boxes on the quay sides are shown in fig. 7-3-1.

The capacities of transformers in the sub stations are as follows:

Voltage of input power : 6.6 KV
Frequency : 50 Hz
Voltage of jib crane : 380 V
Voltage of lights : 220 V
Power of jib cranes -
5 ton jib crane : 80 KW
10 ton jib crane : 100 KW to 120 KW
16 ton jib crane : 120 KW

The present sub station and junction boxes on the quay sides are shown in Fig. 7-3-1

The capacities of transformers in the sub stations are as follows:

No.1 through No.3 :630 KVA
No.4 :560 KVA
No.5 :320 KVA

The cables of output from the sub stations are connected with each other in order to supply the necessary electricity in case of power failure on one circuit line.

The dates of purchases of sub stations are 1975 and 1978 for sub stations No.1 and No.2, and 1961 to 1968 for sub stations No.3 and No.5. All equipment in the sub stations and cables were made by the USSR and seem to required replacement.

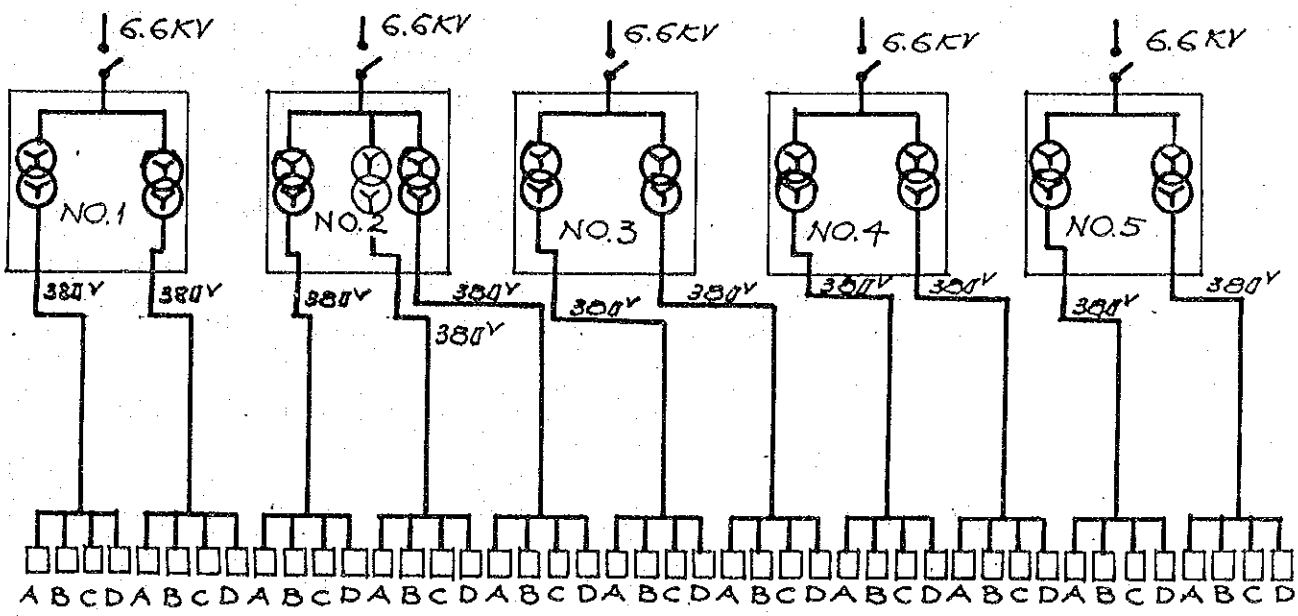


Fig. 7-3-1 Electric Power Sub Station

2) Improvement plan of electric power sub station

(a) Electric power sub station for container terminal

Sub station No.1 is located in the yard of berth No.2 and this must be transferred to the backward of C.F.S. when berth No.1 to berth No.3 are used for container berths. As the equipment in sub station No.1 is very old,new sub station equipped with necessary electric apparatus should be prepared for container terminal. The junction boxes presently used for jib cranes and set at the land side should be set on the sea side when the gantry cranes for container are set on the same terminal because electric cables must be protected from the passing of chassis.

a) Necessary power

1) Gantry crane

Gantry crane needs power for hoisting,traveling and transversing. However, power for these purposes are supplied by the transformers equipped on the gantry crane. Therefore the high voltage of 6.6 KV is directly supplied to the gantry crane.

2) Light for yard

Three light poles are necessary in the container yard. The number of lights is 60 units.Necessary amount of power will be as follows:

Power = P x N/ 1,000 = 990 x 60/1,000 = 59.4 (KW)

P : 990 W/unit N : Numbers of lights

Capacity of transformer : 75 KVA

3)Power for reefer container

Number of reefer containers	:20
Unit power per container	:12 KW
Capacity of power	:(12x20x0.6)/0.8 = 180 KVA
Capacity of transformer	:400 KVA

4)C.F.S

For light;	
Area of C.F.S	:500 square meters
Loading density	:3.0 W/square meter
Necessary power	:5,000 x 3.0 = 15KW
For air conditioning for office;	
Area of office	:250 square meters
Load density	:40 W/square meter
Necessary power	:250 x 0.04 = 10 KW
For air exchange for C.F.S.;	
Necessary power	:10 KW

5) Control center

For light;	
Area of office	:1,800 square meters (3 stories of 20 m x 30 m)
Load density	:33 W/square meter
Necessary power	:1,800 x 33 = 59.4 KW
For air conditioning;	
Load density	:40 W/square meter
Necessary power	:1,800 x 40 = 72.0 KW

6) Other facilities (Oiling house, container washing area, gate house, etc.)

For light;	
Necessary power	:10 KW
For apparatus;	
Necessary power	:15 KW

The necessary power for lights and for other apparatus from 4) to 6) above are as follows;

For light

C.F.S.	:15.0 KW
Control center	:59.4 KW
Others	:10.0 KW
Total	:84.4 KW

Capacity of transformer :150 KVA

For electric apparatus;

C.F.S.	:20.0 KW
Control center	:72.0 KW
Others	:15.0 KW
Total	:107.0 KW

Capacity of transformer :150 KVA

b)Outline of new electric power sub station

The general circuits in the sub station are shown in Fig. 7-3-2. The following are general points which must be considered in setting electric apparatus in Viet Nam.

1)The design of apparatus should consider the environment of Viet Nam(high temperature and high humidity).

2)The new sub station will be set o the backward of the C.F.S. and the apparatus is preferable to be set in the house.

3)The electric circuit of input line should be connected to the line of another sub station.

4)Electric power for gantry cranes will be supplied by high voltage cable lines from sub station. Transformers for this purpose in the sub station are not necessary.

5)The power for reefer containers is supplied by a transformer with capacity of 400 KVA.

6)Lights for container yard are supplied by a transformer with capacity of 75 KVA.

7)Lights for C.F.S. and control center are supplied by a transformer with capacity of 150 KVA.

8)The power for other electric apparatus such as air conditioners and others is supplied by a transformer with capacity of 150 KVA.

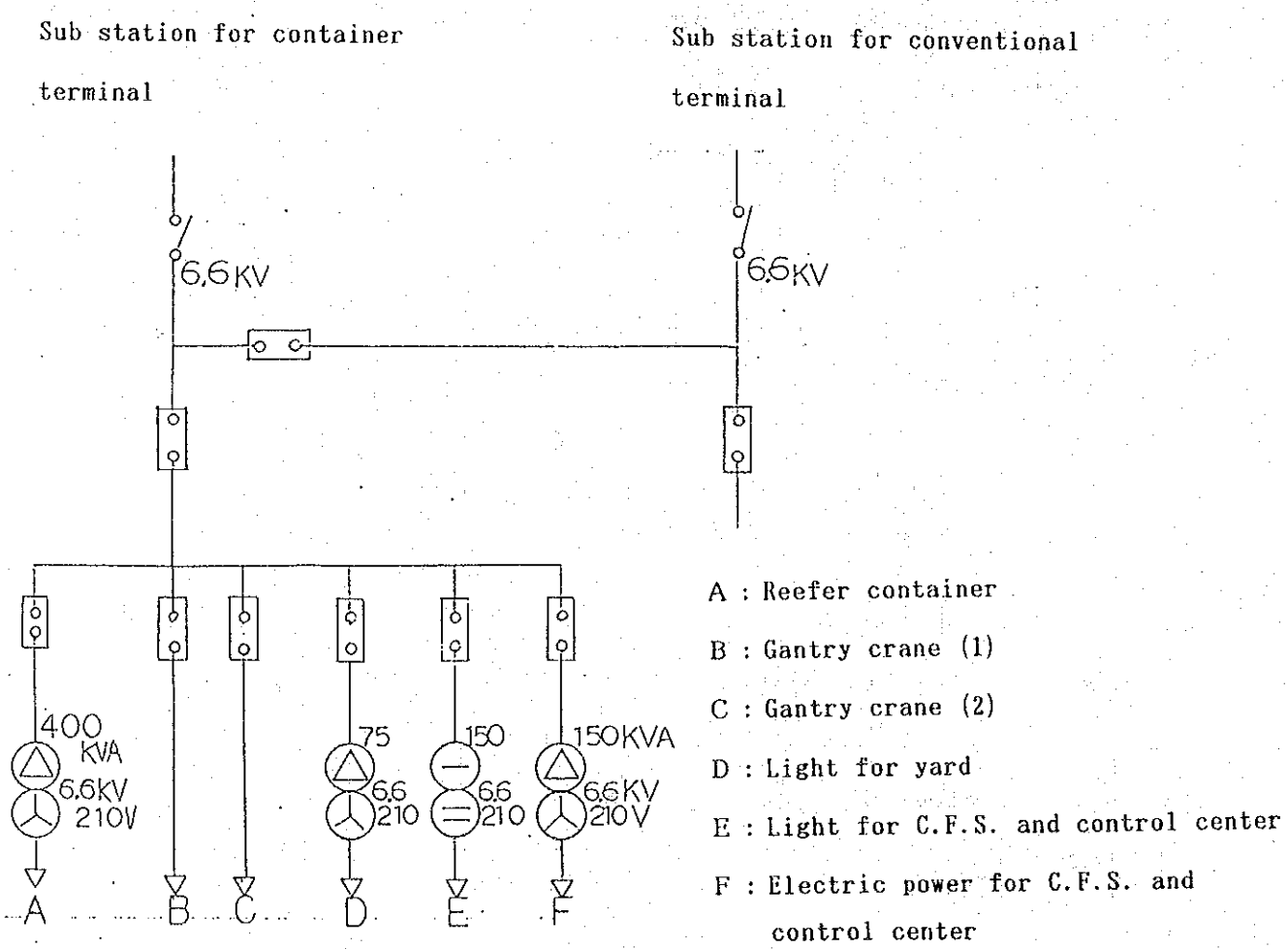


Fig. 7-3-2 Electric Circuit for Sub Station of Container Terminal

7-4 Facilities Rehabilitation Plan

(1) Container berth

As mentioned Chaptr in 2-3, containers are now mostly handled at berth No.1.Container cargo is expected to increase so it is planned that berths No.1-3 will be integrated into a specialized container wharf with expansion of marshalling yard and introducing necessary cargo handling equipment. The detailed plans are described in Chapter 8.

(2) Bulk cargo berth

Bulk cargo such as clinker,apatite is now handled at berth No.2 and No.3. When these berths are converted to container berths,bulk cargo handling shall be shifted to No.4,No.5,and No.6 berth. The open yard which is located behind No.2 and No.3 berth apron has an area of 9,980m2,on the other hand,ther is an area of 15,910m2 behind berths No.5 and No.6,and if the space behind berth No.6 is added,it becomes 20,340m2.This area is sufficient for handling the forcast bulk cargo volume.

(3) General cargo berth

General cargo including bagged cargo will be handled at berths No.7-11. Behind berths No.8-11 there are 5 transit sheds (these are mostly used as werehouses and will hereinafter be referred to as werehouses). Therefore it is no problem to keep general cargo in house.

As already mentioned in Chapter7-1-2, utilization of warehouses is now extremely low. The reason is as follows. Shippers or fowarders transport cargo directly to or from the berthing ships by truck, avoiding payment for the charge of warehouses or open yards. It causes sometimes results in idle cargo handling operation at quay side, and requires coordination between Hai Phong Port Authority and shippers or forwarders. It is necessary to reach a fundamental solution increasing cargo volume in the future.

(4) Bonded transit warehouse

As a countermeasure to the above mentioned problem, No.13 warehouse is planned to be converted to a bonded transit warehouse for quick treatment of custom clearance and smooth cargo flow between EPZ or China. This plan also includes arranging the layout plan of access road to No.13 warehouse area.

No.13 warehouse is now 6,080 m2 and it can hold approximately 100,000 tons of general cargo per year according to the calculation below.

N = RxaxwxA here: N --- handling volume per year:ton
R --- turn round per year: 10
a --- accommodation ratio usually: 0.7
w --- unit cargo volume (ton/m2): 2-3 ton/m2
A --- area of warehouse

N = 10 x 0.7 x (2-3) x 6,080 = 85,120 - 127,680 ton
Figure 7-4-1 shows the layout plan.

(5) Demolition and improvement of warehouses

In accordance with intergration of berths No.1-3 into a specialized container wharf, No.1 warehouse behind berth No.2 which has an area of 4,000 m2 will be demolished. And No.12 warehouse which has an area of 3,600 m2 will be converted to CFS (container freight station). No.2 warehouse which has an area of 4,000 m2 and No.3 warehouse which has an area of 3,704 m2 behind berth No.3 also will be demolished to enlarge the yard.

Even if these three warehouses are demolished, remaining area of the other 11 warehouses is 37,184 m2. So it is no problem the total capacity of warehouse which is calculated 0.8-1.0 million ton (in case of 12 turn round per year) for planning cargo handling volume, 1.27 million tons in the year of 1998.

(6) Road in Main Port

There are now some roads between warehouse and office buildings, however there is no clear road border between aprons, open yards and warehouses because of the comparatively vast land ara in Main Port. In the near future, that seems to be no need to distinguish the roads so a layout plan for roads is not prepared.

Although it is necessary to make green fields for improving the environmental condition, it is difficult to plan a large green field in Main Port. So it is planned to lay green fringes along main roads and buildings (actual layout shall be planned in detailed design phase.)

(7) Work vessel basin

Adjacent downstream of berth No.1 there is a small basin for work vessels, tug boats and lighters and in the land area of the basin there is a lighters' repair yard where usually 4 to 5 lighters are docked and under repair.

As berth No.1 is now only 125 m in length, in future there would be a considerable shortage of berth length if container ships (length over all is 120-130m) more than 500TEU call the port. According to Hai Phong Port Authority, berth No.1 was originally designed to be 190m length, but 65m has not yet been constructed. If there is a necessity to lengthen the berth, the existing work vessel basin should be removed.

Hai Phong Port Authority has a future plan to construct a work vessel basin on the opposite side of Cam river which is also the area planned for damping place for dredging soil.
Figure 7-4-2 shows the layout plan. This plan is appropriate, and if berth No.1 is lengthened, this plan will be adopted as part of the Rehabilitation Plan.

(8) Building except warehouse

In Main Port there are many small buildings which are likely to tell the long history of construction, but they are too scattered to be convenient from the management point of view.

Table 7-4-1 List of Buildings

Present Use of Building	Area ㎡	Plan in the Future
Power Stat.of No.1warehouse	90	Remove to New Building
Weighing Bridg No.3	100	〃
Cargo Handling Enterprise (C.H.E.)No.2 Headquater	180	〃
Administration Offfices of C.H.E. No.2	270	〃
Electric Forklift Truck Sta	1,456	〃
Rolling Stock of C.H.E.No.2	5,350	〃
Cargo Handling Gear Stock	1,200	
Canteen	120	
Operation Office C.H.E.No.2	360	
Pilot Office(inclu.Harbour Master Office)	176	
Seamen's Club	2,350	
Weighing Bridg No.2	100	
Canteen Area(inclu.Customs)	2,200	
Border Police Station	1,480	
C.H.E.No.1 Headquarter	300	
Technical Subdepartment of C.H.E.No.1	375	
Communication Building Security Department	4,500	
Weighing Bridg No.1	100	
Water Tank Area	70	
Dock Office(inclu.Construct ion Office)	4,000	
Rolling Stock of C.H.E.No.1 (inclu.Power Distribu.Sta.)	11,000	
Power Station at No.1 Berth	180	
Container yard No.1 Office	180	
Dry Dock Office	2,200	
Petroleum Station	4,000	
War Shelter(next to W.B.No.1	240	
Power Substa. at No.7 Berth	200	
Total	42,777 ㎡	New Building 6,200㎡

Hai Phong Port Autority has already planned and designed the new intensive office building near the outside area about 200m from main gate No.4. The list of existing buildings and buildings planning to be removed is as shown in Table 7-4-1.

The new intensive office building plan confirmed by JICA team from the information provided by Hai Phon Port Authority is tabulated in 7-4-2.

It is very important to raise management efficiency for the execution of the Rehabilitation Plan so that this new intensive office building plan by Hai Phong Port Authority is adopted as part of the Rehabilitation Plan.

The seamen's club building located inside the main gate is now under the control of Hai Phong City. However it is desirable that this building is relocated outside of Main Port in the interests of a unified management.

When berth No.1-3 are conveted to a specialized container wharf, it is necessary to construct a new intergrated management and operation office building, area of which is calculated as 800 m2 as shown below.

Number of staffs of container handling enterprise 147 person unit dimension 5m2/person, premium ratio 1.1 then:

147 x 5 x 1.1 = 808 m2

5m2/person is decided comparing present average figure of Hai Phong Port Authority and Japanese example.

(9) Other facilities

It is necessary to improve water supply and electricity facilities. There is a water tank tower in Main Port, but this tank is now of no use. A feasibility study on the entire water supply system in Hai Phong City has being carrid out by Hai Phong City with the assistance of Finland. This study will cover water supply system in Main Port. Thus the Main Port water supply improvement plan is not treated in this study.
However the necessary cost for the new pipe lines in the specialized container wharf is included in the study. Detailed plan will be presented in the next detailed design phase.
Water for the ships is now supplied by special water supply vessels, so there is no problem in this area.

As far as electricity is concerned, power is supplied from out side and improvement plan in Main Port is described in Chapter 7-3.

(10) Tug boat

Hai Phong Port Authority now has 20 tug boats and 32 lighters. However, the 20 tub boats are all small and old. When ships are berthing, dispatching and turning, it is necessary to assist them using a large tug boat with 1,000 horse power. Thus it is planned to procure four 1,000 horse power tug boats, two for use in Main Port, the others in Chua Ve.

Table 7-4-2 Plan for New Office Building

Land Area Building Space Total Space	4,500 ㎡ 1,800 ㎡ ×4 Stories(including courtyard) 6,200 ㎡	
Ground Floor First Floor Second Floor Third Floor Forth Floor	Reception, Administration, Accounting, Commercial Dpt. Guest Room, Canteen, Kitchen, Strage, Wash Room, Closet. Labour, Salary, Secretary Dpt. Director, Vice Director Foreign Guest, Accommodation, Sanitary, Rest, Room. Vice Director, Guest, Servant, Conference, Room. Communist Party, Port Union, Room. Personal, Plannig, Civil, Engineering, Investigation Dpt. Designing, Drawing, Painting, Room. Photo Laboratory. Technical, Security Dpt. Computer, Conference, Room. Library, Recreation, Club, Room.	
Cost	Building Air Condi., Elec. Power, Water Supp. etc	6.5 Bill. Don 10.5 Bill. Don

7-5 Plan for Main Port

As results of the study, berth use plan, bonded transit warehouse layout plan and work vessel basin plan are shown in Figure 7-5-1, 7-5-2 and 7-5-3 respectively.

As shown in Figure 2-3-1, there are so many facilities and buildings in the area of Main Port that it is not realistic to relocate all facilities at the same time. It is most essential to raise productivity of cargo handling by integrating container berth and specializing berth for each handling commodity as shown in this plan.

The purpose of this study is to examine whether this plan is feasible or not, so that the detailed layout plan shall be drawn in the next phase. However container slot plans are made comparing suitable systems for the marshalling yard. These plans are shown in Chapter 8.

Figure 7-5-1 shows berth use plan. Figure 7-5-2 shows bonded transit warehouse layout plan. The plan consists of converting No.13 warehouse to a bonded transit warehouse, constructing a new gte and road and reducing the existing motor pool area. Figure 7-5-3 shows work vessel basin and damping place for dredging soil on the opposite side of Cam river in case of lengthening berth No.1.

Fig. 7 – 5 – 1 **BERTH USE PLAN**

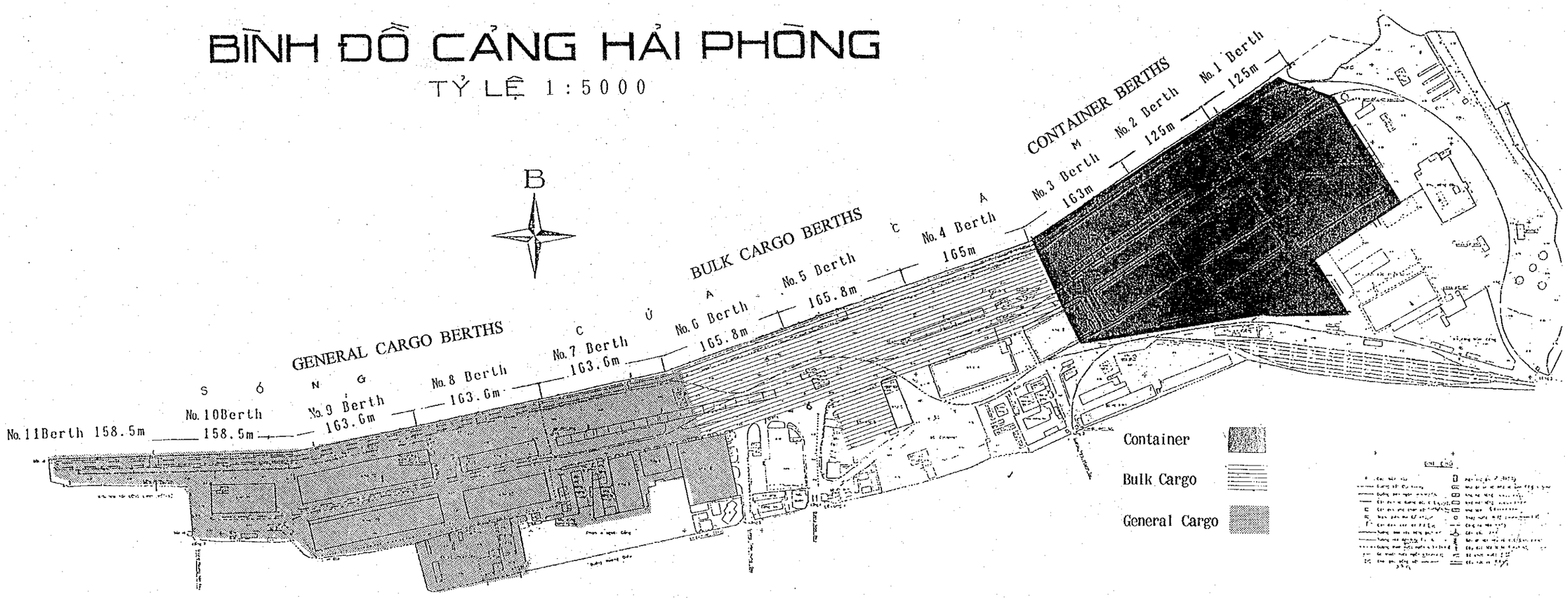
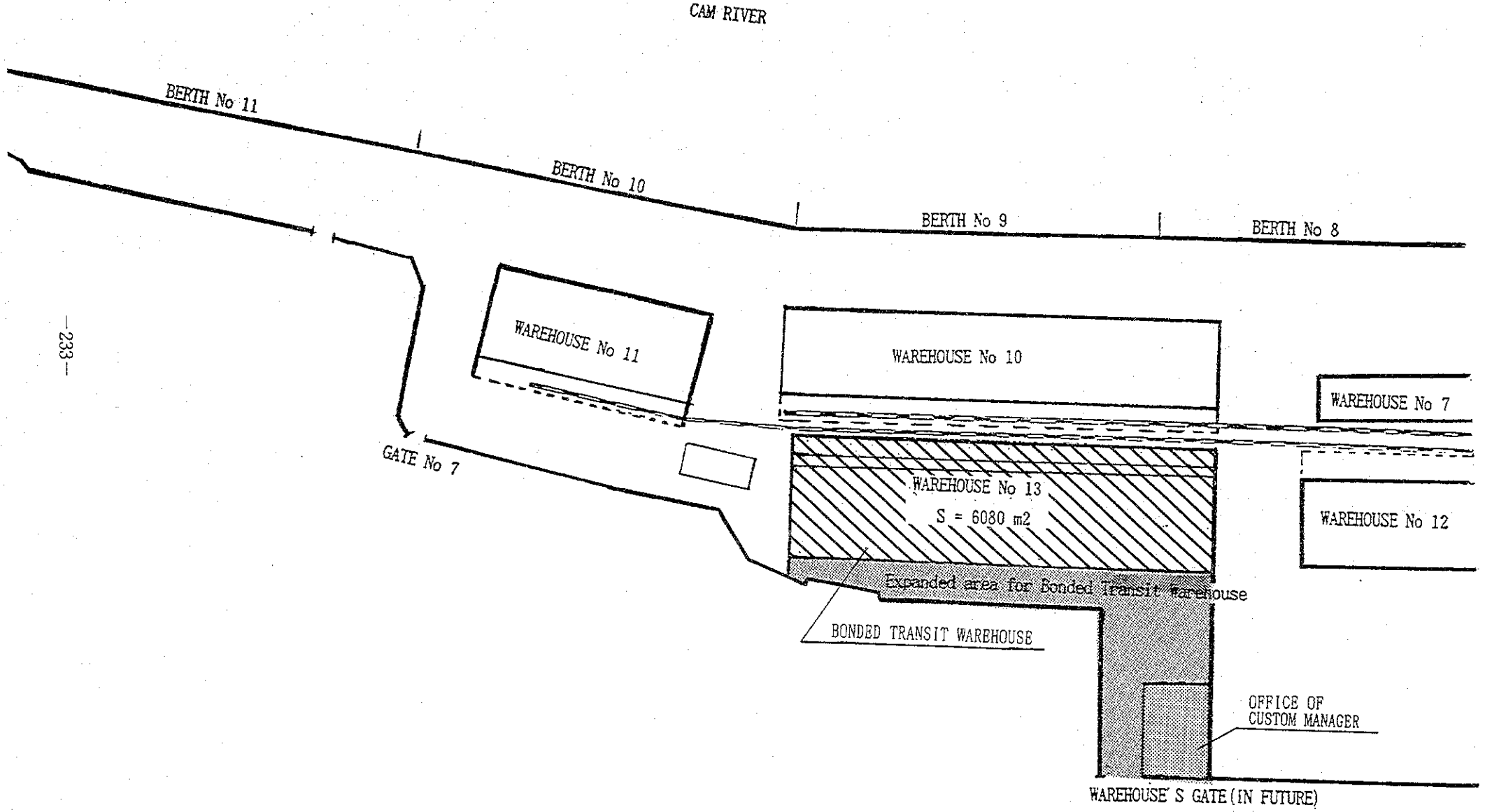


Fig. 7 – 5 – 2 **PLAN OF BONDED TRANSIT WAREHOUSE AT HAIPHONG PORT**



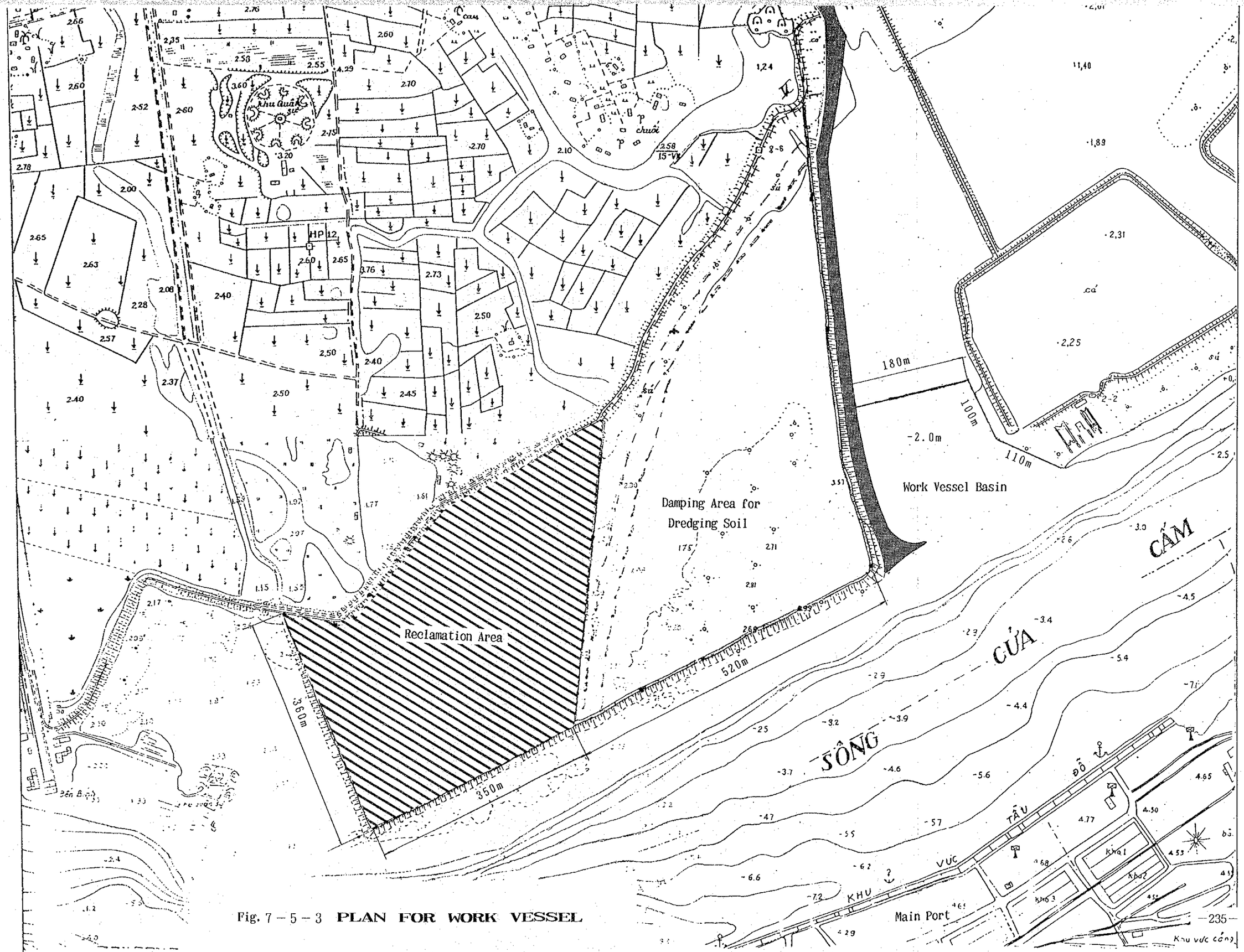


Fig. 7 – 5 – 3 **PLAN FOR WORK VESSEL**

Chapter 8 Container Terminal Improvement Plan

Chapter 8 Container Terminal Improvement Plan

8-1 Container Traffic Characteristics in Hai Phong Port

Container cargo in Hai Phong Port is handled at Berth No.1 and Berth No.7 in Main Port and also in Chua Ve Container Port. The container shipment in both ports was 18,556 TEU in 1990, 19,127 TEU in 1991, 34,111 TEU in 1992 and is expected to reach 49,800 TEU in 1993. The container cargo experienced a higher growth, compared to conventional cargo, posting an annual average growth rate of about 38% for the past three years.

The container shipment in Berth No.1 of Main Port is operated by GEMANTRAN which is a joint venture company between Vietnam and France. As of July 1993, GEMANTRAN allocates one container ship named "TRICOR SON" on a 9 day trip from Hai Phong via Hong Kong / Taiwan and back to Hai Phong. She is provided with container handling crane and can carry 189 TEU containers. In Berth No.7, the Korean shipping line "H-A LINE" handles container cargo. Most of H-A Line ships are provided with ship crane.

In Chua Ve Port, Three(3) shipping companies are now in operation; EAC (MAERSK LINE), CIS and SGA. EAC operates container service, covering two sea routes, one is Hai phong - Hong Kong - Taiwan - Hai Phong and the other is Hai Phong - Saigon - Singapore - Hai Phong. Major container fleet on three routes is composed of 256 TEU - 414 TEU vessels and the schedule of container ships is tightly woven so as to carry a lesser number of empty containers. In recent years, ratio of empty containers has been gradually surging.

Table 8-1-1 Summary of Total Container Cargo Volume (1990-1993)

Origin	Place	Units	1990	1991	1992	1993 Jan-Jun
Import	Main port No. 1	Stuffed TEU	463	1930	3832	2514
		Empty TEU	79	179	180	1
		Tons	5843	20777	36837	21999
	Main port No. 7	Stuffed TEU	0	668	2891	3211
		Empty TEU	0	0	57	43
		Tons	0	7840	25496	29366
	Chua Ve	Stuffed TEU	8445	6354	9785	7227
		Empty TEU	105	76	89	813
		Tons	90849	66756	102040	76119
	Total Import	Stuffed TEU	8908	8952	16508	12952
		Empty TEU	184	255	326	857
		Total TEU	9092	9207	16834	13809
		Tons	96692	95373	164373	127484
Export	Main port No. 1	Stuffed TEU	268	1374	3341	1866
		Empty TEU	26	735	970	1203
		Tons	3343	16007	33727	18673
	Main port No. 7	Stuffed TEU	0	176	459	621
		Empty TEU	0	39	2141	1241
		Tons	0	2047	8269	8021
	Chua Ve	Stuffed TEU	8015	3887	5159	2774
		Empty TEU	1155	3709	5207	3404
		Tons	67773	45580	67234	50008
	Total Export	Stuffed TEU	8283	5437	8959	5261
		Empty TEU	1181	4483	8318	5848
		Total TEU	9464	9920	17277	11109
		Tons	71116	63634	109230	76702
Total		Stuffed TEU	17191	14389	25467	18213
		Empty TEU	1365	4738	8644	6705
		Total TEU	18556	19127	34111	24918
		Tons	167808	159007	273603	204186

Source: Hai Phong Port

8-2 Container Terminal Characteristics

8-2-1 Berth No.1 (Main Port)

Berth No.1 has a 17,000m^2 marshalling yard inshore of the 40m wide open storage yard that is located immediately behind the apron. Most 40 foot import/export containers are stacked maximum two (2) tiers in the open storage yard (This yard also functions as marshalling yard). 20 foot containers, mostly stuffed, are stacked in the marshalling yard, handled by folk-lift trucks and top lifters.

Significant amount of empty containers, both 20 and 40 footers, are stacked, surrounding the 20 footer use marshalling yard, two(2) tiers and five to six rows, face to face.

The share of empty container is as high as 30-40%, which is mainly attributed to an imbalance of foreign trade. Import cargo far exceeds export cargo, resulting in increase of empty containers. Another reason is that a comparatively low stowing charge for empty containers attracts shipping companies, gathering empty container idling in many container terminals in South Asia, including Singapore, Hong Kong and Korea. Huge amount of empty container boxes belonging to the shipping lines are tentatively stocked in the open space in and around Berth No.1.

The recent port statistics shows that 8,269 TEU of containers were handled in 1992 and that figure is expected to reach 11,168 TEU in 1993, almost up 35% over 1992. Due to the high volume of empty containers, both short-stayers and long-stayers, say more than 3-4 months, the container yard is so congested that some of the containers are overflowing into the backside of Berth No.2. To cope with this growing yard demand, the backyard behind the marshalling yard is now being renovated to serve as additional marshalling space.

No.1 Berth handles container by use of ship's gear, with an average productivity of 10 TEU per hour. The marshalling operation is carried out mainly by folk-lift truck and top-lifters, and transport between the yard and quayside is conducted by trucks and low-body trailers.

The dwelling times are 9-10 days for export and 20 days for import, while empty container seem to be stowed more than 1 to 2 months. It is also noteworthy that 40 foot containers have recently been increasing.

8-2-2 Berth No.7 (Main Port)

Berth No.7 has a marshalling yard of about 10,000m^2, which is located close to the apron and small in space. As a result, many containers overflow into neighboring Berth No.6 as well as partly into Berth No.8, so that the actual yard space used for the container storage at Berth No.7 would be more than 15,000m^2.

The containers, after being unloaded by quayside jib crane or ship's crane, are stacked in the marshalling yard. Some

containers are stacked by quayside crane near the apron and once again rehandled by two(2) yard cranes and restacked into the shoreside marshalling yard that is located behind the yard jib cranes. Marking full use of jib cranes, both at the quayside and at the marshalling yard, containers are closely stacked in three tiers, leaving little space for yard truck to pass through.

According to the operational manager posted at the yard, about 700 units of containers, as of July 1993, are being stowed in the marshalling yard. The empty boxes are on the rise as experienced in Berth No.1. A lot of empty containers are stowed for a long time, most of them located closer to Berth No.6 or Berth No.8.

Recent port statistics show that the container shipment in 1992 was 5,548 TEU, and that figure is expected to reach 10,232 TEU in 1993, which is almost 1.8 times larger than 1992's shipment.

8-2-3 Chua Ve Port

Chua Ve Port has a 25,000m^2 container yard, larger than that at container berths of Main Port, and slot plans in the container terminal are comparatively well aligned. On the pier operate two 40 ton level luffing jib cranes. The field survey by the Study Team reveals that each crane handles 17-18 container per hour. This terminal capacity is much greater than the main port's. The slot arrangement in the marshalling yard seems comparatively well set out, though very tight in spacing. Most 40 foot containers are stowed in four tiers just behind the quaywall because 40 foot containers can be only handled by jib cranes. 20 foot containers are handled by mobil cranes and stowed in two tiers at maximum. The container handling by mobile cranes and jib cranes produces a very high stowing capacity in the yard, while space between each module is narrow, making it difficult for trucks to pass through during the time container handling is executed by mobil cranes. It is judged this kind of tight operation will hinder the container handling capacity in future.

The container unloading/loading along the quayside seems very high, causing a significant imbalance between quayside operation and marshalling yard operation. The past statistics logged the container shipment through Chua Ve Port at 20,240 TEU in 1992 and the 1993 figure is projected at 28,436 TEU based on records of the first four months of 1993.

8-3 Container Terminal Capacity

8-3-1 Berth No.1 (Main Port)

The container handling capacity of the terminal, as a whole, is governed by the smaller of the two, either stowing capacity of marshalling yard or container unloading/loading capacity at quayside. Both capacities have been assessed for Berth No.1. The container handling at Berth No.1 is carried out by ship's

gear with the following production rate.

$$10^{TEU/hour} \times 2^{dericks} \times 0.75 \times 15^{hours/day} \times 322^{days/year} \times 0.4 = 28,980^{TEU/year}$$

With 3 shift operation, 28,980 TEU would be practically maximum as calculated above. In the meantime, the annual marshalling capacity in the yard, on the basis of 30 turnaround a year (present practice) and current stowing capacity of 630 TEU, can be calculated at 19,000 TEU, which is far less than quayside productivity. Berth No.1's container handling capacity, therefore, is being controlled by the marshalling yard capacity.

8-3-2 Berth No.7 (Main Port)

The same analysis on terminal capacity has been made for Berth No.7, where both ship's gear and quayside crane operate to handle container shipment. The field survey indicates that the productivity of ship's gear and of quayside crane is 7 TEU per hour and 9-10 TEU per hour respectively. Applying integrated capacity of 16 TEU/hour (using two gears at a time), the annual berth capacity can be estimated at 23,184 TEU.

$$16^{TEU/hour} \times 0.75 \times 15^{hours/day} \times 322^{day} \times 0.4 = 23,184^{TEU/year}$$

The marshalling yard capacity can be calculated at 15,400 TEU/year on the condition that containers are stored 20 days on an average and the stowing capacity of the yard is about 700 TEU. The quayside capacity surpasses the marshalling yard capacity, so that the terminal capacity, as whole, turns out to be 15,400 TEU/year.

8-3-3 Chua Ve Port

The quayside capacity of Chua Ve Port can be estimated at 73,900 TEU per year

$$17^{TEU/hour} \times 2^{cranes} \times 0.9 \times 15^{hours/day} \times 322^{day} \times 0.5 = 73,900^{TEU/year}$$

The marshalling capacity, in the meantime, is calculated at 31,750 TEU/year on the basis of stowing capacity (1,290TEU) and annual turnaround of 25 times.

8-4 Container Terminal Improvement Plan

8-4-1 Premise for Improvement Plan

The target year for the urgent rehabilitation works for Hai Phong Port has been set at 1998 and the traffic demand of container cargo in 1998 has been projected at 150,000 TEU (see chapter 4-2-7). The existing total terminal capacity of Main Port and Chua Ve Port has been estimated at 66,000 TEU, thus requiring urgent expansion of container terminal.

Once the existing berths (No.1, No.2 and No.3) in Main Port are redeveloped into one integrated container terminal, the

marshalling yard would be enlarged to 80,000m^2. Chua Ve Port's yard would be also expanded for a total marshalling space of 77,000m^2. Both terminals will become almost equal in terms of yard space. As such, it has been planned that the future container traffic would be evenly distributed among the two terminals, Main Port Terminal (50%) and Chua Ve Terminal (50%), each would be responsible for 75,000 TEU per year.

8-4-2 Container Marshalling System

The marshaling system in Hai Phong Port varies terminal by terminal. Berth No.1 in Main Port employs folk-lift/top-lifter system, Berth No.7 jib cranes system and Chua Ve Port mobile crane system. At present, the traffic volume of container cargo seems rather small. Even Chua Ve Port, the largest container terminal in Hai Phong Port, handles only 25,000 TEU containers a year. This volume of container traffic is still manageable by use of mobile cranes.

However, it is impractical to handle the planned 75,000 TEU containers per year using the same conventional system. More efficient container handling system shall be introduced. In planning the container terminal, particularly in Hai Phong Port, a somewhat long-term development scheme should be established.

In terms of quayside capacity, Chua Ve Port has about 74,000 TEU/year and Berth No.1 (Main Port) almost 30,000 TEU/year. Assuming that Berth No.2 and Berth No.3 receive the container ships in the same patterns as experienced in Berth No.1, the berth capacity in a new container terminal of Main Port will triple to 90,000 TEU per year, which will exceed the target capacity of 75,000 TEU. Thus, for the urgent rehabilitation works, upgrading the berth capacity is of no priority. If some container shipping companies show a strong interest in allocating gearless container ships to Hai Phong Port, a more careful economic analysis will be necessary, including installation of new container gantry cranes along the quayside. (According to the shipping company using Hai Phong Port, gearless ship will save about 500US$ a day in the class of 200-300 TEU vessels). This still costly investment shall be carefully considered in view of port sales policy of the Hai Phong Port.

There are several container handling system now employed around the world. Among them, most popular are folk-lift-truck system (F/L), transfer crane system (T/C) and straddle carrier system (S/C). All of them have some merits and demerits in terms of their performance and economy. Selection between T/C and S/C is always a controversial subject. Generally speaking, S/C system prevails over T/C system in terms of capital investment and flexibility of operation, while T/C system is more advantageous in view of stowing capacity, operation cost, required skill of workers and pavement cost for marshalling yard. More thorough study would be essential on the choice of equipment in Hai Phong Port. In our study, T/C system has been selected mainly due to low operation cost and higher stowing capacity and has been compared with F/L system that is currently used in Hai Phong Port.

The slot plans for T/C and F/L have been prepared for Main Port and Chua Ve Port (See 8-4-1 to 8-4-4). In T/C system, six plus one in lane and three over one in lift has been employed.

In Chua Ve Port, T/C system will be able to secure 1,656 TEU ground slots and F/L system 1,135 TEU. On the basis of these slot plans, the annual terminal capacity has been estimated as below.

Table 8-4-1 Annual Container Handling Capacity by System

	F/L System (F/L)	T/C System (T/C)
Ground Slots	1,135	1,656
Average Tiers	1.75	2.25
Stowing Capacity(TEU)	1,988	3,726
Annual Handling Capacity(TEU)		
Turnround 20	39,760	74,520
25	49,700	93,150
30	59,640	
35	69,850	
40	79,520	

EAC (MAERSK LINE), the main terminal user in Chua Ve Port, envisions that weekly container service can be maintained. Assuming that the maximum dwelling days at the yard are 10.5 days, 14 days and 21 days, the annual turnaround works out to be 39.5, 33.2 and 25.2. At present, the dwelling time in Chua Ve Port ranges from 14 to 21 days, mainly affected by high ratio of empty containers that are stowed in the yard for a long time. If this slow turnaround continues in future, the application of T/C system will be practically impossible. In case of F/L system, 40 times of annual turnaround could be translated into 79,520 TEU of handling capacity, though this extremely high cargo handling would not be a realistic figure in the near future.

In the mean time, T/C system will easily clear the goal of 75,000 TEU/year in 20 times a year pace. Even if the traffic demand surges another 50%, 30 times turnaround would be able to handle a traffic increase of 50%. In the short and long-term plan, therefore, T/C system is superior to F/L system.

For reference, the required capital cost for T/C system and F/L system in Chua Ve Port have been tabulated in Table 8-4-2.

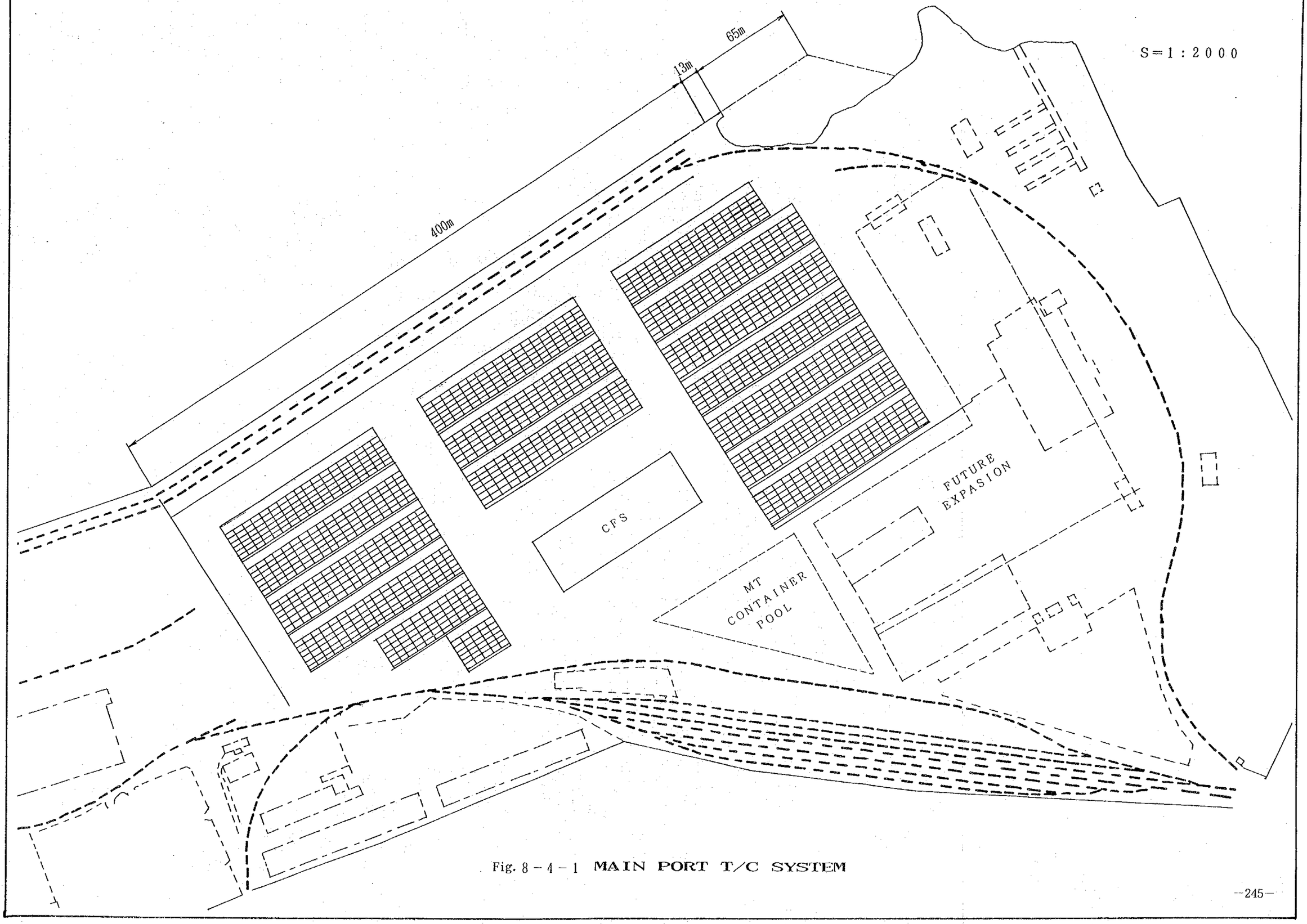


Fig. 8－4－1 MAIN PORT T/C SYSTEM

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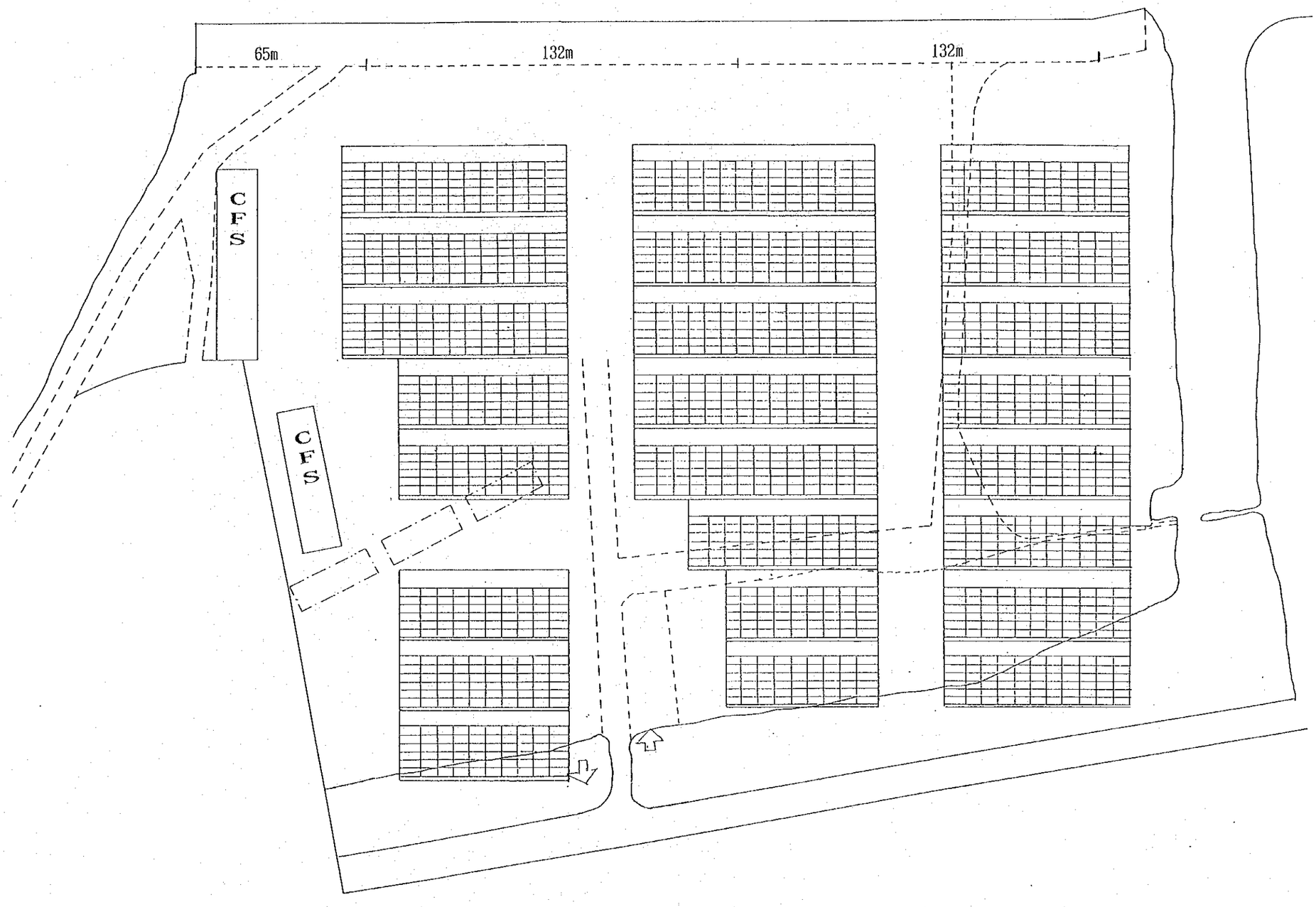

Fig. 8－4－2 CHUAVE PORT T/C SYSTEM

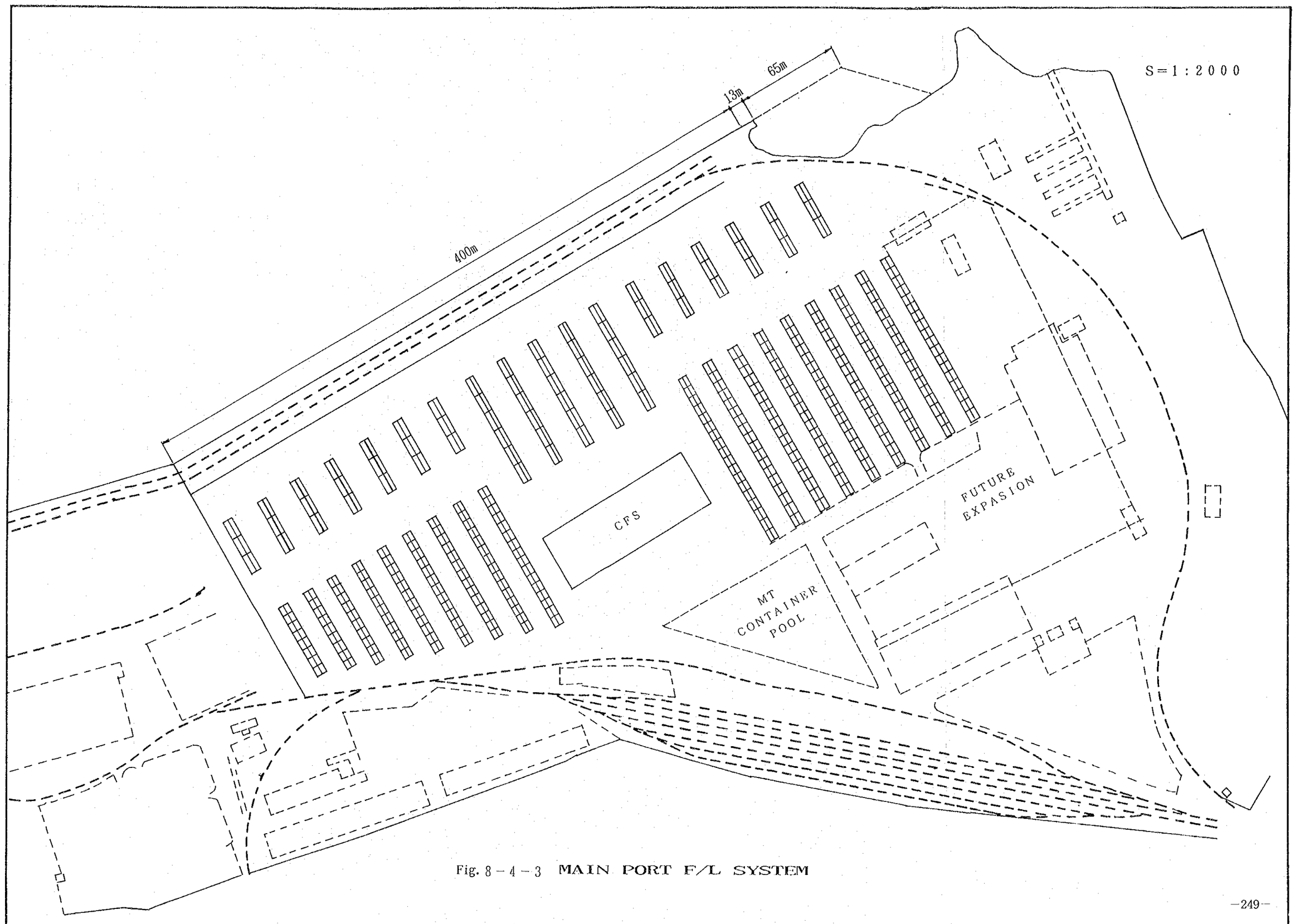

Fig. 8－4－3 MAIN PORT F/L SYSTEM

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Fig. 8－4－4 CHUAVE PORT F/L SYSTEM

Table 8-4-2 Required Equipment for T/C and F/L System

	F/L System	T/C System
Wharf Crane	40Ton Jib× 2	40Ton Jib× 2
Transfer Crane	—	5 (8.5)
Top Lifter	10 (5.0)	—
Yard Chassis	10 (0.3)	10 (0.3)
Tractor	10 (0.9)	10 (0.9)
(Total Investment)	(6.2)	(9.7)

( ) Amount of Investment in Mil. US$

The above table suggests that the investment cost of T/C system is about 3.5 million US$ higher than F/L system. In addition to this capital cost, operation and maintenance costs should be also considered. Furthermore, F/L system will require heavy-duty pavement, which is very costly in Chua Ve Port, where very poor subsoil exists in the newly expanded marshalling yard. This fact also favors T/C system. (The discussion above has been on a very preliminary study during our survey period; more in depth study in the successive stage is required.)

In the rehabilitation plan, CFS operation has been positively taken into account and the following basic equipment has been considered.

Top-lifter (25 ton)	2
Chassis	6
Folk-lift Trucks (3 ton)	3
Folk-lift Trucks (3 ton)	2

In addition, one reach-stacker has been proposed mainly to handle empty container. Full set of T/C system, including CFS equipment is tabulated in Table 8-4-3.

Table 8-4-3 Equipment List of T/C System

Equipment	Specification	Required Nos.	Cost (Mil.US$)
T/C (RTG)	6 plus 1 3 over 1	5	8.5
Yard Chassis		10	0.3
Yard Tractor		10	0.9
Top-lifter	25ton	2	0.6
CFS Chassis		6	0.18
Folk Lift Trucks	3ton	3	0.09
Folk Lift Trucks	2ton	2	0.08
Reach Stacker		1	0.4
		39	11.05

For Main Port, a similar analysis has been made. On that basis, the marshalling yard plans have been prepared as shown in Fig.8-4-1 and Fig.8-4-2. As a result, it has been preliminarily concluded that the same equipment fleet will be required for the new container terminal in Main Port. More consideration, in the stage of implementation, would be mandatory for the replacement of existing yard equipment operated by GEMATRAN, which uses several folk-lift trucks and top-lifters.

8-4-3 Improvement Plan of Civil and Building Facilities

(1) Main Port

The improvement works of container terminal in Main Port will cover the existing container Berth No.1 as well as Berth No.2/Berth No.3. In this connection, the existing container yard will be upgraded and expanded as shown in Fig.8-4-1, resulting in a total marshalling yard of 76,000m^2.

This yard expansion will entail the demolition of the existing transit sheds No.1, No.2 and No.3, and also require relocation of power substation and utilities like water and drainage. In addition, yard lighting, reefer facilities and terminal operation building will be included in the work component of Main Port Improvement Plan.

(2) Chua Ve Port

In connection with the container terminal expansion of Chua Ve Port, the existing container yard (25,000m^2) will be upgraded and another marshalling yard (52,000m^2) will be constructed close by. In addition, the port road will be also improved. The upstream section of 66m, as stated in 3-2-2, will require reinforcement works to allow container crane movement. CFS facilities and weighing system will be also needed.

Chapter 9 Implementation Plan

Chapter 9 Implementation Plan

9-1 Determination of priority of the Rehabilitation

The entire Urgent Rehabilitation Plan proposed in the previous chapters is summarized in Table 9-1-1, which as a reference includes the planned figures which the Vietnamese Government has worked out. Section 5-4 basically explains that the extension of berth is to be examined in Main Port Area and Chua Ve Port Area considering their cargo handling volume and capacities.

However, it is concluded that extending the berth by 300 meters and improving the backyard of 60,000 m2 are not necessary within target years. Moreover, although 65 meter extension at berth No.1 in Main Port Area is fundamentally designed, it is considered that the extension is not in the first priority until the target year, from the view point of the length of container vessels and the volume of handling containers. Consequently, the idea in which the basin is transplanted to the other side of the river will be postponed.

As explained in Section 5-4, the water supply plan of Main Port Area is presently well-considered; therefore, the improvement of the present system can be put off except improving the berth itself.

As for tugboats, four 1,000 HP boats are first planned, and two of them are introduced by target year.

As for constructing a new office, shifting the business office is mainly for the administration department and from the viewpoint of cost-minimization compared with constructing a new building to manage cargo handling, that construction shall be postponed until the next plan.

On the other hand, since the replacement and reinforcement of cargo handling equipment enables efficiency of handling cargo to be improved and earnings in a port to be increased, this improvement is one of the most urgent actions. As considered previously, pallets, which are cost effective, shoul be introduced as soon as possible. As explained in Section 9-4, in 1994 detail design and present bid are planned, though the actual construction is not started within that year. However, in this project, acquisition of cargo handling equipment includes replacement of present superannuated machines, and they can be selected before checking the entire improvement plan. Therefore, it is desired that the acquisition is made within 1994 in order to enhance the investment efficiency.

The priority list for various rehabilitation items is explained in Table 9-1-2 and its content was put on the negotiation table between the Vietnamese Government and the Study Team. As shown in the middle column of the table, the priority is evaluated by the Study Team in terms of A or B, which is also confirmed by the Vietnamese Government. Consequently, based on the projects ranked as A, the detail implementation plan is examined in the following manner.

Table 9-1-1. Summary of Rehabilitation Plan

	Rehabilitation Plan	Vietnamese Side Plan
1. Target Year	1994 - 1998	Phase I 1994 - 1995 Phase II 1996 - 2000 Phase III 2001 -
2. Forecast of Handling Cargo	Year 1994 1998 2000 Export 630 1,050 1,653 Import 1,144 1,485 1,712 Domestic 1,314 2,152 2,407 TOTAL 3,088 4,687 5,772 Container (TEU) 74,000 154,000 199,000 Increasing cargo volume in trade with China is not included, but is considered as an extra element. The planned volume is 4.7 million ton and 150 thousand TEU in 1988.	Year 1994 1998 2000 Export 1,100 1,550 2,200 Import 1,400 1,600 2,500 Domestic 1,500 1,850 2,300 TOTAL 4,000 5,000 7,000 Container (TEU)= 40% of total cargo volume = Container Volume / 10 ton 7,000 * 0.4 / 10 = 280,000 TEU (by 2000)
3. Dredging Plan	Water Depth is decided as -6m. Vessels of 10,000DWT can enter in accordance with tidal operation. Dredging vessels for maintenance shall be examined at detail stage. Dredging -5.0 m Initial 1.0 mil m3 Maint. (1yr) 3.5 mil m3 -6.0 m 3.7 6.1 -7.0 m 7.6 8.2 Turning Basin -6.0 m 0.9 0.2 Thu $ Dredging -6.0 m 10.9 mil m3 51,572 Dikes 6 Nos. 3,300 Dredging Vessels 3,000 m3 cap. 15,000 Dredging management system 1,500 Survey 1,500 TOTAL 72,872 Alignment change is determined according to another detailed survey. Sand groins and dikes are requisite.	1st. Phase Water Depth -7 m Target Vessel Type 10,000DWT, Draft 8.3 m Survey & Design 500 thu$ Dikes 6 Nos. 3,300 thu$ Dredging 5.0 mil m3 6,000 thu$ Dredging Vessels 15,000 thu$ (3,500 m3 capacity) TOTAL 24,800 The alignment of Nam Trieu Access Channel is to be altered.

Table 9-1-1. Summary of Rehabilitation Plan (Con't)

	Rehabilitation Plan	Vietnamese Side Plan
4. Plan at Chua Ve Area	Present 2 Berths 264 m, Yard 25,000 m2 — Plan 2 Berths 264 m, New Yard 52,000 m2 Although additional berth is examined, the cargo volume in 1998 can be handled by the extension of Yard behind the present berth. Present Yard and handling equipment are also improved. New Yard 5,200 m2 — 2,080 thu$ Improv. Yard 2,500 m2 — 500 thu$ Equipment Transfer Crane35-45t: Nos. 5, thu $ 8,500 Yard Chassis: 10, 300 Yard Tractor: 10, 900 Top Lifter 25t-35t: 2, 600 CFS Chassis: 6, 180 Forklift 2t-3t: 5, 170 Reach Stacker: 1, 400 sub TOTAL 11,050 New Berth Plan The new birth will be introduced considering the situation until 1998, but presently it is not on the priority list. However, reinforcement of present berth and new CFS, roads, and pavement are planned. thu$ Reinforcement of Berth 66 m 3,300 Improvement of Road 1Ls 200 Construction of CFS 1Ls 800 Weighing System 1Ls 400 sub TOTAL 4,700 2 Tugboats for Berthing Tug Boat 1,000 HP 2 Nos. 4,000 TOTAL 22,330	Present 2 Berths 264 m, Yard 25,000 m2 — Plan 3 Berths 564 m, New Yard 135,000 m2 Improvement of present berth (1st. Phase) Improvement of Yard and handling equipment is planned. Yard 25,000 m2 - 75,000 m2, Av. 50,000 m2 = 1,000 thu$ Equipment Present / Plan / thu$ Quay Crane 4 / 0 / 0 Mobile Cran 4 / 1 / 1,070 Forklift 1 / 5 / 100 Trucks 5 / 5 / 205 Tracterhead / 3 / 330 Chassis 40' / 2 / 60 20' / 5 / 100 Phase I TOTAL 2,865 New Berth Plan (2nd. Phase) Construction Nos. thu$ Berth 300*1 7,500 Yard 60,000 Equipment Gantry Crane 30t 3 15,600 Transfer Crane 3 3,210 Forklift 2t 5 100 Tug Boat 1000 HP 2 3,000 Phase II TOTAL 29,410 TOTAL 32,275

Table 9-1-1. Summary of Rehabilitation Plan (Con't)

	Rehabilitation Plan	Vietnamese Side Plan
5. Rehabilitation Plan of Main Port Area	No. 1 - No. 3 berths are set specifically for container berths. Expansion of Yard and necessary handling equipment such as Transfer Crane are introduced. CFS is improved and the introduction of quaywall crane is postponed. General handling equipment on berths is improved. General Plan Plan Container 3 berths Others 8 berths Warehouse 10 Yard Pavement 76,000 m2 Main Port Area Plan 65m extension of quaywall and quay crane are improved. Equipment / Plan / thu$ Top Lifter 25 - 30t: 2 / 600 Tracterhead: 10 / 300 Chassis: 10 / 900 Forklift: 5 / 170 Transfer Crane: 5 / 8,500 CFS Chassis: 6 / 180 Reach Chassis: 1 / 400 Yard Pavement: 76,000 m2 / 1,520 Sub TOTAL: 12,570 Electric Power Supply: 1 / 1,700 Light: 4 / 1,252 Reefer: 20 / 70 Sub TOTAL: 3,022 Warehouse Demolition: 3 / 400 Operation Office: 1 / 600 Tug Boat 1,000 HP: 2 / 4,000 Sub TOTAL: 5,000 TOTAL: 20,592 Handling equipment of general berth of Main Port Area shall be replaced and/or reinforced. Present / Plan / thu$ Truck: 32 / 35 / 3,255 Tracterhead: 32 / 10 / 1,100 Chassis: 9 / 20 / 1,400 Forklift 2t-10t: 40 / 26 / 1,092 Bulldozer 2t: 0 / 8 / 480 Pallets: 0 / 1 set / 150 TOTAL: 7,477	No. 1 and No. 7 berths are combined into one container terminal. Cranes for heavy load are introduced. Handling equipment and Yard are improved. Handling efficiency of general berth is improved. General Plan Present / Future Plan Container: 2 berths / 2 Others: 9 berths / 9 Warehouse: 13 / 12 Yard: 53,000 m2 / 56,500 m2 Main Port Area Plan 1st. Phase / Present / Plan / thu$ Tracterhead: 3 / 3 / 330 Chassis 20': 3 / 4 / 80 Chassis 40': 3 / 2 / 60 Forklift 2t-32t: 6 / 4 / 80 Truck: 5 / 205 Tug Boat 1000ph: 2 / 3,000 Pavement 3,500 m2: 1,000 Sub TOTAL: 4,755 2nd. Phase Gantry Crane 30t: 2 / 10,400 Transtainer 30t: 2 / 2,140 Forklift 42t: 1 / 800 Sub TOTAL: 13,340 General berth of Main Port Area (1st. - 2nd. Phase) Equipment / Superannuation Truck IFA: 6 UNITS KAMAZ: 3 Mobile Crane: 2 Forklift 5t: 14 Jib Crane: 6 Tracterhead: 5

Table 9-1-1. Summary of Rehabilitation Plan (Con't)

	Rehabilitation Plan	Vietnamese Side Plan
6. Water and Electric Supply	Detail design is required. Water and Electric Supply TOTAL 2,000 thu$	(1st. - 2nd. Phase) Water Supply to Chua Ve Area Water and Electric Supply Plan to Main Port Area Electric Supply 1,500 thu$ Water Supply 1,500 thu$ TOTAL 2,000 thu$
7. Communication Network System for Operation	Introduced based on priority. Office Automation for handling container requires guidance. Nos. thu$ Computer Network for Operation 1 1,000 Hand Talky 12 3 TOTAL 1,003	thu$ Computer Network for Operation TOTAL 1,000
8. Training	12,000US$/Month/Person * 50 persons TOTAL 600 thu$	Technical Training TOTAL 600 thu$
9. Others	Management sections, presently spread through narrow port areas, are collected outside and efficiency of management is improved. Remaining sites are also utilized effectively. 6,200 m2 = 1,845 thu$ Regarding the extension of berth No.1, a basin for working vessels is required. 4,000 m2 = 600 thu$ TOTAL 2,445 thu$	Office Building 6,200 m2 TOTAL 1,845 thu$ (Compensation cost included)
10. Summary	1994-1998 (thu$) Phase II (thu$) Dredging 72,872 15,000 Chua Ve Port Area 22,330 23,200 Main Port Area 24,069 7,250 Others 1,003 4,445 Training 600 TOTAL 120,874 49,895 (Tentative) Phase II of Main Port Area includes the extension of No.1 berth (65m, 3.25 mil$).	1994-1995 (thu$) 1996-2000 (thu$) Dredging 24,800 Chua Ve Port Area 2,865 29,410 Main Port Area 4,755 13,340 Others 5,445 TOTAL 32,420 48,195

Table 9-1-2 Proposed Budget for Hai Phong Port Rehabilitation Plan

Location	Rehabilitation Items				Unit Rate	Proposed Amount 1000USD	Pri-ority	Phase	Vietnamese Side Plan					
	Items	Spec.	Q'ty	Unit					Items	Spec.	Q'ty	Unit	Unit Rate	Amount 1000USD
Chua Ve	Yard Expansion		52000	m2	0.04	2,080	A	1	Yard		50000	m2		1,000
	Yard Improvement		25000	m2	0.02	500	A							
	Reinforcement of Berth		66	m	50.00	3,300	A							
	Improvement of Road		1	LS		200	A							
	Construction of CFS		1	LS		800	A							
	Weighting System		1	LS		400	A							
	Equipment						A	1	Equipment			Unit		
	Transfer Crane	35-40t	5	Nos	1,700	8,500	A	1	Mobile Crane		1	Nos	1,070	1,070
	Yard Chassis		10	Nos	30	300	A	1	Forklift		5	Nos	20	100
	Yard Tractor		10	Nos	90	900	A	1	Tractor Head		3	Nos	110	330
	Top Lifter	25t-35t	2	Nos	300	600	A	1	Trucks	12t	5	Nos	41	205
	CFS Chassis		6	Nos	30	180	A	1	Chassis	40'	2	Nos	30	60
	Forklift	2-3t	5	Nos	34	170	A	1	Chassis	20'	5	Nos	20	100
	Reach Stacker		1	Nos	400	400	A							
	Berth Extension						B	2	Berth Extension					
	Construction	300mx1B Yard 60,000m2				7,500	B	2	Construction	300mx1B Yard 60,000m2				7,500
	Equipment						B	2	Equipment					
	Gantry Crane	30t-40t	3	Nos	5,200	15,600	B	2	Gantry Crane	30t	3	Nos	5,200	15,600
								2	Transfer Crane		3	Nos	1,070	3,210
	Forklift	2t	5	Nos	20	100	B	2	Forklift	2t	5	Nos	20	100
	Tug Boat	1000HP	2	Nos	2,000	4,000	A	2	Tug Boat	1000HP	2	Nos	1,500	3,000
	Chua Ve Sub-total					45,530			Chua Ve Sub-total					32,275
Main Port Container No.1-3	Equipment							1	Equipment					
	Transfer Crane	35-40t	5	Nos	1,700	8,500	A	1	Tracter Head		3	Nos	110	330
	Yard Chassis		10	Nos	30	300	A	1	Chassis	40'	2	Nos	30	60
	Yard Tractor		10	Nos	90	900	A	1	Chassis	20'	4	Nos	20	80
	Top Lifter	25t-35t	2	Nos	300	600	A	1	Forklift	2-32t	4	Nos	20	80
	CFS Chassis		6	Nos	30	180	A	1	Truck		5	Nos	41	205
	Forklift	2-3t	5	Nos	34	170	A							
	Reach Stacker		1	Nos	400	400	A							
	Yard Pavement		76000	M2	0.020	1,520	A	1	Yard Pavement		3500	M2	0.29	1,000
	Electrical Work							2	Gantry Crane	30t	2	Nos	5,200	10,400
	Power Supply		1	LS	1,700	1,700	A	2	Transtainer	30t	2	Nos	1,070	2,140
	Light		4	Nos	313	1,252	A	2	Forklift	42t	1	Nos	800	800
	Reefer		20	Nos	4	70	A							
	Wharehouse Demolition					400	A							
	Office Construction					600	A							
	Berth Extension	No.1 65m	1	LS		3,250	B							
	Tug Boat	1000HP	2	Nos	2,000	4,000	B	1	Tug Boat	1000HP	2	Nos	1,500	3,000
	Main Port No.1-3 Sub-total					23,842			Main Port No.1-3 Sub-total					18,095

Table 9-1-2 Proposed Budget for Hai Phong Port Rehabilitation Plan (Con't)

Location	Rehabilitation Items				Unit Rate	Proposed Amount 1000USD	Pri-ori-ty	Vietnamese Side Plan					
	Items	Spec.	Q'ty					Phase	Items	Spec.	Q'ty	Unit Rate	Amount 1000USD
Main Port No.4-11	Equipment							1-2	Equipment				
	Truck		35	Nos	93	3,255	A	1-2	Truck		6 Nos		
	Tracter Head		10	Nos	110	1,100	A	1-2	Truck		3 Nos		
	Chassis		20	Nos	70	1,400	A	1-2	Mobile Crane		2 Nos		
	Forklift	2~10t	26	Nos	42	1,092	A	1-2	Forklift	5t	14 Nos		
	Bulldozer		8	Nos	60	480	A	1-2	Jib Crane		6 Nos		
	Pallets		1	LS		150	A	1-2	Tractor Head		5 Nos		
	Main Port No.4-11 Sub-total					7,477			Main Port No.4-11 Sub-total				
Others	Electric Supply							1-2	Electric Supply				
	Water Supply					2,000	B	1-2	Water Supply				2,000
	Communication							1-2	Communication Network				
	VHF Handy Talky		12	Nos		3	A						
	Computer Network		1	LS		1,000	A	1-2	Computer Network		1 LS		1,000
	Technical Trainning		50	MM	12	600	A	2	Technical Trainning		50 MM	12	600
	Office/Building	6200m2	1	LS		1,845	B	2	Office/Buildin	6200m2	1 LS		1,845
	Working Vessel Basin		1	LS		600	B						
	Others Sub-total					6,048			Others Sub-total				5,445
Channel								1	Initial Dredging		5 mil	m3	6,000
	Initial Dredging to -6m		10.94	mil	m3	51,572	A						
	Dikes					3,300	A	1	Dikes		6 Nos		3,300
	Dredger	3000m3	1	Nos		15,000	A	1	Dredger	3000m3	1 Nos		15,000
	Further Study & Investigation		1	LS		1,500	A	1	Investigation		1 LS		500
	Survey System		1	LS		1,500	A						
	Channel & Basin Sub-total					72,872	A						24,800
Grand Total of Rehabilitation Plan						155,769			Phase 1 Total				32,420
									Phase 2 Total				48,195
Proposed Urgent Rehabilitation Plan (Priority A)						120,874			Total				80,615

9-2 Preliminary Design of Main Facilities

(1) Main Port Area

The Urgent Rehabilitation Project consists of pavement for the container yard expansion, water supply, power supply and drainage.

At present, jib cranes are used under normal conditions in the existing wharves. When gantory cranes will be installed for handling the increased volume of containers in future, betterment and improvement of the wharves will be required for safe operation of the facilities; for example, pile foundation shall be added to support the weight of the gantory cranes just in front of the existing wharves and it must be provided with protectors such as rubber fenders.

For the pavement of the container yard, the asphalt macadam type with Telford subbase is recommended considering not only it's reasonable cost but also the experience of local people in this type of construction..

(2) Chua Ve Area

In Chua Ve Area,the Urgent Rehabilitation Project consists of pavement works for the container yard, construction of a container freight station and reinforcement of a 66 meter long section of the existing pier.

In the above section, additional tie rods shall be especially installed to protect it against the traveling force of the heavy cranes. Subsequently,an additional open type pier with vertical reinforced concrete piles shall be constructed in the future expansion stage.

9-3 Project Cost Estimate

9-3-1 Quantity of Construction Works

The quantity of construction works for the Hai Phong Port Urgent Rehabilitation Project is calculated for each site, Chua Ve area, Main Port from Berth No.1 to Berth No.3, Main Port from Berth No.4 to Berth No.11, the channels of Nam Trieu, Bach Dang, Cua Cam, and the turning basin area in front of the Main Port.

The project works are divided into the following categories;

- -Pavement of the container yard;
- -Construction of the container freight station;
- -Channel dredging;
- -Installation of port handling equipment.

Table 9-3-1 shows the work quantity of the Project.

9-3-2 Construction Cost

The Project construction will be carried out by a contractor selected through international competitive bidding. therefore, the Project cost was estimated taking based on the financing condition, scale of the Project, and detailed background of the local construction industry.

Consequently, the cost of the civil works including pavement, building and dredging works is calculated under the following assumptions and conditions:

(1) Fiscal year

The government budget is allocated from the beginning of January to the end of December of the calender year.

(2) Exchange rate

The following exchange rate effective at the beginning of this Feasibility Study in July 1993 is applied :

1 US$ = 10,680 VND = 108 Yen

(3) Cost Estimating System

A summary of the project cost is shown in Table 9-3-7. This was estimated on the assumption that the Project will be financed by the national budget. The cost of locally available materials, such as rocks and stones, and labor force procured was calculated in the local currency portion. The depreciation cost of the dredging fleet and work boats, steel materials and other imported materials was calculated in the foreign currency portion.

(4) Market Prices of Materials

Table 9-3-2 shows the market prices of local materials.

(5) Construction Equipments

The existing construction equipment such as cranes and trucks have been used for more than 10 years and, therefore, their performance is poor.

As a result of analysis of data collected from the local construction enterprises, only a few machines can be used for this Project.

The rental charges of the existing construction equipment are shown in Table 9-3-3.

Table 9-3-1 Work Quantity for The Hai Phong Port Urgent Rehabilitation Project

LOCATION	REHABILITATION ITEMS & SPEC	QUANTITY	UNIT
CHUA VE	YARD EXPANSION	52,000	m2
	YARD IMPROVEMENT	25,000	m2
	REINFORCEMENT OF BERTH	66	m
	IMPROVEMENT OF ROAD	1	LS
	CONSTRUCTION OF CFS	2,000	m2
	WEIGHTING SYSTEM	1	LS
	(EQUIPMENT)		
	-Transfer Crane 35-40t	5	nos
	-Chassis	10	nos
	-Tractor	10	nos
	-Toplifter 25-35t	2	nos
	-CFS Chassis	6	nos
	-Forklift 2-3t	5	nos
	-Reach Stacker	1	nos
	-Tug Boat 1000HP	2	nos
MAIN PORT No.1-3	EQUIPMENT		
	-Transfer Crane 35-40t	5	nos
	-Chassis	10	nos
	-Tractor	10	nos
	-Top Lifter 25-35t	2	nos
	-CFS Chassis	6	nos
	-forklift 2-3t	5	nos
	-Reach Stacker	1	nos
	YARD PAVEMENT	76,000	m2
	Electrical Work		
	Power Supply	1	LS
	Light	4	nos
	Reefer	20	nos
	Warehouse Demolish	1	LS
	Office Construction	1	LS
MAIN PORT No.4-11	EQUIPMENT		
	-Truck	35	nos
	-Tractor Head	10	nos
	-Chassis	20	nos
	-Forklift 2-10t	26	nos
	-Bulldozer	8	nos
	-Pallets	1	LS
	VHF Handy Talky	12	nos
OTHER	Computer Network	1	LS
	Technical Trainning	1	LS
CHANNEL	INITIAL DREDGING(-6M)		
	-Basin Area -6m	1110,000	m3
	-Cua Cam Area -6m	900,000	m3
	-Bach Dang Area -6m	2490,000	m3
	-Nam Trieu Area -6m	6440,000	m3
	DIKES	1	LS
	S-Hopper Dredger 3000m3	1	nos
	Further Study & Invest'n	1	LS
	Survey System	1	LS

+ : Civil works.

Table 9-3-2 Market Prices of Local Materials (UNIT: VND)

Materials	Dimension	Unit	Cost
1 Quarry run	5-20 kg	m3	58,000
2 Coarse aggregate	40-60mm	m3	55,000
3 Coarse aggregate	60-80mm	m3	56,000
4 Gravel	20-40mm	m3	58,000
5 Crushed stone	10-20mm	m3	65,000
6 Crushed stone	5 mm	m3	68,000
7 Sand		m3	60,000
8 Miled sand		m3	55,000
9 Filling sand		m3	35,000
10 Portland cement		t	600,000
11 Steel pipe pile	Dia 15-50mm	kg	8,500
12 Steel angle		kg	5,500
13 Steel plate		kg	5,000
14 Steel bar	Dia 6 mm	kg	5,500
15 Asphalt		kg	3,000
16 Kerosin		t	150 US$
17 Gasoline		t	250 US$
18 Reinforced concrete pile	0.45*0.45 l=10m	no	3,434,000
19 Reinforced concrete pile	0.45*0.45 l=20m	no	6,868,000
20 Reinforced concrete pile	0.45*0.45 l=30m	no	10,402,000
21 Concrete 150 kg/cm2	25 mm	m3	333,000
22 Concrete 200 kg/cm2	25 mm	m3	374,000
23 Concrete 250 kg/cm2	25 mm	m3	403,700
24 Concrete 300 kg/cm2	25 mm	m3	433,380
25 Concrete 350 kg/cm2	25 mm	m3	452,000
26 Iron timber wood		m3	2,300,000
27 Ship timber, log		m3	1,870,000
28 Wooden form of pillar		m3	800,000

Table 9-3-3 Rental Charges of Construction Equipment (Unit:VND)

	Equipment	Dimension	Unit	Unit Price
1	Mobile crane	16 t	no/day	800,000
2	Mobile crane	40 t	no/day	1,550,000
3	Crawler crane	16 t	no/day	830,000-1,600,000
4	Dump truck	10 t	no/day	570,000
5	Dump truck	15 t	no/day	700,000
6	Truck	12 t	no/day	520,000
7	Bulldozer	150 ps-15 t	no/day	670,000
8	Grader	160 ps	no/day	670,000
9	Tire roller	8-16 t	no/day	280,000
10	Backhoe	0.65 m3	no/day	770,000
11	Backhoe	1.2 m3	no/day	1,030,000
12	Batch plant	50 m3/hr	no/day	1,300,000
13	Generator	Diesel 100 kva	no/day	500,000
14	Air compressor	Gasoline 5.0 m3/min	no/day	400,000
15	Air compressor	Kerosine 5.0 m3/min	no/day	270,000

Note: The unit prices include equipment, fuel and operator cost.

As for dredging work,grab dredgers and suction hopper dredgers are being used. But these were built in the 1970s and, therefore, are overage in general.

Table 9-3-4 shows the type and capacity of the existing dredgers that are operated and maintained by the enterprises. The system of estimating the cost of dredging works in Vietnam is remarkably different from that in Japan.

Although the cost of dredging works is seriously affected by the dredging method, in Viet Nam it is not calculated based on the reasonably established unit prices but is fundamentally determined on the basis of the planned dredging volume per year.

The dredging costs estimated by local enterprises are shown in Table 9-3-5.

According to the local practice, an extra charge is applied to the dredging cost depending on the dredging grades. There are 6 grades defined by the dredging sites. For example, Grade 1 applies to the dredging work in the Mekong and Red River Deltas; Grade 6 applies to that for the northern ports and in this grade the extra charge rate is equivalent to 2.5 times unit price of dredging works.

In the case of dredging by cutter suction pump dredgers, an extra charge rate of 7 % of the unit price is applied for every 100m of discharge pipeline exceeding the initially installed 150m pipeline.

As for dredging by bucket dredgers, the unit price is determined in accordance with the thickness of the dredging layer.

The standard thickness of dredging layer is more than 1m for sea dredging and more than 0.7m for river dredging. If the actual dredging thickness is less than 50 % of the standard thickness, an extra charge of 10 % is to be applied to the unit price. The standard dredging depth is 9 to 12 meters in sea areas and 5 to 6 meter in river areas. An extra charge of 5 % is applied for every 1.5 meters exceeding the standard depth.

In the cases of dredging works during typhoon, flood seasons and in the areas of fast stream or current, the extra charge can amount to 50 % the unit price if approved by MOTAC.

(6) Reasons for Cheap Dredging Costs Estimated by Local Enterprise.

The dredging cost consists of direct costs such as depreciation cost of dredgers, tugboats, anchor lifting boats, fuel, and salary, and indirect costs such as general management cost,insurance, and benefit. In Vietnam,the depreciation cost of dredgers is especially cheaper compared with the cost in Japan.

Table 9-3-4 Capacity of Existing Dredgers

NAME	TYPE	BUILT IN	DREDGING DEPTH(m)	TOTAL POWER(hp)	DREDGING CAPACITY(m
LONG CHAN	SEAGOING SELF-PRO PELLED SUC -TION	GERMANY	-16	5540	30000 m3/d
TAU CUOC TC 82	SEA GOING DREDGER OF BUCKET	GERMANY 1980	-16	2060	5000-8000 m3/d
TAU CUOC TC 54	SEA GOING DREDGE OF BUCKET	GERMANY 1970	-14	653	3000-5000 m3/d
TAU HB 88	SUCTION DREDGER	BACHDAN 1988	-6	1460	5000 m3/d
TRAN HUNG DAO	TRAILING SUCTION HOPPER DREDGER	GERMANY 1970	-20	n.a	3000 m3/h
TC 81	BUCKET DREDGER	n.a	-16	n.a	800 m3/h
H 19/5	CUTTER SUCTION DREDFER	n.a	-11	n.a	500 m3/h.
H 01	JET CUTTER SUCTION DREDGER	n.a	-11	n.a	250 m3/h

Note: n.a.: none available

Table 9-3-5 Summary of Dredging Cost

Unit:+1000 VND

ITEM	TAU HUT LONG CHAU	TAU HUT HB88	TAU CUOC BIEN	VAN CHUYEN DAT	Remark
1 Salary Cost	119,412	106,089	136,248	285,681	
2 Fuel Cost	3,487,845	751,665	524,213	1,121,654	
3 Basic Depreciation	2,060,954	313,956	1,775,183	460,285	
4 Heavy repair	678,466	87,210	745,875	300,017	
5 Small repair	1,017,699	130,815	1,118,813	450,027	
Sub-Total	7,364,376	1,389,608	4,300,332	2,617,664	1-5)
6 Indirect Cost	1,031,013	194,545	602,046	366,473	14%
Sub Total	8,395,389	1,584,153	4,902,378	2,984,137	
7 Standard Profit Rate	671,631	126,732	392,190	238,731	1-6) 8%
Sub Total	9,067,020	1,710,885	5,294,568	3,222,868	1-7)
8 Ship Insurance	81,416	9,501	89,505	27,540	0.6%
9 Capital Tax	84,840	40,640	144,644	66,100	3.6%
Total Cost	9,233,276	1,761,026	5,528,717	3,316,508	1-9)
Dredging Volume(m3)	2,009,000	249,500	720,000	3,176,000	
(Unit Price)					
Dredging D/m3	4.596	7.115	7.697	-----	
Transp't D/m3.km	-----	-----	-----	1.044	

* Fuel Price 1) Diesel 2,800 VND/kg
2) Lubricant Oil 8,000 VND/kg

This may be attributed to the following reasons:

1)The unit prices of dredging work are determined in advance for every dredger fleet under the MOTAC. The depreciation cost for the dredger fleet,which is determined based on the standard dredging volume per year in Vietnam is radically different from the depreciation cost caluculated on the basis of annual working days as applied in the Japanese system.

The Vietnamese unit prices of dredging work are extremely cheap compared with the prices in other countries.

If the standard dredging volume per year is small, the unit prices of dredging work will become logically expensive. If the standard number dredging days per year increases, a larger benefit will be produced by the dredger fleet.

2) When the dumping area for discharge materials is located very far in the sea from the channel dredging site, the dredging work is expensive but the allocated local budget is not enough to apply a reasonable working system.

Usually, the dredging operation by grab dredgers is obliged to be interrupted while the barges are full of dredged materials and carry them away from the dredging site.

Moreover,due to limited budget, the discharge materials are dumped at temporary areas located near the channel course. The dredged channel is seriously affected by not only the initial sedimentation from upperstream but also the sedimentation from the dumping sites.

In consequence, it would be impossible to execute the dredging work adequately at the local standard prices that are determined by the government.

3) In Vietnam, it is not easy to procure dredgers due to limitations in number, type and capacity. Therefore,it would be impossible to dredge big volumes of deposited soil within short periods of time as usually required in construction schedules.

It is not necessary to follow the construction schedule as under normal conditions and, consequently, the enterprises can execute the dredging work even at cheapest costs.

(7) Procurement of Labor Force

It is comparatively easy to recruit common labors and unskilled workers in Vietnam and there is no limitation on employment of expatriate labors, engineers and managers provided that they get entry visas in advance.
The local labor costs are shown in Table 9-3-6.

(8) Summary of Project Cost

It is urgently required to improve the substructure of the

Table 9-3-6 Local Labor Costs (Unit:VND/Month)

POSITION		DIRECT COST
1	Foreman	541,000
2	Carpenter	495,000
3	Concrete Worker	520,000
4	Steel Bender	520,000
5	Common Labor	362,000
6	Plant Operator	521,000
7	Driver	521,000
8	Plumber	521,000
9	Scaffolder	495,000
10	Piling Crew	520,000
11	Slinger	495,000
12	Captain	726,000
13	Sailor	449,000
14	Mechanician	520,000
15	Electrician	520,000
16	Civil Engineer	583,000

Note: The indirect cost is 12 % of the direct cost.

existing pier to be used as an exclusive container terminal and to build a container freight station in the Chua Ve Area.

The section of the Main Port from Berth No.1 to Berth No.3 will be utilized for container berths after completion of the civil works, expansion of the yard, power supply facilities and installation of handling equipment such as transfer crane and forklift.

The section of the Main Port from Berth No.4 to Berth No.11 will be provided especially with handling equipment such as tractor head with chassis to ensure efficient handling works.

And a computer network will be established to ensure economical and safe operation and maintenance of the handling equipment.

The length of the access channel is approximately 36 km consisting of the Nam Trieu, Bach Dang, Song Cam rivers and the Basin Area. The dredging volume is approximately 11 million cubic meters.

Table 9-3-7 shows the budget for the urgent rehabilitation works.

The total project cost is estimated at 138,960,000 US$,breakdown as follow:

By work items:

Civil Works	:	12,822,000 US$ (9.2%)
Dredging Works	:	54,872,000 US$ (39.5%)
Equipment Supply	:	51,080,000 US$ (36.8%)
Others	:	600,000 US$ (0.5%)
Engineering Fee	:	9,781,000 US$ (7.0%)
Contingency	:	3,385,000 US$ (2.4%)
Price Escalation	:	6,420,000 US$ (4.6%)
Total		138,960,000 US$

By Sites:

Chua Ve Area	:	22,330,000 US$ (16%)
Main Port Berth No.1-No.3	:	16,592,000 US$ (12%)
Main Port Berth No.4-No.11	:	9,080,000 US$ (7%)
Channel Area	:	71,372,000 US$ (51%)
Other	:	19,586,000 US$ (14%)
Total		138,960,000 US$

The physical contingency for adjustment of work quantities is considered to be 5 % of the direct construction cost including dredging, civil and building works.

The price escalation rate is set at 3.3 % per year taking the present economic condition into consideration.

Table 9-3-8 shows the yearly investment for the urgent rehabilitation works.

Table 9-3-7 Budget for The Hai Phong Port Urgent Rehabilitation Works

LOCATION	REHABILITATION ITEMS ITEM & SPEC	QUANT'TY	UNIT	UNITRATE 1000US$	AMOUNT 1000US$	RANK
CHUA VE	YARD EXPANSION	52,000	m2	0.04	2,080	A
	YARD IMPROVEMENT	25,000	m2	0.02	500	A
	REINFORCEMENT OF BERTH	66	m	50.00	3,300	A
	IMPROVEMENT OF ROAD	1	LS		200	A
	CONSTRUCTION OF CFS	2,000	m2	0.40	800	A
	WEIGHTING SYSTEM	1	LS		400	A
	(EQUIPMENT)					
	-Transfer Crane 35-40t	5	Nos	1,700	8,500	A
	-Chassis	10	Nos	30	300	A
	-Tractor	10	Nos	90	900	A
	-Toplifter 25-35t	2	Nos	300	600	A
	-CFS Chassis	6	Nos	30	180	A
	-Forklift 2-3t	5	Nos	34	170	A
	-Reach Stacker	1	Nos	400	400	A
	-Tug Boat 1000HP	2	Nos	2,000	4,000	A
	Sub Total				22,330	
MAIN PORT CONTENER NO1-NO3	EQUIPMENT					
	-Transfer Crane 35-40t	5	Nos	1,700	8,500	A
	-Yard Chassis	10	Nos	30	300	A
	-Tractor	10	Nos	90	900	A
	-Top Lifter 25-35t	2	Nos	300	600	A
	-CFS Chassis	6	Nos	30	180	A
	-Forklift 2-3t	5	Nos	34	170	A
	-Reach Stacker	1	Nos	400	400	A
	YARD PAVEMENT	76,000	m2	0.020	1,520	A
	Electrical Work					
	Power Supply	1	LS	1,700	1,700	A
	Light	4	Nos	313	1,252	A
	Reefer	20	Nos	4	70	A
	Warehouse Demolish	1	LS		400	A
	Office Construction	800	m2	0.750	600	A
	Sub Total				16,592	
MAIN PORT NO4-NO11	EQUIPMENT					
	-Truck	35	Nos	93	3,255	A
	-Tractor Head	10	Nos	110	1,100	A
	-Chassis	20	Nos	70	1,400	A
	-Forklift 2-10t	26	Nos	42	1,092	A
	-Bulldozer	8	Nos	60	480	A
	-Pallets	1	LS		150	A
	-VHF Handy Talky	12	Nos		3	A
	Sub Total				7,480	
OTHER	Computer Network	1	LS		1,000	A
	Technical Trainning	1	LS		600	A
	Sub Total				1,600	
CHANNEL	INITIAL DREDGING (-6M)					
	-Basin Area -6m	1110,000	m3	0.007	7,770	A
	-Cua Cam Area -6m	900,000	m3	0.004	3,600	A
	-Bach Dang Area -6m	2490,000	m3	0.0058	14,442	A
	-Nam Trieu Area -6m	6440,000	m3	0.004	25,760	A
	DIKES	1	LS		3,300	A
	S-Hopper Dredger *1) (Capacity 3000m3)	1	Nos		15,000	A
	Survey System	1	LS		1,500	A
	Sub Total				71,372	
	Total (Const'n Cost)				119,374	
ENGINEERING FEE*2)					9,781	
	Total				129,155	
PHISICAL CONTINGENCY (5%)					3,385	
	Grand Total				132,540	
G.T INCLUDED PRICE ESCALATION(3.3%)					138,960	

*1) Capacity of S-Hopper Dredger may be changed to 1000m3-1500m3 according to the further study result of channel realignment.

*2) The Cost of Further Study & Investigation is included in the Engineering Fee.

YARD EXPANSION, etc mean Civil Facilities.

Table 9-3-8 Yearly Investment for Hai Phong Port Urgent Rehabilitation Plan

(Unit: * US$ 1000)

Site	Work Item	Volume	1994	1995	1996	1997	1998	Total
Chua Ve	Quay	66 m	0	3300	0	0	0	3300
	Pavement	8.7 ha	0	2780	0	0	0	2780
	CFS	2000 m²	0	400	400	0	0	800
	Weigh'g equ'	1 LS	0	400	0	0	0	400
	Equipment	1 LS	0	2150	12900	0	0	15050
Sub Total			0	9030	13300	0	0	22330
Main Port Berth No1 to Berth No3	Pavement	7.6 ha	0	1520	0	0	0	1520
	Electric works	1 LS	0	3022	0	0	0	3022
	Warehouse demo	1 LS	0	400	0	0	0	400
	Office const'n	800 m²	0	400	200	0	0	600
	Equip't	1 LS	0	1970	9080	0	0	11050
Sub Total			0	7312	9280	0	0	16592
Main Port Berth No4 to Berth No11	Equipment	1 LS	0	4500	2980	0	0	7480
Sub Total			0	4500	2980	0	0	7480
Other	Computer net'k	1 LS	0	1000	0	0	0	1000
	Tech'l train'g		0	600	0	0	0	600
Sub Total			0	1600	0	0	0	1600
Channel	Dredging	10.9 mil	0	43462	8110	0	0	51572
	Dike	1 LS	0	3300	0	0	0	3300
	Hopper dredger	1 no	0	0	0	15000	0	15000
	Survey system	1 LS	1500	0	0	0	0	1500
Sub Total			1500	46762	8110	15000	0	71372
Total			1500	69204	33670	15000	0	119374
Engineering fee			5471	2155	2155	0	0	9781
Physical contingency			0	2949	436	0	0	3385
Price escalation			0	2452	2433	1535	0	6420
Grand Total			6971	76760	38694	16535	0	138960

9-4 Implementation Program

(1) Pre-Construction Stage

The Government of Vietnam shall prepare the Tender Documents including Detailed Design, Drawings, Bill of Quantity and Technical Specifications.

The detailed design will take 1 year, therefore an early commencement of the Project implementation should be considered.

Table 9-4-1 shows the schedule of pre-construction stage of the Project.

(2) Construction Stage

The Project works can be divided into 3 parts: Channel dredging, pavement of yard and improvement of existing wharves, and installation of handling equipment.

Due to the special character of channel dredging which required work execution in the sea area, the dredging works should be undertaken by marine contractors.

The pavement and building works on land will be entrusted to general contractors.

On the other hand, as the Project is to be completed within a concentrated period of 2 years in 1995 and 1996, it is recommended that the dredging works and the civil works be carried out by several contractors under separate contracts with the Government of Vietnam.

This will allow to ensure the quality and the timely completion of the new facilities in such a short construction period.

The schedule of the whole construction works is shown in Table 9-4-2.

The type and expected capacity of dredgers are shown in Table 9-4-3.

Table 9-4-1 Schedule of Pre-Construction Stage
Hai Phong Port Urgent Rehabilitation Project

YEAR	1ST	2ND											3RD	
ACTIVITY	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F
1 PQ of Consultant	—															
2 Selection of Consult't		—														
3 Detailed Design			—	—	—	—	—	—	—	—	—					
-Review of F/S			—	—	—	—										
-Detailed Design			—	—	—	—	—	—	—	—	—					
-Preparation of Tender Document									—	—	—					
4 Tender Procedure												—	—	—		
-PQ of Contractor												—				
-Approval of OECF																
-Tender Evaluation of Vietnam Govern't													—			
-Approval of OECF																
-Contract Negotiation														—		
-Contract & Signing																
5 Commence't of Const'n															—	

F/S : Feasibility Study PQ : Pre-Qualification

Note: This schedule showns the shortest period for conclusion ofcontracts for urgent rehabilitation works. It is required to follow this schedule for early commencement of the Project.

Table 9-4-2 Work Schedule of Hai Phong Port Urgent Rehabilitation Project

LOCATION	REHABILITATION ITEMS ITEM & SPEC	Q'ty	UNIT	1st 1994	2nd 1995	3rd 1996	4th 1997	5th 1998
CHUA VE	YARD EXPANSION	52,000	m2					
	YARD IMPROVEMENT	25,000	m2					
	REINFORCEMENT OF BERTH	66	m					
	IMPROVEMENT OF ROAD	1	LS					
	CONSTRUCTION OF CFS	1	LS					
	WEIGHTING SYSTEM	1	LS					
	(EQUIPMENT)							
	-Transfer Crane 35-40t	5	Nos					
	-Chassis	10	Nos					
	-Tractor	10	Nos					
	-Toplifter 25-35t	2	Nos					
	-CFS Chassis	6	Nos					
	-Forklift 2-3t	5	Nos					
	-Reach Stacker	1	Nos					
	-Tug Boat 1000HP	2	Nos					
MAIN PORT CONTAINER No.1-3	EQUIPMENT							
	-Transfer Crane 35-40t	5	Nos					
	-Chassis	10	Nos					
	-Tractor	10	Nos					
	-Top Lifter 25-35t	2	Nos					
	-CFS Chassis	6	Nos					
	-Forklift 2-3t	5	Nos					
	-Reach Stacker	1	Nos					
	YARD PAVEMENT	76,000	m2					
	Electrical Work							
	Power Supply	1	LS					
	Light	4	Nos					
	Reefer	20	Nos					
	Warehouse Demolish	1	LS					
	Office Construction	1	LS					
MAIN PORT No.4-11	EQUIPMENT							
	-Truck	35	Nos					
	-Tractor Head	10	Nos					
	-Chassis	20	Nos					
	-Forklift 2-10t	26	Nos					
	-Bulldozer	8	Nos					
	-Pallets	1	LS					
	VHF Handy Talky	12	Nos					
OTHER	Computer Network	1	LS					
	Technical Trainning	1	LS					
CHANNEL	INITIAL DREDGING(-6M)							
	-Basin Area -6m	1110,000	m3					
	-Cua Cam Area -6m	900,000	m3					
	-Bach Dang Area -6m	2490,000	m3					
	-Nam Trieu Area -6m	6440,000	m3					
	DIKES	1	LS					
	S-Hopper Dredger 3000m3	1	Nos					
	Further Study & Invest'n	1	LS					
	Survey System	1	LS					

: Civil works.

Table 9-4-3 Dredging Method of Hai Phong Port
Urgent Rehabilitation Project

SITE	BASIN	CUA CAM	BACH DANG	NAM TRIEU
DRED'G VOLUME (m3)	920000 190000	290000 610000	770000 1720000	2660000 3780000
TOTAL (m3)	1110000	900000	2490000	6440000
OPE'N Hr PER MONTH	G 9h*25d CSPD 17*25	H 21h*25d	CSPD 17h*25d	H 21h*25d
DREDGING PERIOD	NET 9 month	NET 6 month	NET 9 month	NET 9 month
REQUIRED VOLUME PER DAY	5800m3	6200m3	14000m3	40000m3
CAPACITY OF DRE'R	N=4-10silt 6000m3/day	N=10silt 6900m3/day	N=5-10silt 14000m3/day	N=5-10slt/sd 40000m3/day
REQUIRED DREDGER TYPE	4-GRAB DRED'R 2-TUG BOAT 4-BARGE 2-ANCHOR BOAT 1-CSP.DRED'R 1-TRAFFIC BOAT *1) DISCHARGE PIPE *2) FLOATER *3) RUBBER JOINT	1-HOPPER DRED'R	2-CSP.DRED'R 2-ANCHOR BOAT 2-TRAFFIC BOAT *4) DISCHARGE PIPE *5) FLOATER *6) RUBBER JOINT	4-HOPPER DRED'R
REMARKS	GD':6m3 800PS TUG:800PS BARGE:500m3 CSP.D:1350PS ANB:90PS TRFB:60PS *1) 480m *2) 90m *3) 21Nos	H:2200m3	CSP.D:2250PS ANB: 240PS TRF:60PS *4) 2000m *5) 300m *6) 61Nos	H:3000m3

Chapter 10 Management and Operation System

Chapter 10 Management and Operation System

10-1 Port Management System in Viet Nam

The administration and operations of traffic and communication in Viet Nam are controlled by the Ministry of Transport and Communication.

Railways, roads, inland and water transport, aviation, communication and postal service, and port and maritime transport are under its control.

There is an organizational change under way in the port-related administrative structure; administrations duties are being transferred to VINAMARINE, which is referred to later, as stipulated by regulation no.31 issued on February 2, 1993. Main organs of VINAMARINE are outlined below.

10-1-1 Central Administrative Structure

The Vietnam National Maritime Bureau(VINAMARINE) is in charge of and supervises the planning, construction and management/operation of the major ports in Viet Nam.

Organizationally, it has such supervisory organs as the Ministry of Transport and Communication and the State Planning Committee.

Other management organizations related to ports include the Ministry of Heavy Industry and the Ministry of Energy.

10-1-2 Port Authorities

The port authorities take care of the improvement, management and operation, and stevedoring of seven ports under the direct supervision of the Vietnam National Maritime Bureau (hereinafter referred to as VINAMARINE).

The relation among the port authorities, VINAMARINE and the central government concerning the port management/operation system is described below.

(1) Central Government's Role

In the past the main ports of Viet Nam were under the control of the Ministry of Transport and Communication, but the power has gradually been transferred to VINAMARINE, its internal organization. Vinamarine directly controls the seven ports in the country, and the port authorities are management organs. (See Figure 10-1-1.)

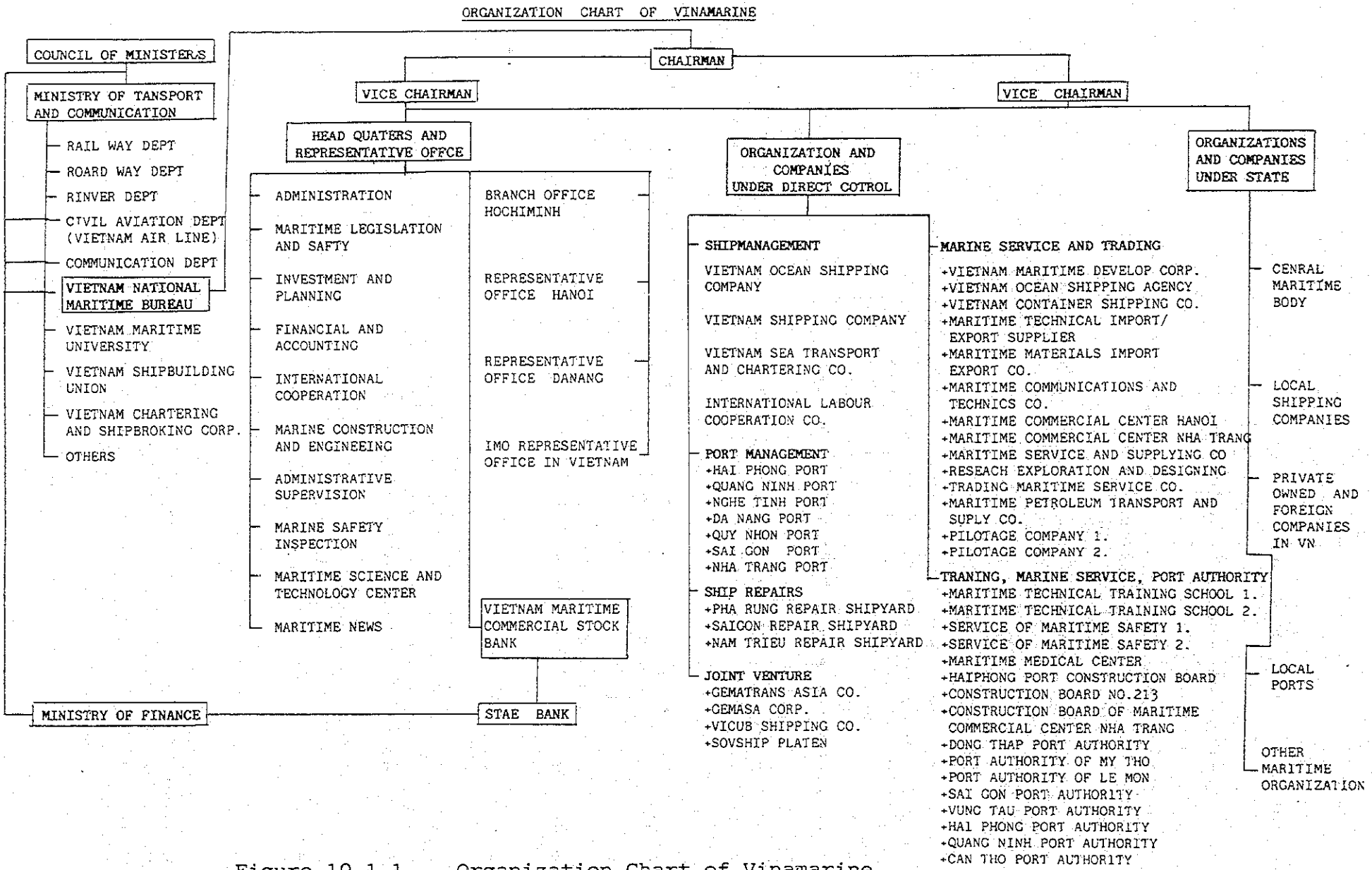


Figure 10-1-1 Organization Chart of Vinamarine

(2) Local Governments' Role

Local ports are controlled by prefectures and cities. The Ministry of Transport and Communication and VINAMARINE provide guidance and supervision.

(3) Other Organizations

The following organizations are related to ports. Both are under the control of the Ministry of Transport and Communication.

Transport Engineering Design Institute (TEDI)
Transport Economic Science Institute (TESI)

The above institutes are in charge of planning and technical aspects of ports.

10-2 Outline of Service at Hai Phong Port

The harbor activities in Hai Phong Port are carried out by the entities concerned, with the Hai Phong Port Authority being the central figure.

(1) Ship Navigation Control

Foreign ships planning to enter the port give notice through the Hai Phong Port Authority Communication Station so that the information reaches the Port Authority 10 days in advance.

Port entry and departure, navigation in the port, and mooring at an anchorage need to be approved by the harbormaster who belongs to VINAMARINE. To be assigned an anchorage and a berth, a ship communicates with the Haiphong Port Authority Operation Department and complies with its instructions.

(2) Examination

Foreign ships entering the port go through various inspections near the no.0 buoy.

Generally, a team of six--a member of the harbormaster's staff, police officer, customs officer, doctor, quarantine officer and maritime procedure commission agent--inspect the ship, and then the harbormaster issues a permit for port entry.

(3) Pilotage

Foreign ships entering or leaving the port or moving within the port receive instructions for pilot at the no.0 buoy. A pilot sent from VINAMARINE Pilot Company boards each ship, usually at an anchorage off Hon Dau. He may board the ship

inside the navigation channel, depending on the weather.

(4) Customs Clearance

There is a customhouse in the port for customs inspection. Part of its job is done by the city of Hai Phong on behalf of the nation, and some of the customs duties are collected by the city itself.

Sometimes personnel of The Ministry of Finance take care of the formalities.

(5) Mooring and loading/unloading

The Operation Department of the Haiphong Port Authority arranges for ships to come alongside piers and load/unload cargoes based on a stevedoring plan for every 10 days.

Cargo handling work on piers is done by the Haiphong port stevedoring organizations, each taking responsibility for a pier.

There are five such organizations, which are allotted berths no.2- 5 and no.6 and berths no.8-11 of the main port, the Chua Ve container terminal, the Vat Cach area, and nos. 1 and 7 container berths. In the past, incorporated organizations operated the stevedoring but they do not exist any more. The Hai Phong Port Authority is responsible for personnel management, budgeting, etc. Cargoes are conveyed to the rear zone mainly via road, rail and inland waterway.

(6) Agency Business

The overseas shipping business in Viet Nam was for a long time carried out by the state-operated VOSCO (Vietnam Ocean Shipping Company) and a few other companies, and the agency business for shipping companies by VOSA (Vietnam Ocean Shipping Agency).

Now that competition is being encouraged, local shipping companies have joined them in the overseas shipping business. A number of joint venture companies are engaging in various areas of the business, and even VOSCO has launched into the shipping agency business, indicating the increased liberalization in this industry. Changes in the system allow anyone to engage in the agency business for either shippers or shipping companies.

The Hai Phong Port Authority is no exception. The door to these business fields is left open and even now the authority engages in brokerage business.

(7) Counting and Measuring

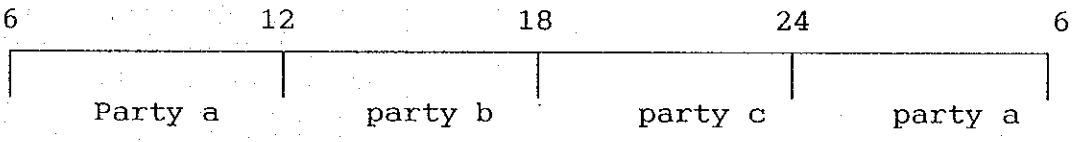
During the loading or discharging of foreign ships, the Hai Phong Port Authority counts or measures and inspects the cargoes

for damage.

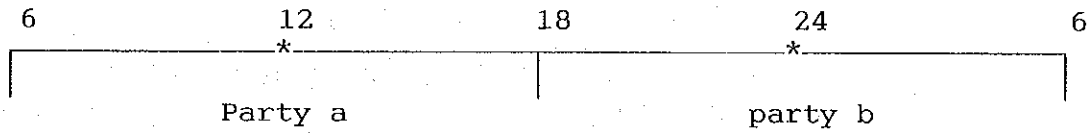
(8) Service system

The harbormaster, pilots, customs officers, quarantine officers and stevedores work in a 24-hour service system. They are off on New Year's holidays, old calendar New Year's holidays and national holidays, totaling 7.5 days each year.

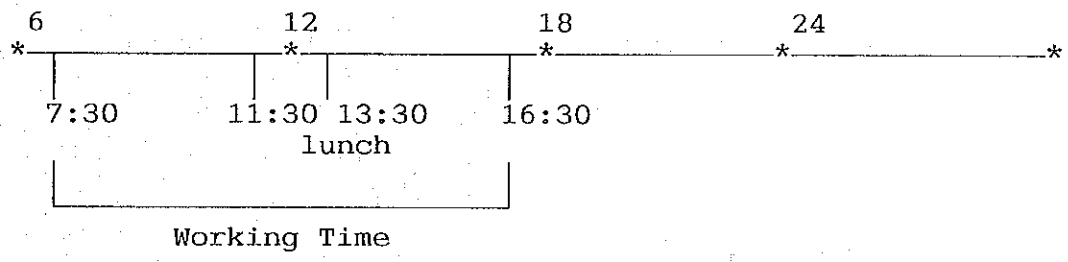
Working system of stevedores is as follow:



Working system of office is as follow:
(Operation Division)



(Administration Division)



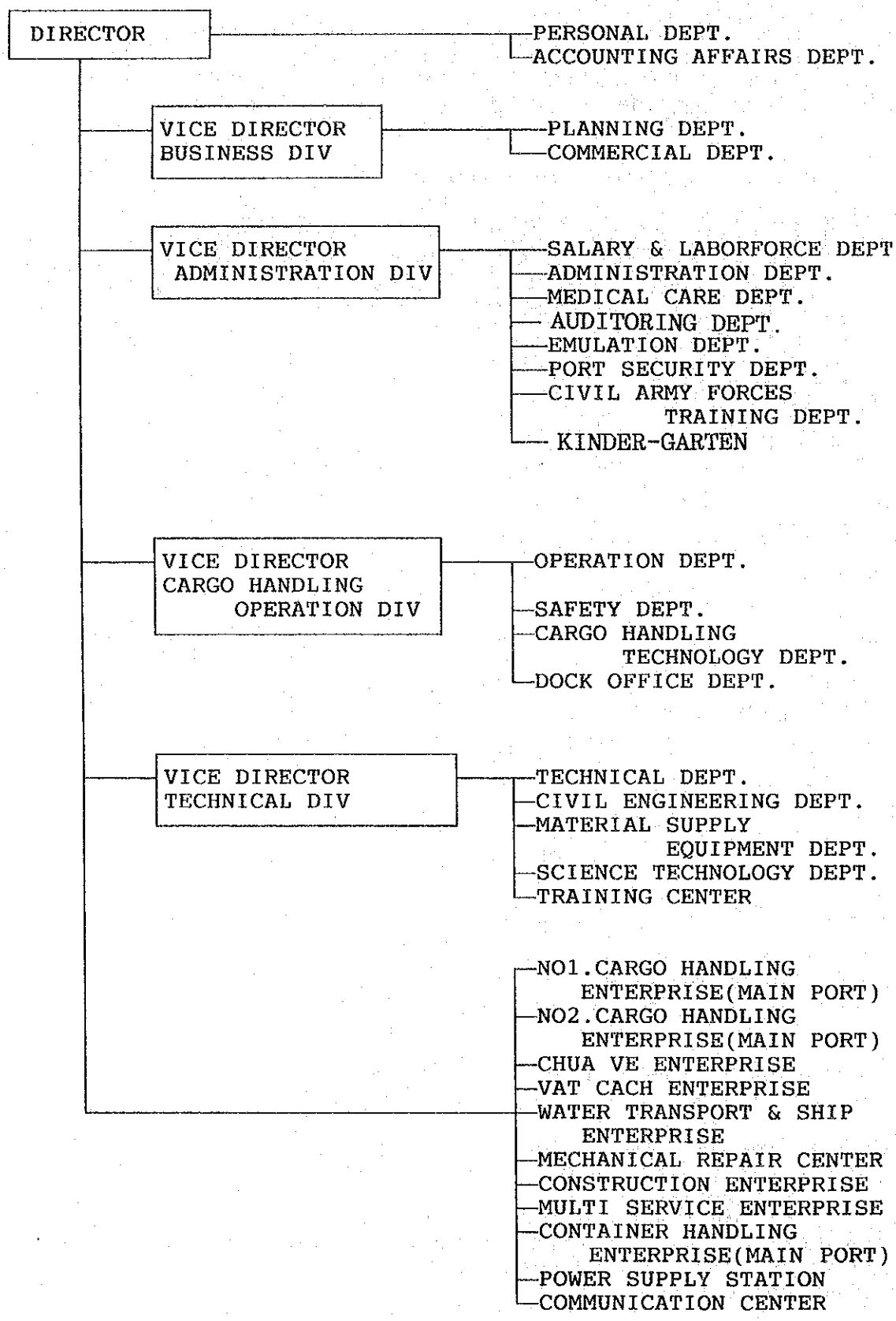
Working hours per month do not exceed 208 hours for every division.

10-3 Organization of Hai Phong Port Authority

10-3-1 Organization and Services Rendered

Hai Phong Port conducts various types of businesses besides stevedoring, for example, the operation of a hospital, restaurants and a kindergarten, and maintenance of loading and unloading machines.

Figure10-3-1 ORGANIZATION CHART OF HAIPHONG PORT



The port employs a large number of people, about 5,600 (the figure was over 6,000 a few years ago), and has a welfare service for employees and their families.

An organization chart of the Hai Phong Port Authority is shown in Fig.10-3-1.

Broadly, it is divided into two sectors: a Management and Control sector and an Actual Work sector. Under the director there are four deputy directors, the Personnel Division and the Accounting Affairs Division. The Authority has the four divisions of Business, Administration, Cargo Handling Operation, and Technical, headed by the four deputy directors. The Actual Work sector has 11 departments. Although they are called 'enterprises' in English, the departments are not independent and the Port Authority makes decisions on management, personnel affairs, budget, etc.

The management and operation system of Hai Phong Port is summarized as follows:

(1) Business Division

- Makes long-term and short-term management plans
- Port sales
- Establishes the Port Authority's policy

(2) Administration Division

- Employees' payroll control
- Employees' service control
- Port security
- Employees' welfare
- Operates a hospital and kindergarten
- Audits the management of business
- Improves productivity
- Civil army training

(3) Cargo Handling Division

- Makes plans for the use of berths and coordinates with the entities concerned
- Makes and adjusts stevedoring plans
- Controls freight transportation
- Safety control
- Technical study and improvement of matters related to stevedoring
- Supervises improvement, maintenance and inspection of loading and unloading machines and facilities

(4) Technical Division

- Improves technical ability

- Plans and executes civil engineering work
- Procures and controls maintenance materials
- Plans and executes facility maintenance
- Provides technical training to employees

(5) Actual Work Sector

- No.1 Cargo Handling Enterprise:

  In charge of berths nos.2-5
  loading/unloading of cargoes,
  counting, metage, and servicing of simple machines

- No.2 Cargo Handling Enterprise:

  In charge of berths no.6 and berths nos.8-11
  loading/unloading of cargoes,
  counting, metage, and servicing of simple machines

- Chua Ve Enterprise:

  In charge of the container terminals in the Chua Ve area and the piers of the Old Chua Ve area; loading/unloading of cargoes, counting, metage, and servicing of simple machines

- Vat Cach Enterprise:

  In charge of the Vat Cach area
  loading/unloading of cargoes, counting, metage, and servicing of simple machines

- Water Transport and Ship Enterprise:

  In charge of the control of working ships

- Mechanical Repair Center:

  In charge of the repair of loading/unloading machines, etc.

- Construction Enterprise:

  Civil engineering repair work of the port

- Multiservice Enterprise:

  In charge of purchasing, providing meals, and other

employee-related services

- Container Handling Enterprise:

  In charge of berths no.1 and no.7

- Power Supply Station:

  In charge of electric power distribution and facility control in the port

- Communication Center:

  In charge of communication in the port and among the various entities

(6) Facts about Employees

The average age of employees, numbering just over 5,600, is 36. Several of them work in jobs related to stevedoring.

The average annual salary is $300-340 (1992). The retirement age is 60. Between 1989 and 1991 more than 300 employees retired, and in 1992 about 80 retired.

Table10-3-1 Age of Workers

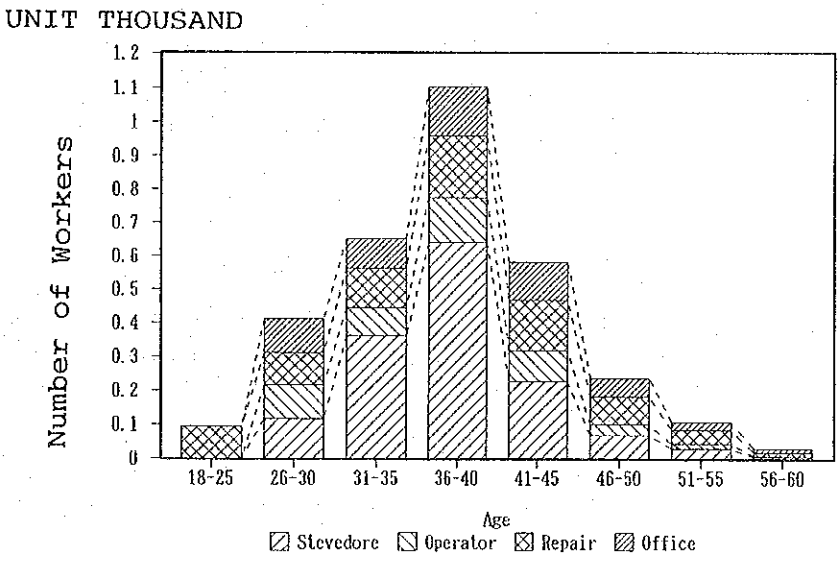
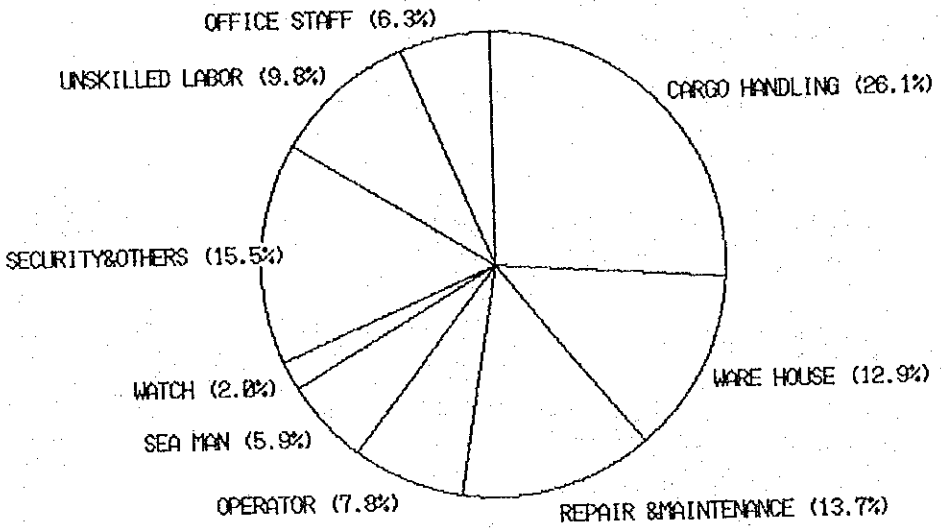
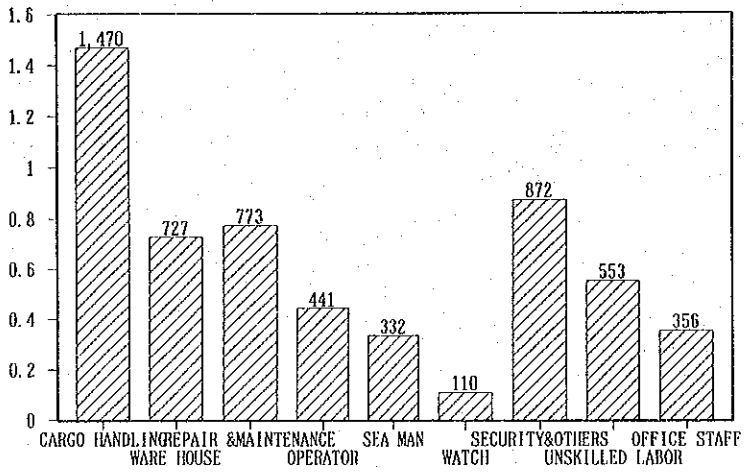


Table10-3-2 Workers by Occupation





10-3-2 Other Bodies Concerned

In Hai Phong port, besides the Port Authority there is a harbormaster, customhouse, pilot company, coast guards, national dredging company, national railway, etc.

Port Authority controles port facilities almost, there are some port facilities which are subject to the city, the navy, etc.

10-4 Present State of Management and Operation System

The Haiphong Port Authority has the Operation Department which belongs to the Cargo Handling Operation Division. This section assigns berths to all ships in the port, plans stevedoring, and plans port entry and departure.

Stevedoring work is performed by five cargo handling enterprises under the guidance of the Port Authority.