## Chapter 26 Terminal Layout / Operation and Channel Operation

To cope with neighboring countries, the scale of sea transport in Vietnamese waters must conform to international standards. The most important requirement in this respect is to have a container terminal that offers reasonable priced services and that could accommodate large containerships. The following plans for the feasibility study of priority projects are examined as the first stage to give a stimulus to sea transport in Vietnam in order to reach the final international standards.

Terminal scale and number, and number of calling vessels can be determined based on projected cargo volumes.

Table 26.1.1 Number of Ports and Calling Vessels by Cargo Distribution in SFEA

| 2010 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Group of site | Name of Port | Dry Cargo And Liquid Oil | Container | Size of Vessel | Number of Berth | Length of Berths | Depth of Berth | Average Volume per vessel | Number of calling vessels |
| | | Thousand Tons | Thousand TEUs | DWT | Units | Meter | Meter | Tons or TEUs | Units |
| HCMC Port Group | Saigon Port/Ben Nghe/Tan Cang (GC) | 9,600 | | 20,000 | Existing or | Var. | Var. | 5,000 | 1,920 |
| | Tan Cang/Saigon Port/Ben Nghe/VICT (CTNR) | | 760 | 20,000 | Improving | Var. | Var. | 450 | 1,689 |
| | Others | 3,000 | | 20,000 | | Var. | Var. | 5,000 | 600 |
| | Cat Lai Tang Cang | | Inc. | 20,000 | 2 | 303 | -11 | 450 | - |
| | Cat Lai (General) | 400 | above | 20,000 | 1 | 200 | -11 | 5,000 | 80 |
| | *Cat Lai (Container)* | | 300 | *20,000* | 2 | *200* | *-11* | *450* | 667 |
| | Hiep Phuoc Container Port (GC) | 400 | | 20,000 | 1 | 200 | -11 | 5,000 | 80 |
| | Hiep Phuoc CP (Container) | | 110 | 20,000 | 1 | 200 | -11 | 450 | 244 |
| | Refined Oil Ports | 6,750 | | 10,000 | N/A | Var. | Var. | 8,000 | 844 |
| | Sub Total | **20,150** | **1,170** | - | 7 | - | - | - | **6,124** |
| Thi Vai-Vung Tau Port Group | Go Dau/Baria Serece/etc. | 3,200 | | 30,000 | Existing | | | 3,000 | 1,067 |
| | Thi Vai General Port | 1,100 | | 50,000 | 2 | 300 | -14 | 15,000 | 73 |
| | Container Port (Lower Cai Mep) | | 600 | 50,000 | 2 | 300 | -14 | 1,500 | 400 |
| | Container Port (LCai Mep) | | 500 | 50,000 | 2 | 300 | -14 | 1,500 | 333 |
| | Dong Xuyen Port | 200 | | 10,000 | 1 | 200 | -9 | 3,000 | 67 |
| | Refined Oil Ports | 1,480 | | 10,000 | N/A | Var. | Var. | 8,000 | 185 |
| | Sub Total | **5,980** | **1,100** | - | 7 | - | - | - | **2,125** |
| | **Grand Total** | **26,130** | **2,270** | | **14** | | | | **8,249** |

Remark: Feasibility Study on the priority projects

| 2020 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Group of site | Name of Port | Dry Cargo And Liquid Oil | Container | Size of Vessel | Numb-er of Berth | Length of Berths | Depth of Berth | Average Volume per vessel | Number of call vessel |
| | | Thousand Tons | Thousand TEUs | DWT | Units | Meter | Meter | Tons or TBUs | Units |
| HCMC Port Group | Saigon Port/Ben Nghe/Tan Cang (GC) | 7,500 | | 20,000 | Existing or | Var. | Var. | 5,000 | 1,500 |
| | Tan Cang/Saigon Port/Ben Nghe/VICT (CTNR) | | 760 | 20,000 | Improving | Var. | Var. | 450 | 1,689 |
| | Others (GC) | 4,800 | | 20,000 | | Var. | Var. | 5,000 | 960 |
| | Cat Lai Tan Cang (Container) | | Include the above | 20,000 | 2 | 303 | -11 | 450 | - |
| | Cat Lai (General) | 400 | | 20,000 | 1 | 200 | -11 | 5,000 | 80 |
| | Cat Lai (Container) | | 300 | 20,000 | 2 | 200 | -11 | 450 | 667 |
| | Hiep Phuoc Container Port (GC) | 800 | | 20,000 | 2 | 200 | -11 | 5,000 | 160 |
| | Hiep Phuoc CP (Container) | | 380 | 20,000 | 3 | 200 | -11 | 450 | 844 |
| | Hiep Phuoc General Port | 5,800 | | 20,000 | 10 | 200 | -11 | 5,000 | 1,160 |
| | Refined Oil Ports | 12,400 | | 10,000 | N/A | Var. | Var. | 8,000 | 1,550 |
| | Sub Total | **31,700** | **1,440** | - | **20** | - | - | - | **8,610** |
| Thi Vai-Vung Tau Port Group | Go Dau/Baria Serece/etc. | 3,300 | | 30,000 | Existing | | | 3,000 | 1,100 |
| | Thi Vai General Port | 5,800 | | 50,000 | 6 | 300 | -14 | 15,000 | 387 |
| | Container Port (UCai Mep) | | 730 | 50,000 | 2 | 300 | -14 | 1,500 | 487 |
| | Container Port(LCai Mep) | | 1,100 | 80,000 | 2 | 350 | -16 | 2,500 | 440 |
| | Container Port (LCai Mep) | | 740 | 50,000 | 2 | 300 | -14 | 1,500 | 493 |
| | Container Port (LCaiMep) | | 740 | 50,000 | 2 | 300 | -14 | 1,500 | 493 |
| | Dong Xuyen Port | 400 | | 20,000 | 1 | 200 | -11 | 3,000 | 133 |
| | Refined Oil Ports | 4,200 | | 10,000 | N/A | Var. | Var. | 8,000 | 525 |
| | Sub Total | **13,700** | **3,310** | - | **15** | - | - | - | **4,058** |
| | **Grand Total** | **45,400** | **4,750** | | **35** | | | | **12,668** |

Remark: 1) Figures under the 'dry cargo and liquid oil' column refer to dry cargo except in the case of the refined oil ports.

2) Number of calling vessels is calculated by dividing total cargo volume for the port by average cargo volume per vessel, which is assumed to be volume discharged and loaded from /to the ship mentioned in the figure.

## 26.1 Terminal Layout and Operation

### 26.1.1 Terminal Layout Plan

In the candidate sites on the east side of the Thi Vai River, there are presently many rivulets and swamps with mangrove. But almost of all rivulets are not long and may not have much river stream. At the north end of the Lower Cai Mep Site, the Nga Tu Canal stretches from the back of Long Son

Island to Dinh River and is currently used by small boats. Therefore, available length of berth is limited, taking the depth of the river edge and available hinterland area into account.
Study Team proposed the Cai Mep site for container terminals from the south side of Nga Tu Canal to the downstream of the river. On the other hand, Thi Vai site is proposed as the site for general cargo terminals from the south side of Ong Trinh Village to the downstream of the river because Phu My site is already occupied by industrial terminals such as Ba Ria Serece, Power Plant Terminals and Phu My Steel Plant Terminal. And due to limited space available for berth development and anticipated larger vessels to call in the future, berths will be designed to accommodate fairly large vessel sizes (i.e. 50,000 DWT rather than 30,000 DWT).

The basic layout plan up to 2020 in the Thi Vai and Cai Mep sites is summarized in the following table.

Table 26.1.2 Terminal Layout Plan in Thi Vai and Cai Mep Sites (2010 & 2020)

| Site | Kind of Terminal | Number of Berth (Name of Berth) | Size of Vessel (DWT) | Terminal | | 2010 | 2020 |
|---|---|---|---|---|---|---|---|
| | | | | Length (m) | Depth (m) | **F/S | |
| Thi Vai Site | General Cargo | 2B(TVG-1/2) | 50,000 | 300x2 | 450 | **2B | 2B |
| | General Cargo | 2B(TVG-3/4) | 50,000 | 300x2 | 450 | | |
| | General Cargo | 2B(TVG-5/6) | 50,000 | 300x2 | 450 | | 2B |
| | Total | 6B | | 1,800m | 450 | 2B | 4B |
| | Total Area | | | | *** | 27 ha | 81 ha |
| Upper Cai Mep Site | Container | 2B(UCC-1/2) | 50,000 | 300x2= 600m | 550 | | 2B |
| | Total Area | | | | *** | - | 33 ha |
| Lower Cai Mep Site | Container | 2B(LCC1/2) | 80,000 | 350x2 | 650+80+60 | | 2B |
| | Container | 2B(LCC3/4) | 50,000 | 300x2 | *650+90+50 | **2B | |
| | Container | 2B(LCC5/6) | 50,000 | 300x2 | *650+90+50 | 2B | |
| | Total | 6B | | 1,900m | | 4B | 2B |
| | Total Area | | | *** | Exc. Pier | 66 ha | 125 ha |

Remark: * For 50,000DWT Container Berth means
650m (550m is yard depth plus 100m for future expansion)
90m is the length of bridge between pier and yard.
50m is the width of pier.
** Feasibility Study on project
*** Total area in 2020 includes one in 2020.

In addition, the following layout plans have been prepared for the feasibility study on the priority projects in 2010.

(1) Cai Mep International Container Terminal (LCC-3 and LCC-4)

Two (2)-berth container terminal (LCC-3 and LCC-4) for 50,000DWT vessels is planned in the Lower Cai Mep Site. The terminal shall be situated between two (2)-berth terminal in the upper

stream for 80,000DWT vessels planned in 2020 and two (2)-berth terminal in lower stream for 50,000DWT vessels planned in 2010. In the feasibility study, the terminal shall be designed to be able to accommodate 80,000DWT containership with maximum 12.5m draft, since such ships are anticipated to call this terminal a few times a week in 2010.

1) Berth Depth is –14m above CDL.

2) Detached pier is 600m in length and 50m in width for installing post-Panamax quayside (16 to 17 rows reach) container crane.

3) The terminal is 600m in length, and 550m in depth. However, an additional 100m in depth is reserved for use up to 2020, when the neighboring 80,000 DWT Terminal will be in operation.

4) Total number of ground slots is 2,800 TEUs per berth with 13 blocks, which is equivalent to 5,600 TEUs with 26 blocks for a two (2)-berth terminal.

5) Berth face line bend between Berth No. LCC-1/4 and LCC-5/6
The berth face line of LCC-5/6 will be bent by 22 degrees with one of LCC1/4 due to the river depth and shore configuration. Therefore additional triangular space will be produced in the hinterland between LCC-4 and LCC-5. The space will be used multipurpose such as empty vanpool and other necessary purposes. On the other hand, It should be considered that cranes and container yards in the terminal of LCC-3/4 and 5/6 can be used mutually by connecting facilities, though the rail span of quayside container cranes must be the same size and the rails be curved with necessary radius for crane transferring.

6) Facilities

① Administration Office
Administration Office must have separated compartment for each organization, which has different function. The related organizations will consist of terminal management / administration, documentation and yard control sections, and also Port Authority, Port Security police, Immigration, Quarantine, Pilot and many shipping agents concerned.

② Amenity Block
An amenity block will be necessary for stevedores to rest and stand by for next duty even the night. It is recommended that the administration Office and Amenity Block be in the same building to minimize occupied space and construction cost. The scale of the building will be 3,000m2 on the ground and four (4) floors will be required including various amenity facility such as dining room and rest rooms. The Control Center will be situated on the top.

③ Container Freight Station (CFS)
LCL cargoes shall be handled in CFS. The cargo volume is currently quite small, but is expected to increase in line with the experience of other Asian countries. It is assumed that the ratio of LCL will be about four (4) % out of container throughput in the future. Currently some of FCL cargo have been vanned and devanned in the terminal yards of HCM City Port Group, because of mainly traffic congestion in the city, but FCL cargo should be handled in ICD, IZ, consignee/shipper sites and so on. Then CFS should handle only LCL cargoes in

the future.

④ Maintenance Shop

To maintain equipment in sound condition and repair containers, maintenance shop will be indispensable. The shop shall have ceiling crane of 7–10 tons, spare part shelves, an engineer's office, etc, and be designed to service equipment other than RTG with more than seven (7) m in height and five (5) m in width. In addition, a special treatment facility for oil leakage shall be required around the shop.

⑤ Reefer Plugs and Monitoring Stages

Fishery products, which will be carried by reefer containers, are expected to greatly increase. According to the cargo forecast in 2010, 69,000 TEUs of fishery products will be expected in SFEA. Provided 25% out of 69,000 TEUs will be handled in this terminal, at least 400 reefer plugs will become necessary. Taking the number of reefer plugs and available space for container yard into account, monitoring stages for reefer containers are preferable to be installed near the Maintenance Shop.

⑥ Two Gates with weighbridges

Due to the long length of the terminal, it is preferable to prepare more than two (2) gates. On each gate with in and out lanes, catwalk stages shall be installed to inspect container conditions and five (5) or six (6) weighbridges be prepared under the ground of gate.

⑦ Container Washing Area / Power Station / Fuel Station / Water Supplying Facility

⑧ Equipment Yard / Truck Waiting Yard.

⑨ Fences

⑩ Others (i.e. Bond Shop and Seamen's Club)

7) Berth for pilot boats and tugboats

Up to 2020, a special berth shall be provided for tugboats and pilot boats to attend vessels calling the berths, but up to 2010, for the Thi Vai Site, a rivulet adjacent to the terminal will be used as temporary berth, and for the lower Cai Mep site, the both sides on the detached pier of the terminal can be used. Up to 2020, one (1) special berth is proposed to construct in the south side of the mouth of Nga Tu Channel for Cai Mep Site.

The under-mentioned table is the guidance for the terminal construction.
The dimensions of the facilities are based on the maximum terminal capacity.

Table 26.1.3 Facilities and Dimensions of the Proposed Lower Cai Mep two (2)-Berth International Container Terminal

| | Items | Description | Quantity (Ground Space) | Remark |
|---|---|---|---|---|
| 1. | Administration Office and Amenity Block | 30m x 100m<br>3 floors + 1 Floor (Control Center) | 3,000m2 | Two (2) entrance halls for Administration Office and Amenity Block |
| 2. | Container Freight Station | 120m x 50m | 6,000m2 | Floor height will be 1.2m for container on chassis, etc. |
| 3. | Maintenance Shop | 50m x 35m | 1,750m2 | Ceiling crane, spare part shelves, office and wide entrance for equipment |
| 4. | Container Washing Area | 15m x 20m | 300m2 | Steaming and air compressor |
| 5. | Power station | 15m x 20m | 300m2 | Necessary to supply power whenever city power cut |
| 6. | Fuel Station | 15m x 20m | 300m2 | For yard equipment |
| 7. | Water Supplying Facility | 20m x 20m | 400m2 | Pond, water tower and pumping machine |
| 8. | Lighting Tower | | More than 6 tower | It is preferable to place near fence side, provided light power available. |
| 9. | Main and Sub Gate | Main Gate (6 lanes)<br>50m x 30m<br>Sub Gate (4 lanes)<br>35m x 30m | 1,500m2<br><br>1,050m2 | Gatehouses, Catwalk, weighbridge 5 to 6 units<br>In gate: 6<br>Out gate: 4 |
| 10. | Equipment Yard / Truck Waiting Yard | 140m x 20m<br>100m x 20m | 2,800m2<br>2,000m2 | |
| 11. | Terminal Fence | | 1,800m | Pier and yard traffic to neighboring terminal shall be considered. |
| 12 | Seamen's Club | 30m x 20m | 600m2 | Including bond shop (If required) |
| | Buildings | Total | 15,000m2 | |

(2) Thi Vai International General Cargo Terminal (TVG-1 and TVG-2)

1) Two (2)-berth General Cargo Terminal (TVG-1 and TVG-2) for 50,000DWT vessels, is planned in Thi Vai site and the terminal shall be situated in the extreme upstream of the riverside among the 6 (six) berths for 50,000DWT vessels finally planned in 2020.

2) Berth Depth should be –14m above CDL, with the width of 50m, though the approach channel is

-12m in depth, because vessel with a maximum draft of 12.6m can stay at berth even during low water.

3) Berth length is 600m, and the size of terminal is 600m in length and 450m in depth, including 40m for apron and marshalling yard.

4) Two (2) warehouses and two (2) transit sheds, each with areas of 4,000m2, will be prepared. The warehouses and transit sheds shall be situated along the berth apron. Eight (8) open yards (14,400m2 in area each) will be situated in the back of warehouses and sheds. The cargo stowage area is 131,200m2, and is capable of stowing about 160 thousand tons of general cargo at the same time.

5) Track waiting area shall be prepared at both sides of the warehouses and sheds to make marshalling yard clear and minimize idling time for the next truck during cargo operation on ship.

6) Facilities

The details of facilities will be similar with the above container terminal.

① Administration Office
② Amenity Block
③ Warehouses / Transit Sheds
④ Open Yard
⑤ Maintenance Shop
⑥ Fuel Station
⑦ Power Station
⑧ Water Supplying Facility
⑨ Equipment Yard
⑩ Fence
⑪ Others (i.e. Seamen's Club)

The under-mentioned table lists the facilities in the proposed terminal.
The dimensions of facilities are calculated based on the maximum terminal capacity.

Table 26.1.4 Facilities and Dimensions of the Proposed Thi Vai two (2)-Berth International General Cargo Terminal

| | Items | Description | Quantity (Ground Space) | Remark |
|---|---|---|---|---|
| 1. | Administration Office | 60m x 30m | 1,800m2 | Two or three floors |
| 2. | Amenity Block | 40m x 30m | 1,200m2 | Two or three floors |
| 3. | Warehouse | 40m x 100m x 2 units | 8,000m2 | Sloped floors are recommendable. |
| 4. | Transit Shed | 40m x 100m x 2 units | 8,000m2 | Sloped floors are recommendable. |
| 5. | Open Yard | 120m x 120m x 8 Blocks | 115,200m2 | Truck ways are necessary inside yard |
| 6. | Maintenance Shop | 40m x 20m | 800m2 | Ceiling crane, spare part shelves, office |
| 7. | Power station | 15m x 20m | 300m2 | Necessary to supply power, whenever city power cut |
| 8. | Fuel Station | 20m x 20m | 400m2 | For terminal equipment |
| 9. | Water Supplying Facility | 20m x 20m | 400m2 | Pond, water tower and pumping machine |
| 10. | Lighting Tower | | More than 6 towers | It is preferable to place them near fence side, provided light power available. |
| 11. | Main and Sub Gate | Main Gate: 50m x 25m<br>Sub Gate: 30m x 25m | 1,250m2<br>750m2 | Gate houses will be required. |
| 12. | Equipment Yard<br><br>Truck Waiting Yard | 140m x 20m<br>50m x 20m<br>40m x 10m x 8 | 2,800m2<br>1,000m2<br>3,200m2 | |
| 13. | Terminal Fence | | 1,400m | Berth & Yard traffic connection to neighboring terminal shall be considered. |
| 14. | Seamen's Club | 30m x 30m | 900m2 | Including bond shop (If required) |
| | Total | For cargo stock | 131,200m2 | |
| | | For buildings | 9,000m2 | |

### 26.1.2 Terminal Operation

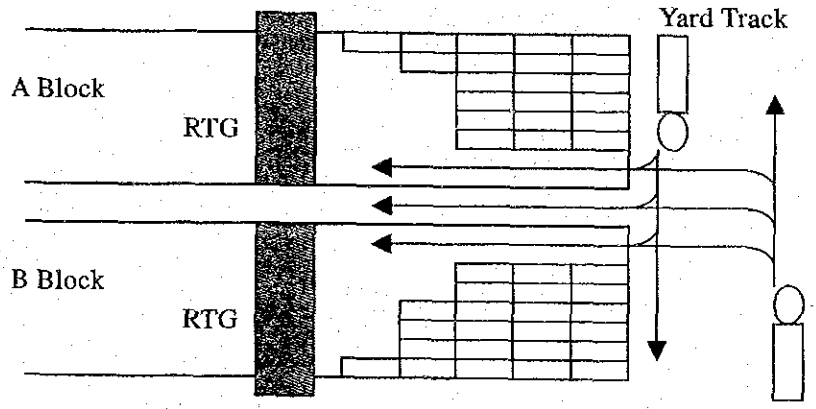
Basic system for terminal operation is as mentioned in Chapter 25, but due to the limited available length of berths, the size of terminal shall be larger than in the initial plan. Therefore, the following terminal operation will be applied for this two (2)-berth 50,000DWT general cargo terminal, while a more specious yard will be needed for two (2)-berth 50,000DWT container terminal.

(1) Container Terminal (LCC-3 and 4)

Generally, containers on board vessels are laden to door after except special ones such as reefer containers. On the other hand, the door direction of containers to be stacked in the terminal yard should be the same, because containers on a truck from outside will be loaded to door after, (though there are some different cases such as one 20'container to door after and another 20' to door fore on 40' chassis). The following container yard operation is to be based on the same direction stacked container system.

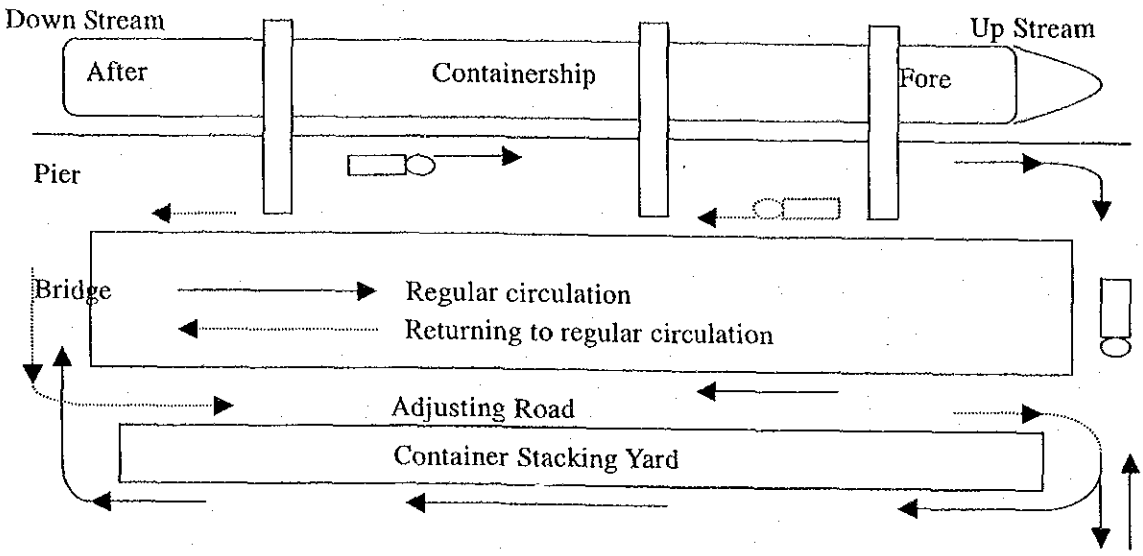
1) Combined operation system with transfer crane (Rubber Tyred Gantry Crane (RTG)) and tractor / chassis shall be introduced. The type of RTG to be introduced will be four (4) stacks and one (1) over, and six (6) lanes for stacking containers, and also one (1) lane for tractor traffic within its span, because the type is popular and fairly handy for operation.

Figure 26.1.1 RTG/Yard Truck Operation




2) Vessel should make fast to berth against the river stream from the viewpoint of safe navigation.
In case of this terminal, usually containership will come alongside on her head in (starboard side) due to river stream and then the circulation of yard vehicle movement is proposed to be clockwise for the purpose of placing containers in the yard on the same direction. Vehicles moving in the terminal must keep to the right on yard passage and their speed must be less than 20km/h from the viewpoint of safety.
If a containership berths on her head out due to some reason such as tidal current, vehicles to attend ship operation must return to regular circulation (clockwise) at the adjusting road in the yard.

Figure 26.1.2 Yard Truck Flow on Ship and Yard Operation




3) The distribution of containers in each yard needs to be well balanced in consideration of transhipment containers and local containers to be carried by mother and feeder containerships.

4) The terminal capacity will be 600 thousand TEUs for a two (2)-berth 50,000 DWT terminal, under the following assumptions, taking berth and yard capacities into account. But the above capacity will be in case of the commencement of the terminal due to less experience of management and operation. After experienced and improved the operation, the capacity will be expected to be maximum 740 thousand TEUs with full facilities and equipment.
   ① Annual working days per year: 347 days (5 % of the year unable to work due to bad weather).
   ② Average number of container stacks in the yard: three (3) high.
   ③ Average container dwelling time including empty container: seven 7 days (after improved 6 days)
   ④ Peak Ratio : 1.3
   ⑤ Comparison for number of 20' and 40' containers: 1:1
   Nowadays the ratio of 40' containers is increasing.
   ⑥ Productivity of quayside container crane: 20 boxes (30 TEUs) per hour (after improved, 25 boxes (37 TEUs))
   ⑦ Working hours per day: 24hours x 0.7 = 17 hours
   ⑧ Average number of containers to be loaded and unloaded per vessel: 1,500 TEUs for 50,000DWT vessel
   ⑨ Average number of quayside container cranes to attend to ship operation: 2.5 units
   ⑩ Number of necessary hours other than container operation for vessel (including hours of vessel berthing, unberthing and turning in the basin): four (4) hours
   ⑪ Total berthing hours occupied by a 50,000DWT containership: 33 hours = 1.36days (after improved, 27 hours (1.13 days)) (calculated by using the above factors)
   ⑫ Berthing Occupancy Ratio (BOR): 0.8 (schedule of containership can be regular)
   Trial calculation for BOR study in case of improved conditions for calling 50,000DWT

containership:

Annual workable days: 347days, 347days x 0.8 (BOR)=277days

277days ÷ 1.13 days = Maximum number of calling vessels = 245 per berth per year,

347days – 277days = 70 days (1,680 hours), 1,680 hours ÷ 245 = 7 hours, (berth vacant hours between sailed vessel and next calling vessel)

Container throughput in 2010 per this one berth is planned to be 300 thousand TEUs out of the maximum capacity (370 thousand TEUs), and then the number of calling containerships will be 200. Accordingly, the vacant hours would be 10 hours in 2010.

As a result, in case of more than two (2) available berths, the hours will be enough time for next vessel to call port without waiting, taking the following issues into account.

* ETA (Estimated Time of Arrival) and ETD (Estimated Time of Departure) of container ship will not be much different compared with actual time.
* It will take less than 1.5 hours for vessel maneuvering 12 nautical miles between Vung Tau Pilot Station and the berth.
* The related channels can accommodate 50,000 DWT vessels for 24 hours a day in both directions.

5) Control system by computer for EDI, documentation flow, and yard /ship operation must be introduced by converting existing software on the market appropriately. But DGPS, which can catch yard vehicles and containers in the yard immediately, is not recommendable at this time due to its unreliability and large investment involved.

6) The required capacity of CFS will be 6, 000 m2 for two (2)-berth 50,000 DWT terminal, provided number of LCL containers would be four (4) % out of container throughput (740,000TEUs). The capacity will have some margin in 2010.
The required area for the CFS is calculated on the formula as mentioned in Chapter 23.

7) The minimum required number of truck lanes at the main gate will be six (6) for a two (2)-berth 50,000 DWT terminal and the sub gate will be necessary to avoid traffic congestion at peak time. In addition, a number of weighbridges shall be provided at the gate.

The required number of truck lanes at gate is calculated on the formula below.

$$N = \{(Mc \times p) / (Dy \times H)\} \times (S/60)$$

Where:

N: Required number of truck lanes

Mc: Annual handling volume of containers (boxes) (assumed to be two thirds of annual container throughput)

P: Peak ratio (1.3)

Dy: Annual operating days (347)

H: Operating hours per day (24 x 0.7)

S: Necessary procedure time per truck (3 minutes)

8) Container operation for feeder boats and barges.
Although studied about the operation of large sized containership in this chapter, feeder

boats for domestic service and barges from / to Mekong Delta, Cambodia and ICD in inland water will call this terminal to carry transshipment, import and export containers. These boats shall be operated by quayside container cranes, during large sized containership will not occupy the berth.

9) Required number of container equipment is as follows:
The number of required equipment is based on the maximum terminal capacity.

Table 26.1.5 Required Equipment for the Proposed Cai Mep two (2)-Berth International Container Terminal

| No. | Item | Two (2)-Berth 50,000 DWT Container Terminal | Remark |
|---|---|---|---|
| 1. | Quayside Container Crane (Rail-mounted) | For post-Panamax. 6 units | 3 units x 2 berths |
| 2. | Transfer Crane (RTG) 4 stacks and 1 over, and 6 lanes for stacking containers | 15 to 18 units | Minimum 2 units per quayside container crane and other works |
| 3. | Tractor/chassis set (Basically, 40' chassis) | 36 units | *5 tractor/chassis sets per quayside container crane and 6 sets for other works |
| 4. | Side lifter, Top lifter, Reach stacker, Forklift, Weighbridge, etc. | Various<br>Lifters / Stackers: 4 to 6 units<br>Forklifts: 15 to 20 units | Side lifters, top lifters and reach stackers will handle empty containers.<br>2 to 4 T forklifts for CFS |

Remark: * Required number of tractor/chassis for ship operation is calculated under the following assumption.

① Productivity of a quayside container crane: 25 boxes (37 TEUs) /hour
② Yard track waiting time at the crane: 2.5 minutes
③ Yard track waiting time at RTG: 5 minutes
④ Average yard track speed: 15km/hour
⑤ Average one round distance by yard truck: about 1,200m

10) Maintenance System

In order to maintain container equipment all the time in sound condition, the following measures are necessary for terminal management.

① Fostering and training service engineers in the Maintenance Shop
Equipment supplier will usually provide the training and education of the maintenance.
② Periodical Inspection of equipment
③ Container equipment and its spare parts should be duly controlled by computer to improve its operation ratio by analyzing its breakdown time.

11) Personnel

400 to 500 persons will be necessary to work in this terminal, but some of them such as stevedoring, catering and cleaning sections can be outsourced. (See attached Appendix table)

(2) General Cargo Terminal (TVG-1 and 2)

- The size of this terminal will be rather large for general cargo ship, because even in the future the normal size of general cargo ship will be 20,000 to 30,000DWT to carry general cargo including long steel products and large size of construction goods which cannot be packed in container.
- Kinds of general cargo will be mainly fertilizer, steel products, agricultural products such as rice, coffee, wheat, sliced cassava, etc. And the form of cargoes will be bagged, palletized, pre-slung, break bulk or bulk. On the other hand, some completed cars by Pure Car Carriers (PCC) and containers by general cargo ships will be also handled in this terminal. Such large size of vessels as 50,000DWT will call here to carry mainly bulk cargoes like fertilizer.
- Considering the above kind of cargoes and type of vessels, the terminal must be multi-purpose in function.
- Up to 2010 for the feasibility study on the priority project, one (1) terminal with two (2) berths will be available. Since all kind of the above cargoes shall be handled here, it will be rather difficult to improve cargo-handling productivity. But after 2010, as the number of terminals will increase (six (6) berths will become available up to 2020), a few berths can be specialized for a large lot of bulk cargo carried by bulk carrier. Then cargo-handling productivity can be greatly improved. On the other hand, some of bulk cargo like fertilizer and agricultural products might be containerized.
- Therefore the design of the feasibility study on this terminal may be considered its conversion to specialized bulk terminal (and container terminal if necessary) after 2010.

The terminal operation is envisaged as follows, taking the above matters into account.

1) The terminal capacity will be expected maximum 1.6 million tons in 2010, and two (2) million tons in 2020 for a two (2)-berth 50,000 DWT terminal, taking berth and yard capacities into account. Because, available number of berths will increase to six (6) in 2020 and each terminal be in more efficient operation. The capacity in 2010 is calculated under the following assumptions, based on the ship operation of 50,000DWT general cargo ship.
   ① Annual working days per year: 347 days (365days x 0.95)
   ② Working hours per day: 17 hours (24 hours x 0.7)
   ③ Average cargo dwelling days in the yard: 25 days including bulk cargo.
   ④ Cargo capacity capable to be stowed in the warehouses/sheds/open yards: 164,000 tons
   The capacity is calculated by the formula below.
   Total cargo capacity stowed at the same time in the terminal: Area (m2) x 2.5m x available ratio (0.5)
   ⑤ Peak Ratio : 1.3
   ⑥ Cargo handling productivity with ship's gear and shore crane: 60 tons per hour
   The above figure is assumed to be the average of all general cargo including bulk.
   ⑦ Available gangs to attend ship operation per vessel: five (5) gangs
   ⑧ Average cargo volume to be loaded and unloaded per vessel: 15,000 tons for 50,000DWT vessel
   ⑨ Necessary hours other than cargo operation for vessel, including hours of vessel berthing, unberthing and turning in the basin: six (6) hours

⑩ Total berthing hours occupied by a 50,000DWT general cargo ship: 77 hours = 3.23 days
(The result is calculated by using the above factors)
⑪ BOR: 0.50 for two (2) berths

2) The cargo handling operations will be performed by ship's gears and shore cranes together.

3) It is recommendable that many forklifts attend shipside operation to carry cargo from/to adjacent warehouses and transit sheds directly, in case that the cargo must be stowed in covered storage area. This operation system has been adopted in many conventional berths throughout the world to reduce reliance on tracks for transiting cargo in the yard.

4) It is recommendable that each ground floor of warehouses and transit sheds provides slope by about four (4) degrees from seaside exit on ground level to the landside exit with one (1) meter in height above ground level. The recommendable facility is very convenient for forklifts as cargo can be loaded or received directly on /from outside truck at the ramp way of landside exit. This ramp way system is customarily introduced in CFS.

5) Vehicles in the terminal must keep to the right on yard passage so as not to meet with coming truck from the opposite side and also maintain a speed of less than 20km/h from the viewpoint of safety.

6) Export and import cargoes shall be separately stacked in the yard to avoid wrong delivery.

7) In case of cargoes to be protected from rain, long dwelling cargo must be stowed in warehouses and short dwelling one in transit sheds.

8) In case of cargoes stowed in warehouse and transit shed, it is very convenient for cargo operation to /from outside trucks to use the exit lamp way by means of forklift operation as mentioned above.

9) To improve bulk cargo handling productivity, it is recommendable to provide removable hopper and automatic belt conveyor with casters to reach to the stockyard, in case that considerable volume of bulky cargo is discharged from ship.

10) For the operation of compact cargoes such as bags and cartons, it is recommendable to use potable aluminum conveyor with roller, which shall be movable by manpower.

11) Various types and quantities of equipment may be introduced depending on the type of operation. To improve cargo- handling productivity at a multi-purpose terminal, the following type and quantities of equipment are recommended.

Table 26.1.6 Desirable Kinds and Number of Equipment for General Cargo Terminal

| No. | Item | Two (2)-Berth 50,000 DWT GC Terminal | Remark |
|---|---|---|---|
| 1. | Multi-purpose Shore Crane (Rail-mounted) | For 10-40 T 6 units | 3 units x 2 berths<br><br>Cranes and ship's gears should be used together. |
| 2. | Mobile cranes | Various (40-100T) | To attend ship's operation |
| 3. | Floating Cranes | One (100-300T) | For heavy cargo |
| 4. | Tractor/low bed chassis | For 40-50 T/unit<br>Tractor 10 units<br>Low bed chassis 40 units | To carry cargo between shipside and stockyard |
| 5. | Forklift | For 2-4 T/unit<br>More than 50 units | To carry cargo between shipside and warehouses / transit sheds and also attend at cargo stock area. |
| 6. | Grab, hopper, belt conveyor | Various | To carry bulk cargo to stock yard |
| 7. | Pneumatic unloader | Various | To discharge grain |
| 8. | Portable belt conveyor with roller | Various | To carry unit cargo like bags and cartons |
| 9. | Bulldozer / Excavator | Various | For trimming bulk cargo in stock yard |
| 10. | Grain sucker with grab | Various | For grain operation |
| 11. | Bagging machine | Various | To put bulk in bag automatically |
| 12. | Side lifter, Top lifter, Reach stacker | Various | For handling containers |
| 13. | Weighbridge | Various | To prepare near the gate |
| 14. | Sling, spreader, pallet, etc. | Various | To use cargo handling |

12) Personnel

800 to 1,000 persons will be necessary to work in this terminal, but some of them such as stevedoring, catering and cleaning sections can be outsourced. (See attached Appendix table)

13) Rationalization

General Cargo Terminal generally needs lot of workers although its cargo handling productivity will only be one-forth of that of container terminal. Therefore the following matters need to be considered for efficient operation of Thi Vai International General Cargo Terminal:

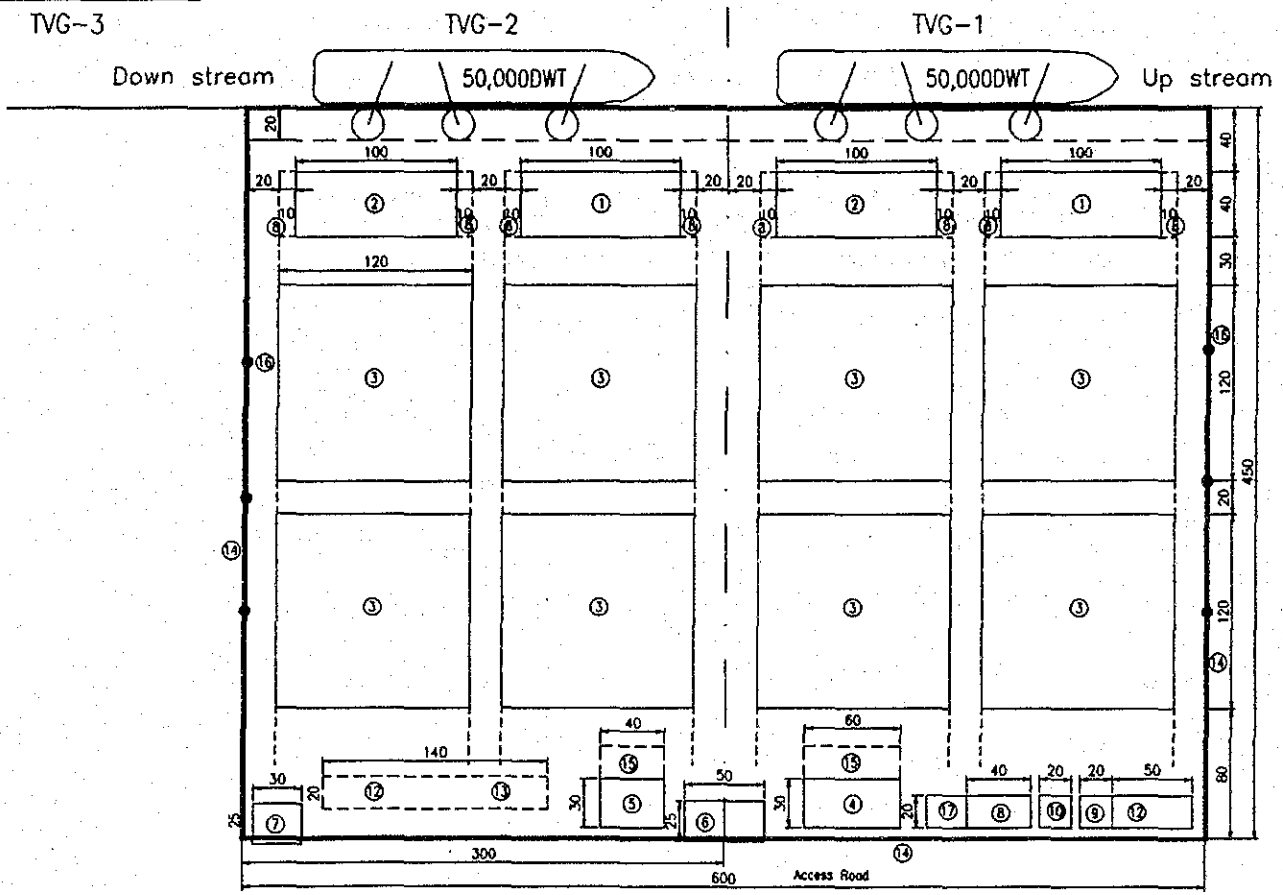
Many kinds of cargoes shall be handed such as heavy cargo, large size (long and high) cargo, dirty and clean bulk cargo, completed cars and containers laded by general cargo ship as well

as general cargo.

① Number of workers engaged in the terminal shall be minimized by means of appropriate cargo handling equipment.
② Cargo handling productivity shall be improved by using appropriate cargo handling equipment.
③ Cargo dwelling time in the terminal shall be minimized.

**Figure 26.1**

# Thi Vai International Genreral Cargo Terminal (50,000DWT)




Legend

| | |
|---|---|
| ① | Warehouse |
| ② | Transit Shed |
| ③ | Open Yard |
| ④ | Administration Office |
| ⑤ | Amenity Block |
| ⑥ | Terminal Main Gate |
| ⑦ | Terminal Sub Gate |
| ⑧ | Maintenance Shop |
| ⑨ | Fuel Station |
| ⑩ | Power Station |
| ⑪ | Truck Waiting Area |
| ⑫ | Equipment Yard |
| ⑬ | Truck Waiting Yard |
| ⑭ | Fence |
| ⑮ | Parking |
| ⑯ | Lighting Tower |
| ⑰ | Water Supplying Facility |

SCALE
0 50 100 150m

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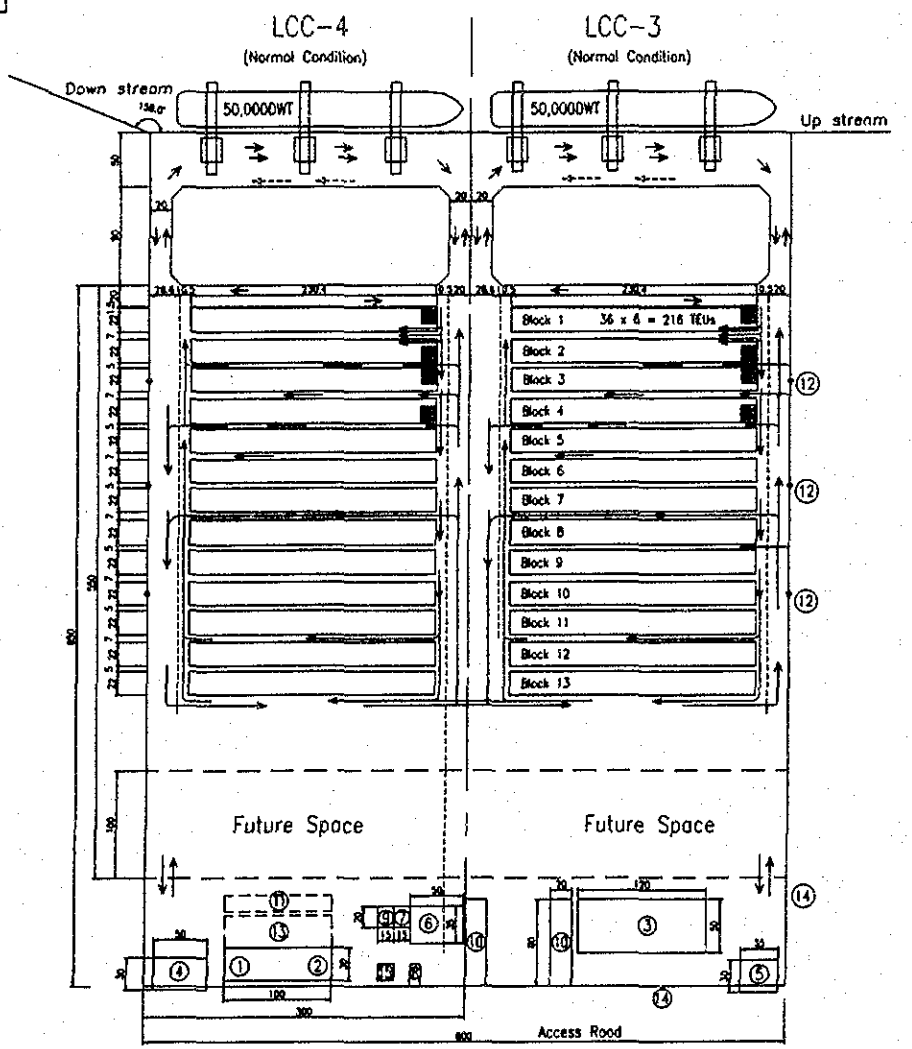
**THE PORT DEVELOPMENT STUDY IN THE SOUTH OF VIETNAM**
(THI VAI INTERNATIONAL GENERAL CARGO TERMINAL)

SCALE: DRAWING No.:

**Figure 26.2**

# Cai Mep International Container Terminal (50,000DWT)




Legend

| | |
|---|---|
| ① | Administration Office |
| ② | Amenity Block |
| ③ | Container Freight Station |
| ④ | Main Gate (Weighbridge) |
| ⑤ | Sub Gate |
| ⑥ | Maintenance Shop |
| ⑦ | Container Washing Area |
| ⑧ | Power Station |
| ⑨ | Fuel Station |
| ⑩ | Equipment Yard |
| ⑪ | Truck Waiting Yard |
| ⑫ | Lighting Tower |
| ⑬ | Parking Area |
| ⑭ | Fence |
| ⑮ | Water Supplying Facility |

SCALE
0 50 100 150m

JAPAN INTERNATIONAL COOPERATION AGENCY

THE PORT DEVELOPMENT STUDY IN THE SOUTH OF VIETNAM
(CAI MEP INTERNATIONAL CONTAINER TERMINAL)

SCALE: | DRAWING No.:

## 26.2 Channel Operation

(1) Number of calling vessels in SFEA in 2010 and 2020

According to the calculation from the anticipated cargo volume in 2010 and 2020, the number of calling vessels to HCM City Port Group and the Thi Vai River / Vung Tau Port Group is expected to be more than 8,000 in 2010 (an increase of 1.3 times over 2000) and 12,000 in 2020 (a twofold increase) as shown in Table 27.1.1 and 27.2.1. As the calculation is made on the assumption that cargo will be handled by large sized vessels, an ever greater number of vessels can be expected. Therefore channel traffic in these waters will require special control from the viewpoint of safe navigation.

Table 26.2.1 Forecasted Number of Calling Vessels to SFEA in 2010 and 2020

| Name of Passing Place or Channel | Number of calling vessels more than 10,000DWT | |
|---|---|---|
| | 2010 | 2020 |
| Vung Tau Pilot Station | 8,249 vessels | 12,668 vessels |
| **For HCM City Port Group** | | |
| Long Tau River Channel | 6,124 vessels | 8,610 vessels |
| **For Thi Vai / Vung Tau Port Group** | | |
| Dinh River Channel | 67 vessels | 133 vessels |
| Thi Vai River Channel | 2,058 vessels | 3,925 vessels |
| Cai Mep Site Approach Channel | 2,058 vessels | 3,925 vessels |
| Thi Vai Site Approach Channel | 1,325 vessels | 2,012 vessels |
| Phu My to Go Dau Site Approach Channel | 1,252 vessels | 1,625 vessels |

Remark: ① The number of calling vessels is calculated on the assumption that all cargo will be carried by more than 10,000DWT vessels. Therefore the number of calling vessels will be substantially greater, because a considerable number of small vessels including barges will still come to SFEA in the future.

② Tankers carrying liquid cargo for HCM City Port Group are included in the 'Long Tau River Channel' column.

③ Tankers carrying liquid cargo for Thi Vai / Vung Tau Port Group are included in the ' Phu My to Go Dau Site Approach Channel' column.

Vessel traffic number will be more than double that above. Because the vessels will come in and out, or move to other ports in between HCM City Ports and Thi Vai / Vung Tau Ports.

(2) Channel Dimensions

The dimensions of the approach channels to the above terminals shall be decided as follows:

Table 26.2.2 Planned Approach Channels to the Terminals in 2010 and 2020

| 2010 | | | | | |
|---|---|---|---|---|---|
| | Name of Channel | Length (N. Mile) | Width | Depth | Remark |
| 1. | Vung Tau Approach Channel (From '0' Buoy) | 5.9 NM<br>5.9 NM | 310m | -14m | Outer River (2 ways) |
| 2. | Thi Vai River Approach Channel (From '5' Buoy) | 5.0 NM<br>10.9 NM | 310m | -14m | Outer River (2 ways) |
| 3. | Lower Cai Mep Site (From the river mouth) | 2.7 NM<br>13.6 NM | 310m | -14m | Inner River (2 ways)<br>Turning Basin: 450m |
| 4. | Upper Cai Mep Site | 2.2 NM<br>15.8 NM | 310m | -12m | Inner River (2 ways) |
| 5. | 'S' shape Bent | 1.2 NM<br>17.0 NM | 200m | -12m | Inner River (1 way for vessels more than 30,000DWT) |
| 6. | Thi Vai Site | 1.5 NM<br>18.5 NM | 310m | -12m | Inner River (2 ways)<br>Turning Basin: 320m |
| | Total | 18.5 NM | | | |

Remark: For vessels greater than 50,000DWT (LOA 267m), all of the channels must be one (1) way.

| 2020 | | | | | |
|---|---|---|---|---|---|
| | Name of Channel | Length (N. Mile) | Width (m) | Depth (m) | Remark |
| 1. | Vung Tau Approach Channel (From '0' Buoy) | 5.9 NM<br>5.9 NM | 420m | -16m | Outer River (2 ways) |
| 2. | Thi Vai River Approach Channel (From '5' Buoy) | 5.0 NM<br>10.9 NM | 420m | -16m | Outer River (2 ways) |
| 3. | Lower Cai Mep Site (From the river mouth) | 2.7 NM<br>13.6 NM | 420m | -16m | Inner River (2 ways)<br>Turning Basin: 450m |
| 4. | Upper Cai Mep Site | 2.2 NM<br>15.8 NM | 310m | -14m | Inner River (2 ways)<br>Turning Basin: 400m |
| 5. | 'S' shape Bent | 1.2 NM<br>17.0 NM | 200m | -12m | Inner River (1 way for vessels more than 30,000DWT) |
| 6. | Thi Vai Site | 1.5 NM<br>18.5 NM | 310m | -12m | Inner River (2 ways)<br>Turning Basin: 320m |
| | Total | 18.5 NM | | | |

(3) Issues to be studied

1) Entrance of Ganh Rai Bay

There are four (4) entrances to SFEA ports in Ganh Rai Bay as described in Chapter 7.

① To HCM City Port Group through the Long Tau River

② To the Thi Vai River and Vung Tau Port Group

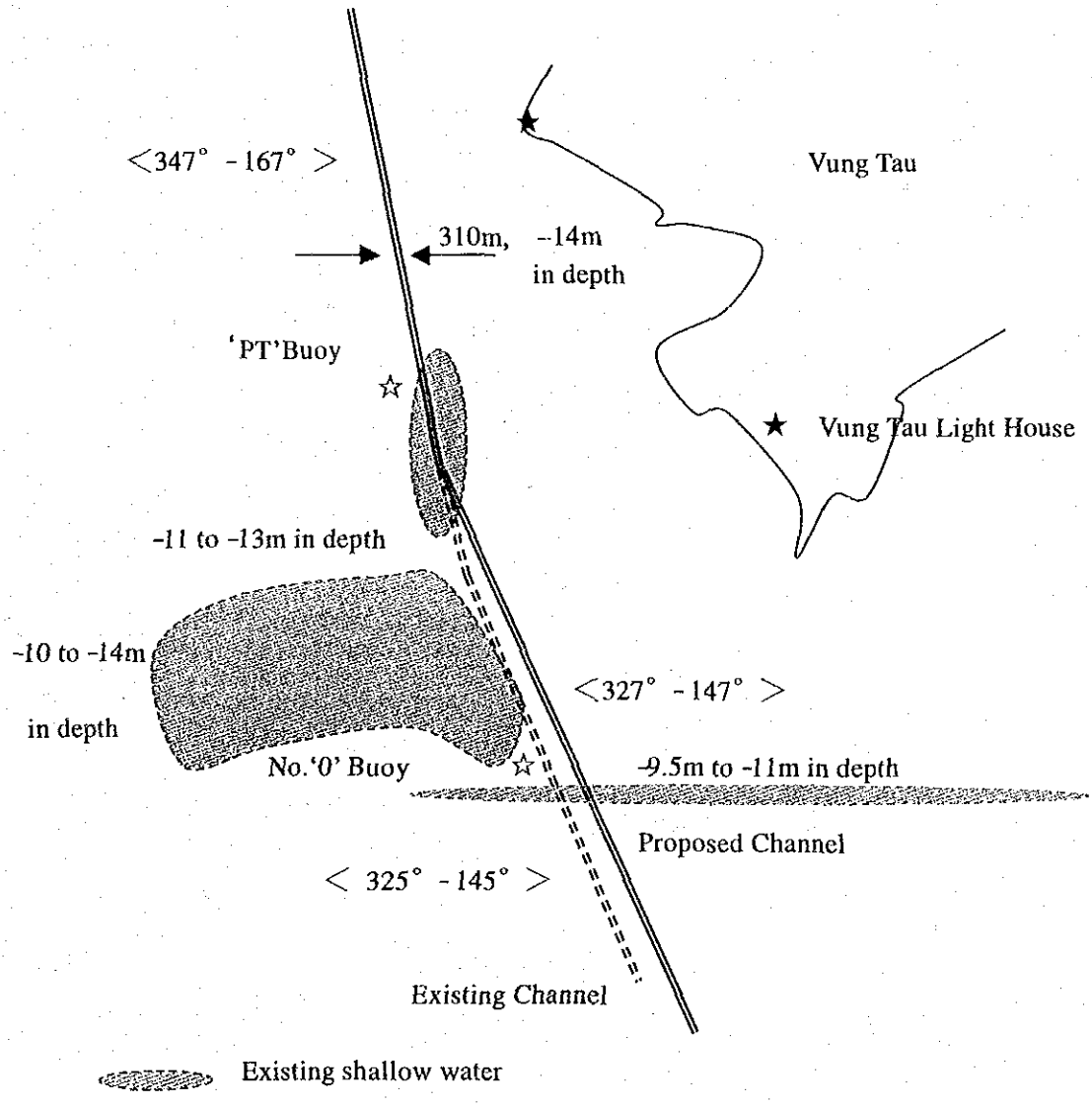
③ To Hiep Phouc Ports including HCM City Ports through the entrance of the Soai Rap River
④ To My Tho and Cambodian Ports (connecting to Tien River) through the Tieu Entrance

The study on the Priority Project is executed about the above②. And the following shallow channel must be dredged up to –14m in depth for 50,000DWT vessels with full draft to pass safely 24 hours a day with both ways.

- There are two (2) shallow belts across the proposed channel in the mouth of Ganh Rai Bay. One (1) is spreading around WSW 1.5 Nautical Miles (NM) from Vung Tau Light House (10° -20'N, 107° -05'E), which is –11 to -13m in depth, and another is stretching from west to east with about 500m band, situated in 1,000m south from No.'0'buoy (2.5 NM south from Vung Tau Light House), which is –9.5m to –11m in depth.

- Study Team proposes to draw the following new channel, which would have a depth of –14m.

Figure 26.2.1 Proposed new deep channel in the mouth of Ganh Rai Bay



However, if the proposed channel would be in outer sea condition, its width and depth might be considered.

2) Confluence among the Long Tau River, Thi Vai River channels and Dinh River to Ben Dinh Sao Mae

As mentioned above, vessel traffic volume in SFEA will reach 17 thousand vessels in 2010 and 25 thousand in 2020. In other words, 47 vessels in 2010 and 69 in 2020 will come in and out in a day. These vessels will meet at the confluence of the Long Tau, Thi Vai and Dinh Rivers. In this regard, special attention must be paid to this confluence.

The following four (4) guidances are proposed for the confluence traffic.

① Basically outgoing vessels have priority over ingoing vessels.
② War ships, Passenger boats, Containerships, Car Carrier, Tanker will have priority in that order.
③ Vessels in Long Tau, Thi Vai, Dinh River Channels will have priority in that order.
④ Larger vessels will have priority.

3) 'S' Bent channel in the Thi Vai River

'S' shape bent channel between Upper Cai Mep and Thi Vai Site is very deep, but narrow and sharply bent (2,200m in length, 200m in width with a bent of more than 90 degrees). Therefore vessels more than 30,000DWT (Vessel with LOA more than 200m) shall keep one-way navigation there.

4) Turning Basin

Proposed turning basins in front of Thi Vai International General Cargo Berths and Cai Mep International Container Berths shall be 320m and 450m in diameter respectively. These berths will be able to accommodate 50,000DWT vessels in Thi Vai Site and 80,000DWT vessels in Cai Mep Site. When large vessels are turning there, other vessels, which are passing the channel, shall wait at the outside of turning basin.

5) Berth Depth

① Thi Vai General Cargo Berths shall be –14m in depth with 50m in width and the depth of both berth edges shall spread towards 30 degrees from the berth face line for vessels to be able to go alongside and leave the berth safely, though the approach channel will be –12m in depth.
② Cai Mep Container berths shall be –14m in depth including approach channel.

6) Bent channel

Each bent channel shall be wider than planned width with the radius of curvature of not less than 1,000m.

7) Distance between the Channel in the river and the berths

The channel adjacent to every berth along the river shall be at least 120m to 150m apart from berth, because a wake behind a passing vessel would seriously disturb cargo operations on ship alongside berth.

8) Ship's speed in the river channel

The vessel speed in the channel shall be reduced, taking the above 7) into account.

9) Anchorage

There are 57 anchorages on the west side of Vung Tau Approach Channel, of which 15 anchorages are more than –14m in depth. Therefore existing anchorages can be used for deep draft vessels in 2010.

10) Approach channel to Vung Tau port Group

The Dinh River Channel to access Vung Tau port group is currently as follows:

① The channel from Buoy No.5 of Vung Tau to Vietsovpetro Port is –7.0m in depth and 50m in width.

② Cu Lao and Cat Lo Channels are –5.7m and –3.9m in depth respectively.

(Decision No.4/PC of the Director of Vung Tau Port Authority in 1996 and the information of Vungtau Pilot Enterprise in July, 2001)

In this study, Dong Xuyen (IZ) Port along the Dinh River is planned. The approach channel for 10,000DWT vessels for Dong Xuyen Port shall be –7m in depth and 70m in width in 2010 and for 20,000DWT vessels be –8.5m in depth and 120m in width in 2020. Therefore the present channel shall be deepened and widened.

11) Aids to navigation

Existing lighthouses, light beacons and light buoys can be used by shifting them, when the channel be deepened and widened. But additional light beacon or light buoys shall be installed, in particular, at the extreme south in the entrance of Ganh Rai Bay for vessels to be able to approach No.'0' buoy and pilot station. Distance between buoys in the channel shall normally be about 1,500m, although almost of all existing buoys are now installed in the distance, but additional buoys will be required at each bent of channels in spite of the distance.

12) Tug boats

As the size of calling vessels will be larger in 2010, after established 50,000DWT channel in this water, tugboat companies shall provide at least two (2) to three (3) tugboats with greater than 2,500HP for the Thi Vai River Ports.

13) Strengthening of pilots

Number of extra class pilots who can handle a vessel of more than 20,000 GRT, shall be increased. Therefore, the training system must be strengthened. It is recommended to send pilots to developed countries where ship-handling simulators are available.

So far, as mentioned in Chapter 16, it is recommended that the captain of vessel who calls the same port area frequently can be exempted to take pilot for the purpose of reduction of traffic congestion at pilot station and of pilot charge.

(4) Vessel Traffic Service (VTS)

For vessel traffic safety, efficiency and protection of environment, VTS in SFEA will be definitely necessary as the number of calling vessels will increase year by year.

1) VTS by the Port Authority of HCM City

As mentioned in Chapter 16, Port Authority of HCM City has installed VTS hardware covering waters between HCM City Port Area and Vung Tau Pilot Station and the system is now being tested. The system is divided into two (2) zones which are separated at around Longitude 106□-57'E. West side is Zone 1 (under the control of HCM City Control Center) and East side is Zone 2 (under the control of Vung Tau Control Station).

2) Issues to be studied

In order to use VTS system practically in the future, the following issues shall be considered.

① Training and fostering of VTS operators

VTS operators must well know ocean going vessels and vessel traffic in the channel, and also be able to communicate by VHF in English with the captain of vessels. They are preferable to have an experience of deck officer of ocean going vessel.

② To control small boat traffic

Small boats like barges, fishing boats will be very difficult to be caught by VTS radar for maritime surveillance. According to Vung Tau Port Authority, about 90 % out of maritime accidents and incidents in this water has been caused by small boats, in particular, fishing boats. Even if Vietnamese Government would ratify and introduce SOLAS Chapter Ⅴ, which recommends vessels more than 300 GRT serving in international water and 500 GRT in domestic water shall install AIS and VDR, such small boats as less than 300 GRT for international service and 500 GRT for domestic might not be covered.

③ To control wide water traffic by VTS

SFEA water is wide and has many channels. As it is very difficult to cover the water by one (1) control center, two (2) or three (3) control stations shall be provided and the system, which each station can communicate each other closely to surveille a vessel movement in succession, shall be established.

④ Common regulation to cover SFEA water (HCMC, Dong Nai and Baria Vung Tau Province)

As mentioned above, almost of calling vessels will pass Vung Tau Pilot Station and the junction (confluence) of three (3) channels, though their destinations will be different. Therefore, a common navigation regulation for VTS covering HCM City, Thi Vai River and Baria Vung Tau Ports shall be established.

⑤ The scope of the service rendered by VTS

According to IMO A.857(20), the following matters concerning the services that are rendered by VTS are guided.

a) Information service

The information service is provided by broadcasting information at fixed times and intervals or when deemed necessary by the VTS or at the request of a vessel, and may

include for example reports on the position, identify and intentions of other traffic; waterway; conditions; weather; hazards; or any other factors that may influence the vessel's transit.

b) Navigation Assistance Service

The navigation assistance service is especially important in difficult navigational or meteorological circumstances or in case of defects or deficiencies. This service is normally rendered at the request of a vessel or by the VTS when deemed necessary.

c) Traffic Organization Service

Traffic organization service concerns the operational management of traffic and the forward planning of vessel movements to prevent congestion and dangerous situations, and is particularly relevant in times of high traffic density or when the movement of special transports may effect the flow of other traffic. The service may also include establishing and operating a system of traffic clearances or VTS sailing plans or both in relation to priority of movement, allocation of space, mandatory reporting of movements in the VTS area, routes to be followed, speed limits to be observed or other or other appropriate measures which are considered necessary by the VTS Authority.

It would be very difficult to perform all of the above guidance when starting VTS.
Therefore when commencing the service, first of all, it should start from the above a), then proceed to b) and c) step by step, after each step could be conducted completely.

⑥ Control of small boats

It may be the most important to control and manage small boats, in particular, fishing boats, because the lack of information for the boats and of discipline of the crew may be an obstruction against VTS control.

3) VTS System in 2010

The following system would be proposed for VTS in SFEA water up to 2010, taking the above issues into account.

① VTS in this water shall be operated by one (1) organization.

Port Authority of HCM City has provided VTS hardware to cover the area through the Long Tau River between HCM City ports and Vung Tau Pilot Station ,and is going to commence the operation. Therefore the Port Authority shall have the initiative of the VTS in cooperation with Vung Tau and Dong Nai Port Authorities under the control of VINAMARIME.

② Zone 3 shall be established in addition to Zone 1 and 2.

Existing Zone 1 and Zone 2 will only cover the movement of vessels calling HCM City ports. For the future, Zone 2 shall cover Vung Tau Port Area in addition to the area between the border of Zone 1 and Vung Tau Pilot Station, and Zone 3 is proposed to cover the movement of vessels calling Thi Vai River Ports.

③ Additional radar shall be installed along the Thi Vai River

One (1) new radar will be necessary to surveille the movement of vessels calling Thi Vai River Ports.

⑤ Additional Control Station shall be prepared to cover Zone 3.

The station may be settled in the existing VTS control Station in Vung Tau.

⑥ Scope of the Service

As mentioned above, the service shall be started from the information service and then improve step by step after the first step could be completely performed.

⑦ Detailed Information of Calling Vessels

Control Center and Stations shall have the detailed information of calling vessels shall be received in advance from shipping lines or shipping agents by E-Mail and file the information in the computer of the station. The information will consist of vessel's size, speed, ETA or ETD, kind and volume of cargo, port of call, and so on.

⑧ Local Navigation Regulation to cover SFEA Water

To cope with the increase of maritime traffic volume in SFEA water, a special navigation regulation for VTS in SFEA water shall be established to stipulate restriction of vessel speed, priority for kind of vessels, priority of vessels passing channel and restriction when vessel turning in the basin, restriction for large vessels in one way channel and so on.

⑨ Countermeasures against the movement of small boats

It may be very difficult to control and manage the movement of small boats in SFEA water. First of all, it will be most important to thoroughly teach the VTS regulation to the captains and crew of small boats by means of special measures such as lectures and brochures. But that will be not much effective. As the future countermeasures, special surveillance boats like Coast Guard Boats would be prepared in the water area of high traffic density for small boats to keep the regulation.

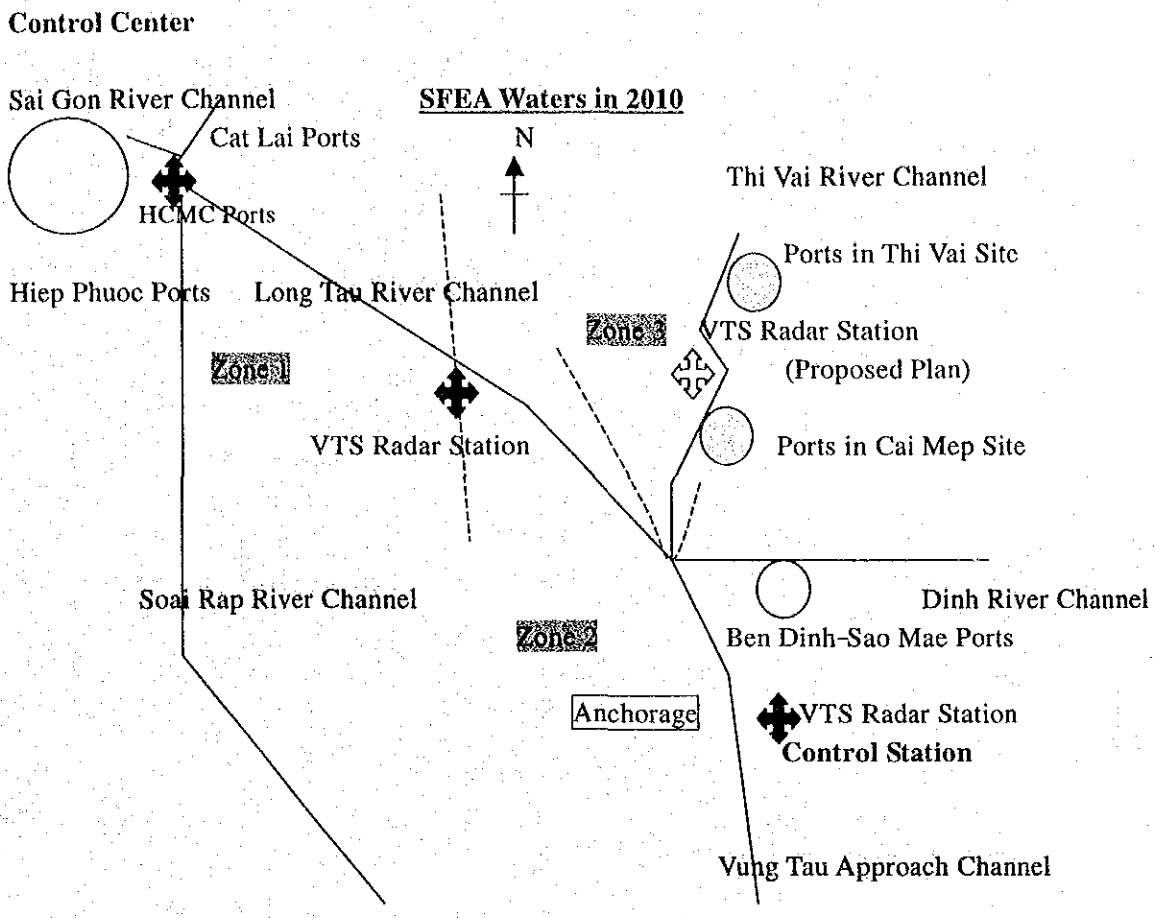
⑩ Training and Fostering of VTS Operators

The candidates of VTS operators shall be trained and fostered in developed countries, which render the service for long time, and then qualified as the operator.

⑪ Future Study other than the above Zones

After developed inland waterways among Mekong Delta, SFEA including Soai Rap River Channel and Cambodia, further study concerning VTS shall be required.

Figure 26.2.2 VTS System in SFEA Water




A Flowchart of the VTS System is as mentioned in Chapter 14.