

VI REGIONAL DEVELOPMENT RELATED TO THE PORT ACTIVITIES OF THE PORT OF BALBOA

6.1 Reverted Areas

6.1.1 Current Situation

1) Area of the Canal Zone

1. The Canal Zone is scheduled to revert totally to Panama from U.S. Army control before the year 2000 under the Torrijos-Carter Treaty in September 1977(in vigor as from October 1979). The area thereof is 147,400 ha including water area, which is shown in Figure 6-1-1.

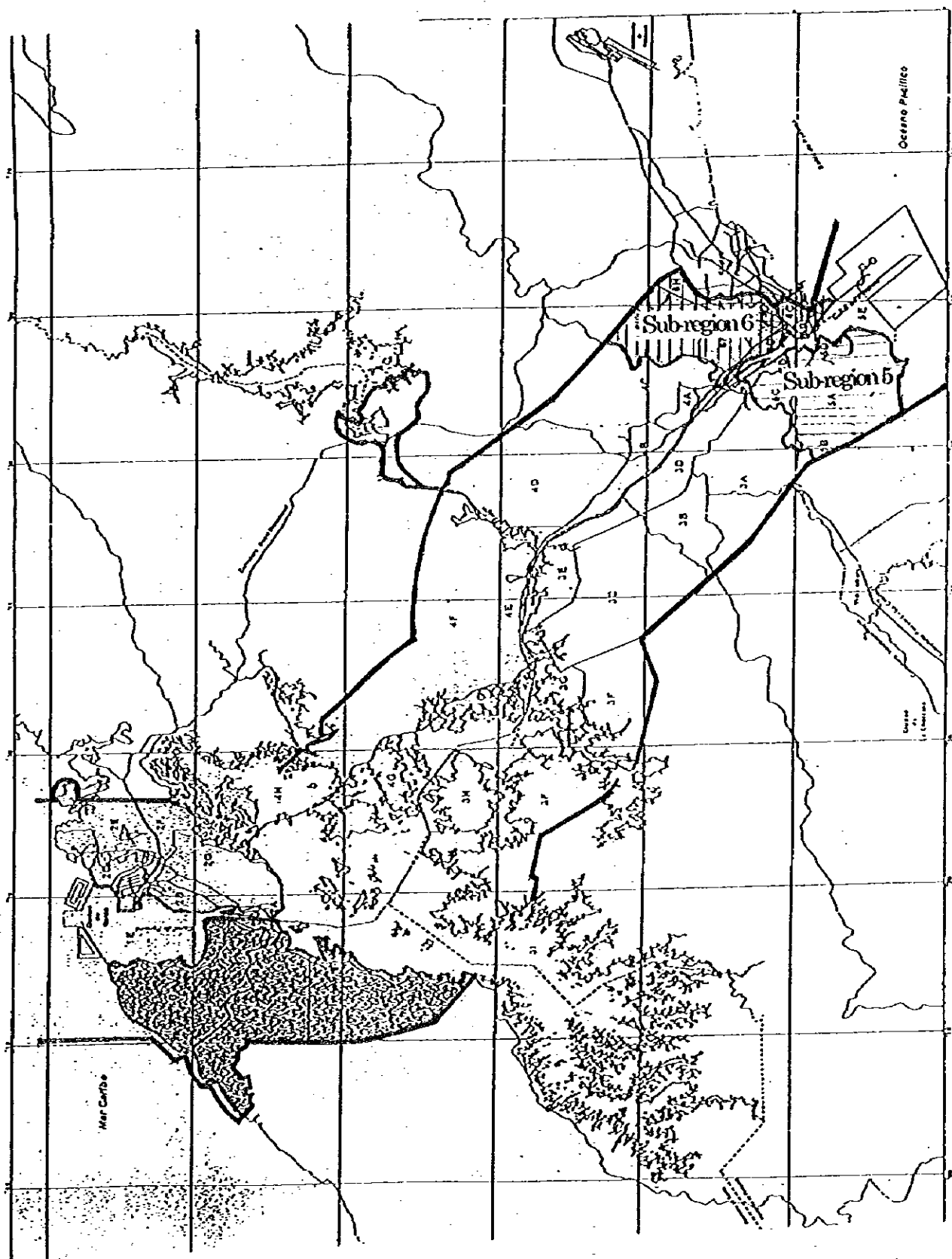


Figure 6-1-1 Sub-regions of the Canal Zone

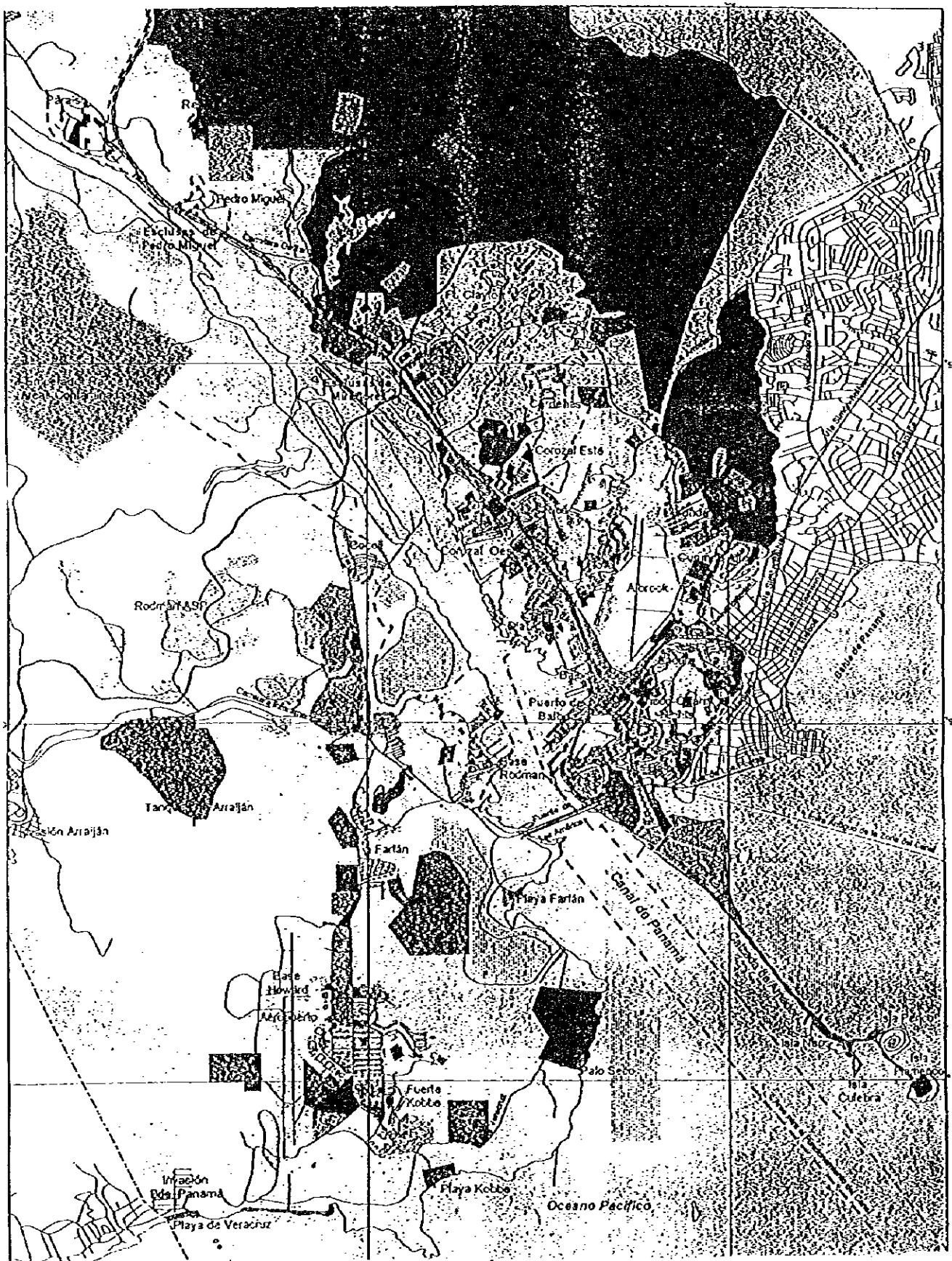


Figure 6-1-2 Pacific Side of the Canal Zone

2) Actual Land Use in the Canal Zone

2. Actual land uses in the Canal Zone are classified as shown in Table 6-1-1.

Table 6-1-1 Actual Land Uses in the Canal Zone

| Type of Use | Areas(ha) | % |
|----------------------|-------------|--------|
| 1.Rural Area | 43,686.0 | 46.3 |
| 2.Green Area | 36,465.8 | 38.6 |
| 3.Industrial Use | 862.7 | 0.9 |
| 4.Comercial Use | 218.7 | 0.2 |
| 5.Housing | 3,635.8 | 3.9 |
| 6.Institutional Use | 455.8 | 0.5 |
| 7.Transportation* | 1,739.0 | 1.8 |
| 8.Infrastructure | 1,088.6 | 1.2 |
| 9.Historic Heritage | 28.3 | 0.0 |
| 10.Contaminated Area | 5,582.9 | 5.9 |
| 11.Canal | 621.5 | 0.7 |
| Total | 94,385.1 ha | 100.0% |

Note) *Transportation includes the maritime and port transportation area of 352.3 ha.

Source: "Plan General de Uso, Conservacion y Desarrollo del Area del Canal" presented to ARI by Intercarb SA/Nathan Associates, Inc, April '96.

3) Areas of the Pacific Region

3. Out of 94,385.1 ha, total area of land in the Canal Zone, the areas at the Pacific side are 11,892.3 ha; 5,845.4 ha at the East side and 6,046.9 ha at the West side.(Sub-regions 5 and 6 of Figure 6-1-1)

4. The East side includes;

| | |
|-------------|---|
| Fort Amador | 199.9 ha |
| Balboa | 86.9 |
| Ancon | 262.4 |
| La Boca | 499.0 (In this area the Port of Balboa is found, having area of 161.4 ha) |

| | |
|-----------------------------|--------------|
| Albrook | 648.5 |
| Clayton | 794.7 |
| Las Cruces National Park | 1,510.9 |
| Metropolitan Park | 945.3 |
| <u>Patacon Hill</u> | <u>897.9</u> |
| Total | 5,845.4 ha |

5. The West side includes;

| | |
|------------------|--------------|
| Howard | 3,872.1 ha |
| Arraijan-Sureste | 458.5 |
| Rodman | 1,009.9 |
| <u>Farfan</u> | <u>706.4</u> |
| Total | 6,046.9 ha |

See Map 6-1-2.

6. The areas related to the development of the Port of Balboa at the first phase will be those of the East side above, especially, La Boca, Balboa, Albrook, Fort Amador and a part of Ancon. If it becomes necessary to expand the development area in the future in accordance with the development of port activities of the Port of Balboa, the area of Base Rodman (around 498 ha, including maritime area of 9 ha) will be considered for expansion area.

6.1.2 Schedule for Reversion

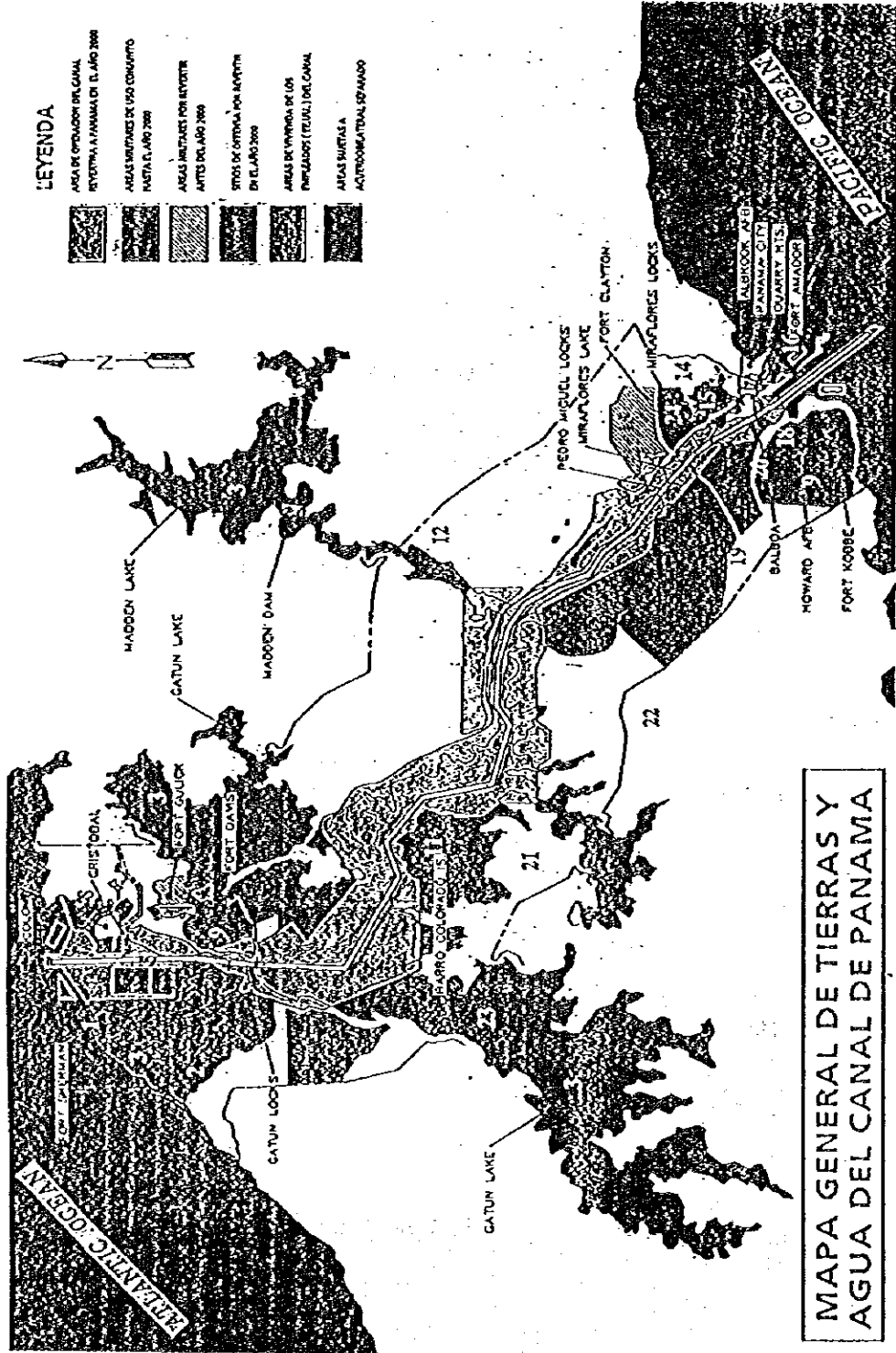
1) Total Schedule

7. Many areas of the Canal Zone including port area have already reverted to Panama up to date. ARI (Autoridad de la Region Interoceanica) has a total schedule for reverting of areas of the Zone up to the year 1999. Map 6-1-3 shows its schedule.

2) Transfer Schedule of U.S. Military Property to Panama

8. What follows is a transfer schedule of U.S. military property to the government of Panama:

| <u>Year</u> | <u>Area</u> | <u>Property</u> |
|-------------|-------------------------------|--|
| 1996 | Fort Amador | 80 ha 185 homes, office buildings, pool, golf club, tennis courts, 3 island, & others |
| | Fuel Storage Area at Arraijan | 36 fuel storage tanks |
| | Curundu | 75 ha 116 homes, school, warehouses, pool, theater, & others |
| | Empire Range | 4,100 ha (out of a total of 21,327.5 ha) |
| 1997 | Albrook Air Force Base | 310 ha 468 homes, dormitories, pool, & others |
| | Gorgas Hospital | 30 ha 10 buildings, equipment, & others |
| 1998 | Quarry Heights | 31 ha 86 homes, offices, social club, & others |
| | Herrick Heights | Panama Canal College Communication center, & others |
| 1999 | Fort Clayton | 800 ha 1,300 homes, office builds., & others |
| | Howard Air Force Base | 2,100 ha 700 homes, airport, school, & others |
| | Fort Kobbe | 2,494 ha 264 housing units, warehouse ,etc. |
| | Fort Sherman | 9,200 ha 67 homes, landing strip, & others |
| | Rodman Naval Base | 240 ha 86 homes, 3 ship docks, & others |
| | Cocoli | 70 ha 162 housing units |
| | Corozal | 154 ha 60 housing units, school, & others |



| | | | | |
|---|---|----|------------------------------------|----|
| 1 | Industria | 9 | Puerto de Contenedores | 17 |
| 2 | Combar - Centro de Ecoturismo | 10 | Aeropuerto Internacional | 18 |
| 3 | Instituto de Investigación Tropical Eda Smithsonian | 11 | Áreas Residenciales | 19 |
| 4 | Parque Nacional Soberanía | 12 | Abastecimiento de Combustibles | 20 |
| 5 | Parque Nacional Camino de Cruces | 13 | Silvicultura | 21 |
| 6 | Parque Nacional Metropolitano | 14 | Granjería Estabulada | 22 |
| 7 | Área Institucional y Académica | 15 | Pecuicultura | 23 |
| 8 | Turismo y Recreación | 16 | Áreas Residenciales para Jubilados | 24 |

Figure 6-1-3 Reversion Schedule of the Canal Zone up to 2000

6.1.3 Future Plan

9. ARI has a land use plan of the reverted areas including the areas to revert for the following three major purposes; ① Maritime sector ② Tourism and ③ Industrial parks.

10. As to the maritime sector, the principal purpose is to promote both ports of Balboa at the Pacific side and Cristobal including the adjacent ports at the Atlantic side.

11. What follows is a synopsis of the project:

a) Manzanillo International Terminal Panama, S.A.

This U.S.-Panamanian joint venture port opened in 1994 and will be expanded with an investment of 100 million U.S. dollars before 1997.

b) Evergreen

The world's largest shipping company Evergreen of Taiwan has a project to construct the 24-ha "Colon Container Terminal" at Coco Solo Norte, which consists of phases 1~4. The phase 1(10 ha) is now ongoing and a part of the port operation is expected to start in July 1997, and will be completed at the beginning of 1998. Evergreen also has a plan to build hotels, facilities for fuel storage and fuel sales. In addition, the company has a plan to build a nautical school that would supply its own ships with qualified seamen.(Evergreen has hired 25 persons every year out of the graduates of Panamanian Nautical School).

c) Arraijan Fuel Storage

The operation of Arraijan fuel storage at the west side of the Pacific sub-region which will revert totally to Panama in 1997 will provide bunkering and sell fuel to the ships transiting the Canal.

d) Service Center for Transiting Passengers

Each year, around 14,000 ships and hundreds of thousands of people transit the Canal. This Center will sell them personal items, boat and engine parts, foods for cruise lines and so on.

e) Seamen's Training Center

Two training centers are envisioned at both the Pacific and Atlantic sides.

The centers will train Panamanians in the maritime profession and provide shipping lines with professional seamen for crew rotations.

f) **World Cargo Distribution Center**

Under the project which has been proposed by a Canadian consortium, the center will provide shipping companies with information on the whereabouts of their cargo, its time-of-arrival and other important data.

g) **Container Storage and Repair Center**

The project is at present planned only at the Atlantic side. The center will serve the container ports on the Atlantic coast and improve competition in the industry.

h) **Maintenance and Repair of Vessels**

Two centers for ship repairs are envisioned at both the Pacific and Atlantic sides. This service will be offered while the vessels are waiting to enter the Canal, which gives Panama a unique advantage over other ports.

12. In regard to Tourism, as the Canal Zone includes many beautiful and green areas, there is a big potential for development of tourism. IPAT (Tourism Institute of Panama) is cooperating with ARI on a number of projects in the Canal Zone. What follows is a synopsis of the project at present.

a) **Gamboia**

Gamboia which lies on Gatún Lake is considered to be one of the richest bio-diverse zones in the Western Hemisphere. In the area there live thousands of species of birds and other wildlife such as monkeys and manatees. It is an ideal location for the development of eco-tourism and a tourism village.

b) **Fort Amador**

Fort Amador is a beautiful area at the Pacific entrance to the Canal, where visitors can watch ships coming in and out of the Canal and look out the Panama City skyline. There are at present many recreational facilities, such as a golf course, a marina, a beach, a playing field, and restaurants, etc. A consulting company EDSA recently proposed a master plan for new development of the area which consists of the construction of hotels, a professional golf course, a shopping center, improved recreational facilities and a trolley system to the islands.

c) **Panama to be "Port of Call"**

The Amador Master Plan also includes a cruise ship pier, where cruise passengers (around 270 cruises each year) that transit the Canal will disembark and experience a bit of Panama. The pier will be located at the tourism area that contains recreational facilities, a golf course, shopping, a restaurant and three lush tropical islands connected by a causeway.

d) **Arts and Crafts Market**

A new arts and crafts market will be built by ARI and the City of Panama. The new market will be located near the tourism development area of Fort Amador and offer visitors a wide selection of "molas", the colorful stitched cloth pieces made by Kuna Indian women, as well other traditional arts of Panama.

13. Regarding Industrial Parks, reverted areas have a big potential for development of industry, because near or within the Canal Zone there are two big cities of Panama and Colon. To be competitive with other countries, it is indispensable to create duty-free zones in the Zone, like "Export Processing Zones" (EPZs) which will give incentives to foreign and domestic investors.

14. An Agreement of Understanding has been signed between the Government of Panama and Taiwan for the creation of an export processing zone in Fort Davis near Gatún Locks. This project is a joint venture between ARI and ODIC, a Taiwanese holding corporation. According to ARI, other groups from Asia and South America are interested in additional industrial park operations at Fort Davis.

Note) The export processing zones (EPZs) will be stated later in detail.

15. ARI is looking into other projects in the reverted areas than the above three purposes, such as ;

a) **Best Use of Gorgas Hospital**

Gorgas Hospital will be transferred to Panama in October 1997.

b) **Best Use of Former School of the Americas**

This former U.S. military academy is located in an area of natural beauty near Colon.

- c) **Reforestation of Canal Watershed**
Recently, ARI has started a program to reforest 3,500 ha of watershed area under concessions to private sector.
- d) **City of Knowledge**
The city of knowledge will consist of three entities: University of the Americas, non-profit research centers, such as the Smithsonian Institute, and training programs toward producing skilled professionals.

6.2 Colon Free Zone

6.2.1 Institutional Scheme

1) Establishment

16. The Government of Panama issued the Decree-Law No.18 on June 17, 1948 (some Articles were amended by Act. No.22 of June 23, 1977) to establish Colon Free Zone. The Free Zone was created as an Institution of the State that has its own legal identity and is autonomous. At that time, also the Administration was organized to operate the Free Zone.

2) Law and Regulations

17. The laws and regulations which regulate the activities of Colon Free Zone are as follows;

- .Decree-Law No.18 (June 17, 1948) fundamental law
(Amended by Act No.22 of June 23, 1977)
- .Decree No.428 (September 7, 1953)
- .Act No.23 (June 23, 1977)
- .Decree No.48 (April 14, 1978)
- .Decree No. 5 (January 19, 1979)
- .Law No.28 (June 20, 1995)
(Amended by Law No.62 of September 19, 1996)

3) Main Objective Activities

18. Main objective activities are re-exportation of the goods for Central and South America.

4) Development and Management Entity

19. The Administration of Colon Free Zone was established under the above Decree-Law No.18 to operate the Zone.

5) Restriction on Activities

20. The followings are the main restrictions on activities:

- a) More than 60 % of goods should be re-exported.
- b) More than 5 Panamanian workers should be employed.
- c) Retails is not permitted.
- d) Residence is not permitted.

6) Areas and Projects Applied

21. The area already developed is 174.9 ha (Colon sector 59.4 ha and France Field sector 115.5 ha). Legally , Decree-Law No.18 is applicable within Province of Colon, but considering the conditions of location it will actually be limited in the areas of Colon and its adjacency.

6.2.2 Commercial Activities

22. The first building in the Free Zone opened in September 1952, and three commercial activities in the Zone started in next September 1953 with an area of 5.6 hectares and 10 companies. The Zone expanded remarkably during the 70's economic development in Central and South America, and by 1978 the entire area was occupied. To meet the great demand for more space, it became necessary to use the land known as "France Field", which had reverted to Panama through the Torrijos-Carter Treaty in 1977 (in vigor as from October 1979). Between 1980 and 1983 a total amount of 130 million U.S. dollars furnished by a private bank group, the World Bank and so on was used to prepare land areas and maintain the roads in France Field.

23. Today there are around 1,600 companies (including representative) established in the Zone to expedite importation, storage, assembly, re-packing, and re-exportation of large amounts of goods from all over the world, from electronic devices of all kind to pharmaceutical products, including also other goods such as liquor, cigarettes, office and home furniture, clothing, shoes, jewels, toys, etc. The Free Zone is functioning as a transit center to re-export these goods mainly to Central and South America.

24. Past records of commercial activities in the Free Zone for last 10 years (from 1986 to 1995) are shown in Table 6-2-1, Figure 6-2-1 (trade volume in metric tons) and Figure 6-2-2 (trade value in U.S. dollars). The commercial activities in volume and value had increased year by year from 1986 to 1994 except a decline of 1988 (-14.7 % in volume and -7.5 % in value compared with 1987) due to U.S. economic sanctions against Panama in the same year.

25. As to the year 1995, the trade in volume compared with the previous year 1994 decreased by 15.2 % (-14.8 % in importation and -15.5 % in re-exportation), while the trade in value showed a slight increase by 2.17 % (+5.09 % in importation and -0.34 % in re-exportation).

26. As to the import origins of cargo (in volume) through the Free Zone in 1994, predominant is Hong Kong (33.9 %), followed by U.S.A. (15.2 %), Taiwan (10.8 %), South Korea (8.1 %), Italy (5.4 %) and Japan (4.1 %), as shown in Table 6-2-2.

27. Regarding the re-export destinations of cargo (in volume) through the Free Zone by country/area in 1994, the most important is Central and South America. Predominant is Colombia (25.4 %), followed by Ecuador (11.2 %), Panama (11.2 %), Cuba (4.9 %) and Brazil (4.8 %), as shown in Table 6-2-2. By the way, Aruba (the Netherlands Antilles) had occupied the first position from '87 to '92.

28. As for the transit means of cargo of importation in 1993, the share of the maritime transportation was 97.1 % and 95.8 % in 1994 (in volume, respectively). Although the share of the Port of Balboa in '93 was only 2.9 % (18,273 t) of total importation volume (622,203 t), it remarkably increased by 13.6 % (100,587 t) in '94. This is due to the increase of cargo from Asia, as the Port of Balboa is located at the Pacific side. On the other hand, the share of the Port of Cristobal decreased from 78.7 % in '93 to 64.1 % in '94, while the share of the Port of Coco Solo was 10.0 % in '93 and 9.9 % in '94. See Table 6-2-3.

29. In regard to re-exportation, unlike imports, transit means is not exclusively by ship because the main destinations are Central and South America which are easily accessible by land and/or air. The share of maritime transportation was 70.8 % in '93 and 71.4 % in '94. The share of the Port of Balboa in '93 was 4.6 % and 4.7 % in '94 of total transportation volume, while that of the Port of Cristobal was 39.9 % in '93 and 38.0 % in '94, and that of the Port of Coco Solo was 21.0 % in '93 and 22.3 % in '94. See Table 6-2-3.

Table 6-2-1 Commercial Movement in Colon Free Zone, 1986-1995
(in volume and value)

| YEARS | Commercial Movement | | I m p o r t a t i o n | | Re-exportation | |
|-------|---------------------|--------------|-----------------------|--------------|----------------|--------------|
| | Weight | Value | Weight | Value | Weight | Value |
| | (met. ton.) | (millions\$) | (met. ton.) | (millions\$) | (met. ton.) | (millions\$) |
| 1986 | 476,904 | 4,113.4 | 250,757 | 1,930.8 | 226,147 | 2,182.6 |
| 87 | 513,297 | 4,283.2 | 270,922 | 2,005.2 | 242,375 | 2,278.0 |
| 88 | 437,654 | 3,963.0 | 226,954 | 1,843.6 | 210,700 | 2,119.4 |
| 89 | 533,262 | 4,642.3 | 281,847 | 2,272.8 | 251,415 | 2,369.5 |
| 90 | 597,804 | 5,762.9 | 309,746 | 2,676.6 | 288,058 | 3,086.3 |
| 91 | 859,822 | 7,640.8 | 450,235 | 3,681.1 | 409,587 | 3,959.7 |
| 92 | 1,057,009 | 9,198.4 | 563,613 | 4,365.1 | 493,396 | 4,833.3 |
| 93 | 1,184,337 | 9,646.2 | 622,203 | 4,495.7 | 562,134 | 5,150.6 |
| 94 | 1,441,343 | 10,673.6 | 739,675 | 4,923.8 | 701,668 | 5,749.8 |
| 95 | 1,222,900 | 10,904.8 | 630,100 | 5,174.3 | 592,800 | 5,730.5 |

Note) 1990~1995 Preliminary Figures

Source : Administration of Colon Free Zone

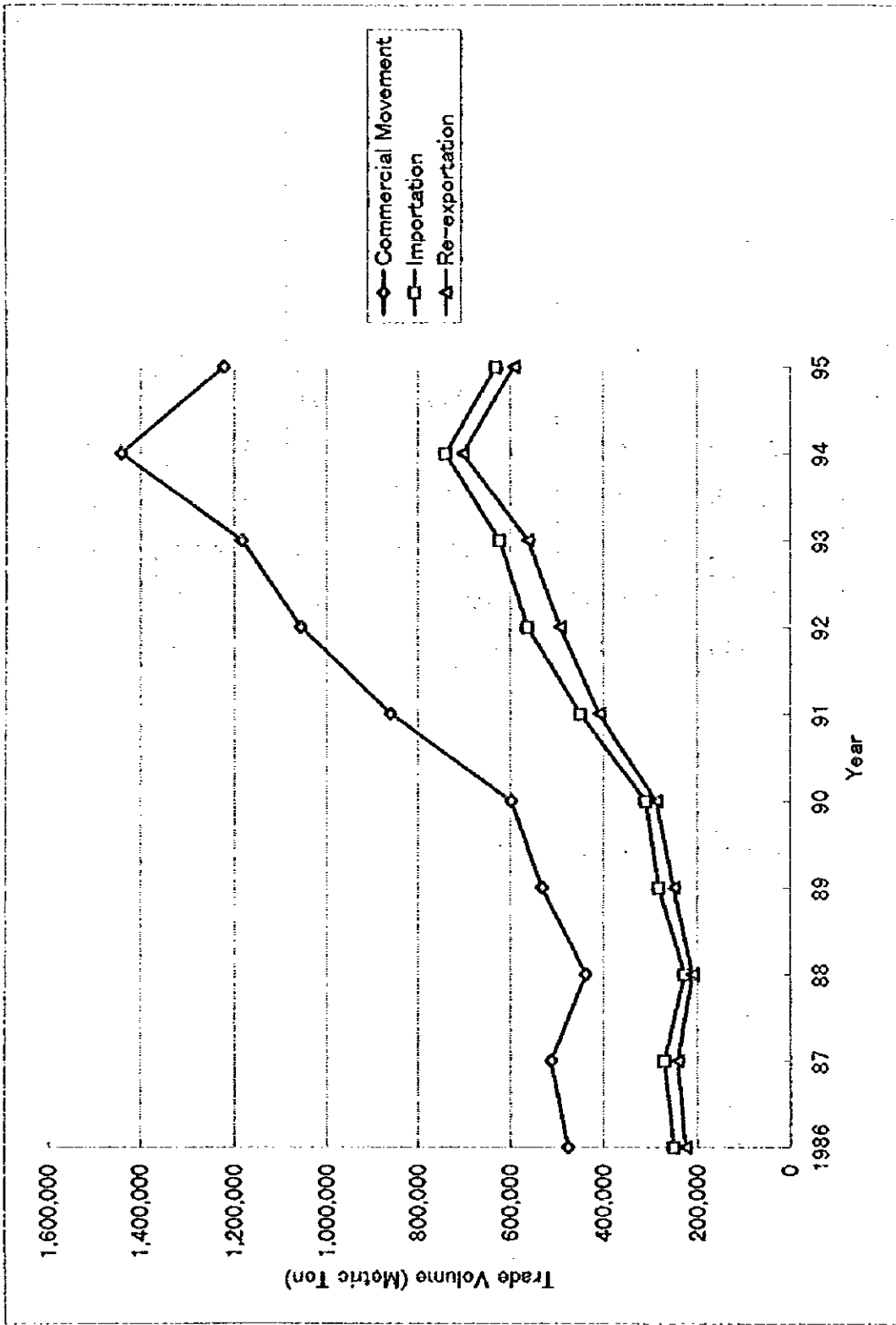


Figure 6-2-1 Trade Volume in Colon Free Zone, 1986-1995
(in metric tons)

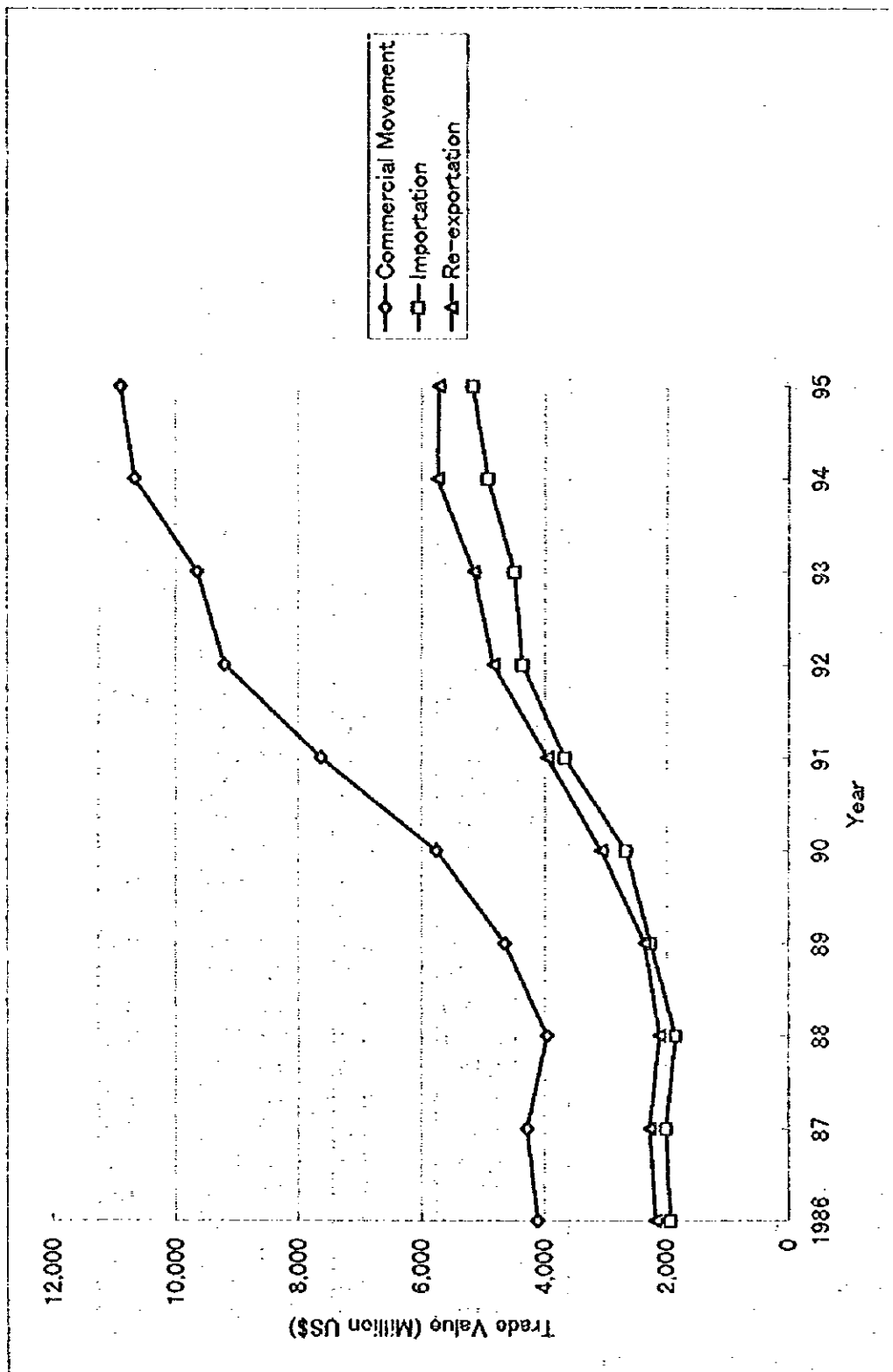


Figure 6-2-2 Trade Value in Colon Free Zone, 1986-1995
(in U.S. dollars)

Table 6-2-2 Import and Re-export by Country/ Area
(Colon Free Zone)
(in volume) 1993-1994

Unit: Metric Ton

| Country/Area | 1993 (p) | % | 1994 (p) | % |
|-------------------|----------------|------------|----------------|------------|
| <i>Import</i> | | | | |
| Japan | 27,842 | 4.5 | 30,557 | 4.1 |
| U.S.A. | 94,788 | 15.2 | 112,542 | 15.2 |
| Taiwan | 90,541 | 14.6 | 79,801 | 10.8 |
| Hong Kong | 179,404 | 28.8 | 250,857 | 33.9 |
| Singapore | 11,683 | 1.9 | 16,165 | 2.2 |
| Thailand | 14,567 | 2.3 | 17,442 | 2.4 |
| South Korea | 48,519 | 7.8 | 60,097 | 8.1 |
| United Kingdom | 7,885 | 1.3 | 7,409 | 1.0 |
| Switzerland | 2,433 | 0.4 | 2,113 | 0.3 |
| Germany | 4,312 | 0.7 | 5,547 | 0.7 |
| France | 5,118 | 0.8 | 5,520 | 0.7 |
| Italy | 5,421 | 0.9 | 39,716 | 5.4 |
| Colombia | 4,231 | 0.7 | 4,607 | 0.6 |
| Others | 125,459 | 20.2 | 107,302 | 14.5 |
| Total | 622,203 | 100 | 739,675 | 100 |
| <i>Re-export</i> | | | | |
| Brazil | 8,977 | 1.6 | 33,932 | 4.8 |
| Panama | 62,611 | 11.1 | 78,654 | 11.2 |
| Venezuela | 28,293 | 5.0 | 27,832 | 4.0 |
| Aruba Island | 31,182 | 5.5 | 17,040 | 2.4 |
| Ecuador | 55,067 | 9.8 | 78,785 | 11.2 |
| Colombia | 114,752 | 20.4 | 178,042 | 25.4 |
| San Andres Island | 4,565 | 0.8 | 4,906 | 0.7 |
| Mexico | 7,947 | 1.4 | 5,200 | 0.7 |
| U.S.A. | 14,875 | 2.6 | 18,923 | 2.7 |
| Bolivia | 4,130 | 0.7 | 3,717 | 0.5 |
| Chile | 26,025 | 4.6 | 25,333 | 3.6 |
| Guatemala | 15,496 | 2.8 | 17,290 | 2.5 |
| Costa Rica | 17,984 | 3.2 | 22,658 | 3.2 |
| Peru | 14,183 | 2.5 | 19,313 | 2.8 |
| Salvador | 12,987 | 2.3 | 13,287 | 1.9 |
| Argentina | 22,347 | 4.0 | 20,802 | 3.0 |
| Paraguay | 12,557 | 2.2 | 18,610 | 2.7 |
| Honduras | 12,321 | 2.2 | 11,139 | 1.6 |
| Nicaragua | 17,130 | 3.0 | 17,703 | 2.5 |
| Cuba | 25,217 | 4.5 | 34,407 | 4.9 |
| Others | 53,488 | 9.5 | 54,095 | 7.7 |
| Total | 562,134 | 100 | 701,668 | 100 |

Note) (p) Preliminary figures

Source: Administration of Colon Free Zone

Table 6-2-3 Import and Re-export by Route (Colon Free Zone)
(in volume) 1993-1994

Unit: Metric ton

| Route & Place of Disembarkation /Loading | Import | | | | Re-export | | | |
|---|----------------|-------------|----------------|-------------|----------------|-------------|----------------|-------------|
| | 1993(p) | % | 1994(p) | % | 1993(p) | % | 1994(p) | % |
| <i>Air</i> | | | | | | | | |
| Tocumen Airport | 12,403 | 2.0 | 21,650 | 2.9 | 54,756 | 9.7 | 72,822 | 10.4 |
| Other ports | 34 | - | 62 | - | 614 | 0.1 | 392 | 0.1 |
| Not specified | 18 | - | 23 | - | 25 | - | 74 | - |
| Total | 12,455 | 2.0 | 21,735 | 2.9 | 55,395 | 9.9 | 73,288 | 10.4 |
| <i>Sea</i> | | | | | | | | |
| Bahia Las Minas | 33,423 | 5.4 | 38,768 | 5.2 | 26,754 | 4.8 | 24,022 | 3.4 |
| Balboa | 18,273 | 2.9 | 100,587 | 13.6 | 25,910 | 4.6 | 32,873 | 4.7 |
| Coco Solo | 62,231 | 10.0 | 72,914 | 9.9 | 117,977 | 21.0 | 156,419 | 22.3 |
| Cristobal | 489,618 | 78.7 | 473,841 | 64.1 | 224,026 | 39.9 | 266,617 | 38.0 |
| Manzanillo | - | - | 20,319 | 2.7 | - | - | 15,436 | 2.2 |
| Other ports | 172 | - | 267 | - | 3,058 | 0.5 | 5,050 | 0.7 |
| Not specified | 359 | 0.1 | 1,836 | 0.2 | 170 | - | 444 | 0.1 |
| Total | 604,076 | 97.1 | 708,532 | 95.8 | 397,895 | 70.8 | 500,861 | 71.4 |
| <i>Land</i> | | | | | | | | |
| Local Consumption | 2,856 | 0.5 | 3,316 | 0.4 | 62,612 | 11.1 | 78,654 | 11.2 |
| Paso Canoas | 1,877 | 0.3 | 3,543 | 0.5 | 42,121 | 7.5 | 46,280 | 6.6 |
| Others | 35 | - | 1 | - | 3,827 | 0.7 | 2,519 | 0.4 |
| Total | 4,768 | 0.8 | 6,860 | 0.9 | 108,560 | 19.3 | 127,453 | 18.2 |
| <i>Refund</i> | 895 | 0.1 | 1,512 | 0.2 | 1 | - | 19 | - |
| <i>Not specified</i> | 9 | - | 1,036 | 0.1 | 283 | 0.1 | 47 | - |
| Grand Total | 622,203 | 100 | 739,675 | 100 | 562,134 | 100 | 701,668 | 100 |

Note)1. Percentage (%) shows the ratio compared with grand total.

2. (p) Preliminary figures

Source: Administration of Colon Free Zone

6.2.3 Future Prospect

(1) Trade Activities

30. As aforementioned, the main destinations of the Free Zone's cargo are countries in Central and South America. The reason why the trade volume in the Free Zone had been increasing in recent years comes mainly from the policies of economic liberalization in these countries. To increase continuously the trade volume of the Free Zone in the future in connection with the steady demand in these countries depends on that their economies continue to grow.

31. These countries also are susceptible to the political and economic conditions of the United States. In 1995, the weak U.S. dollars affected directly or indirectly their economies including Panama. As aforementioned, the trade volume of the Free Zone in '95 remarkably decreased by 15.2 %.

32. The new income tax system as from July 1, 1995 also may have affected the decrease of the trade volume, under which were introduced 15 % tax rate for income derived from foreign operations(re-export) and an advance non-refundable payment. Actually a part of the companies that were operating in the Free Zone withdrew or moved to the free zone of the other country. (Thereafter, this new tax system was abolished by Law No.62 of September 19, 1996 as from January 1 '97.)

33. Further, there is a possibility that free zones in South America like Colon Free Zone will be established. To be competitive with free trade systems of the other countries, it is indispensable for Colon Free Zone to offer the attractive fiscal advantages to users. In addition, there has happened pilferage some times within the Zone, so the problem of making sure of security should be solved. Advantageous location of Panama is merely one of the incentives.

(2) Area Expansion Plan

34. Colon Free Zone remarkably developed after its establishment in 1948 and the entire commercial area was occupied by 1978. Thereafter, under the Torrijos-Carter Treaty, the area of "France Field" reverted to Panama, and the Government approved the development plan in the areas of Colon city and its surroundings in 1980, which, aforementioned, was financed by the World Bank and the commercial banks. Furthermore the Consortium for the Development of Folk River, S.A. (COFRISA) was established led by Japanese enterprises to fill in

the Folk River Bay (45 ha) adding 4.5 ha adjacent to the original area.

35. The total area which has been already developed as of July 1996 is as follows:

| | |
|-----------------------------|-------------------------------|
| .Casco Viejo (Colon sector) | 53.1 ha |
| .COFRISA (" ") | 6.3 (1 st . phase) |
| .France Field | 115.5 (" ") |
| <u>Total</u> | <u>174.9 ha</u> |

36. The total area in development is as follows:

| | |
|-------------------------|-----------------------------------|
| .COFRISA (Colon sector) | 12.8 ha (2 nd . Phase) |
| .France Field | 4.25 (" ") |
| .Nueve de Enero | 4.05 |
| <u>Total</u> | <u>21.1 ha</u> |

37. The Administration of Colon Free Zone also has a development plan to meet future demand of the space as follows:

| | |
|-------------------------|---|
| .COFRISA (Colon sector) | 30.4 ha |
| .France Field | 14.25 |
| .Nueve de Enero | 13.95 |
| .Coco Solito | 114.0 (at present containers are stacked in part) |
| <u>Total</u> | <u>172.6 ha</u> |

38. Based on the above figures, the total area of Colon Free Zone in the future will be 368.6 ha, the localization of which is as follows:

| | |
|-----------------------------|-----------------|
| .Casco Viejo (Colon sector) | 53.1 ha |
| .COFRISA (" ") | 49.5 |
| .France Field | 134.0 |
| .Nuevo de Enero | 18.0 |
| .Coco Solito | 114.0 |
| <u>Total</u> | <u>368.6 ha</u> |

Figure 6-2-3 shows the expansion plan for the Free Zone described above.

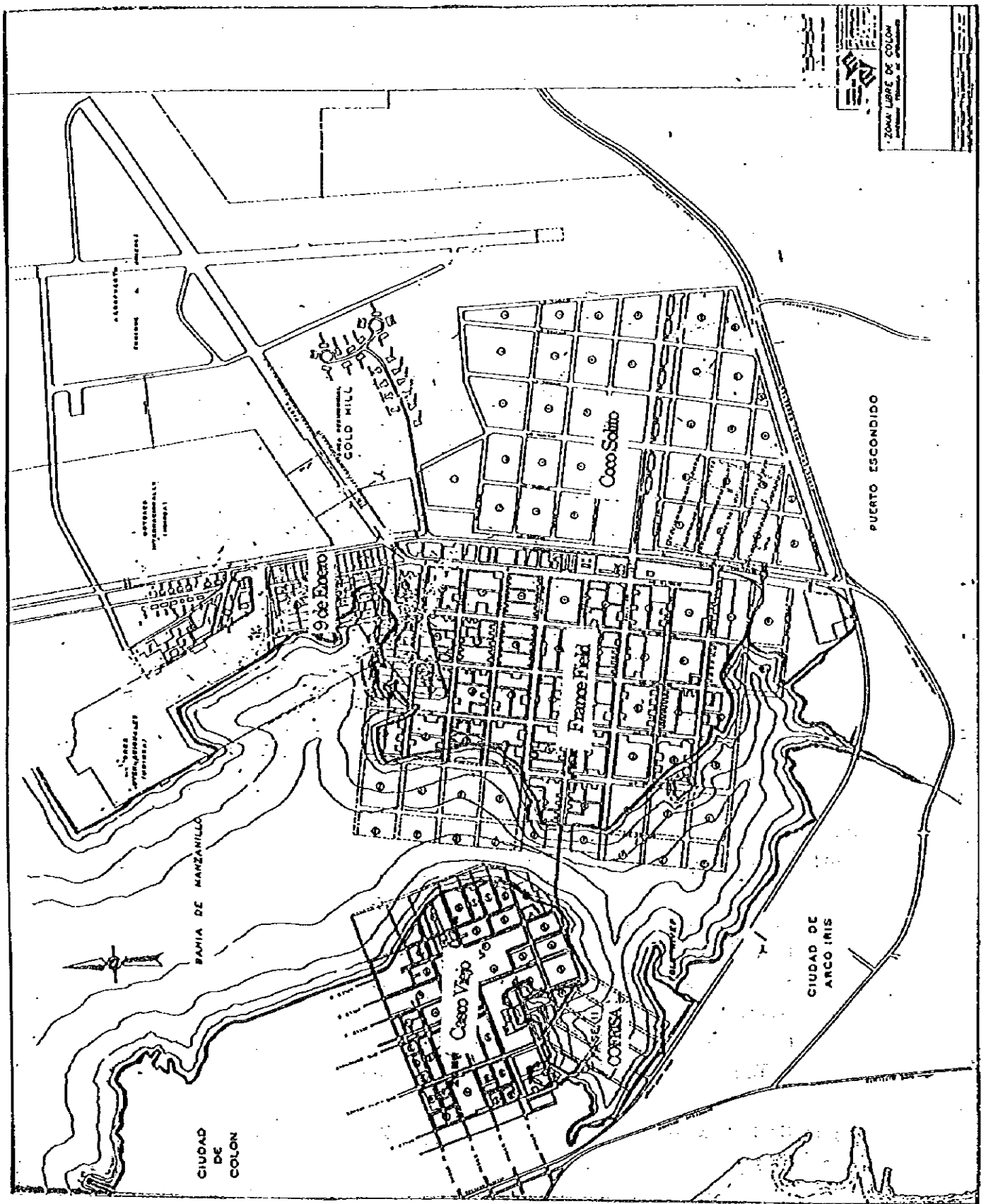


Figure 6-2-3 Colon Free Zone Expansion Plan

(source: The Administration of Colon Free Zone)

6.3 Export Processing Zones (EPZs)

6.3.1 Institutional Scheme

(1) Establishment

39. On November 6, 1990, the Government of Panama issued Law No.16 which regulates the creation and development of Export Processing Zones within the country, but this law was not enough to attract foreign investors or business entrepreneurs and repealed by the new Law No.25 of November 30, 1992.

(2) Law and Regulation

40. What follows are a law and regulations that regulate the establishment and operations of Export Processing Zones:

- . Law No.25 (November 30, 1992) fundamental law
- . Executive Decree No.28 (May 19, 1993)
- . Executive Decree No.138 (May 19, 1993)
- . Executive Decree No.I-D (January 28, 1994)

(3) Organization

41. IPCE (Panama Trade Development Institute) acts as Technical Secretariat for the fulfillment of the functions of the National Commission of Export Processing Zones.

Within the Zone, Promoter and Operator, natural or juridical person, private or public, national or foreign, assume the responsibility to plan, direct, administrate, operate and supervise the integral functioning of the Zone.

6.3.2 Current Situation

(1) Actual EPZs

42. There are six EPZs established in Panama as of July 1996 as follows:

a) Isla Margarita

Isla Margarita is located at the Atlantic entrance of the Panama Canal, near the Port of Coco Solo Norte. The area is around 69 ha, of which a 21.3-hectare area except roads area is for the industrial zone, while the

other adjacent areas are for commerce, tourism, residence, school, etc.

b) **Panama Teleport**

Panama Teleport is located beside the Tocumen International Airport. The area is around 100 ha and is planned to be divided into the following Zones; International Business Park, Export Processing Zone, Scientific and Technological Research Zone, and Advanced Telecommunications Zone.

c) **PANEXPORT, Ojo de Agua**

PANEXPORT is located in San Miguelito, a suburb of Panama City, 20 minute drive to the Port of Balboa and to Tocumen International Airport. The area consists of a total area of around 32 ha including forest area of around 4.0ha. The total area of lots for industry is around 26 ha. PANEXPORT has a future expansion plan of 5 ha.

d) **Fort Davis Export Processing Zone**

Fort Davis EPZ is located in Fort Davis near the Gatún Locks, 20 minute drive to the City of Colon. The total area thereof is 102 ha which consists of two areas: 30 ha and 72 ha. The construction of the first phase (30 ha) has started in July 1996 for the period of 18 months. This project is a joint venture of ARI and OIDC, a Taiwanese holding corporation, share of 50 % respectively. Corporación Sino-Panameña de Inversiones, S.A. (Sino-Panamanian Investment Corporation) acts as a Promoter and Operator. ARI also has a future expansion plan of 50 ha which formerly had been used for a golf course.

e) **Tocumen Export Processing Zone**

Tocumen EPZ is located beside Panama-Tocumen Airport road in Juan Diaz, only 3 minute drive to Tocumen International Airport. The area is around 4.0 ha, where formerly existed a tobacco plant and there are buildings, a cold storage, office area. The company (Empresas Vicsons) intends to expand the area in accordance with the demand of investors in the future.

f) **Pro-Export**

Pro-Export EPZ is located near Tocumen International Airport and contiguous to the above Panama Teleport. This project is a joint-venture of enterprises of Panama and Spain, with a total area of 50 ha, for the purpose of establishing light and medium industries non-contaminated.

At present it has not yet begun construction.

43. Out of the above six EPZs, Isla Margarita EPZ and Fort Davis EPZ are located in the Reverted Areas at the Atlantic side and others at the Pacific side.

(2) Activities

44. The system of the Export Processing Zones in Panama is very new, and the above 6 actual EPZs are under construction or expected to be constructed in near future, with a long term plan, one of which is over 20 years.

45. PANEXPORT, Ojo de Agua, has already exported their products to foreign countries. According to IPCE, the amount is 1,830,311.37 U.S. dollars from January to October 1996. (The amount of imports in the same period is US\$ 4,491,198.02.) As of November 1996, three companies from Canada (packing of pharmaceutical products), Italy (manufacturing of ball-point pen) and United Kingdom (medicines) are operating there. Other companies from Denmark (smoked salmon), Panama (recording of compact disks) and Italy (agricultural machinery) are expected to start their activities soon.

6.3.3 Future Prospect

46. Since the new Law was issued on November 30, 1992, six Export Processing Zones have been established, and they have recently started their construction activities with a long term plan for 21st century, one of which, as aforementioned, has a development plan over 20 years. PANEXPORT, Ojo de Agua, has already started the exporting activities.

47. The above Law No.25 hopes that EPZs may contribute to the country's development, and to employment and foreign currency generation through the export of goods and services, promoting the economic, scientific, technological, cultural, educational and social development of Panama.

48. To this effect, the Law allows for EPZs to be established anywhere in the country, and stipulates the advantageous fiscal system (total exemption from taxes, duties and other levies on importation, no income tax, no export tax, no sales tax, no tax on capital or assets, etc.), special labor provisions, and special immigration system applicable especially to EPZs. The biggest incentive will be the permanent exemption from income tax.

49. The future prospect of the expansion of EPZs will depend on the possibility of success of the above actual EPZs and on the political and economic conditions of Panama.

VII CARGO HANDLING SYSTEM

7.1 General Condition

7.1.1 Overview of the Port of Balboa in Terms of the Cargo Handling System

(1) Container Handling

1. So called "Container Terminal" facility can not be seen in the port of Balboa (hereinafter referred to as "the Port ") for the reasons mentioned below :

- 1) No container gantry crane is equipped.
- 2) No proper container yard is allocated behind the apron but there is a single rail-siding on the narrow tractor passage. Container storage yards are dispersed and far away from the pier.
- 3) Most of the ships coming in the Port are conventional type and very few are self-sustained container-ships.
- 4) Container loading and unloading is quite similar to the bulky cargo handling with ship's gear, so that hooking and unhooking of slings on the corner fittings of the container is carried out manually.
- 5) Therefore, efficiency of container handling is extremely low.

(2) Breakbulk Cargo Handling

2. In order to conduct more efficient breakbulk cargo handling, for practical purposes, the transit shed directly behind the pier is indispensable considering the often and heavy rain in the Port. From this point of view, Pier 18 is the only one suitable for the conventional liner. However, Pier 18 is often occupied by cruise ships and tuna boats.

(3) Dry - bulk Cargo Handling

3. Six units of pneumatic unloaders are good enough to handle two (2) bulk-ships simultaneously. However, the grain importer does not prepare enough trucks to match the capacity of the unloader which causes frequent and long interruptions during the process. Though grain importers are employing private stevedores or unloading by their own hands, work schedule for unloading F.I.O.(Free in and Out) grain should be under APN control or stay of the bulk ship will always exceed the capacity of unloader.

7.1.2 Related Organization for Container / Cargo Handling

4. Main function of the related department for container / cargo handling operation at the port of Balboa is summarized as in Table 7-1-1.

Table 7-1-1 Main Function of the Related Department for Container/Cargo Handling Operation

| FUNCTION | Cargo Handling Dept. | Container Control Dept. | Cargo Verification Dept. |
|---|----------------------|-------------------------|--------------------------|
| Information on Vessels | ● | | |
| Assignment of Berth | ● | | |
| Arrangement of Gang | ● | | |
| Arrangement of Handling Equipment | ● | | |
| Arrangement of Operators | ● | | |
| Cargo Handling Operation at Pier | ● | | |
| Document Control of Import Empty | | | ● |
| Document Control of Import Full | | | ● |
| Document Control of Export Empty | | | ● |
| Document Control of Export Full | | | ● |
| Receive/Deliver Container at Storage Yard | | ● | |
| Check Container (In/Out) at Pier | | | ● |
| Check Container (In/Out) at Terminal Gate | | ● | ● |
| Check Container (In/Out) at Storage Yard | | ● | |
| Inventory of Containers at Storage Yard | | ● | |
| Storage Control at Storage Yard | | ● | |
| Storage Control of Empty at Port Area | | ● | |
| Storage Control Import Full at Storage Yard | | ● | |

Source : APN

7.1.3 Off - dock Depot Arrangement

5. Due to the lack of on-dock container storage space, major shipping lines or their agents who have contracts with container handlers have to prepare the following off-dock facilities at their own expense. This arrangement places a heavy burden on the customers (cost of land, pavement, container handling equipment and extra haulage to / from ship's tackle etc.). A container-ship operator, CLAN (Compania Latinoamericano de Navigacion), evacuated from the Port because of the extremely high cost of off - dock depot arrangement.

| | ha/m ² | Location |
|---|-----------------------|----------|
| Terminal Panama / Super Bond | 10,924 m ² | Albrook |
| Transalma S.A. | 47,616 m ² | Albrook |
| Patio Container | 5,107 m ² | Albrook |
| Ricardo Perez / Panama Bond (Auto) | 24,327 m ² | Albrook |
| Transbal (Auto) | 44,529 m ² | Albrook |
| Area 300 (Area between Panama Railway Yard and Albrook) | | Area 300 |
| Seven (7) Concessionaires are involved including : | | |
| International Sea-Land Terminal Inc. | 24,810 m ² | |

7.1.4 Port Statistics / Movement of Ships

Table 7-1-2 Movement of Ships / by Type of Ship

| TYPE OF SHIP | 1993 | 1991 | 1995 | |
|---------------------|--------------|--------------|--------------|------------|
| | | | | % |
| Container | 159 | 177 | 204 | 16 |
| RO-RO | 81 | 69 | 74 | 6 |
| Conventional | 79 | 63 | 58 | 5 |
| Dry-Bulk | 53 | 57 | 46 | 4 |
| Bulk-Liquid | 55 | 59 | 55 | 4 |
| Tanker | 106 | 144 | 180 | 14 |
| Refrigerator | 22 | 21 | 22 | 2 |
| Fishing (Tuna) Boat | 337 | 316 | 368 | 29 |
| Passenger | 32 | 34 | 33 | 3 |
| Others | 191 | 210 | 219 | 17 |
| Total | 1,115 | 1,150 | 1,259 | 100 |
| Variation | | + 3.1 % | + 9.5 % | |

(Source : APN)

Others (type of ship) include ; Scientific Investigation Ship, Tug Boat, Dredger, School Ship, Warship, Barge and Yacht.

6. From the above table, we note that almost 1 / 3 of total is fishing boat.

Table 7-1-3 Average Port Staying Hours

| TYPE OF SHIP | 1993 | 1991 | 1995 |
|---------------------|----------|----------|----------|
| Container | 17 | 33 | 71 |
| RO - RO | 110 | 30 | 69 |
| Conventional | 45 | 119 | 68 |
| Dry - Bulk | 71 | 120 | 73 |
| Bulk - Liquid | 121 | 37 | 81 |
| Tanker | 42 | 73 | 98 |
| Refrigerator | 20 | 31 | 47 |
| Fishing (Tuna) Boat | 65 | 118 | 73 |
| Passenger | 29 | 21 | 59 |
| Others | 99 | 77 | 157 |
| All Ships | 65 | 78 | 90 |
| (Days) | 2.7 Days | 3.3 Days | 3.8 Days |
| Variation | | + 20 % | + 15 % |

Table 7-1-4 Average Waiting Hours

(waiting hours includes ship's maneuvering time from anchorage to the pier)

| TYPE OF SHIP | 1993 | 1991 | 1995 |
|---------------------|----------|----------|----------|
| Container | 5 | 7 | 23 |
| RO - RO | 11 | 15 | 8 |
| Conventional | 12 | 17 | 8 |
| Dry - Bulk | 10 | 10 | 8 |
| Bulk - Liquid | 17 | 11 | 7 |
| Tanker | 8 | 13 | 11 |
| Refrigerator | 5 | 13 | 6 |
| Fishing (Tuna) Boat | 14 | 8 | 7 |
| Passenger | 6 | 4 | 13 |
| Others | 19 | 9 | 18 |
| All Ships | 12 | 10 | 13 |
| (Days) | 0.5 Days | 0.4 Days | 0.5 Days |

Table 7-1-5 Average On-berth Hours

| TYPE OF SHIP | 1993 | 1991 | 1995 |
|---------------------|----------|----------|----------|
| Container | 12 | 26 | 48 |
| RO - RO | 99 | 15 | 61 |
| Conventional | 33 | 102 | 60 |
| Dry - Bulk | 61 | 110 | 65 |
| Bulk - Liquid | 107 | 26 | 74 |
| Tanker | 31 | 60 | 87 |
| Refrigerator | 15 | 18 | 41 |
| Fishing (Tuna) Boat | 51 | 110 | 66 |
| Passenger | 23 | 17 | 46 |
| Others | 80 | 68 | 139 |
| All Ships | 53 | 68 | 78 |
| (Days) | 2.2 Days | 2.8 Days | 3.3 Days |
| Variation | | + 28% | + 15% |

Table 7-1-6 Ratio, Waiting hours : On-berth hours / Port staying hours
(1995)

| Type of Ship | Port Stay Hours | Waiting Hours | | On-Berth Hours | |
|---------------------|-----------------|---------------|------|----------------|------|
| | | Hours | % | Hours | % |
| Container | 71 | 23 | 32.4 | 48 | 67.6 |
| RO - RO | 69 | 8 | 11.6 | 61 | 88.4 |
| Conventional | 68 | 8 | 11.8 | 60 | 88.2 |
| Dry - Bulk | 73 | 8 | 11.0 | 65 | 89.0 |
| Bulk - Liquid | 81 | 7 | 8.6 | 74 | 91.4 |
| Tanker | 98 | 11 | 11.2 | 87 | 88.8 |
| Refrigerator | 47 | 6 | 12.8 | 41 | 87.2 |
| Fishing (Tuna) Boat | 73 | 7 | 9.6 | 66 | 90.4 |
| Passenger | 59 | 13 | 22.0 | 46 | 78.0 |
| Others | 157 | 18 | 11.5 | 139 | 88.5 |
| All Ships | 90 | 13 | 14.4 | 77 | 85.6 |

7. Considering the average cargo tonnage per ship (average of all ships 568 tons / bulk grain 8,105 tons), average stay of 90 hours (3.75 days) far exceed the ordinary stay.

8. Average waiting hours (13 hours as shown in Table 7-1-4 and 7-1-6) is considered to be better than other Latin American ports. For the liner ships (incl. Container-ships), waiting hours are not always the responsibility of the Port, because it includes Shipping Line's convenience as follows :

- 1) Earlier arrival
- 2) Delay (the ship loses initial berth allocation)
- 3) Adjustment of ship's schedule (congestion of next port etc.)
- 4) Sometimes shipping lines dislike night work
- 5) Delay of cargo ready (in case of large lot export)

7.2 Cargo Handling System

7.2.1 Shift-hours

9. Container / Cargo handling is carried out in two shift with the following time table :

| | |
|------------------|----------------|
| 1 st shift | 07:00 - 15:00 |
| 2 nd shift | 17:00 - 23:00 |
| (Irregular shift | 23:00 - 07:00) |

Every shift may continue working beyond its normal ending time the cargo handling is expected to be completed within a reasonable period of time.

7.2.2 Formation of Gang and Total Number of APN Workers

Table 7-2-1 Gang Formation

| Type of Vessel | Formation | By Ship's Crane | |
|----------------|-------------------|-------------------|-----------|
| | | Number of Workers | |
| | | Land-side | Ship-side |
| Container | First Foreman | 1 | 1 |
| | Tally Clerk | 1 | 1 |
| | Crane Operator | | 3 |
| | Forklift Operator | 1 | |
| | Tractor Driver | 7~12 | |
| | Worker | 2 | 8 |
| | Total | 12~17 | 13 |
| Conventional | First Foreman | 1 | 1 |
| | Tally Clerk | 1 | 1 |
| | Crane Operator | | 3 |
| | Forklift Operator | 2 | |
| | Tractor Driver | 2 | |
| | Worker | 2 | 8 |
| | Total | 8 | 13 |
| Ro - Ro | First Foreman | 1 | |
| | Tally Clerk | 3 | |
| | Tractor Driver | 10 | |
| | Worker | 8 | |
| | Total | 22 | |

10. Total number of APN workers is as follow (as of June, 1996) :

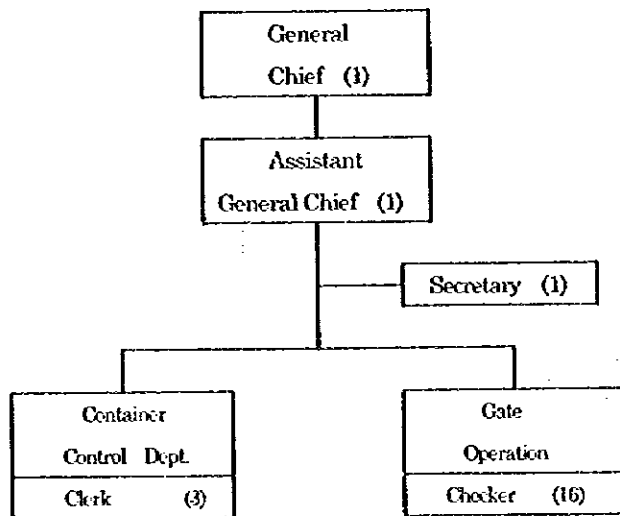
| | |
|---------------------|------------|
| First Foreman | 8 |
| Crane Operator | 27 |
| Forklift Operator | 14 |
| Tractor Operator | 17 |
| Heavy Lift Operator | 8 |
| Worker | 144 |
| TOTAL | 218 |

Source : APN

7.2.3 Container Handling

(1) Organization and Number of Workers

11. Container terminal at the Port is managed by Container Control Department which consists of 22 employees as shown in Figure 7-2-1.



Notes : The figure in () is number of persons in charge
Source : APN

Figure 7-2-1 Organization Chart of Container Handling Department

(2) Management of Terminal

12. The delivery / receiving of containers is carried out from 07:00 to 15:00 and 15:00 to 22:00, Monday through Saturday. For Sunday and National Holiday, all gate work is made on an overtime basis.

13. The starting time for receiving containers is 5 days prior to the vessel's ETA (Estimated Time of Arrival) and cut-off of receiving containers is 24 hours prior to the vessel's ETA.

14. Free storage periods for various types of container are set in the following manner ;

- Export Full : 5 normal days, exclusive of Sunday and National Holidays.
- Import Full : 5 normal days, exclusive of Sunday and National Holidays.
- Transshipment : 30 days, Sunday and National Holidays inclusive.

(3) Control of Container Handling

15. Container terminal operation is mainly controlled by the two sections mentioned above under the General Chief. Main functions of these sections are as follows :

1) Container Location Control

16. The location of containers is managed by the Container Control Department ; the allocation of containers is controlled using cards which are placed on a board. There is one card for each container and one color for the first letter (initial) of container number. Each card has specific container data such as container number, name of the ship, date of discharge, date of delivery, date of empty return, date of shipment etc. When the ship arrives, they verify that the information matches that received from the agency. Then the inventory form is filled to locate the container and the card is placed on the board. Every morning at 07:00, inventory is checked to update the information. There are six container storage areas named as follows :

| | Maximum capacity (in box) | |
|-------------|------------------------------|------------------------------|
| a) Pier 18 | 180 boxes | mainly empty containers |
| b) Marginal | 150 boxes | |
| c) Bayano | 75 boxes | old equipment is also stowed |
| d) Sarigua | 250 boxes | |
| e) San Blas | 75 boxes | old equipment is also stowed |
| f) Pier 6 | 200 boxes | so called "Industrial Area" |

17. At present, new storage areas are under construction at :

- a) Back area of Pier 15 North approx. 6,245 m²
- b) Back area of Pier 6/7 approx. 18,000 m²

2) Terminal Gate

18. Container Control Department has the main responsibility for the gate operation which is controlled by three checkers together with the following workers :

Security officer Customs officer Quarantine officer

carried out of the Port immediately.

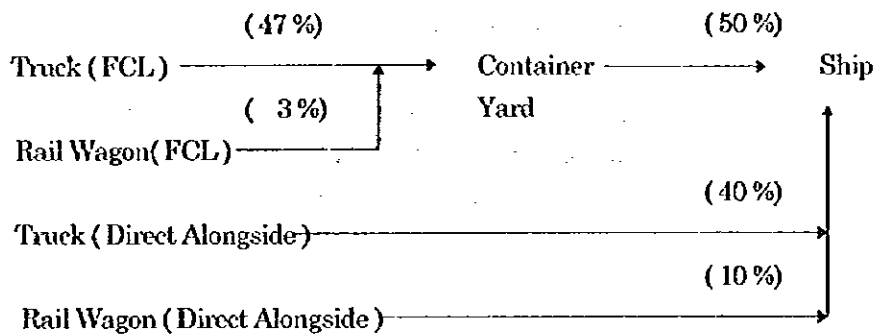
23. In the Port, there are six pneumatic unloaders owned by the grain importers. Five are at the Pier 14 and the rest at the Pier 6.

7.2.5 Container / Cargo Flow in the Port

24. Container / cargo flow in the Port is shown in Figure 7-2-2 and 7-2-3.

(1) Container

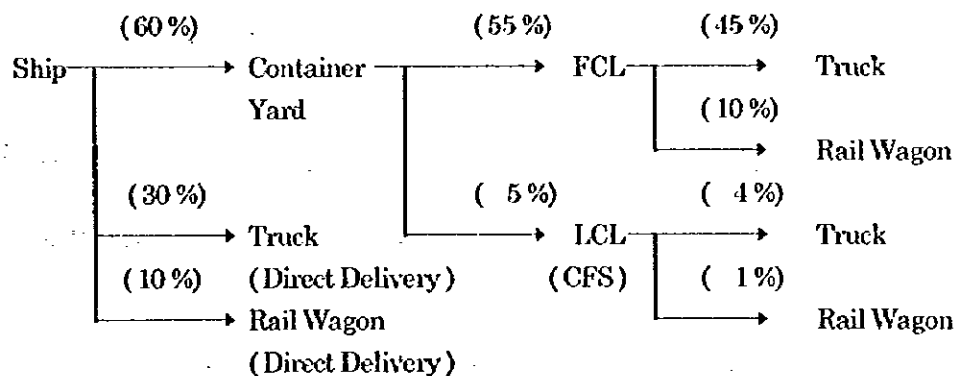
a) Loading



Source: APN

Figure 7-2-2 Container Flow in the Port (Loading)

b) Discharging



Source: APN

Figure 7-2-3 Container Flow in the Port (Discharging)

c) Port stay days of import container

Table 7-2-2 Port Stay Days of Import Container

| day after ship's sail | % | day after ship's sail | % |
|-----------------------|----|-----------------------|-------|
| sailing day | 40 | 7 th | 3 |
| next day | 20 | 8 th | 3 |
| 3 rd | 10 | 9 th | 2 |
| 4 th | 10 | 10 th | 1 |
| 5 th | 7 | 11 th and after | |
| 6 th | 4 | | 100 % |

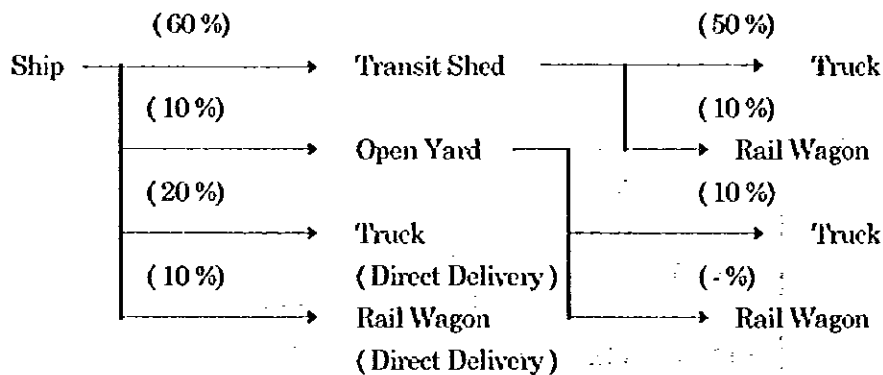
25. As shown in the above Figure 7-2-2, direct delivery at the pier to consignee, shipping line and off-dock terminal operator, on sailing day, represents 40 %. The average staying days in the Port is 2.4 days.

26. Port stay days for LCL (less than container load) container is not shown in the above table because no proper CFS facility is installed in the Port and very few transshipping LCL containers are stripped at the Pier 18.

(2) Breakbulk Cargo

a) Loading (not applicable)

b) Discharging



Source : APN

Figure 7-2-4 Breakbulk Cargo Flow in the Port

(3) Dry-bulk Cargo

a) Loading (not applicable)

b) Discharging

Since the term of the Charter Party is F.I.O.(Free In and Out), all of the bulk cargoes are directly carried out by consignee's truck.

7.2.6 Container Documentation Flow

27. Documentation flow for import and export container is outlined as follows :

(1) Import

28. Cargo Verification Department receives from shipping agent three copies of B/L, cargo manifest, stowage plan, list of containers and checking books (which shows everything that will come off the ship).

29. Cargo Verification Department proceed to detach the document, 1 copy to local delivery with a container list and 3 checking books. When they finish, Cargo Verification Department separate and makes 2 sets of documents (cargo manifest and B/L), 1 goes to Invoice Department and the other stays in the Cargo Verification Department files.

30. Container handling gangs are dispatched by the Cargo Handling Dept.

31. When consignee come to pick up containers, they should bring from shipping agent, B/L, customs certificate and Delivery Order (D/O), local delivery proceed to verify documents then deliver container to the consignee.

(2) Export

32. Cargo Verification Department receives container booking list from shipping agent.

33. Shipper's trucker presents customs certificate, seal and number of container. Cargo Verification Department checks documents before the trucker enter the terminal gate.

34. Before loading, checker of Cargo Verification Department checks all containers that go on board.

35. Shipping agent sends stowage plan, documents that accompany B/L. agent signs shipping order (S/O).

7.2.7 Port Statistics / Productivity

Table 7-2-3 Gang / Hour Productivity (Gross Working Hours)
(in Metric Ton)

| TYPE OF SHIP | 1993 | 1991 | 1995 |
|------------------|--------------|--------------|--------------|
| Container | 33.90 | 40.16 | 39.30 |
| RO - RO | 70.54 | 42.57 | 48.05 |
| Conventional | 18.46 | 66.73 | 44.24 |
| ALL SHIPS | 38.48 | 63.58 | 40.30 |
| Variation | | + 65.2 % | - 36.6 % |

Source : APN

Table 7-2-4 Gang / Hour Productivity (Gross Working Hours)
(Container)

| TYPE OF SHIP | 1993 | 1991 | 1995 |
|--------------|------|------|------|
| Container | 3.4 | 4.4 | 4.6 |

Source : APN

Table 7-2-5 Gang / Hour Productivity (Net Working Hours)
(in Metric Ton)

| TYPE OF SHIP | 1993 | 1991 | 1995 |
|------------------|--------------|--------------|--------------|
| Container | 49.37 | 52.53 | 48.48 |
| RO - RO | 92.14 | 64.20 | 62.28 |
| Conventional | 32.18 | 74.09 | 56.91 |
| ALL SHIPS | 50.68 | 81.55 | 50.18 |
| Variation | | + 60.9 % | - 38.5 % |

Source : APN

Table 7-2-6 Gang / Hour Productivity (Net Working Hours)
(Container)

| TYPE OF SHIP | 1993 | 1991 | 1995 |
|--------------|------|------|------|
| Container | 5.4 | 5.3 | 5.7 |

Source : APN

Table 7-2-7 Ratio ; Waiting Hours, On-berth Hours, Gross Working Hours, Net Effective Working Hours / Port Staying Hours (1995)

| TYPE OF SHIP | Port Stay Hours | Waiting Hours | | On-berth Hours | | Gross Working Hours | | Net Working Hours | |
|--------------|-----------------|---------------|------|----------------|------|---------------------|------|-------------------|------|
| | | Hours | % | Hours | % | Hours | % | Hours | % |
| Container | 71 | 23 | 32.4 | 48 | 67.6 | 20 | 28.2 | 16 | 22.5 |
| RO - RO | 69 | 8 | 11.6 | 61 | 88.4 | 7 | 10.1 | 6 | 8.7 |
| Conventional | 68 | 8 | 11.8 | 60 | 88.2 | 33 | 48.5 | 26 | 38.2 |
| All Ships | 70 | 17 | 24.3 | 53 | 75.7 | 17 | 24.3 | 14 | 20.0 |

Source : APN

36. Waiting hours, as well as gross working hours, represents almost 1/4 (24.3 %) of the total staying hours.

Table 7-2-8 Ratio ; Gross Working Hours, Net Working Hours, Dead Time, / On - berth Hours (1995)

| TYPE OF SHIP | On berth Hours | Gross Working Hours | | Net Working Hours | | Dead Time | |
|--------------|----------------|---------------------|------|-------------------|------|-----------|------|
| | | Hours | % | Hours | % | Hours | % |
| Container | 48 | 20 | 41.7 | 16 | 33.3 | 4 | 8.3 |
| RO - RO | 61 | 7 | 11.5 | 6 | 9.8 | 1 | 1.6 |
| Conventional | 60 | 33 | 55.0 | 26 | 43.3 | 7 | 11.7 |
| All Ships | 53 | 17 | 32.1 | 14 | 26.4 | 3 | 5.7 |

Source : APN

37. Brief comments on the above Table :

Gross working hours represents less than 1/3 (32.1 %) of the on-berth hours. Part of the reason for such low productivity is that the Port applies 8 hours x 2 shifts system which is odd when compared to 24 hours / day system employed throughout the world. Sample checking for 122 ships shows the following :

| | | | |
|-----------------------------------|-------------------------------------|----------------------|--------------------------------|
| Day shift only (07:00 - 15:00) | Night shift only (15:00 - 23:00) | Day +Night | Grave shift (23:00 - 07:00) |
| 22 ships (18.0 %) | 18 ships (14.8 %) | 82 ships (67.2 %) | (irregular shift) none |

Dead Time includes :

- a) Meal hours
- b) Rain
- c) Crane break down
- d) Waiting for ship's berthing
- e) Interruptions for whatever reasons

7.3 Cargo Handling Equipment

(1) Container Crane

38. Once there was one PACECO 32 ton gantry crane, solely used for U.S. Line at Pier 15. It had been in use for 12 years from 1981 to 1993, however, because of bankruptcy of U.S. Line, the same was sold to the Colombian Consortium in 1993. Sea - Land Service had also one PACECO gantry crane at Pier 7 which was in use for 5 years from 1978 to 1983.

(2) Reach - stacker

39. The port has two reach-stackers which are in good working condition as they were purchased in 1993 and 1995 (Table 7-3-1).

(3) Front - lifter

40. There is one front-lifter with a capacity of 30 ton which is kept in normal working condition. It has been in use for 22 years and is beyond its regular working lifetime (Table 7-3-1).

(4) Heavy Forklift

41. There are six heavy forklifts with a capacity of 2 x 30 ton, 1 x 25 ton, 2 x 15 ton and 1 x 10 ton. Though 1 x 25 ton and 1 x 15 ton forklifts were purchased in 1976, both are in normal condition (Table 7-3-1).

(5) Tractor and Chassis

42. There are thirteen tractors, of which twelve are kept in good working condition and the remaining one is in normal condition. Three tractors with a capacity of 35 ton will be delivered in July 1996 as shown in Table 7-3-2. The port has eleven chassis, all of which are kept in good condition as shown in Table 7-3-3. Six new chassis will be delivered in June 1996.

(6) Forklift Truck

43. As shown in Table 7-3-4, the Port has sixteen forklifts, thirteen are in good condition and the remaining three are in poor condition.

Key to following tables:

- Condition : (G)ood (well working)
- : (N)ormal
- : (P)oor (Repair often required)

Table 7-3-1 Heavy Lifter

| Maker | Type | Year Built | Capacity | Quantity | | Condition |
|-------------|---------------|------------|----------|----------|--|-----------|
| Valmet | Reach Stacker | 1993 | 40 t | 1 | | G |
| P & H | Reach Stacker | 1995 | 40t | 1 | | G |
| Caterpillar | Front Lifter | 1974 | 30t | 1 | | N |
| Caterpillar | Forklift | 1980 | 30t | 1 | | N |
| Caterpillar | Forklift | 1980 | 30t | 1 | | P |
| Caterpillar | Forklift | 1976 | 25t | 1 | | N |
| Caterpillar | Forklift | 1976 | 15t | 1 | | N |
| Toyota | Forklift | 1981 | 15t | 1 | | N |
| Clark | Forklift | 1981 | 10t | 1 | | N |
| P & H | Crane | 1980 | 40t | 1 | | P |

Source: APN

Table 7-3-2 Yard Tractor

| Maker | Type | Year Built | Capacity | Quantity | | Condition |
|----------|------|------------|----------|----------|--|-----------|
| Otawa | | 1980 | 35 t | 2 | | G |
| Otawa | | 1983 | 35 t | 1 | | G |
| Otawa | | 1984 | 35t | 2 | | G |
| Otawa | | 1984 | 35t | 1 | | N |
| Capacity | | 1985 | 35t | 5 | | G |
| Capacity | | 1994 | 35t | 2 | | G |
| | | | | | | |
| Otawa | | 1996 | 35t | 3 | | July 1996 |

Source: APN

Table 7-3-3 Yard Chassis

| Maker | Type | Year Built | Capacity | Size | Quantity | Condition |
|------------|----------|------------|----------|-----------|----------|-----------|
| Cameco | Chassis | 1986 | 40t | 40 Footer | 4 | G |
| Cameco | Platform | 1986 | 40t | 40' | 1 | G |
| Sun | Chassis | 1994 | 40t | 40' | 3 | G |
| Omni | Low Bed | 1994 | 45t | 40' | 1 | G |
| Great Dane | Platform | 1994 | 40t | 40' | 2 | G |
| | | | | | | |
| | Chassis | 1996 | 40t | 40' | 6 | June 1996 |

Source: APN

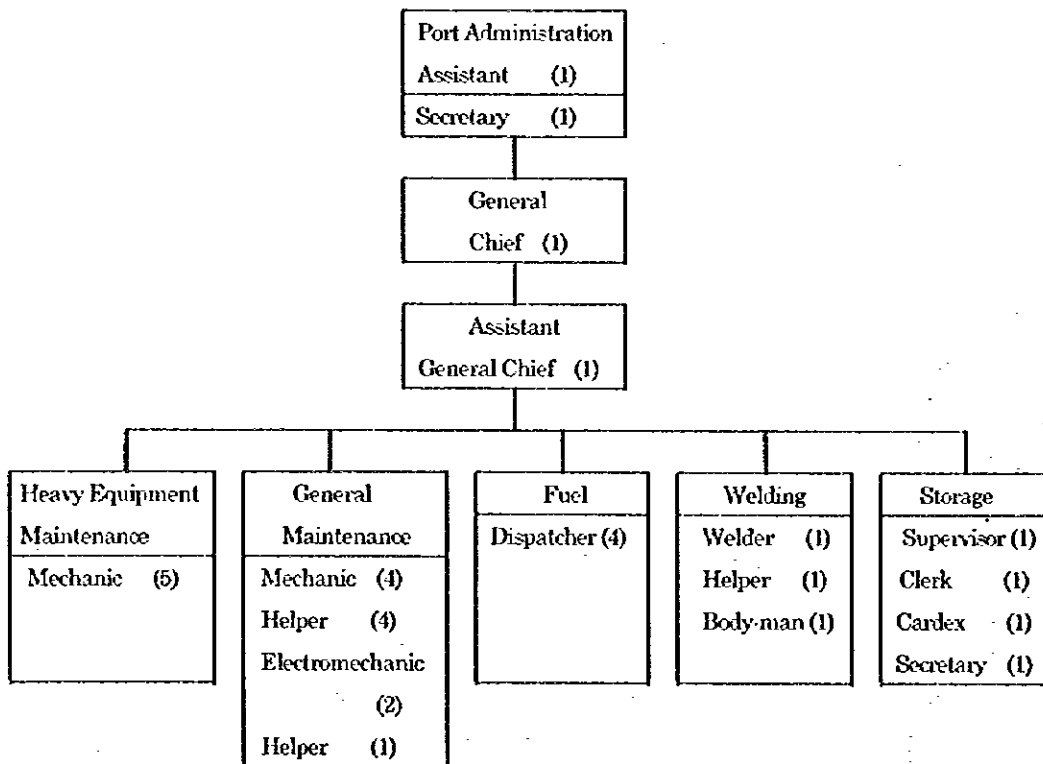
Table 7-3-4 Forklift Truck

| Maker | Type | Year Built | Capacity | Quantity | | Condition |
|-------------|-----------|------------|----------|----------|--|-----------|
| Caterpillar | M-4-11/28 | 1980 | 4t | 10 | | G |
| Toyota | M-4-31 | 1981 | 4t | 1 | | P |
| Toyota | M-4-34/36 | 1982 | 4t | 2 | | P |
| Komatsu | M-4-46 | 1985 | 4t | 1 | | G |
| Caterpillar | M-4-47/48 | 1990 | 4t | 2 | | G |
| Caterpillar | DP-40D | 1996 | 4t | 3 | | G |

7.4 Maintenance and Repair

7.4.1 Organization and Number of Employees

44. The maintenance and repair of equipment are carried out by the Maintenance Department under control of Administration Department of the Port which consists of thirty-one employees as shown in Figure 7-4-1.



Notes : The figure in () is number of persons in charge

Source : APN

Figure 7-4-1 Organization Chart of Maintenance Department

7.4.2 Maintenance and Repair

45. Generally, all repair works are performed by this department. At present, the maintenance of small forklifts (capacities of 4 ton) is performed every 2 months or depending on work schedule while maintenance of heavy handling equipment (30 to 40 ton) is conducted every 15 days.

7.4.3 Spare Parts

46. When new equipment is received, the Storage Section makes list of spare parts according to the replacement schedule during the year and the spare parts are supplied according to the annual budget. Inventory is controlled by card system and supervised by internal auditor and comptroller office.

7.4.4 Workshop

47. All of the maintenance and repair works are mainly performed in the workshop.

VIII SHIP REPAIR SERVICE AND MARINE FUEL SUPPLY

8.1 Ship Repair Service

8.1.1 Management and Administration

1. A concession contract between APN and Astilleros Braswell International S.A. (hereinafter referred to as "Licensee") was signed in 1992 (operation commenced in 1991), term of which is 20 years. Licensee is a Panamanian registered company owned by an American.

2. Since the shipyard was reverted from the Panama Canal Commission (PCC) to Panama (APN) in 1979, 2 companies were granted concessions with APN. However, both failed and bankrupted because of poor management and operation.

3. The existing Licensee inaugurated in 1991 and it extended their business three times as much within the first 4 years in operation. At present, the shipyard is fully booked until August, 1996 and for the first time refuse customers.

4. Licensee's personnel structure is as follows :

| | |
|-------------------|------------------|
| Administrative | 40 |
| Permanent workers | 70 |
| Temporal workers | 350 (Panamanian) |

Licensee has a training program for the required skillful labors and on occasion, managing staffs (foreman) are invited from abroad.

8.1.2 Business Activities and Future Prospect

5. In 1995, Licensee attended 74 ships by type are as follows :

| | |
|---------------------------|----------|
| Panamax tanker | 25 ships |
| Panamax Bulk ship | 15 " |
| Tuna boat | 15 " |
| Cruise ship (emergency) | 2 " |
| Others | 17 " |

6. Other ships include Chemical carriers, Refrigerated ships, LPG tankers, Dredgers and Tug boats.

7. Average staying days in the shipyard are 8 to 10 days. However, sometimes they are from 22 to 30 days.

8. In 1994, 75 % of Licensee customers were from Central and South America but in 1996, 85 % are from Europe (Greek, Italy, Russia) and some fishing boats from Japan.

9. In 1996, Licensee will attend 85 to 90 ships and by 1998, will reach their full capacity of 105 ships. Their intention is to maintain current facilities and to become a superior small scale repair dock. Therefore, when the business reaches maximum capacity, it is best to hold selective customers under fleet management agreement with ship owners or to expand capacity on the Caribbean.

8.1.3 The Gist of the Concession

10. The objects : APN grants to Licensee the exclusive use of the infrastructures, installations, equipment and lands of Balboa Shipyard, necessary for the reconditioning, reactivation and operation of said shipyard.

The objects include :

1) Exclusive use of Piers 8, 10, 11, 12 and 13

2) Combined-use of Piers 7, 14, 15 and 16

Subject to ship's schedule, and based on the considerations which will not affect the operation of vessels arriving at the Port. A committee, formed by 2 from APN and 2 from Licensee shall be created with the purpose of coordinating the use of combined-use piers. Licensee shall be entitled to, at least, 105 ship-pier-days use of these piers per month.

11. Rental : Licensee undertakes to pay APN as rent for the concession :

1) Grace period : 1 year

Subsequent 9 years : US\$ 250,000 annum

10 last years : US\$ 300,000 annum

2) First 5 years : 3 % of Licensee's annual income

Following 15 years : 3.5 % of Licensee's annual income

12. Investments : Licensee undertakes to make the investments total minimal amount of \$ 250,000 up to \$ 3,000,000.

13. Term : 20 years

Renewal : Being renewed by mutual agreement between the parties.

14. Licensee's privilege : Without prejudice to the rights and obligations provided for in the Concession Agreement hereunder, Licensee shall enjoy the utmost freedom in determining the procedures and means to carry out its purpose, particularly in connection with the election of sub-contractors, investment policies, determination of necessary works, client classification and determination of repair prices billed to clients.

15. The concession indicates that under no circumstances can the dry dock be blocked. Panama Canal rules and regulations also indicate that channel between Pier 7 and 8 should be always free with the width of 100 ft. Whenever a ship is coming in to or out from No.1 Dry Dock, a ship berthing at Pier 7 is forced to vacate even in the course of cargo handling.

16. This arrangement makes privatization of the Port almost impossible. However, as a company, Licensee is in favor of privatization. They are open about reviewing the concession.

8.1.4 Facility

(1) Dry Docks

Table 8-1-1 Outline of Dry Docks

| Dock No. | Size (m) | Draft on Blocks (m) |
|----------|----------------|---------------------|
| 1 | 318 x 33.5 (*) | 12.8 (*) |
| 2 | 134 x 25.5 | 8.1 |
| 3 | 72 x 15 | 5.8 |

(*) Panamax size

(2) Cranes

3 self-propelled cranes of :

40 tons 30 tons 8 tons

8.2 Marine Fuel Supply

8.2.1 Marine Fuel Supplier

17. The following seven Oil Majors/suppliers are engaged in marine fuel supply service at both ends of the Canal :

| | | | |
|--------|---------|------------|------|
| Texaco | Chevron | Mobil | Esso |
| Shell | Coastal | Rio Energy | |

18. Originally the port of Balboa is a bunkering and ship's store supplying port, rather than a cargo handling port. The marine fuel supply has a share of 70 % on the Pacific side of the canal, in part due to the stillness of the sea.

19. Texaco has a petroleum refinery (Panama Refinery) at Las Minas Bay and is solely refine petroleum products in the country of Panama. Main sources of crude oil are as follow :

Table 8-2-1 Main Sources of Crude Oil

| | 1992-1994/Ave. | % | 1995 | % |
|--------------|------------------------|--------------|--------------|--------------|
| Ecuador | 19,036 / 6,345 | 56.3 | 8,047 | 91.6 |
| Venezuela | 5,134 / 1,711 | 15.2 | 737 | 8.4 |
| Mexico | 755 / 252 | 2.2 | | |
| Saudi Arabia | 7,482 / 2,491 | 22.1 | | |
| Others | 1,411 / 470 | 4.2 | | |
| TOTAL | 33,818 / 11,273 | 100.0 | 8,781 | 100.0 |
| | | | - 22.1 % | |

Source : APN

(1 metric ton = approx. 6.4 barrels)

Others include Guatemala, Peru, Colombia, Aruba, Bolivia and Algeria.

20. Texaco has an exclusive contract with the government and is sole domestic supplier/distributor of automobile gasoline and diesel. As for marine fuel, main business of Texaco is on the Caribbean and deliver marine fuel with their own barge.

21. Chevron Marine and Services Co., Ltd., as shown in the name of company, handle marine fuel only. Chevron imports finished material from their own refinery in Pascabula, California and very few finished marine fuel is imported from Venezuela, Mexico and Ecuador. The condition of the other suppliers is more or less the same.

22. The price of the fuel oil imported by Chevron is much competitive because of mass production at Pascabula and mass transportation to the Port (- 28 ft. at Pier 6) compared to the shallow depth at Las Minas Bay of Texaco (- 21 ft.).

23. If the depth of water at Pier 6 could be dredged to at least - 35 ft., larger tankers are acceptable and transportation cost (ocean freight) for the finished fuel oil could be cheaper.

24. Other methods to reduce transportation cost are :

- 1) to shorten the ship's stay time in the port
on Pier 6, the bulk ship has higher berthing priority over the tanker. An average of two bulk ships are berthing at Pier 6 in a month and each ship takes 5 days to unload. In sum, fuel tanker lose 10 days per month.
- 2) to reinforce pumping capacity (now 2,000 barrels per hour at Pier 6/7)

25. Chevron has 2 tanks at the Caribbean side (max capacity 700,000 barrels) and 8 tanks at Balboa (max capacity 800,000 barrels).

26. The barge supply of Chevron represents 75 % (ex-wharf 25 %). However, because of expensive lighterage, customers prefer to receive bunker ex-wharf.

27. The large size tuna ship sometimes acts as fuel mother ship, who will take 5,000 to 7,000 tons per supply and distribute fuel to the small size fishing boats on the ocean.

28. In 1994, about 22 % of ships passing through the Canal in both direction took bunkering service at Balboa.

29. According to APSA, bunker supply at the Port in 1995 were 7,540,000 barrels (approx 1,180,000 m³), while almost the same volume of 7,828,000 barrels were imported in the same year.

8.2.2 Bunkering Facility

30. Under the concession with APN, APSA (Atlantic-Pacific, S.A.) is responsible for the administration of fuel oil pumping between the supplier's tanks and the piers.

31. The pipelines run from the tank to pumping facility (manifold) are installed by fuel supplier and the same from the manifold to the piers, APN facility. The APN installed pipelines to the piers 6/7, 14/16 and 18.

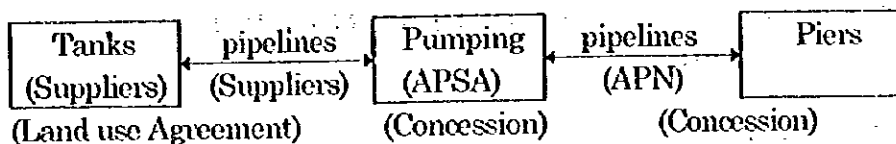


Figure 8-2-1 Oil Supply System in Balboa Port

32. All the suppliers have their own bunker storage tanks at the inland area behind Pier 6/7 as the Balboa Tank Farm Area (32 ha). Also, they have their own pipelines which run from the tank to the manifold. From the manifold to each pier, there are 6 sets of lines, 2 for Fuel Oil (FO) 380 CST (Centistoke), 2 for FO 180 CST and 2 for Light Diesel Oil (LDO). Out of 2 lines, 1 is the main line and the other is a backup line.

33. Piers 6 and 7 are used for both discharge and load (supply) but piers 14/16 and 18 are used only for loading. Because of the long distance, the pumping at piers 14/18 only move 400 barrels per hour, while at piers 6 and 7, move 2,000 barrels per hour.

8.2.3 Price of Marine Fuel Oil in Panama

34. According to the marine fuel price list of McGraw-Hill as of April 18, 1996, price of IFO-380 CST in Panama was in the second worst group as follows :

| | |
|-----------|---|
| US\$ 100s | New Orleans • Houston \$104 , Los Angeles \$ 105, Kuwait \$ 106 |
| US\$ 110s | Singapore • Rotterdam \$ 111, Antwerp \$ 111.5, New York \$ 112, Hamburg • Seattle \$114 |
| US\$ 120s | Panama • Hong Kong \$125 (second worst) |
| US\$ 140s | Japan • Australia \$ 144 (worst group) |

8.2.4 Concessions

35. The concession of APN is granted only for pipelines between APSA and piers.

36. Another concession is given to the APSA for their pumping service.

37. Until 1985 the fuel suppliers paid the Ministry of Treasury a license fee of \$ 0.02 per square feet per annum for the occupation and use of tank site. Afterward this was transferred to APN.

IX EXISTING PORT FACILITIES OF THE PORT OF BALBOA AND THEIR STRUCTURAL REVIEW

9.1 General Information

9.1.1 Anchorage, Entrance Channel, Turning Basin, Navigation Aids

1. Ships entering the Port of Balboa are anchored when necessary at the same anchorage for the Panama Canal. The anchorage is located east to the entrance of the canal open to the Pacific Ocean. The ships entering the Port of Balboa navigate the canal entrance channel. The canal is maintained 13.41m (44 ft) deep below MLWS and 213.36 m (700 ft) m wide up to Bridge of America and 152.4m (500 ft) from Bridge of America to Miraflores Locks. The turning basin of the Port of Balboa is located between the canal's channel and the port's piers. The turning basin has an approximately 500 m diameter and is maintained -12.95 m MLWS. Ships will follow the navigation aids installed along the canal for their entering and leaving the port. In addition, the port has its own navigation aids showing the harbor limit. See Figure 9-1-1.

2. The Port of Balboa has 13 piers overall, three piers on the west bank of the canal and ten piers on the east bank. Among these piers, the three Piers on the west bank, namely No. 1, No. 2 and No. 3, were used by US Navy and reverted to Panama in September 1996 together with the tank yards. On the east bank, Piers No. 8 to No. 12 are used by the dry-dock operator and Piers No. 13 and No. 19 are for the use of PCC. As a result, Piers No. 6, No. 7, No. 14, No. 15, No. 16, No. 17 and No. 18, all are on the east bank, are under the APN management. The dimensions of the piers for commercial use and cargoes being handled at these piers are tabulated in Table 9-1-1.

3. Both sides of Piers No. 1 and No. 2 are currently used for the oil-unloading and bunkering. Their length and usable berth length are 214.6 m (704 ft) and 213.4 m (700 ft) respectively and their water depths at a 15 m distance from the pier are 12.2 m (40 ft) at Pier No. 1 and 10.7 m (35 ft) at Pier No. 2. Both sides of Pier No. 3 are for emergency use only. Its north side has 214.6 m (704 ft) length, 8.53 m (28 ft) depth at a 15 m distance and 213.4 m (700 ft) usable berth length. Meanwhile, the south side of Pier No. 3 has the same length and depth but a 167.6 m (550 ft) usable berth length only. On this side, the beam of a docking ship is limited to 21.3 m (70 ft).

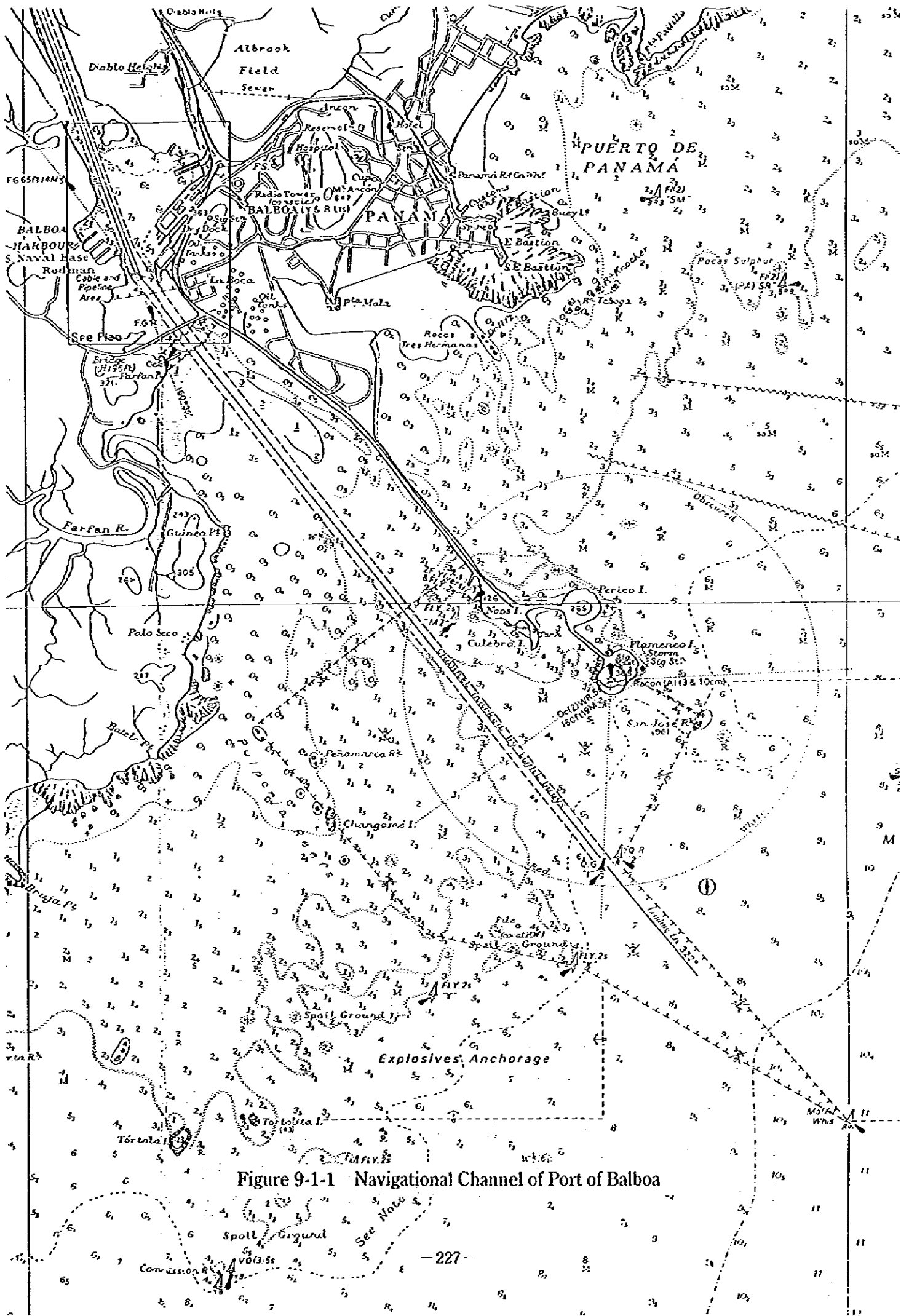


Figure 9-1-1 Navigational Channel of Port of Balboa

Table 9-1-1 Summary of General Characteristics of Piers of the Port of Balboa

| Pier | Location | Usable Length (m) | Assigned Length (m) | Maximum Ship Draft (m) | Average Water Depth (m) | Available Services | | |
|------|----------|-------------------|---------------------|------------------------|-------------------------|---|-------------------------------------|-----------------------------------|
| | | | | | | Supplies to Ships | Handled Cargoes | Other Services |
| 4 | | | | | | | | Demolished |
| 6 | A | 226 (742 ft) | 213 | 8.3 | 9.2 | Gasoline, Kerosene, H.D.O., L.D.O., F.O., Water | Bunkering, Cars | Passengers, Grain |
| 7 | A | 322 (1,058 ft) | 259 | 9.2 | 10.1 | Gasoline, Kerosene, H.D.O., L.D.O., F.O., Water | Bulk Cargo (chemicals), Bunkering | Passengers |
| | B | | | 7.0 | 9.9 | | | |
| 8 | A | 143 (470 ft) | 162 | 8.3 | 9.2 | | Mooring Buoy - Heavy Lift - Repairs | Shipyard's Use |
| 13 | A | | | 9.1 | 10.0 | | | For Tugboats and PCC |
| 14 | A | 236 (775 ft) | 236 | 9.6 | 10.5 | H.D.O., F.O., Water | Grain, Containers | For Vessels with proper Equipment |
| | B | | | 9.6 | 10.5 | | | |
| 15 | A | 349 (1,146 ft) | 305 | 10.1 | 11.0 | H.D.O., F.O., Water | Containers | For Vessels with proper Equipment |
| | B | | | 9.4 | 10.3 | | | |
| | C | | | 10.1 | 10.1 | | | |
| 16 | A | 226 (742 ft) | 183 | 9.5 | 10.4 | H.D.O., F.O., Water | Grain, Containers | For Vessel with proper Equipment |
| | B | | | 9.1 | 10.0 | | | |
| 17 | A | 92 | 18 | 7.1 | 8.0 | | | Launches, Tourist Passengers |
| | A | 152 (500 ft) | | 9.75 | 10.65 | H.D.O., F.O., Water | | |
| | B | | | 8.1 | 9.0 | | | |
| | C | 152 (500 ft) | | 11.1 | 12.0 | H.D.O., F.O., Water | Break-bulk Cargoes | Passenger Boats |
| 18 | D | | | 9.5 | 10.2 | | | |
| | E | 61 | 58 | 7.5 | 8.7 | H.D.O., Water | | |
| 19 | A | 122 | 18 | 7.1 | 8.0 | | | For PCC's use |

Remarks: The water depths in front of each pier are those at 5 m from its face-line.

The port has also navigation aids such as lighted buoys and leading lights.

Source: Engineering Department of the Port of Balboa

4. One of the unique characteristics of the Port of Balboa is that this port has dry-dock facilities capable of repairing a panamax ship. This is due to the fact that the port was originally constructed for providing services to the ships which would pass the Panama canal. Dry-Dock No. 1 is 318.2 m (1,044 ft) long, 33.5 m (110 ft) wide and 10.7 m (35 ft) deep at the mean sea water level. Dry-Docks No. 2 and No. 3 are of smaller dimensions for smaller ship repairing. Dry-Dock No. 2 is 134.2 m (440 ft 4.5") long, 14.6 m (48 ft) wide, 6 m (19 ft 6") deep. And Dry-Dock No. 3 is 71.7 m (235 ft 4.5") long, 14.9 m (49 ft) wide and 3.7 m (12 ft) deep. Currently the dry-docks are operated by a private company under a concession contract.

5. Also unique is that all the piers have outlets of fuel oil for bunkering. The fuel oil is mainly unloaded at Pier No. 6 and No. 7 because their closer locations to the tank yards which lies at the foot of the Sosa Hill. However, when Pier No. 6 and No. 7 are occupied by other cargo ships, the unloading of fuel oil can be carried out at other piers on the east bank, naturally with a longer period of time because of a longer distance and smaller pipeline diameter.

6. Also unique is that PCC has occupied a large area behind Piers No. 14, No. 15 and No. 16 with its workshop facilities. This is again originated from the characteristics of the port which was constructed for the Panama canal. However, the PCC's occupation has hampered efficient container cargo handling of the port. As the PCC's facilities there are planned to move to the site of US military workshop at Corozal when the military vacates them, the area will be handed over to APN in the near future

9.2 Piers

9.2.1 General Information

7. The Port of Balboa was constructed at an originally plane and marsh area. The construction was carried out in dry conditions with enclosure dikes surrounding the construction site. Therefore, all the works, except the dredging, were built in dry conditions. The foundations of the piers were cast-in-situ concrete piles of a 4.5 ft to 8 ft diameter except Pier No. 7, where cast-in-situ concrete abutments were built directly on the basalt rock. (The foundations of Berth No. 15B was partly altered from cast-in-situ concrete piles to concrete abutments for preventing collapse of the slopes.) The dredging was carried out with floating cutter suction dredgers which were working on the water ponds

inside the enclosure dikes.

8. In 1992, dredging works were conducted in Balboa Port. The port basin was dredged up to -12.95 m MLWS, a sufficient depth for a panamax vessel. However, a 15 m width of the seabed in front of the piers was not dredged but only leveled smooth. This 15 m intact width was necessary for preventing collapse of the slopes beneath the piers. At present, therefore, no piers of the Port of Balboa have a sufficient water depth for accommodating a full-loaded panamax vessel.

9. As more than 80 years has passed since their construction, all the piers are deteriorated and have been repeatedly repaired. Recently, APN has repaired Piers No. 14, No. 15 and No. 16. So far as these piers are concerned, the exposed reinforcement steel bars have been neatly covered with concrete patching and no serious defects are observed. However, the mortar riprap of the slope protection are damaged at many places. As these damages are resulted from the slope collapse, APN is currently improving the slope stability by driving steel sheet piles in front of the piers. On the contrary to Piers No. 14 to 16, deterioration and damages are left not repaired at Piers No. 6, No. 8 and No. 18. Reinforcement bars and concrete-encased steel beams of the upper structures are exposed. Particularly, the deterioration is excessive at Pier No. 18 where an immediate repair is necessary.

10. As the piers have neither a sufficient water depth nor adequate apron width, APN is planning to improve Piers No. 6, No. 14, No. 15, No. 16 and No. 18 in the following steps.

1st Step: To drive steel sheet piles forming a retaining wall along the face-line of Piers No. 6, No. 14, No. 15 and No. 16 to protect the slope from collapsing.

To replace the concrete pavement on the fill at the center of Pier No. 18 with concrete beams and slabs supported by cast-in-situ concrete piles.

2nd Step: To excavate the seabed in front of the steel sheet pile wall as constructed in the 1st Step up to the planned elevation (Pier No. 6 up to -12.20 m, Pier No. 14 up to -12.50 m, Pier No. 15 up to -12.95 m, all with respect to MLWS). To excavate the seabed in front of Pier No. 18 up to -12.20 m MLWS.

3rd Step: To construct container crane beams in front and at the rear of the existing piers at Pier No. 14 , No. 15 and No. 16. (For Piers No. 14 and No. 15, the berth face-line will be forwarded. Meanwhile, for Pier No. 16 the face-line will be maintained as it is . For Pier No. 16, therefore, additional piles for the front crane beam are to be driven through the existing structures.)

9.2.2 Pier No. 6

11. Pier No. 6 was constructed as "Reloader Wharf" of Balboa Coaling Plant and is located most southward among the piers of the port after Pier No. 4 was demolished. It is very close to the canal's navigational channel. It has a usable berth length of 226 m and an average water depth of 9.2 m below MLWS. The pier is able to accommodate a vessel having a 213 m length and 8.3 m draft. The water depth in front of the pier much varies as basalt rock appears along the face-line.

12. The pier is an open type marginal wharf, constructed on the mortar-paved slope protection, horizontally anchored to the rear fill. The pier has cast-in-situ concrete caisson pile foundations of 2.43 m (8 ft) and 1.83 m (6 ft) diameters in three and four rows respectively, 10.67 m (35 ft) interval, concrete-encased steel transversal beams and cast-in-situ reinforced concrete lateral beams and slabs. The pier is provided with 11 pieces of floating pneumatic rubber fenders. The concrete deck is 19.51 m wide. Figure 9-2-1 illustrates the cross section. The pier is equipped with pipelines and outlets for water supply and bunkering for the ships.

13. As the basalt rock appears shallow at the southern part, the deepening is limited up to -12.20 m MLWS in APN's improvement plan. Therefore, this pier is unable to accommodate a full-loaded panamax ship during low tide.

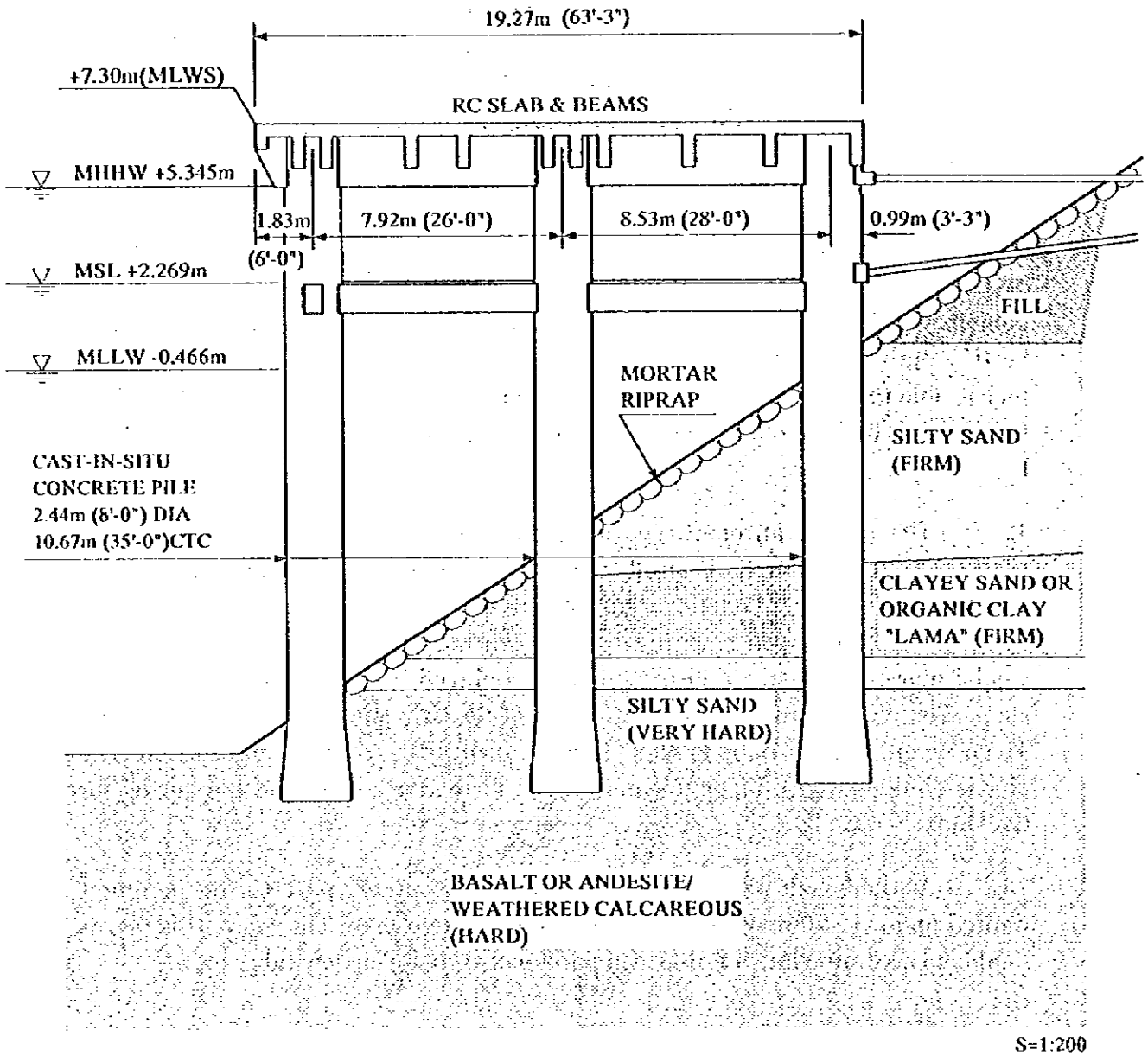


Figure 9-2-1 Simplified Cross Section of Pier No.6

9.2.3 Pier No. 7

14. Pier No. 7 was constructed as "Unloader Wharf" of Balboa Coaling Plant and converted to a pier to accommodate a 70,000 displacement ton vessel. It is located between Pier No. 6 and Dry-Dock No. 1. It has a usable berth length of 322 m and can accommodate a vessel having 259 m length. The pier is divided to two berths; namely Berth 7A at the canal side and Berth 7B at the dry-dock side. The Berth 7A has an average water depth of 10.1 m below MLWS while Berth 7B has a 9.9 m depth. The Berth 7A is able to accommodate a vessel having a 9.2 m draft while Berth 7B can accommodate up to a 7.0 m draft ship. The pier is provided with 9 sets of fender systems, which are composed of steel floaters surfaced with rubber fenders and guided with the concrete abutment. Vertical movement of these fenders is eased with counter balances suspended below the apron. Along the face-line, basalt rock was evenly excavated up to -10.67 m below MLWS (43.5' below PLD (Precise Level Datum of Canal)).

15. The foundation of the pier is 1.83 m (6 ft) thick cast-in-situ concrete abutments with an interval of 7.62 m (25 ft). The abutments were made in dry condition and anchored on basalt rock with rails. Concrete-encased steel I-beams and reinforced concrete slabs are supported by these abutments. The concrete deck is about 12.3 m wide. As this pier was constructed as an unloader wharf of the coal plant, the partition wall of the coal storage and pedestals of a conveyer system are attached to the pier structure. The typical cross section is as shown in Figure 9-2-2.

16. The pier is equipped with pipelines and outlets for water supply, bunkering and loading and unloading of chemicals. It is also equipped with loading arms for oil unloading. Behind the pier, existing are several chemical tanks and abandoned coal yards, a 7,700 m² of which APN has converted to a container stacking yard.

17. Because its foundation is rested on hard basalt rock of the seabed, the deepening of the pier is technically difficult. APN has no plan to deepen this pier at present.

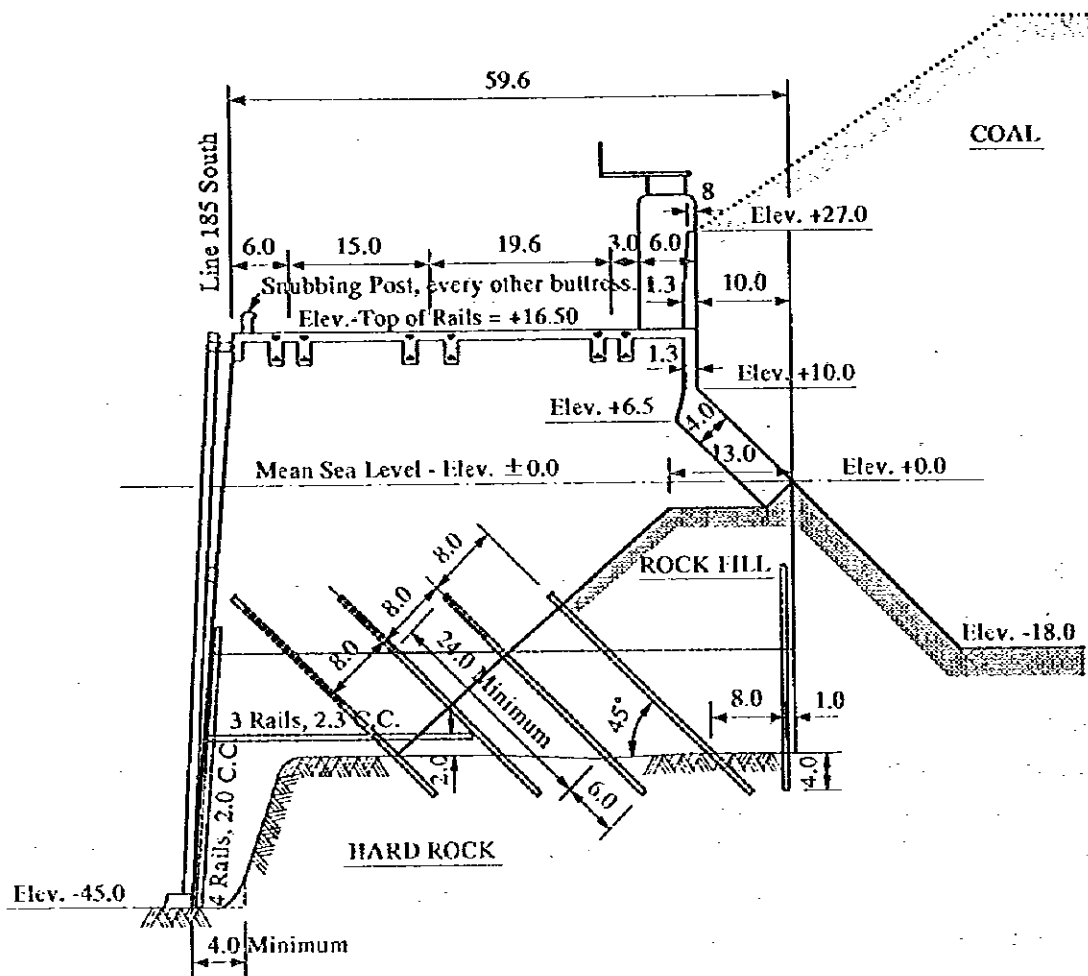


Figure 9-2-2 Cross Section of Pier No.7

9.2.4 Pier No. 8

18. Pier No. 8 was constructed as an entrance pier of Dry-Dock No. 1 and, because of its location, as a retaining wall of Dry-Dock No. 2. It is located at the opposite side of Pier No. 7. The pier has a usable length of 143 m and an average water depth of 9.2 m below MLWS. It can accommodate up to a vessel having a 162 m length and 8.3 m draft.

19. The pier is an open type marginal wharf having two rows of cast-in-situ concrete piles of a 1.37 m (4.5 ft) diameter with a 7.63 m (25 ft) interval. Concrete-encased steel I-beams and cast-in-situ reinforced concrete slabs are supported by both the piles and concrete abutments. The pier is provided with floating pneumatic rubber fenders. The concrete deck is 18 m (59 ft) wide. The typical cross section is shown in Figure 9-2-3. The pier is equipped with crane rails for repairing ships both on Pier No. 8 and in Dry-Dock No. 2.

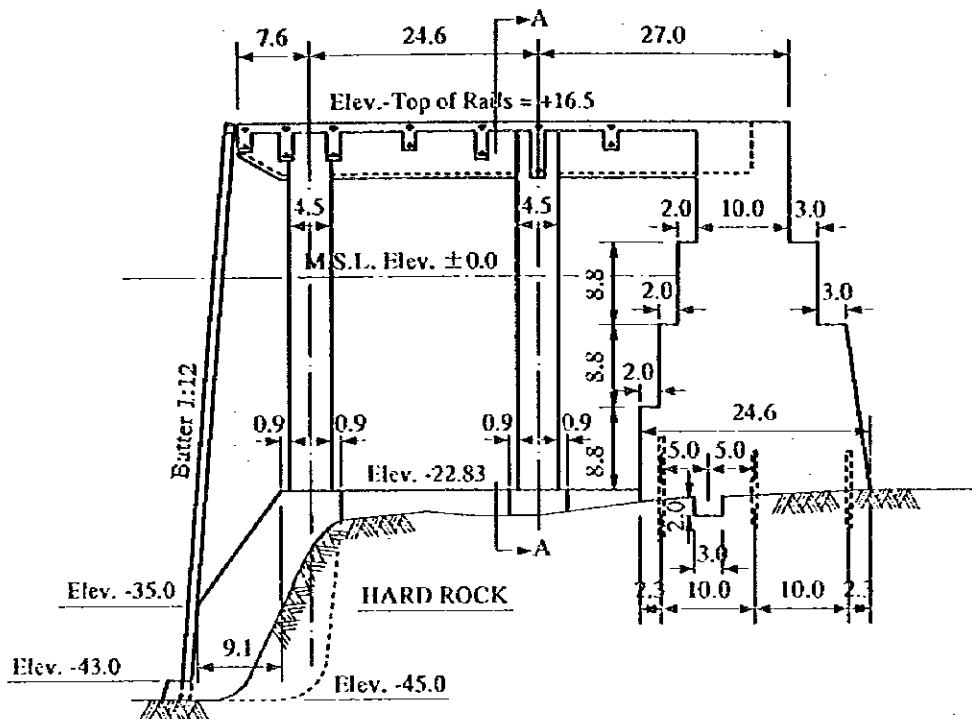


Figure 9-2-3 Cross Section of Pier No.8

9.2.5 Pier No. 13

20. Pier No. 13 is adjoining to Dry-Dock No. 3 and Pier No. 14. (Pier No. 13 is a corner of Pier No. 14.) The pier has an average water depth of 10.0 m and can accommodate up to a vessel having a 9.1 m draft. The pier is currently provided with neither fender systems nor service facilities. The pier is used for tugboats and working boats of PCC. The pier is too short to accommodate ocean going cargo vessels.

9.2.6 Pier No. 14

21. Pier No. 14 is a part of a 811 long marginal wharf comprised of Piers No. 14, 15 and 16. It has a usable berth length of 236 m and is divided to two berths; namely Berth 14A at the canal side and Berth 14B at Pier No. 15 side. Both berths have an average water depth of 10.5 m MLWS and can accommodate up to a vessel having a 9.6 m draft.

22. The pier is an open type marginal wharf, constructed on the mortar-paved slope protection, horizontally anchored to the rear fill, having cylindrical concrete caisson foundations (1.83 m (6 ft) diameter) and cast-in-situ reinforced concrete beams and slabs. The concrete deck is 18.75 m wide. The pier is provided with a fender system which is composed of two vertical steel piles attached to the pier with tapered cylindrical rubber fenders. The cross section is illustrated in

Figure 9-2-4. The pier is equipped with pipelines and outlets for water supply and bunkering for the ships.

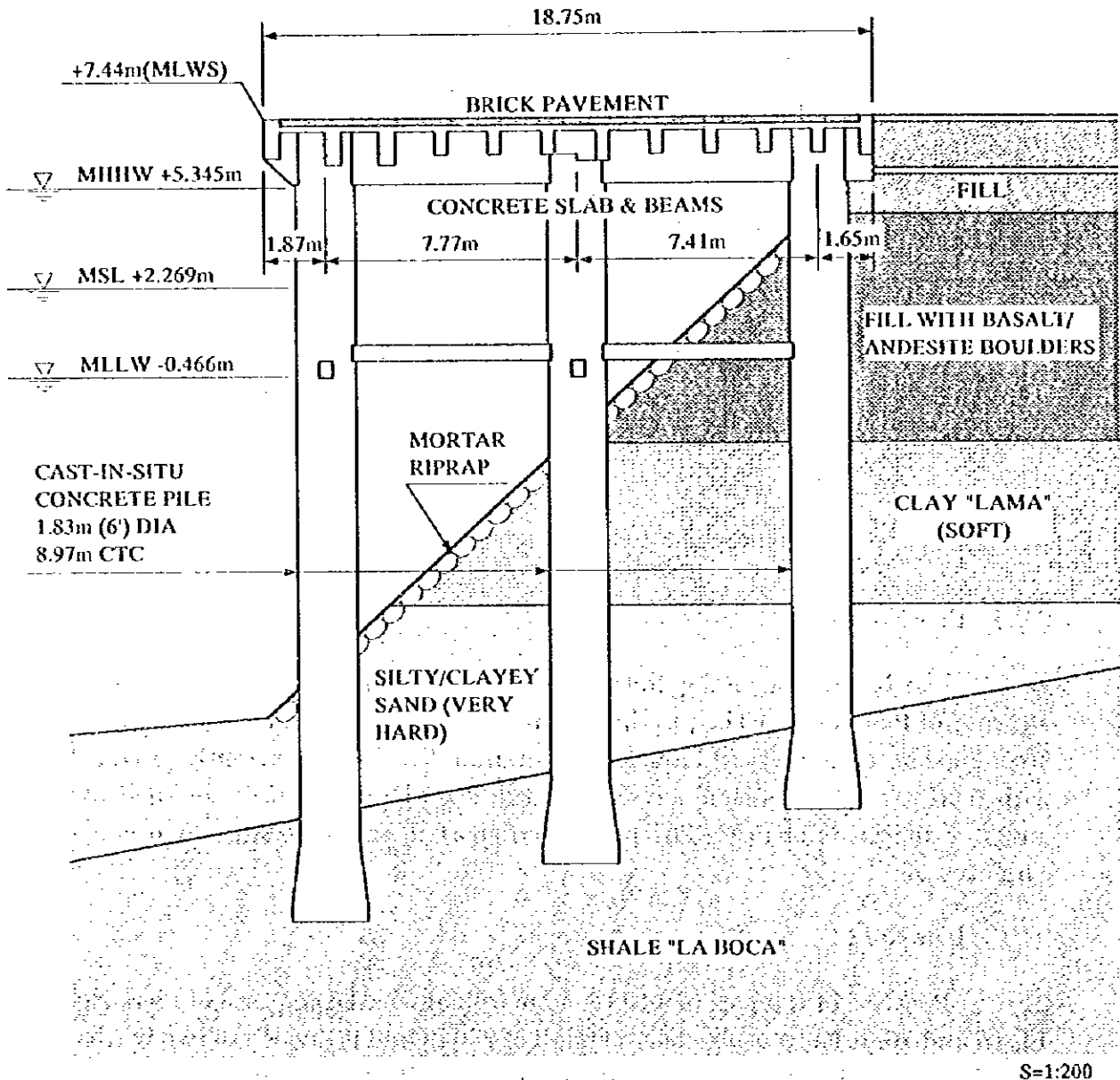


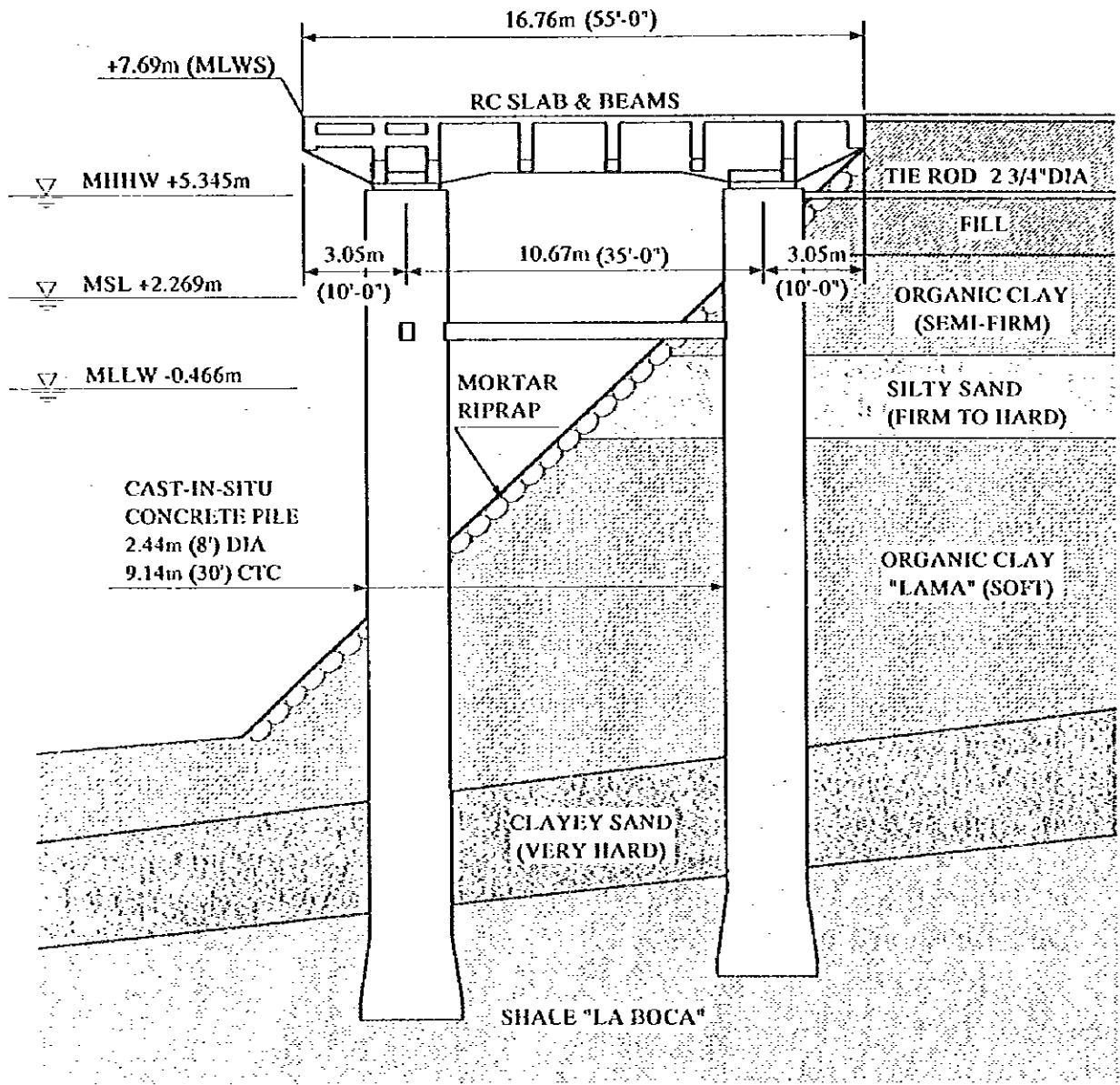
Figure 9-2-4 Simplified Cross Section of Pier No.14

23. APN has a plan to improve the pier for accommodation of a full-loaded panamax container vessel. The front crane beam will be built on the two rows of additional cast-in-situ concrete piles of a 1.20 m diameter, while the rear crane beam will be supported by one row cast-in-situ concrete piles of the same size. The crane rail gauge is designed 30.26 m. The land fill behind the pier will be retained with an anchored L-shape retaining concrete wall. The berth face-line will be forwarded by 4.75 m from the present face. However, as the dry-dock concessionaire occupies the workshops behind the pier, development of a container yard will be limited to a smaller scale.

9.2.7 Pier No. 15

24. Pier No. 15 is a part of a 811 long marginal wharf comprised of Piers No. 14, No. 15 and No. 16. It has a usable berth length of 305 m and can accommodate up to a vessel having 305 m length. The pier is divided to three berths; namely Berth 15A adjoining to Pier No. 14, Berth 15B at the middle and Berth 15C adjoining to Pier No. 16. The Berths 15A, 15B and 15C have an average water depth of 11.0 m, 10.3 m and 10.1 m respectively. Both Berth 15 A and Berth 15C can accommodate up to a vessel having a 10.16 m draft while Berth 15B can accommodate up to a 9.4 m draft vessel.

25. The structure of Pier No. 15 is not uniform as its foundations are of two different types; namely, cast-in-situ concrete piles and cast-in-situ concrete abutments. As previously mentioned, the whole pier was originally constructed as a pile support structure and, due to the slope collapse, they were partly replaced with a concrete-abutment-supported structure. The structural features of Pier No. 15 are tabulated in Table 9-2-1. The cross section of the pile supported part is illustrated in Figure 9-2-5.



S=1:200

Figure 9-2-5 Simplified Cross Section of Pier No.15

Table 9-2-1 Structures of Pier No. 15

| Approx. Length | Foundation | Super-structure | Remarks |
|----------------|--|---------------------------------|--|
| 28 m | Cast-in-situ concrete piles, 2 rows, 9.15 m interval, 2.28 m diameter., horizontally anchored. | Steel beams and concrete slab | |
| 164 m | Concrete abutment, 27.44 m interval. | Steel girders and concrete slab | Difference is the arrangement of piles and details of super structure. |
| 37 m | Cast-in-situ concrete piles, 4 rows, 6.70 m interval, 2.28 m diameter., horizontally anchored. | Concrete beams and slab | |
| 37 m | Cast-in-situ concrete piles, 4 rows, 6.70 m interval, 2.28 m diameter., horizontally anchored. | Concrete beams and slab | |
| 78 m | Cast-in-sit concrete piles, 3 rows, 10.67 m interval, 2.28 m diameter., horizontally anchored. | Concrete beams and slab | |

Note: The description above is in the order from Pier No. 14 to Pier No. 15.

26. Rubber fender systems are same with those of Pier No. 14 except the shape of the rubber fenders. The fenders on Pier No. 15 are cylindrical but not tapered. The pier is equipped with pipelines and outlets for water supply and bunkering for the ships.

27. APN has a plan to improve the pier for accommodation of a full-loaded panamax container vessel. The front crane beam will be built in the same manner with Pier No. 14 on the two rows of additional cast-in-situ concrete piles of a 1.20 m diameter. Meanwhile, the widening of the apron and the supporting of the rear crane beam will be made by three rows (two rows only where piles exist at present) of cast-in-situ concrete piles of a 1.20 m diameter. The crane rail gauge is designed 30.26 m. The berth face-line will be forwarded by 4.75 m from the present face-line. The workshops of PCC occupies the hinterland of an about 130 m width. A part of this hinterland has been transferred to APN, who has built a container stacking yard of about 6,100 m² there. The stacking yard can be partly expanded about 220 m wide if PCC vacates all the workshops there.

9.2.8 Pier No. 16

28. Pier No. 16 is a part of a 811 long marginal wharf comprised of Piers Nos. 14, 15 and 16. There is, however, a 13° 55' degree angle between the face-lines of Pier No. 15 and Pier No. 16. (The angle between Pier No. 16 and Pier No. 17 is 104° 29'-03".) Pier No. 16 has a usable berth length of 226 m and can accommodate up to a vessel having a 183 m length. The pier is divided to two berths; namely Berth 16A adjoining to Pier No. 15 and Berth 16B adjoining to Pier No. 17. Berth 16A and Berth 16B have an average water depth of 10.4 m and 10.0 m to accommodate up to 9.5 m and 9.1 m draft vessels respectively.

29. The pier is an open type marginal wharf anchored to the rear fill, constructed on the mortar-paved slope protection, supported on three rows of cast-in-situ concrete piles of a 2.29 m (7 ft 6") diameter at a 3.50 m or 3.60 m interval. The apron is made of cast-in-situ reinforced concrete beams and slab. The concrete deck is approximately 19 m wide. The fender system is composed of vertical and horizontal steel members attached to the concrete deck with tapered cylindrical rubber fenders. The cross section is illustrated in Figure 9-2-6.

30. APN has a plan to improve the pier for accommodation of a container vessel. Because the port basin is limited, the berth face-line cannot be forwarded as is planned for Pier No. 14 and Pier No. 15. Therefore, the front crane beam will be built 5.86 m inward from the existing berth face-line. To support this beam, cast-in-situ concrete piles of a 1.20 m diameter will be installed through the existing concrete slab. Three rows of cast-in-situ concrete piles of the same diameter will support the widened apron and rear crane beam. The crane rail gauge on Pier No. 16 is designed to be 22.56 m unlike 30.26 m of Pier No. 14 and Pier No. 15. Behind Pier No. 16, Panama Railway has an about 90 m wide workshop area for railcar repair, across which PCC also has a workshop area of an about 130 m width. It is, therefore, possible, to construct a container yard of an about 220 m width behind Pier No. 16.

9.2.9 Pier No. 17

31. Pier No. 17 located between Pier No. 16 and Pier No. 18 which are facing each other across an approximately 90 m water basin. Pier No. 17 has two concrete floaters whose dimensions are 73.2 m (240 ft) in length, 8.59 m (28 ft 2") in width and 2.43 m (8 ft) in depth. These floaters are connected to the pier with two ramps. The apron behind the floaters is reinforced concrete beams and slabs supported on the cast-in-situ concrete piles of a 2.43 m (8 ft) diameter.

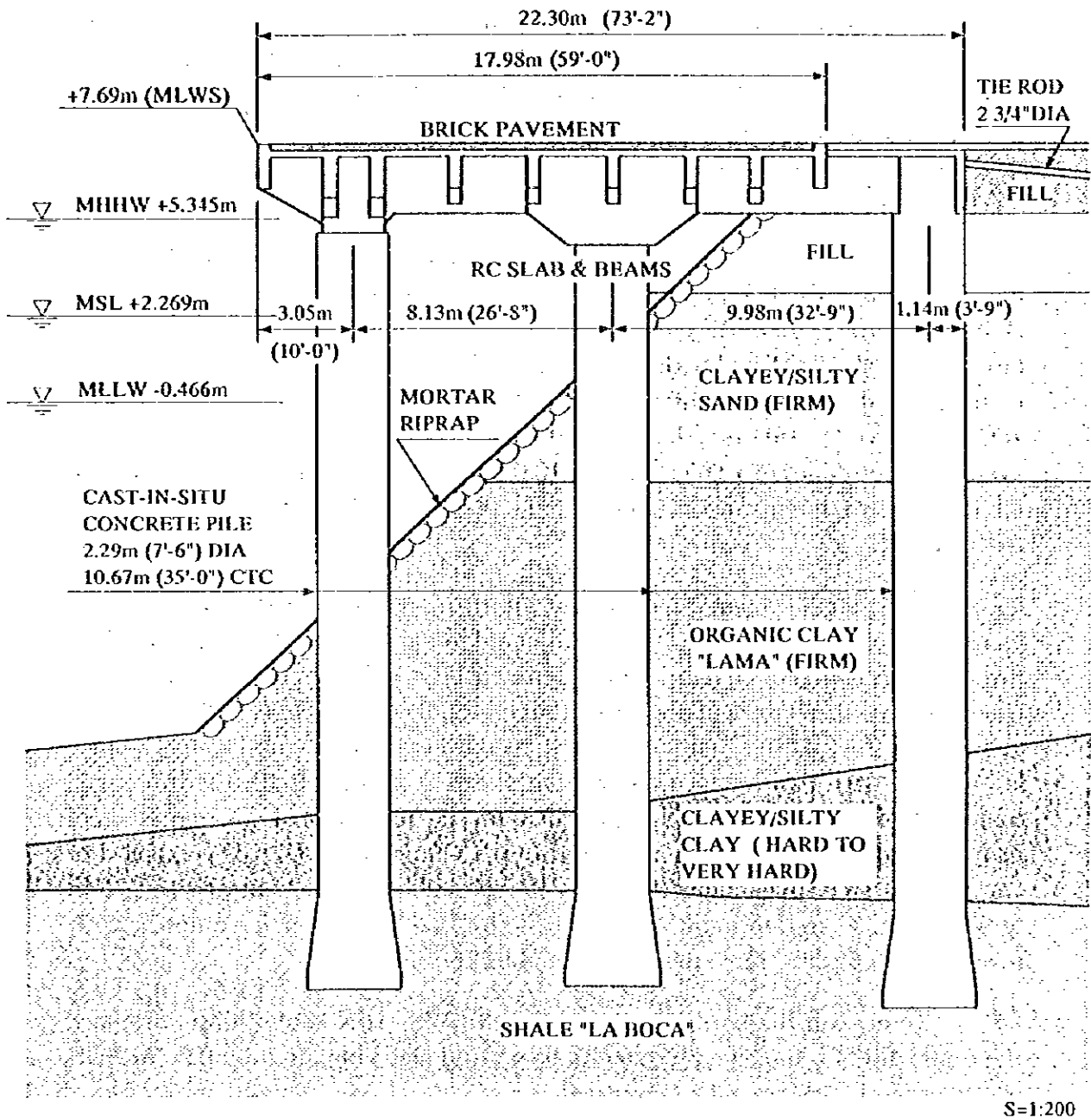


Figure 9-2-6 Simplified Cross Section of Pier No.16

32. The pier has a usable length of 92 m and an average water depth of 8.0 m. It can accommodate up to a vessel having a draft of 7.1 m. However, the maximum length of docking vessels is limited to 18 m not to hamper the operation of adjoining Piers No. 16 and No. 18. The pier has neither service facilities nor cargo handling equipment.

9.2.10 Pier No. 18

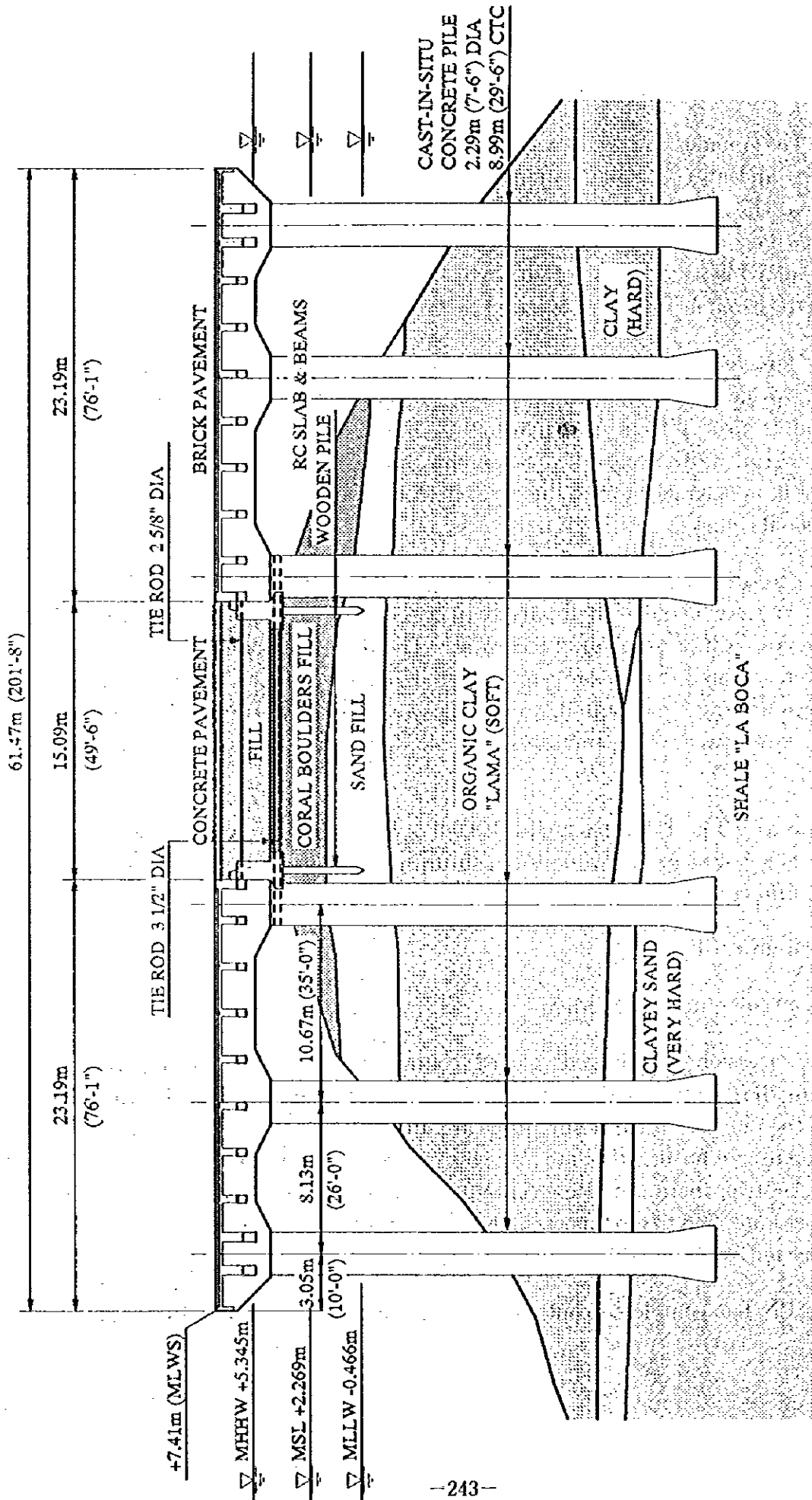
33. Pier No. 18 is a finger-type pier projected to the inner harbor with an angle of 90 degree to Pier No. 17. (In the original master plan of the Port of Balboa, several piers of the same dimensions with Pier No. 18 were assumed to be continuously developed to the north.) The pier has a usable berth length of 365 m and is divided to five berths; namely Berths 18A (north-west), 18B (north-east), 18C (south-west), 18D (south-east) and 18E (west-end). These berths have an average water depth of 10.65 m, 9.0 m, 12.0 m, 10.2 m and 8.7 m to accommodate up to a vessel having a draft of 9.75 m, 8.1 m, 11.1 m, 9.5 m and 7.5 m respectively.

34. The pier has open type wharves all at its margins. At the middle of the pier, there exists a fill of sand and coral boulders on the original soil. This fill is covered with concrete pavement and retained by a pair of retaining walls. The wharves have three rows of cast-in-situ concrete piles of 2.29 m (7 ft 6") diameter at a 9.5 m interval, and cast-in-situ reinforced concrete beams and slab. The pier is provided with two fender systems. On Berth A and Berth B, the system is composed of vertical steel piles attached to the pier with a horizontal steel member and V-type rubber fenders. On Berth C and Berth D, it is composed of two vertical steel piles supported by a *p*-type rubber fender onto the concrete deck. The cross section is illustrated in Figure 9-2-7. The pier is equipped with pipelines and outlets for water supply and bunkering.

35. To deepen the berth up to -12.20 m MLWS, APN is planning to replace the center fill of the pier with concrete beam and slab supported by 0.90 m cast-in-situ concrete piles at a 4.5 m interval.

9.2.11 Pier No. 19

36. Pier No. 19 is located on the other side of Pier No. 17 with respect to Pier No. 18. It has a usable length of 61 m and an average water depth of 8.0 m. However, the maximum length of docking vessels is limited to 18 m not to hamper the operation of Pier No. 18. The pier has basically the same structure with Pier No. 17. This pier is occupied by pilot boats of PCC.



Scale 1:300

Figure 9-2-7 Simplified Cross Section of Pier No.18