3.2 Summary of the Pacific Coast Ports in the United Mexican States

3.2.1 General Situation

Mexico has a long shoreline of about 10,000km. The foreign trade of Mexico largely depends on maritime transportation. There are more than a hundred ports in Mexico, including small ports.

Among these ports, the main ports on the Pacific Coast are Salina Cruz, Acapulco, Lazaro Cardenas, Manzanillo, Mazatlan, Guaymas and Ensenada.

In 1987, the cargo volume handled at these Pacific Coast ports was 54,440 thousand tons, which accounted for 35% of the total maritime cargo volume in Mexico.

As for foreign trade, the share of the Pacific Coast ports ratio drops down to 22%. The reason for this is that petroleum is produced in the Gulf Coast area and the Gulf Coast ports have better access to the U.S.A., which is the biggest trading country in terms of the imports and exports of Mexico.

On the other hand, the domestic cargo volume handled at the Pacific coast ports accounts for 63% of the total maritime cargo volume in Mexico.

As for containerized cargo, about 36% is presently handled at the Pacific coast ports. The volume of containerized cargo handled at the Pacific coast ports is expected to increase according to the growth of trade between Mexico and the Far East, including and Japan.

3.2.2 Cargo Handling Volume at the Objective Six Ports

The objective six ports of the study are the main ports on the Pacific coast of Mexico and have good geographical conditions. The cargo volume handled at these ports occupied accounts for 58% of the total cargo volume of the Pacific coast ports.

The cargo volume handled at the six ports is shown in Table 3.2.1.

Table 3.2.1 Cargo Handling Volume at the Objective Ports

(Unit: 1000 tons)

Item	Salina Cruz	Lazaro Cardenas	Manzanillo	Mazatlan	Guaymas	Ensenada	6 Ports Total	Pacific Coast Total	Mexico Total
Total Cargo Volume	15,009	2,623	4,276	2,711	5,827	1,066	31,512	54,440	153,644
Foreign Trade Total	8,000	1,339	2,600	553	1,958	97	14,547	22,233	102,390
Import	87	832	1,984	467	1,425	76	4,871	5,624	11,746
Export	7,913	507	616	86	533	21	9,676	16,609	90,644
Domestic Trade Total	7,009	1,284	1,676	2,158	3,869	969	16,965	32,207	51,254
Domestic Discharge	177	973	1,409	1,872	3,011	932	8,374	17,713	25,873
Domestic Loading	6,832	311	267	286	858	37	8,591	14,494	25,381
Container	300	88	69	3	79	0	539	545	1,534

Source: SCT Movimient de Carga y Buques 1987

3.3 Port of Salina Cruz

3.3.1 Port Facilities

The Port of Salina Cruz is an old port built at the beginning of this century and was used as a based port for the land transport between Salina Cruz and Coatzacoalcos before the Panama Canal opened.

The Port of Salina Cruz (Fig. 3.3.1) is divided into the outer port area and the inner port area. The outer port area has a container berth (1 in Fig. 3.3.1) and an LPG berth (19 in Fig. 3.3.1). The inner port comprises a general cargo area, a fishing port area and a naval area. The west pier (3 in Fig. 3.3.1) of the general cargo area is used exclusively by PEMEX.

The objective facilities for the study are thus the container berth, the east pier (2 in Fig. 3.3.1) of the general cargo area and related facilities.

The container berth was opened in 1982 and has a wide container yard. The entrance channel of this port is 12m in depth and 100m in width. The channel connecting the outer port and inner port is about 10m in depth and 50m in width.

Table 3.3.1 (a), (b) and (c) show the outlines of main mooring facilities, breakwaters and channels, and storage facilities in the Port of Salina Cruz.

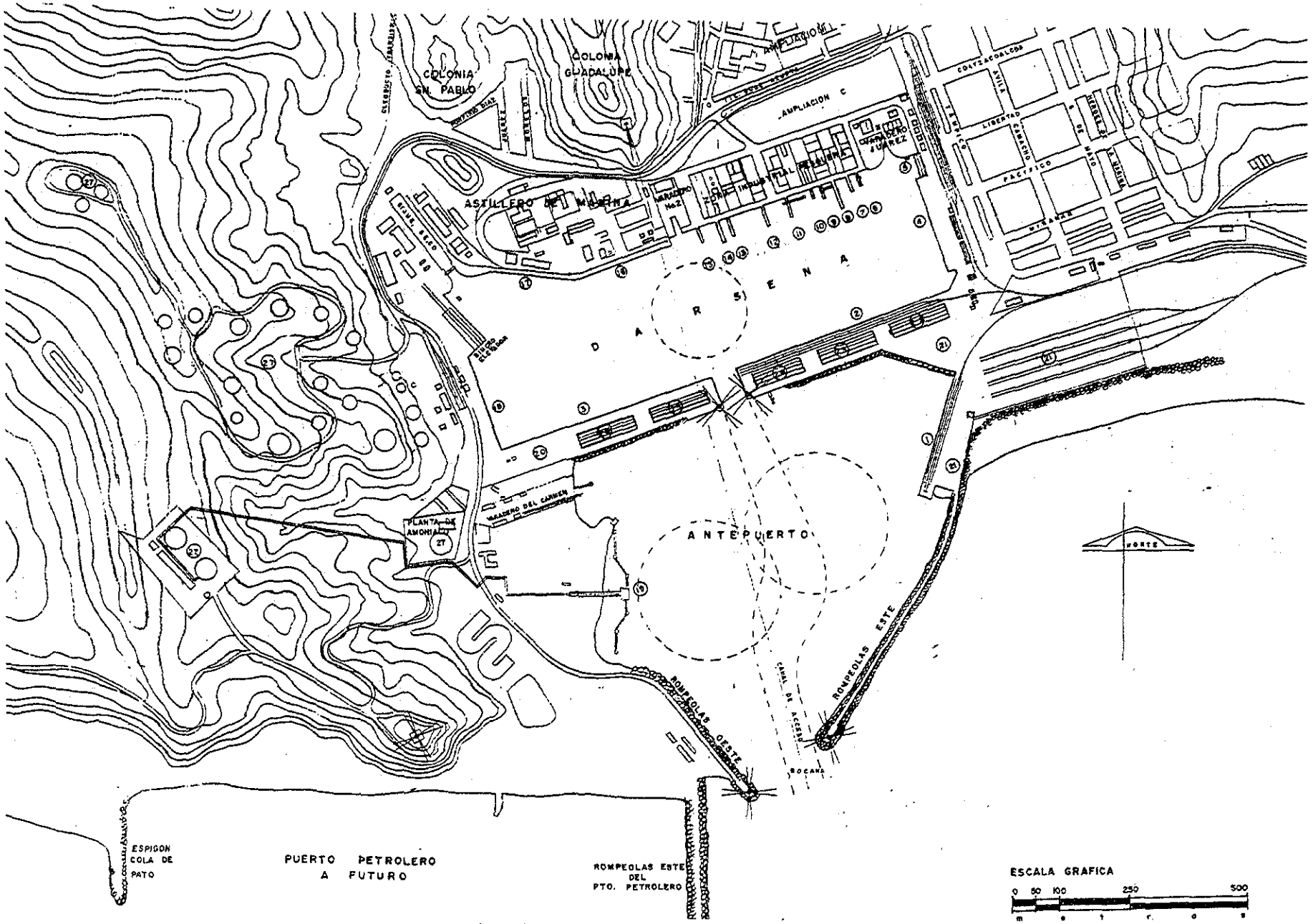


Fig. 3.3.1 Port of Salina Cruz
Source: Catastro Portuario 1989, S.C.T.

Table 3.3.1 (a) Main Mooring Facilities

No.	Name of Facilities	Berth Length (m)	Water Depth (m)	Crown Height (m)	Structural Material	Year Construc-ted	Public or Private
1	Muelle de Contene-dores	275	-12	+3.61	Reinforced	1981	Public
2	Muelle de Recinto Fiscal Section 1. (Berth No. 1,2,3)	486	-6 ~ -8.60	+3.60	Concrete Block	1904	Public
3	Muelle del Recinto Fiscal Section 2.	465	-7 ~ -10	+3.60	Concrete Block	1904	Private (PEMEX)
4	Muelle de Pesca	210	-5	+2.00 ~+3.70	Reinforced Concrete	1981	Public
16	Muelle de la Armada	221	-2 ~ -3.5	+3.60	Reinforced Concrete	1958	Military
17	Muelle de Reparacio-nes a Flote No. 1	168	-2 ~ -3	+3.60	Reinforced Concrete	1958	Public (for repair)
18	Muelle de Reparacio-nes a Flote No. 2	215	-4	+3.60	Reinforced Concrete	1973	Public (for repair)
19	Muelle L.P.G.	127	-10.5	+3.60	Reinforced Concrete	1984	Private (PEMEX)

Source: Catastro Portuario 1989, SCT

Table 3.3.1 (b) Main Breakwaters and Channels

Name of Facilities	Length (m)	Crown Height (m)	Width (m)	Water Depth (m)	Structural Material	Year Constructed
Rompeolas Este	754	+7.0	6.0 (Crown)	--	10ton Stone with Tetrapod	1906
Rompeolas Oeste	330	+7.0	6.0 (Crown)	--	10tons Stone with Tetrapod block	1904
Rompeolas Este del P.T.O. Petrolero	1,365	+4.0	10.0 (Crown)	--	16ton Stone	1982
Rompeolas Oeste del P.T.O. Petrolero	860	+4.0	10.0 (Crown)	--	16ton Stone	1982
Canal de Acceso	--	--	100.0 (Bottom)	-12.0	--	--

Source: Catastro Portuario 1989, SCT

Table 3.3.1 (c) Main Storage Facilities

No.	Name of Facilities	Total Area (m^2)	Net Area (m^2)	Year Constructed	Public or Private
22	Bodega No. 1	4,064 (127 x 32)	2,800	1906	Public
23	Bodega No. 2	4,064 (127 x 32)	2,800	1906	Public
24	Bodega No. 3	3,424 (107 x 32)	2,500	1906	Public
25	Bodega No. 4	4,064 (127 x 32)	2,800	1906	Public
26	Bodega No. 5	4,064 (127 x 32)	2,800	1906	Public

Source: Catastro Portuario 1989, SCT

3.3.2 Utilization of Port

(1) Number of Vessel Calls

The number of vessel calls at the Port of Salina Cruz is shown in Table 2.3.2. The number of vessel calls per year were in the range of 450 to 500 during the last seven years. In 1987, 490 vessels called at the port, and most of them were tankers.

Table 3.3.2 Number of Vessel Calls at the Port of Salina Cruz

Classification	1981	1982	1983	1984	1985	1986	1987
Foreign Trade	77	43	101	102	93	95	109
Domestic Trade	398	416	394	392	386	359	381
Total	475	459	495	494	479	454	490

Source: Momiviento de Cargo y Buques (1981-1987), SCT

(2) Regular Foreign Trade Service

There are two regular liners calling at the Port of Salina Cruz. One of them calls as a part of the most important service for the pacific coast ports in Mexico. Its route is as follows: Mexico - west coast of the U.S.A. - Japan - Far East - Japan - West Coast of the U.S.A. - Mexico. The 10 days service is carried out by TMM using conbulkers (container-bulk) with a capacity of 1590 TEUs or 2069 TEUs. The calling ports in Mexico are Guaymas, Lazaro Cardenas, Salina Cruz and Manzanillo.

The other regular service is operated by Gran Colombia Line and connects Colombia, Central America, Salina Cruz, Manzanillo and the west coast of the U.S.A. as a monthly service using multipurpose vessels.

(3) Characteristics of the Cargoes

The cargo volume handled at the Port of Salina Cruz increased to 15 million tons in 1987, as shown in Table 3.3.3. The main reason for this is the increase of petroleum exports. Petroleum accounts for more than 95 percent of the total cargo.

Table 3.3.3 Cargo Volume through the Port of Salina Cruz

Classification	1981	1982	1983	1984	1985	1986	1987
Foreign Trade							
(Import)	80,549	13,042	22,400	13,506	26,149	50,868	86,787
General Cargo	32,816	13,042	22,400	13,387	26,071	50,844	86,787
Mineral Bulk	47,733	-	-	-	-	-	-
Perishable	-	-	-	119	78	24	-
(Export)	86,963	2,834,531	5,705,275	6,515,310	6,559,717	7,618,002	7,912,328
General Cargo	12,201	71,833	109,347	175,457	172,304	182,635	256,294
Liquids (Petr. & Derivs)	72,435	2,761,506	5,594,805	6,339,324	6,384,353	7,434,068	7,655,711
Perishable	2,327	1,192	1,123	529	3,060	1,299	323
Domestic Trade							
(Discharge)	77,409	92,163	158,133	243,887	193,458	189,452	177,031
General Cargo	73,514	57,927	73,866	155,618	109,584	91,334	125,468
Agricultural Bulk	3,445	34,236	84,267	88,140	83,874	98,118	30,544
Mineral Bulk	-	-	-	-	-	-	20,968
Perishable	448	-	-	129	-	-	51
(Loading)	7,240,130	6,575,747	6,331,160	6,140,124	6,651,821	6,059,247	6,832,976
General Cargo	15,879	23,456	7,912	7,235	2,183	2,404	42
Liquids (Petr. & Derivs)	7,223,509	6,552,291	6,322,748	6,132,889	6,649,638	6,056,843	6,832,934
Perishable	742	-	500	-	-	-	-
T O T A L	7,485,051	9,515,483	12,216,968	12,912,827	13,431,145	13,917,569	15,009,122

Source: Movimiento de Carga y Buques 1987, SCT

Though the volume of general cargo has increased in both foreign trade and domestic trade, the total volume is less than 500 thousand tons. The containerized cargo handled at the port is shown in Table 3.3.4. The containerized cargo volume has also increased, but the imbalance between the imports and exports is remarkable. The main containerized import cargoes were assemblies and the main containerized exports were ácido tereftálico and beer. Transit cargoes in container boxes destined for Guatemala are also discharged and transported by road.

Table 3.3.4 Containerized Cargo through the Port of Salina Cruz

(Unit:tons)

	1981	1982	1983	1984	1985	1986	1987
Import	-	197	1,702	2,729	11,946	34,534	66,908
Export	-	65,957	91,111	140,931	102,435	178,273	232,847
Total	-	66,154	92,813	143,600	114,381	212,807	299,755

Source: Movimiento de Carga y Buques (1981-1987), SCT
Note : The weight of the containers themselves is included.

3.3.3 Management and Finance

(1) Scope of Management

One ESP operates both the Ports of Salina Cruz and Coatzacoalcos. The main office is located at Coatzacoalcos and the Salina Cruz office is a branch.

The number of staff members at this branch is 104, and the ESP provides the following services:

- Loading/discharging cargoes at the public berths
- Storage service in the warehouse
- Tugboat service
- Fuel supply service
- Water supply service

Other services such as the food service are carried out by a private company.

(2) Union

The cargo handling union of this port belongs to CROM, and the numbers of its laborers are as follows:

Associated: 86, Non-associated: 100 - 200

(3) Financial Status and Others

Each ESP at all the objective ports of this study is a joint-stock-company, and its shareholders at this port are as follows:

Federal Government: 99.8% Union: 0.1% Others: 0.1%

This branch recorded a deficit of 650,576 thousand pesos in 1988, as shown in Table 3.3.5.

Table 3.3.5 Balance Sheet and Profit/Loss statement at Salina Cruz

Monetary unit: 1,000 pesos

Balance Sheet			
Assets		Liabilities & Capital	
Item	Amount	Item	Amount
Current Assets	1,035,127	Current Liabilities	5,221,427
Fixed Assets	16,969,440	Fixed Liabilities	893,100
Equipment etc	26,660,627	(sub total)	6,114,527
A Depreciation	- 244,952	Capital	12,040,653
R Depreciation	-9,446,235	Accumulated Profit	12,040,653
Other Assets	150,613	Profit of the year	- 650,577
Total	18,155,180	Total	18,155,180

A Depreciation : Accumulated Depreciation

R Depreciation : Revaluated Depreciation

Profit/Loss Statement	
Item	Amount
Operating Revenues	5,706,559
Ship & Land Operation	3,806,376
Tug boat	118,545
Others	1,781,638
Operating Cost	-4,992,019
Ship & Land Operation	-3,176,850
Tug boat	- 195,224
Others	-1,619,945
Administration Cost	-1,426,960
Financial Cost	-4,220,273
Subsidy from Federal Gov't	4,220,244
Financial Revenues	61,873
Total	- 650,578

Source: Estado de Origine y Aplicacion de Recursos al 30 de Diciembre de 1988

3.3.4 Present Procedures for Ship Entry/Exit, Customs Formalities and Land Transportation

(1) Procedures for Ship Entry/Exit

1) Control by Harbor Master (Capitán de Puerto)

a. Harbor Master controls the entire port area. In addition to the three offices of Destacamento de resguardo marítimo, Piloto mayor and Inspectores técnicos navels, he has five departments as follows:

- Dep. de Navegación
- Dep. de Fomento y desarrollo de la Marina Mercante
- Dep. de Administracion
- Dep. de Senalamiento Marítimo
- Dep. Técnico

b. The program committee chaired by the Harbor Master consists of the concerned parties such as the ESP, Customs, shipping agents, forwarders, etc. The committee meets every Monday. Items to be discussed and decided are as follows:

- Berth allotment
- Allotment of equipment and labor gangs for cargo handling operations.
- Traffic control in the port area

c. Berth allocation is finally decided by the Harbor Master.

2) Application by shipping agents

a. The shipping agents inform the Harbor Master of a ship's arrival 10 days and 72 hours in advance, and also makes a request for her berth allotment and cargo handling operations.

b. 24 hours prior to the ship's arrival, the shipping agent confirms her ETA by an application document with other details such as cargo tonnage to be discharged and/or loaded.

c. Based on the above information, her mooring berth is decided as per 1), b. and c.

3) Aids to ship entry/exit

a. According to the "Ley de Navegacion y Comercial Maritima", pilotage is compulsory for Mexican flag ships of 500 GRT or more and for all foreign ships. There are three (3) pilots at Salina Cruz.
b. One (1) tugboat is available. PEMEX has three (3) tugboats, which are also available if necessary.
c. Entry/ exit at nighttime is strictly prohibited.

4) Investigation by officials

a. First of all, the Quarantine official inspects the vessel.
b. Then, the Harbor Master, Immigration and Customs jointly board and carry out their investigations.

5) Exit clearance

a. At least two (2) hours prior to a ship's departure, the shipping agent has to request exit clearance from the Harbor Master after confirming that all charges and fees have been duly paid.
b. The agent must also request a pilot for departure two (2) hours prior to departure.

(2) Procedures for customs Clearance and Bonded Transit

1) Customs organization

a. Under the customs chief (administrator), there are hour offices and departments, which are: vehicle registration office, customs guard office, administration department and operation department.
b. Customs clearance is handled mainly by the operation department.

2) Application by forwarders

a. A forwarder must register the customs entry of the cargo with the competent officer.
b. The customs entry form must be accompanied by appropriate documents

such as:

- Bill of lading
- Invoice
- Packing list
- Import or export declaration
- Import or export permit (when requested)

c. The forwarder must confirm the cargo in the customs bonded area.

3) Actual procedures

a. Investigation and clearance procedures are as follows:

- To register customs entry number
- To receive an application form with related documents
- To examine the documents
- To obtain the authorization by the customs chief
- To investigate cargo physically, if necessary
- To assess tax on the cargo, checking the tax tariff schedule
- To levy tax from the applicant
- To issue a certificate of customs clearance
- To release the cargo

b. The necessary time for clearance is one or two days. Customs receive about 80 applications per day.

4) Bonded transit

a. Bonded containers can be transferred to a bonded factory using a transit application form.

b. The transit application form of major accounts such as CKD is simply collaborated with the container numbers.

c. Containers are released after confirming the customs transit seal.

d. Several containers are transferred to the Republic of Guatemala with the transit seal intact.

(3) Land Transportation by Rail and Truck

1) Rail

a. The supervisory railway office is located in Veracruz. Orders for

freight cars are sent to the Matias Romero local branch office, which controls the territory between Salina Cruz and Coatzacoalcos.

b. It takes about 2 days to arrange the necessary freight cars. Generally, shortages of locomotives and freight cars are reported by users.

c. The steep slopes between Salina Cruz and Coatzacoalcos make rail traffic slow.

2) Trucks

a. Central de Servicio de Carga is very small in Salina Cruz. About 10 independent private trucking companies are mainly used for transportation of seaborne cargo. Some of them have more than 200 trucks.

b. Major routes and destinations from Salina Cruz are Mexico City via Cordoba, Oaxaca, Yucatan and Guatemala.

c. One hundred (100) percent of import cargo is carried by trucks. However, of export cargo, only 20% is by truck and 80% is by rail, all of which is terephthalic acid (acido teleftalico) from Coatzacoalcos.

3.3.5 Cargo Handling Operations

(1) Present Operation Procedures

1) Two or three weeks prior to a ship's arrival, the agent sends the ship's entering information such as ETA, the ship's size and cargo quantity to ESP.

2) One day prior to the ship's arrival, the agent submits to ESP a document that describes the necessary data for cargo handling operations such as the number of gangs required, necessary equipment and tools, cargo details, handling tonnages, and ship's stowage plan. Usually, the document is a copy of the application to the Harbor Master.

3) On the same day, the ESP decides the ship's cargo working schedule

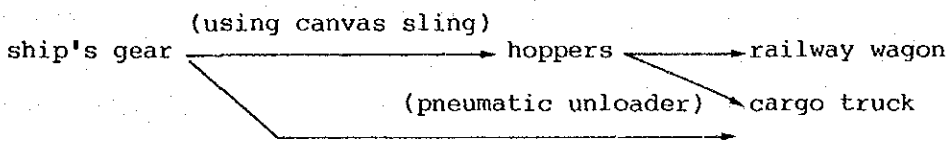
plan in consultation with the agent. Also the plan is delivered to the relevant section. The necessary number of gangs (to the union) and the necessary equipment (to the mechanical section) are arranged by ESP.

4) The program committee meets every Monday and decides the berth allotment of ships.

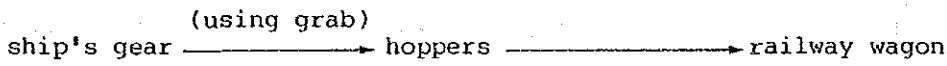
(2) Actual Cargo Handling Operation Flow

The following charts show the main cargo folows in discharging:

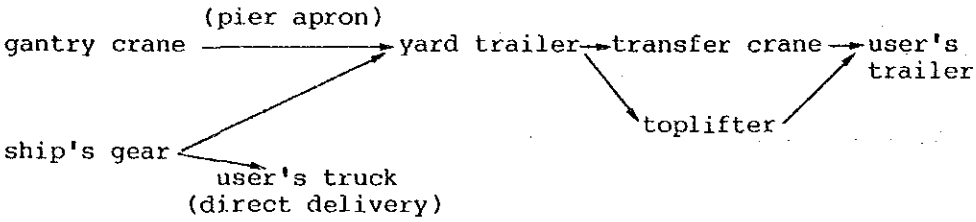
a. Agricultural bulk cargo



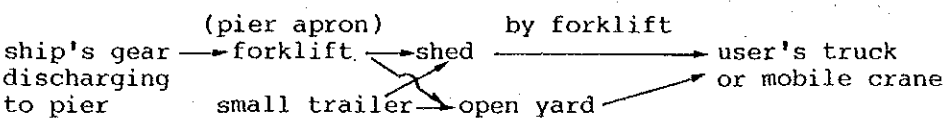
b. Mineral bulk cargo



c. Container



d. General Cargo



3.3.6 Cargo Handling Facilities/Equipment and Maintenance System

(1) Cargo Handling Facilities/Equipment

The existing cargo handling facilities/equipment at the port are shown in Table 3.3.6 - Table 3.3.9.

Table 3.3.6 List of Cargo Handling Equipment

Type	Capacity	Year Procured	Age (in years)	No. of Equipment		
				Total	Available	Non Avail.
Container Crane	30.5 t	1981	8	1	1	0
Pneumatic Unloader	100 t/h	1981	8	5	2	3
Transfer Crane	45 t	1981	8	3	1	2
Mobile Crane	250 t	1981	8	1	1	
	20 t	1981	8	1		1
	18 t	1981	8	1	1	
Forklift	3.6 t	1980	9	1	13	6
	3.6 t	1981	8	8		
	3.46 t	1984	5	2		
	2.7 t	1988	1	2		
	2.3 t	1988	1	5		
	2.0 t	1984	5	1		
Tractor	36.8 t	1981	8	8	7	1
Chassis	40.0 t	-	-	-	19	1
Truck Mobile	300 t	-	-	1		

Table 3.3.7 Average Age of the Existing Cargo Handling Equipment

Name of Group	No. of Units	Average Age	Age	
			Oldest	Newest
Container Crane	1	8	8	8
Pneumatic Unloader	5	8	8	8
Transfer Crane	3	8	8	8
Mobile Crane	3	8	8	8
Forklift	19	5	9	1
Tractor	8	8	8	8
Chassis	20	-	-	-
Truck Mobile	1	-	-	-

Table 3.3.8 Ratio of Operating Days of the Equipment to Available Days of the Equipment

Name of Group	Operation (A)	Number of Days Waiting (B)	Total (C)=(A)+(B)	Percent (A)/(C)
Container Crane	15	64	79	19
Pneumatic Unloader	0	180	180	0
Transfer Crane	182	55	237	77
Mobile Crane	35	145	180	19
Forklift	589	547	1,136	52
Tractor	434	176	610	71
Chassis	868	929	1,797	48
Truck Mobile	29	61	90	48

(From Jan. 1 to Mar. 31, for 3 months)

Table 3.3.9 Ratio of Available Days of the Equipment

(Unit: Days)

Name of Group	Available Days (A)	Total Days (B)	Percent (A)/(B)
Container Crane	79	90	88
Pneumatic Unloader	180	450	40
Transfer Crane	237	270	88
Mobile Crane	180	270	67
Forklift	1,136	1,710	66
Tractor	610	720	85
Chassis	1,797	1,800	100
Truck Mobile	90	90	100

(From Jan. 1 to Mar. 31 in 1989, for 3 months)

Remark; Total Days = No. of Equipment x 3 months.

(2) Maintenance System for Cargo Handling Facilities/Equipment

1) Maintenance system

a. Preventive maintenance

Preventive maintenance adopted at this port consists of monthly maintenance only. The contents of the Preventive maintenance should be decided in accordance with the records of the working hours of the facilities/equipment. The present preventive maintenance at this port is carried out in accordance with manuals supplied by makers.

b. Repair of broken-down facilities/equipment

Almost all repairs are performed at the maintenance shop. On the other hand, serious and special repairs which are impossible to perform at the shop are entrusted to private workshops outside the ESP.

2) Maintenance shop

There is a maintenance shop that belongs to ESP in the port area. The number of workers in the shop is twenty six (26) persons. The main machinery and tools for maintenance in the shop are grinders, drilling machines, hydro-pressing machine, etc., Thus, the capability of the maintenance shop is limited.

3) Spare parts

The stock of spare parts held at the maintenance shop is recognized to be insufficient.

3.4 Port of Lazaro Cardenas

3.4.1 Port Facilities

The Port of Lazaro Cardenas is an artificially excavated port in the mouth area of the River Balsas. This port (Fig. 3.4.1) is a representative Mexican industrial port, with large scale factories in the port area. Among them, FERTIMEX and PEMEX have their own exclusive private berths. ESP mainly provides cargo handling services at the container wharf (2 in Fig. 3.4.1), the general cargo wharf (3 in Fig. 3.4.1), the mineral wharf (SICARTSA; 4 in Fig. 3.4.1) and the grain wharf (8 in Fig. 3.4.1).

The facilities of these wharves and their related facilities are the objects of this study.

The container berth is 14m in depth, 286m in length and is equipped with a gantry crane. The general cargo berths are 12 - 13m in depth, 506m in length and have two warehouses behind them.

The grain berth and the silo behind it were damaged by earthquake and are not fully operational.

Table 3.4.1 (a), (b) and (c) show the outlines of the main mooring facilities, breakwaters and channels, and storage facilities in the Port of Lazaro Cardenas.

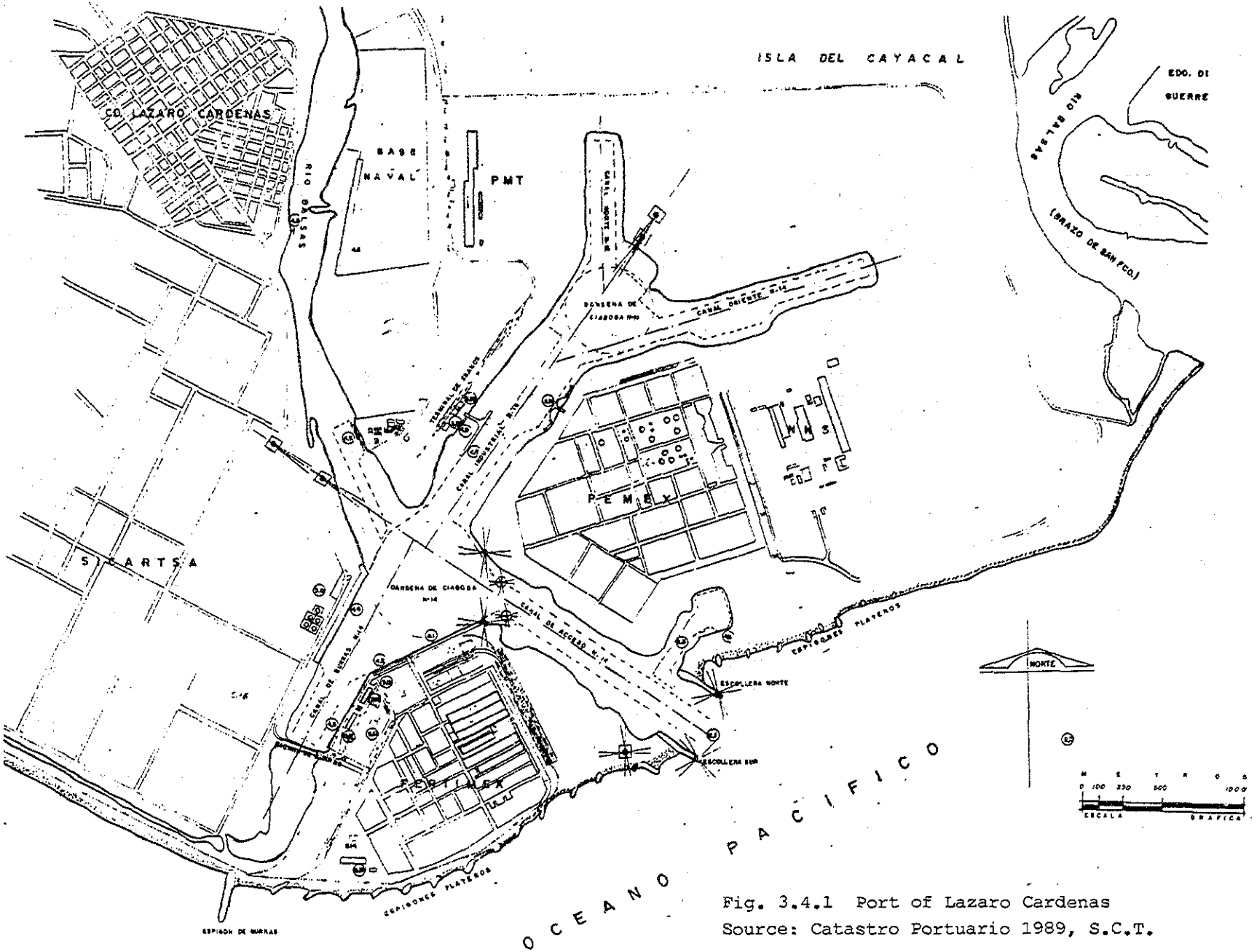


Fig. 3.4.1 Port of Lazaro Cardenas
Source: Catastro Portuario 1989, S.C.T.

Table 3.4.1 (a) Main Mooring Facilities

No.	Name of Facilities	Berth Length (m)	Water Depth (m)	Crown Height (m)	Structural Material	Year Constructed	Public or Private
1	Muelle FERTIMEX	528	-14	+3.8	Reinforced Concrete	1979 1981	Private (FERTIMEX)
2	Muelle de Contenedores	286	-14	+3.1	Reinforced Concrete	1981	Public
3	Muelle de Carga General (Berth No. 1,2,3)	506	-12	+3.1	Reinforced Concrete	1978 1979	Public
4	Muelle de Metales y Minerales	702	-14	+4.0		1973 1976	Private (SICARTSA)
6	Muelle Base Naval	730	--	--	Reinforced Concrete	1987	Military
7	Muelle C.C.M.P.	140	-7	+2.5	Reinforced Concrete	1982	Private (C.C.M.P.)
8	Muelle No. 1 Terminal de Granos	420	-11~ -14	+4.0	Reinforced Concrete	1982	Private (CONASUPO)

Source: Catastro Portuario 1989, SCT

Table 3.4.1 (b) Main Breakwaters and Channels

Name of Facilities	Length (m)	Crown Height (m)	Width (m)	Water Depth (m)	Structural Material	Year Constructed
Escollera Norte	310	+5.3	5.8 (Crown)	--	Stone	1973 1976
Escollera Sur	290	+4.7	6.0 (Crown)	--	Stone	1972 1975
Canal de Acceso	--	--	210.0 (Bottom)	-14	--	--

Source: Catastro Portuario 1989, SCT

Table 3.4.1 (c) Main Storage Facilities

No.	Name of Facilities	Total Area (m2)	Net Area (m2)	Year Constructed	Public or Private
12	Patio No. 1 FERTIMEX	9,800 (140 x 70)	6,000	1982	Private (FERTIMEX)
18	Bodega No. 1	3,420 (114 x 30)	2,400	1979	Public
19	Bodega No. 2	4,500 (150 x 30)	3,100	1982 1988	Public
20	Bodega de Consolidacion	5,120 (160 x 32)	4,100	1984	Public
21	Bodega No. 1 de Terminal de Granos	1,134 (54 x 21)	900	1984	Private (CONASUPO)
22	Silo Terminal de Granos	80,000 ton. (Capacity)	--	1982	Private (CONASUPO)

Source: Catastro Portuario 1989, SCT

3.4.2 Utilization of the Port

(1) Number of Vessel Calls

The number of vessel calls at the Port of Lazaro Cardenas is shown in Table 3.4.2. The total number of vessels was relatively stable until 1985, increasing in 1986 and 1987. The number of vessels for discharging petroleum and its derivatives from Salina Cruz increased in 1987 and the total number of vessels recorded was 286, of which vessels for foreign trade were 181. More than half of the vessels calling consist are general of cargo vessels.

Table 3.4.2 Number of Vessel Calls at the Port of Lazaro Cardenas

Classification	1981	1982	1983	1984	1985	1986	1987
Foreign Trade	121	92	139	132	149	179	181
Domestic Trade	67	49	43	34	27	48	105
Total	188	141	182	166	176	226	286

Source: Momiviento de Cargo y Buques (1981-1987), SCT

(2) Regular Foreign Trade Service

There are two regular services at the Port of Lazaro cardenas. One is the same service operated by TMM at the Port of Salina Cruz, and the other is operated by Canadian Tropical Line as a monthly service using 3,000 Gross Ton multipurpose vessels. The route is Vancouver/West Coast of the U.S.A./Lazaro Cardenas/Caribbean Sea.

Besides the regular liner services, there is an irregular transit container service which connects Los Angeles, Lazaro Cardenas and Guayaquil in Colombia, using container vessels with a capacity of 212 TEUs.

(3) Characteristic of the Cargoes

The cargo volume through the Port of Lazaro Cardenas increased to 2.6 million tons in 1987, as shown in Table 3.4.3. The share of the foreign trade cargo was about 50% of the total cargo volume.

Imported mineral bulk products, inward petroleum and its derivatives, and exported general cargo are the main commodity groups, because the Port

Table 3.4.3 Cargo Volume through the Port of Lazaro Cardenas

Classification	1981	1982	1983	1984	1985	1986	1987
Foreign Trade							
(Import)	1,039,334	700,775	343,485	412,679	854,660	1,046,866	831,636
General Cargo	121,589	103,340	174,313	97,771	70,276	90,885	111,071
Agricultural Bulk	221,122	106,444	-	-	98,702	31,839	58,700
Mineral Bulk	696,623	490,991	169,172	314,908	685,682	924,117	632,412
Liquids (Petr. & Derivs)	-	-	-	-	-	-	29,453
Perishable	-	-	-	-	-	25	-
(Export)	6,939	179,254	385,392	309,930	279,764	440,119	507,101
General Cargo	2,097	158,687	347,896	297,501	177,819	398,832	493,088
Mineral Bulk	-	-	24,417	-	94,689	24,446	-
Other Liquids	4,842	20,567	10,831	11,710	6,016	15,700	13,271
Perishable	-	-	2,248	719	1,240	1,141	742
7							
Domestic Trade							
(Discharge)	228,474	401,477	548,427	326,824	247,558	334,380	973,381
General Cargo	4,200	-	7,736	877	4	16	-
Agricultural Bulk	54,084	247,728	446,819	201,359	123,813	126,652	120,377
Mineral Bulk	23,300	-	-	-	-	-	410,519
Liquids (Petr. & Derivs)	146,888	153,749	93,872	124,588	123,741	207,712	442,485
(Loading)	46,189	59,975	20,591	15,474	3,101	27,439	311,164
General Cargo	41,403	34,187	16,683	11,337	3,101	80	62,156
Mineral Bulk	4,784	25,788	3,908	4,137	-	6,359	189,169
Perishable	-	-	-	-	-	21,000	50,839
T O T A L	1,320,936	1,341,481	1,297,895	1,064,907	1,385,083	1,848,804	2,623,282

Source: Movimiento de Carga y Buques (1981-1987), SCT

of Lazaro Cardenas has been developed as an industrial port. The volume of agricultural bulk products has fluctuated from year to year.

The volume of containerized cargo has consistently increased, but the cargo volume is still small and the fluctuation of the volume depends on the transportation policy of the main shippers and consignees. It increased rapidly in 1988 because the discharging port for auto parts changed from Salina Cruz to Lazaro Cardenas. But the share of the containerized cargo was only 11 percent of exports in 1987 because the main commodity of exported general cargo was steel, which was loaded at the berth of SICARTSA.

Table 3.4.4 Containerized Cargo through the Port of Lazaro Cardenas

(Unit: Tons)

	1981	1982	1983	1984	1985	1986	1987
Import	867	3,684	9,384	15,159	29,209	17,742	33,175
Export	1,409	4,463	23,060	25,934	37,953	43,365	55,314
Total	2,276	8,147	32,444	41,093	67,162	61,107	88,498

Source: Movimiento de Carga y Buques (1981-1987), SCT
Note : The weight of the containers themselves is included.

3.4.3 Management and Finance

(1) Scope of Management

- The ESP provides the following services:
- Loading/discharging cargoes at the public berths
- Unloading bulk cargo at the SICARTSA berths
- Storage service in the warehouses
- Cargo transportation to/from a 30 km area around the port
- Tugboat service
- Fuel supply service
- Water supply service
- *The number of staff members of this ESP is* 141.

(2) Union

The cargo handling union of this port belongs to CROM, and the numbers of its laborers are as follows:

Associated: 140 Non-associated: 250

(3) Financial Status and Others

The shareholders at this port are as follows:

Federal Government: 92% SICARTSA 7% Others: 1%

The share of SICARTSA is equivalent to the cost of the bulk unloader.

This ESP recorded a profit of 182,982 thousand pesos in 1988 as shown in Table 3.4.5. And in 1987 the profit was 518,778 thousand pesos. The major portion of the fixed debt is owed to the World Bank.

Table 3.4.5 Balance Sheet and Profit/Loss statement at Lazaro Cardenas

Monetary unit: 1,000 pesos

Balance Sheet			
Assets		Liabilities & Capital	
Item	Amount	Item	Amount
Current Assets	4,551,614	Current Liabilities	2,770,835
Fixed Assets	7,592,889	Fixed Liabilities	5,585,274
Hi Investment	8,685,673	Conti Liabilities	221,308
Hi Deduction	-1,092,784	(sub total)	8,476,417
Revaluation	5,156,275	Capital	9,603,163
Investment	19,380,955	Capital Social	2,552,716
Depreciation	-14,234,680	Contri from Federal	756,543
Other Assets	879,802	Surplus for Revalu	5,524,111
		Accumulating Profit	769,783
Total	18,180,580	Total	18,180,580

Hi Investment : Historic Investment
Hi Deduction : Historic Deduction
Contri from Federal : Contribution from Federal Gov't
Surplus for Revalu : Surplus for revaluation
Conti Liabilities : Contingent Liabilities

Profit/Loss Statement	
Item	Amount
Operating Revenues	8,493,327
Ship Operation	3,418,873
Land Operation	4,029,065
Tugboat & Others	1,045,389
Operating Cost	-8,397,329
Ship Operation	-2,806,214
Land Operation	-4,455,644
Tugboat & Others	-1,045,471
Expense of Operation	-1,434,800
Other Income	1,431,784
Provision for Tax etc.	0
Total	182,982

Source: Estado de Situacion Financiera al 31 de Diciembre de 1988 con Comparativo de 1987

3.4.4 Present Procedures for Ship Entry/Exit, Customs Formalities and Land Transportation

(1) Procedures for Ship Entry/Exit

1) Control by Harbor Master

a. The organization of the Harbor Master's office is almost the same as that at Salina Cruz.
b. Fifteen harbor master guards are transferred to Roads and Ports Federal Police under the control of the SCT.
c. The program committee meets at 10:00 a.m. every Tuesday. A pilot with the same status as his counterpart at Salina Cruz also attends.

2) Application by shipping agents

a. The procedure is almost the same as at Salina Cruz.

3) Aids to ship entry/exit

a. There are two (2) pilots. Two (2) tugboats are available.
b. Ships with a length under 210m and a draft under 38 feet are permitted to enter and leare the port at night.

4) Investigation by officials

a. Health pratique can be granted via VHF radio.
b. Others are the same as at Salina Cruz.

5) Exit Clearance

a. The same procedures are executed as at Salina Cruz.

(2) Procedures for Customs and Bonded Transit

1) Customs organization

a. Almost the same organization system as at Salina Cruz is used.
b. In order to simplify customs procedures, the Customs office is studying the computerization of documents.
c. The "committee for effective Customs procedures" meets once a month. The committee is chaired by the Customs chief, and the members include representatives of the ESP, Harbor Master, Technical Department of Harbor Master's office, shipping agent, forwarder and Quarantine.

2) Application by forwarders

a. Almost the same procedures are executed as at Salina Cruz.

3) Actual procedures

a. Procedures are almost the same as at Salina Cruz. Customs handles more than 200 applications monthly.

4) Bonded transit

a. The bonded transit system is the same as at Salina Cruz.

(3) Land Transportation by Rail and Truck

1) Rail

a. The supervisory railway office is located in Cuernavaca. Requests for freight cars are sent two or three weeks prior to a ship's arrival by the station office of Lazaro Cardenas to their superior local office in Acambaro.
b. The shortage of locomotives and freight cars for port cargo is worth noting. A ship discharging about 20,000 tons of wheat has to stay in the port more than 30 days waiting for freight cars.

c. The main reason for the shortage is reportedly that some regular domestic cargo from Toluca to Laredo has priority in the allocation of freight cars.

d. 80 TEUs of CKD discharged from every ship are transported to Cuernavaca by 40 gondola cars.

2) Trucks

a. There is no Central de Servicio de Carga in Lazaro Cardenas. Ten (10) independent private trucking companies keep a total of about 200 trucks.

b. Forwarders request the necessary vehicles directly from trucking companies. Trucking companies mutually adjust the necessary units on request from forwarders.

c. Major routes and destinations are follows:

. Acapulco - Cuernavaca - Mexico City

. Uruapan - Morelia

. Guadalajara

3.4.5 Cargo Handling Operations

(1) Present Operating Procedures

1) Two or three weeks prior to a ship's arrival, the agent sends the ship's schedule information, such as the ETA, the ship's size and cargo quantity, to the ESP.

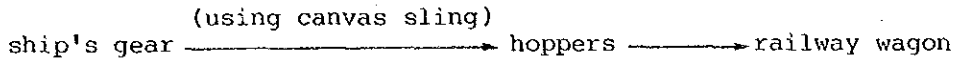
2) The ESP does not make cargo operation plans for a container ship. The shipping agent makes the plan and sends it to the ESP 24 hours prior to the ship's arrival. Then the ESP arranges for the necessary number of gangs from CROM and the necessary equipment from the mechanical section.

3) The Program committee meets at 10:00 a.m. every Tuesday and allocates berths in consideration of ship schedules.

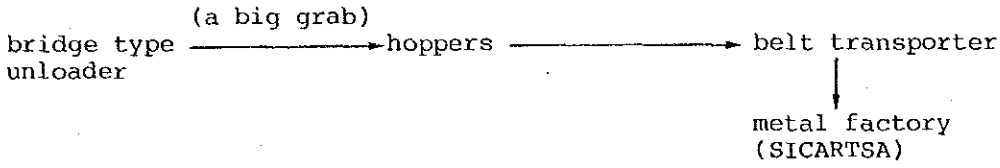
(2) Actual Cargo Handling Operation Flow

The following charts show the main cargo flows in discharging. Loading container (c) and general cargo (d) flows are the reverse of the discharging flows.

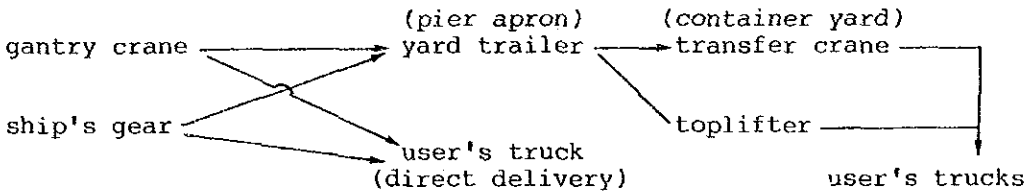
a. Agricultural bulk cargo



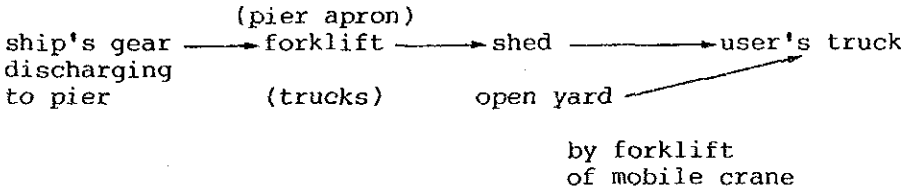
b. Mineral bulk cargo (mechanical unloading)



c. Container



d. General Cargo



When the shed is located far from a ship's berth, trucks are used for haulage.

3.4.6 *Cargo Handling Facilities/Equipment and Maintenance System*

(1) Cargo Handling Facilities/Equipment

The existing cargo handling facilities/equipment at the port are shown in Table 3.4.6 - Table 3.4.9.

Table 3.4.6 List of Cargo Handling Facilities/Equipment

Type	Capacity	Year Procured	Age (in years)	No. of Units		
				Total	Available	Non Avail.
Container Crane	40 t	1974	15	1		
Bridege Type Unloader	1000 t/h	1976	13	1		1
Transfer Crane	35 t	1987	2	2		
Mobile Crane	80 t	-	-	1		
	23 t		-	3	2	1
	20 t		-	2		
Forklift	42 t	1984	5	2	2	
	30,000 L		-	8		
	15,500 L	1981	8	12	7	5
	15,500 L	1986	3	2	2	0
	15,500 L	1988	1	6	6	0
	8,000 L	1974	15	1		
	8,000 L	1975	14	4		
	8,000 L	1988	1	3	3	
	6,000 L	1974	15	1		1
	6,000 L	1979	10	1		1
	6,000 L	1980	9	3		3
	6,000 L	1985	4	2	1	1
	6,000 L	1986	3	1	1	
	5,000 L	1987	2	4	4	
	4,500 L	1975	14	1		1
Tractor Shovel	2 1/2 t		-	1		
	2 1/8		-	4		
	1.5 t		-	1		
	120 t/h		-	5		
	2 yrd.3		-	4		
Trailer	40 t	1975	14	1		
	40 t	1987	2	3	3	
	40 t	1988	7	6	-	
	35 t	1982	7	1	1	
	35 t	1987	2	3	-	
Tractor	5,000 L	1979	10	2		2
	5,000 L	1980	9	7		1
	5,000 L	1982	7	5		5
Chassis	40 t	-	-	21	-	-
Truck Mobile	8 wagon	1988	1	1	1	

Table 3.4.7 Average Age of the Cargo Handling Facilities/Equipment

Name of Group	No. of Units	Average Age	Age	
			Oldest	Newest
Container Crane	1	15	-	-
Bridge Type Unloader	1	13	-	-
Transfer Crane	2	2	-	-
Mobile Crane	6	-	-	-
Forklift	43	6.4	15	1
Tractor Shovel	-	-	-	-
Trailer	14	2.8	14	1
Tractor	8	8	10	7
Chassis	21	-	-	-
Truck Mobile	1	1	-	-

Table 3.4.8 Ratio of Operating Days of the Equipment to Available Days of the Equipment

(Unit: Days)

Name of Group	Number of Days Operation (A)	Waiting (B)	Total (C)=(A)+(B)	Percent (A)/(C)
Container Crane	29	63	92	46
Bridge Type Unloader	-	-	-	-
Transfer Crane	100	55	155	65
Mobile Crane	91	242	333	27
Forklift	1,314	745	2,059	64
Tractor Shovel	370	87	226	62
Trailer	119	543	913	41
Tractor	-	31	150	79
Chassis	16	-	-	-
Truck Mobile	29	76	92	17

(From Oct. 1 to Dec. 31, in 1988, for 3 months)

Table 3.4.9 Ratio of Available Days of the Equipment

(Unit: Days)

Name of Group	Available Days (A)	Total Days (B)	Percent (A)/(B)
Container Crane	92	92	100
Bridge Type Unloader	-	-	-
Transfer Crane	155	184	84
Mobile Crane	333	368	90
Forklift	2,059	2,300	90
Tractor Shovel	226	226	82
Trailer	913	1,196	76
Tractor	150	184	82
Chassis	-	-	-
Truck Mobile	92	92	100

(From Jan. 1 to Mar. 31 in 1989, for 3 months)

Remark; Total Days = No. of Equipment x 3 months.

(2) Maintenance System for Cargo Handling Facilities/Equipment

1) Maintenance System

a. Preventive maintenance

There is no preventive maintenance scheme.

b. Repair of broken down facilities/equipment

Almost all repairs are performed at the maintenance shop and/or in the field. On the other hand, serious and special repairs which are impossible to perform at the shop are entrusted to private workshops outside the ESP.

2) Maintenance Shop

There is a maintenance shop that belongs to ESP in the port. The number of workers in the shop is sixteen (16) persons. The main machinery and tools for maintenance in the shop are grinders, drilling machines, hydro-pressing machines, etc.,.

3) Spare Parts

The stock of spare parts at the maintenance shop is recognized to be insufficient.

3.5 Port of Manzanillo

3.5.1 Port Facilities

The Port of Manzanillio is one of the main ports for cargo distribution in Mexico.

The Port of Manzanillo is divided into the outer port area and the inner port area, shown in Fig.3.5.1.

The outer port area is an old port comprising Fishing Wharf (5 in fig. 3.5.1) and the PEMEX berths (1,2 in Fig. 3.5.1). The inner area is a relatively new port which is being developed. There are public wharves (16, 17, 18 in Fig. 3.5.1), a fishing port (19, 22 in fig. 3.5.1) and a navy area (23, 24 in Fig. 3.5.1) in the inner port.

ESP provides cargo handling services at these public wharves and the fishing wharf(Muelle Fiscal). The facilities on these wharves and their related facilities are the object of this study.

The public wharves in the inner port have 9 berths, 2 of which are not completed. The other 7 berths are the main berths of this port which deal with agricultural and mineral bulk products and general cargoes, including container cargoes.

Table 3.5.1 (a), (b) and (c) show the outlines of main mooring facilities,breakwaters and channels and storage facilities in the Port of Manzanillo.

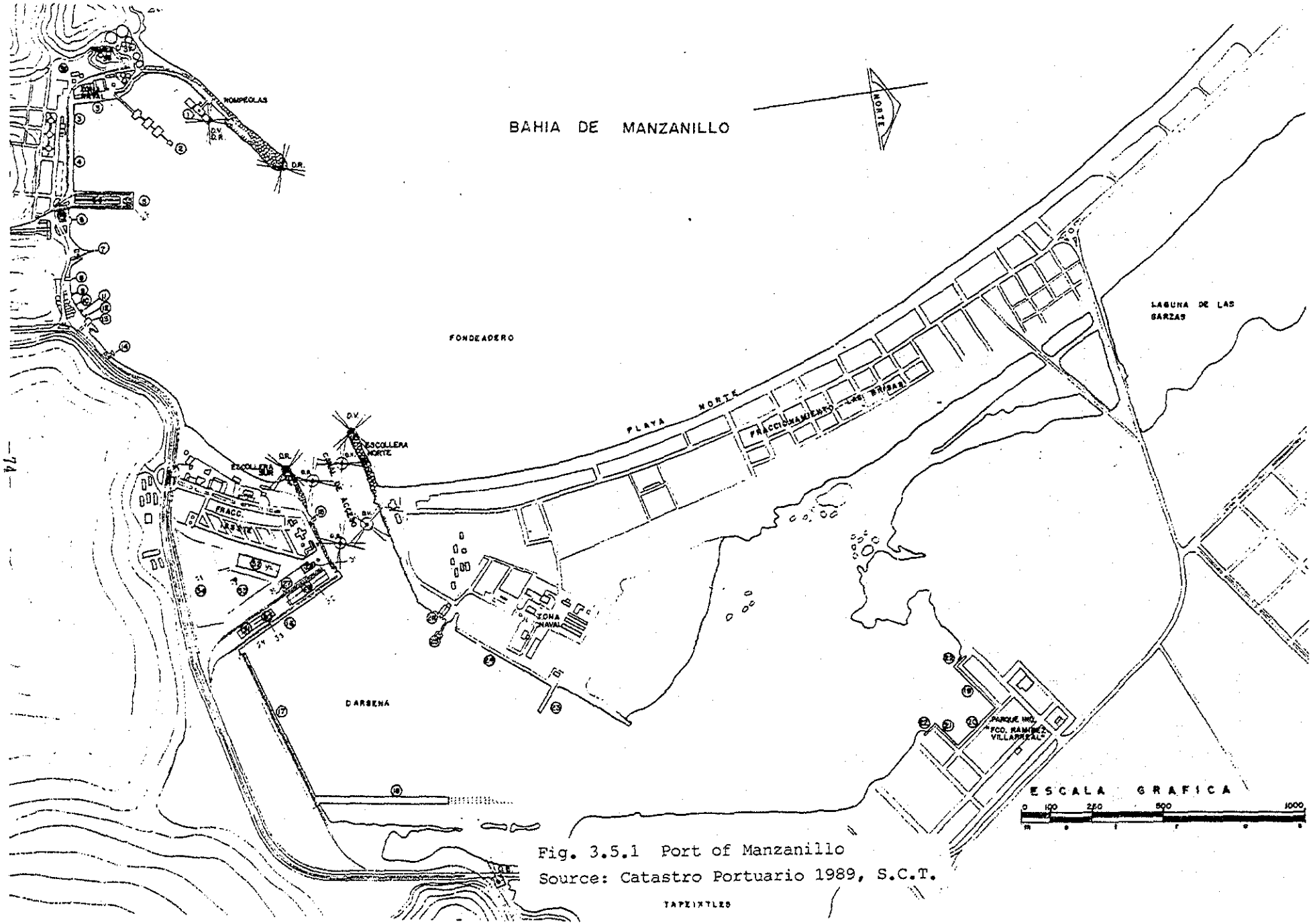


Fig. 3.5.1 Port of Manzanillo
Source: Catastro Portuario 1989, S.C.T.

Table 3.5.1 (a) Main Mooring Facilities

No.	Name of Facilities	Berth Length (m)	Water Depth (m)	Crown Height (m)	Structural Material	Year Construc-ted	Public or Private
1	Muelle de PEMEX	142	--	+4.70	Reinforced Concrete	1983	Private (PEMEX)
2	Muelle de PEMEX	241	-13.4	+6.60	Reinforced Concrete	--	Private (PEMEX)
5	Muelle Fiscal	240	-6.6~ -11.0	+3.80	Reinforced Concrete	1946 1952	Public
15	Senalamiento Maritimo	18	-2.5	+1.20	Reinforced Concrete	1982	Public
16	Muelle de Altura Banda A (Berth No.1,2,3)	470	-14	+3.60	Reinforced Concrete	1986	Public
17	Muelle de Carga General Band B (Berth No.5,6)	600	-14	+3.45	Reinforced Concrete	1983	Public
18	Muelle de Carga General Band C (Berth No.7,8,9)	485	-14	+3.45	Reinforced Concrete	1985	Public
19 22	Terminal Pesquera	594	-5.1	+2.50	Reinforced concrete	1982	Public (for Fish Boats)
24	Muelle No. 2 de la	400	--	+3.50	Reinforced Concrete	1985	Military

Source: Catastro Portuario 1989, SCT

Table 3.5.1 (b) Main Breakwaters and Channels

Name of Facilities	Length (m)	Crown Height (m)	Width (m)	Water Depth (m)	Structural Material	Year Constructed
Rompeolas	700	+3.0	7.0 (Crown)	--	Stone	1906
Escollera Norte	300	+3.0	7.0 (Crown)	--	Stone	1965
Escollera Sur	100	+3.0	7.0 (Crown)	--	Stone	1965
Canal de Acceso	--	--	100 (Bottom)	-16	--	--

Source: Catastro Portuario 1989, SCT

Table 3.5.1 (c) Main Storage Facilities

No.	Name of Facilities	Total Area (m^2)	Net Area (m^2)	Year Constructed	Public or Private
36	Bodega Fiscal No.2	4,698 (162 x 29)	3,758	1948	Public
32	Bodega No.1 del Puerto Interior	5,017 (164 x 30,5)	3,700	1970	Public
33	Bodega No.2 del Puerto Interior	1,800 (72 x 25)	1,300	1982	Public
35	Bodega No.4 del Puerto Interior	6,450 (150 x 43)	4,500	1971	Public

Source: Catastro Portuario 1989, SCT

3.5.2 Utilization of the Port

(1) Number of Vessels Calls

The number of vessels calls at the Port of Manzanillo is shown in Table 3.5.2. Though the total number of vessel calls per year has not changed much, the number of foreign trade vessels has increased while that of domestic trade vessels has decreased. The number of general cargo vessels, including container vessels, was 146, which represented about 55 percent of the foreign trade vessels. The number of tankers was 150 vessels, which was about 90 percent of the domestic trade vessels in 1987. Most of the tankers came from Salina Cruz.

Table 3.5.2 Number of Vessel Calls at the Port of Manzanillo

Classification	1981	1982	1983	1984	1985	1986	1987
Foreign Trade	178	237	175	189	215	250	258
Domestic Trade	215	191	226	236	230	179	168
T o t a l	393	428	401	425	445	429	426

Source: Momiviento de Cargo y Buques (1981-1987), SCT

(2) Regular Foreign Trade Service

The Port of of Manzanillo has the most regular liner services among the ports of the Pacific coast as follows:

i. TMM
- 10day service using con-bulkers
- Mexico/West Coast of the U.S.A./Japan/Far East, (Manzanillo is the last calling port in Mexico).

ii. Navicana
- Monthly service using conventional vessels
- Vancouver/West Coast of the U.S.A./Manzanillo/Central and South America

iii. Trans Maritima Argentina

- Bimonthly service using multipurpose vessels
- Argentina/Chile/Manzanillo/West Coast of the U.S.A.

iv. TMM

- Monthly service using multipurpose vessels
- Manzanillo/Central and South America

v. CACTUS (Consortium of Japanese shipping companies)

- Two sailings per month using conventional vessels
- Far East /Japan/Manzanillo/Acapulco/Central America (One way service)

vi. Gran Colombia Line

- Monthly service using multipurpose vessels
- West Coast of the U.S.A./Manzanillo/Salina Cruz/Central America/ Colombia

(3) Characteristics of the Cargoes

The total cargo volume through the Port of manzanillo was about 4 million tons per year in recent years, as shown in Table 3.5.3. The share of the foreign trade cargo has increased due to the increase of imported liquid bulk cargoes and the increase of exported mineral bulk cargoes such as cement. As for general cargo, the exported volume has increased, though the imported volume has decreased.

While the amount of containerized cargo has constantly increased, the ratio of containerized cargo among general cargo is not so high. Its ratio was 15 percent in terms of imports and 45 percent in terms of exports in 1987.

Table 3.5.3 Cargo Volume through the Port of Manzanillo

Classification	1981	1982	1983	1984	1985	1986	1987
Foreign Trade							
(Import)	1,259,392	830,711	794,877	739,995	1,211,011	1,761,947	1,984,463
General Cargo	404,782	268,892	178,431	289,622	220,428	115,905	86,441
Agricultural Bulk	730,574	189,861	553,303	184,007	274,778	252,264	259,509
Mineral Bulk	122,917	105,632	42,149	70,772	87,080	83,966	95,573
Liquids (Petr. & Derivs)	1,119	259,806	16,789	189,637	626,743	1,307,308	1,542,940
Other Liquids	-	6,520	4,205	5,957	-	2,504	-
Perishable	-	-	-	-	2,782	-	-
(Export)	88,505	62,149	76,613	100,602	141,689	452,381	616,208
General Cargo	75,166	39,757	75,657	75,907	77,539	99,787	122,199
Mineral Bulk	-	-	-	-	63,719	342,692	430,282
Liquids (Petr. & Derivs)	-	-	-	-	-	-	1,524
Other Liquids	13,339	22,392	-	24,565	-	7,851	57,844
Perishable	-	-	956	130	431	2,051	4,359
Domestic Trade							
(Discharge)	912,984	1,919,447	2,560,954	2,749,584	2,768,398	1,534,827	1,408,585
General Cargo	16,197	19,952	519	32	26,611	3,070	-
Agricultural Bulk	-	-	-	102,833	86,717	206,238	64,164
Mineral Bulk	22,446	81,131	192,268	142,210	130,502	18,868	40,752
Liquids (Petr. & Derivs)	874,341	1,818,364	2,368,167	2,504,509	2,524,568	1,306,651	1,303,669
(Loading)	164,066	507,239	596,262	486,120	548,032	174,576	266,972
General Cargo	39,916	23,402	43,720	61,281	30,673	41,650	61,823
Mineral Bulk	-	-	-	-	1,538	-	-
Liquids (Petr. & Derivs)	124,150	483,837	552,542	424,839	515,821	132,926	205,149
T O T A L	2,424,947	3,319,546	4,028,706	4,076,301	4,669,930	3,923,731	4,276,228

Source: Movimiento de Carga y Buques 1987, SCT

Table 3.5.4 Containerized Cargo through the Port of Manzanillo

(Unit: Tons)

	1981	1982	1983	1984	1985	1986	1987
Import	36,806	6,564	1,307	2,528	8,177	7,408	12,853
Export	22,282	7,788	21,580	37,094	32,798	41,110	56,152
Total	59,088	14,352	22,887	39,625	40,975	48,518	69,005

Source: Movimiento de Carga y Buques (1981-1987), SCT

Note : The weight of containers themselves is is included.

3.5.3 Management and Finance

(1) Scope of Management

ESP provides the following services:

- Loading/discharging cargoes at the public berths
- Storage service in the warehouses
- Tugboat service
- Fuel hose joint service at the PEMEX berths
- Water supply service
- Food supply service
- Fumigation service
- Garbage collection and incineration service
- Weighing service
- Repairs service
- Cleaning service

The number of staff members at this ESP is 137.

(2) Union

The cargo handling union of this port belongs to CROM, and the numbers of its laborers are as follows:

Associated: 180 Non-associated: 350

(3) Financial Status and Others

The shareholders at this port are as follows:

Federal Government: 98% Union: 2%

This ESP recorded a deficit of 145,735 thousand pesos in 1988 as shown in Table 3.5.5, but in 1987 there was a profit of 252,360 thousand pesos.

Table 3.5.5. Balance Sheet and Profit/Loss statement at Manzanillo

Monetary unit: 1,000 pesos

Balance Sheet			
Assets		Liabilities & Capital	
Item	Amount	Item	Amount
Current Assets	2,460,929	Current Liabilities	1,293,008
Fixed Assets	6,266,913	Fixed Liabilities	660
Fi Investment	6,254,958	(sub total)	1,293,688
Others	11,955	Capital	7,819,277
Deffered Asset	385,104	Capital Social	864,109
		Contri from Federal	1,258,406
		Stock	18,505
		Surplus for Reval	5,596,602
		Others	81,855
Total	9,112,946	Total	9,112,946

Fi Investment : Fiscal Investment
Contri from Federal : Contribution from Federal Gov't
Surplus for Rreval : Surplus for Rrevaluation

Profit/Loss Statement	
Item	Amount
Operating Revenues	11,472,379
Ship Operation	2,506,479
Land Operation	7,430,819
Tugboat & Others	986,404
Operating Cost	-8,628,134
Ship Operation	-2,329,301
Land Operation	-5,040,014
Tugboat	-818,341
Others	-440,478
Maintenance & Repairs	-1,850,951
Administration Cost	-1,376,102
Other cost	-597,408
Other Income	913,201
Provision for Tax etc.	- 78,720
Total	- 145,735

Source: Estados Financieros al 31 de Diciembre de 1988.

3.5.4 Present Procedures for Ship Entry/Exit, Customs formalities and Land Transportation

(1) Procedures for Ship Entry/Exit

1) Control by Harbor Master

a. The organization of this office is almost the same as that at Salina Cruz.
b. The program committee meets at 12:30 -13:30 every Tuesday and Friday. Members are representatives of the Harbor Master, ESP, Customs, shipping agents, forwarders, pilot, railway, Central de Servicio de Carga and the labor union (CROM)

2) Application by shipping agents

a. Shipping agents request berth allotment 48 hours prior to a berthing ship's arrival and confirm it 24 hours prior with an application document. Pilot reconfirms the ship's arrival via VHF radio.
b. Other procedures are mostly the same as at Salina Cruz.

3) Aids to ship entry/exit

a. Three (3) pilots and one (1) tugboat are available. PEMEX tugboats are also available when requested.
b. Ships may enter at any time of the day or night.

4) Investigations by officials

a. Health pratique can be granted via VHF radio.
b. Other procedures are the same as at Salina Cruz.

5) Exit clearance

a. Procedures are mostly the same as at Salina Cruz. Applications for

departure are accepted 24 hours a day.

b. Payment of port dues by the shipping agent is accepted within 5 days after the ship's departure.

(2) Procedures for Custom Clearance and Bonded Transit

1) Customs Organization

a. Organization is almost the same as at Salina Cruz.

2) Application by forwarders

a. Procedures are the same as at Salina Cruz. A maximum of 2 days is taken for clearance.

3) Actual procedures

a. Same as at Salina Cruz.

b. Physical inspection of new types of cargo is rigidly executed.

4) Bonded transit

a. Procedures are the same as at Salina Cruz.

(3) land Transportation by Rail and Truck

1) Rail

a. The supervisory railway office is located in Guadalajara. In order to control and adjust freight cars, an operation department was recently set up at Manzanillo Station. The chief of the operation department answers directly to the Guadalajara office and supervises Manzanillo Station. The management area is between Manzanillo and Colima.

b. Requests for freight cars are sent to guadalajara 6 days prior to a ship's arrival based on the decision of the program committee.

c. In case it is impossible to arrange the necessary freight cars due

to a shortage, the railway station recommends that forwarders use trucks.

2) Truck

a. Central de Servicio de Carga controls truck transportation. They manage about 65 trucking companies which have an average of 50 trucks each.
b. As for containers, forwarders have to request the necessary trucks from Multimodal Company. Multimodal Company has no trucks. It serves as a coordinator between forwarders and Central de Servicio de Carga.
c. Multimodal Company is a national firm owned by the government and railway, airplane and shipping companies.

3.5.5 Cargo Handling Operations

(1) Present Operating Procedures

1) Two or three weeks prior to a ship's arrival, the agent sends the ship's schedule information such as ETA, ship size and cargo quantity, to the ESP.

2) One day prior to a ship's arrival the agent submits to the ESP a document that describes the necessary data for cargo handling operation, such as the number of gangs required, necessary equipment, cargo details, handling tonnages and stowage plan. Usually the document is a copy of the application to the Harbor Master.

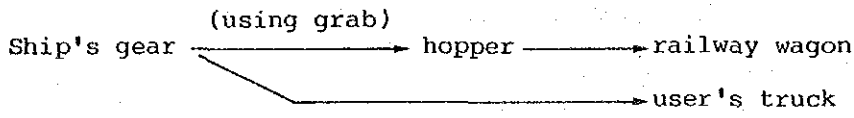
3) The ESP decides the ship's cargo handling operation plan in consultation with the agent. The plan is also delivered to the relevant sections. The ESP arranges the necessary number of gangs from CROM and equipment from the mechanical section.

4) The program committee meets every Tuesday and Friday 12:30 - 13:30 and allocates berths according to sailing schedules.

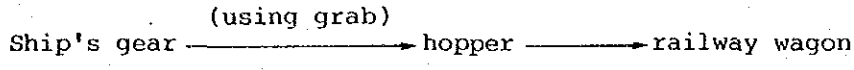
(2) Actual Cargo Handling Operation Flow

The following charts show the main cargo flows in discharging. The handling flow of mineral bulk products (steel pellets) is limited to loading only (refer to c.).

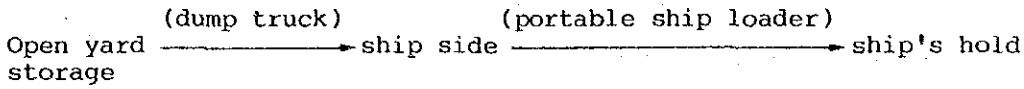
a. Agricultural bulk cargo



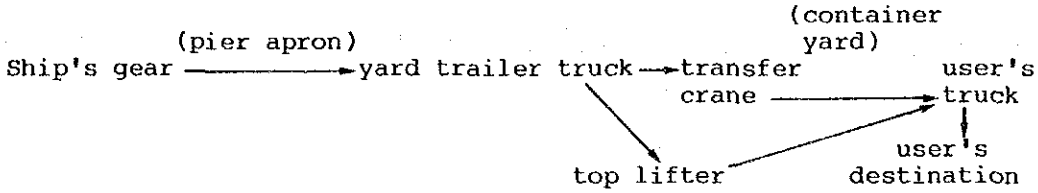
b. Mineral bulk cargo (Urea)



c. Mineral bulk cargo (loading steel pellets)



d. Container



3.5.6 Cargo Handling Facilities/Equipment and Maintenance System

(1) Cargo Handling Facilities/Equipment

The existing cargo handling facilities/equipment at the port are shown in Table 3.5.6 - Table 3.5.8.

Table 3.5.6 List of Cargo Handling Equipment

Type	Capacity	Year Procured	Age (in years)	No. of Equipment		
				Total	Available	Non Avail.
Forklift	80,000 L	1985	4	2		
	30,000 L	1981	8	3		
	15,500 L	1980	9	1		
	15,500 L	1981	8	29		
	10,000 L	1988	1	6		
	8,000 L	1975	14	1		
	8,000 L	1978	11	7		
	8,000 L	1979	10	9		
	8,000 L	1980	9	10		
	6,000 L	1978	11	1		
	6,000 L	1981	8	1		
	6,000 L	1986	3	5		
	6,000 L	1988	1	7		
Mobile Crane	140,000 L	1980	9	1		
	44,000 L	1980	9	1		
	30,000 L	1974	15	1		
	20,000 L	1974	15	2		
	20,000 L	1979	10	1		
Pneumatic Loader	60 T/H	1982	7	3		
Tractor Shovel	1.5 m^3	1978	11	2		
	1.5 m^3	1979	10	2		
	1.5 m^3	1984	5	2		
	0.75 m^3	1979	10	1		
	0.75 m^3	1982	7	7		
	0.75 m^3	1984	5	1		
Tractor	5,000 L	1981	8	6		
	5,000 L	1982	7	10		
	3,000 L	1981	8	1		
Chassis	40 t	1988	1	4		
	20 t	1982	7	2		
	20 t	1984	5	4		
	1 Z	1971	18	1		
Truck Marble		1974	15	1		

Table 3.5.7 Ratio of Operating Days of the Equipment to Available Days of the Equipment

(Unit: Days)

Name of Group	Operation (A)	No. of Days Waiting (B)	Total (C)=(A)+(B)	Percent (A)/(C)
Forklift	4,272	1,709	5,981	71
Mobile Crane	476	244	720	66
Pneumatic Loader Unloader	-	-	-	-
Tractor Shovel	940	499	1,439	65
Tractor	1,040	494	1,534	68
Chassis	420	112	532	79
Truck Mobile	60	29	89	67
(From Apr. 1 to June 30 in 1988 for 3 months)				

Table 3.5.8 Ratio of Available Days of the Equipment

(Unit: Days)

Name of Group	Available Days (A)	Total Days (B)	Percent (A)/(B)
Forklift	5,981	6,188	97
Mobile Crane	770	728	99
Pneumatic Loader Unloader	-	-	-
Tractor Shovel	1,439	1,456	99
Tractor	1,534	1,638	94
Chassis	537	546	98
Truck Mobile	89	91	98
(From Apr. 1 to June 30 in 1988 for 3 months)			

Remark: Total Days = No. of Equipment x 3 months

(2) Maintenance System for Cargo Handling Facilities/Equipment

1) Maintenance system

a. Preventive maintenance

The preventive maintenance adopted at this port is carried out according to the records of the previous historical working hours such as 100 hours, 250 hours, 500 hours, 1,000 hours and 2,000 hours.

The contents of the preventive maintenance should be decided in accordance with the working records of the facilities/equipment.

The present preventive maintenance at this port is carried out in accordance with manuals which was supplied by markers.

b. Repairs of broken down facilities/equipment

Almost all repairs (approximately 90%) are performed at the maintenance shop.

On the other hand, serious and special repairs that are impossible to be performed at the shop are entrusted to private workshops outside the ESP.

2) Maintenance shop

There is a maintenance shop that belongs to the ESP in the port. The number of workers in the shop is twenty two (22) persons. It can be said that machinery and tools for maintenance are poor. The ability of the maintenance shop is limited.

3) Spare parts

The stock of spare parts at the maintenance shop is recognized to be insufficient.

3.6 Port of Mazatlan

3.6.1 Port Facilities

The Port of Mazatlan has multiple functions (Fig. 3.6.1). The pleasure boat area and the ferry terminal (4-18 in Fig. 3.6.1) connecting with La Paz of Baja California area located near the entrance channel. Next to these facilities, there are a cruise ship berth (23 in Fig. 3.6.1) and PEMEX berth (24 in Fig. 3.6.1).

The main public wharf (25-29 in Fig. 3.6.1)is 1,138m in length and has 5 berths with 5 sheds. Most of the inner area is used as a fishing boat terminal.

ESP provides cargo handling services at the cruising ship berth, 5 public berths and some berths in the fishing boat areas. Facilities at these of berths (excluding fishing boat areas) and related facilities are the objects of this study.

The cruise ship berth can be used by ships less than 180m in overall length. The five public berths are used for cargo ships (including container ships, fishing boats (loading/unloading of tuna fish) and many cruise ships.

Table 3.6.1 (a), (b) and (c) show the outlines of main mooring facilities, breakwaters and channels, and storage facilities in the Port of Mazatlan.

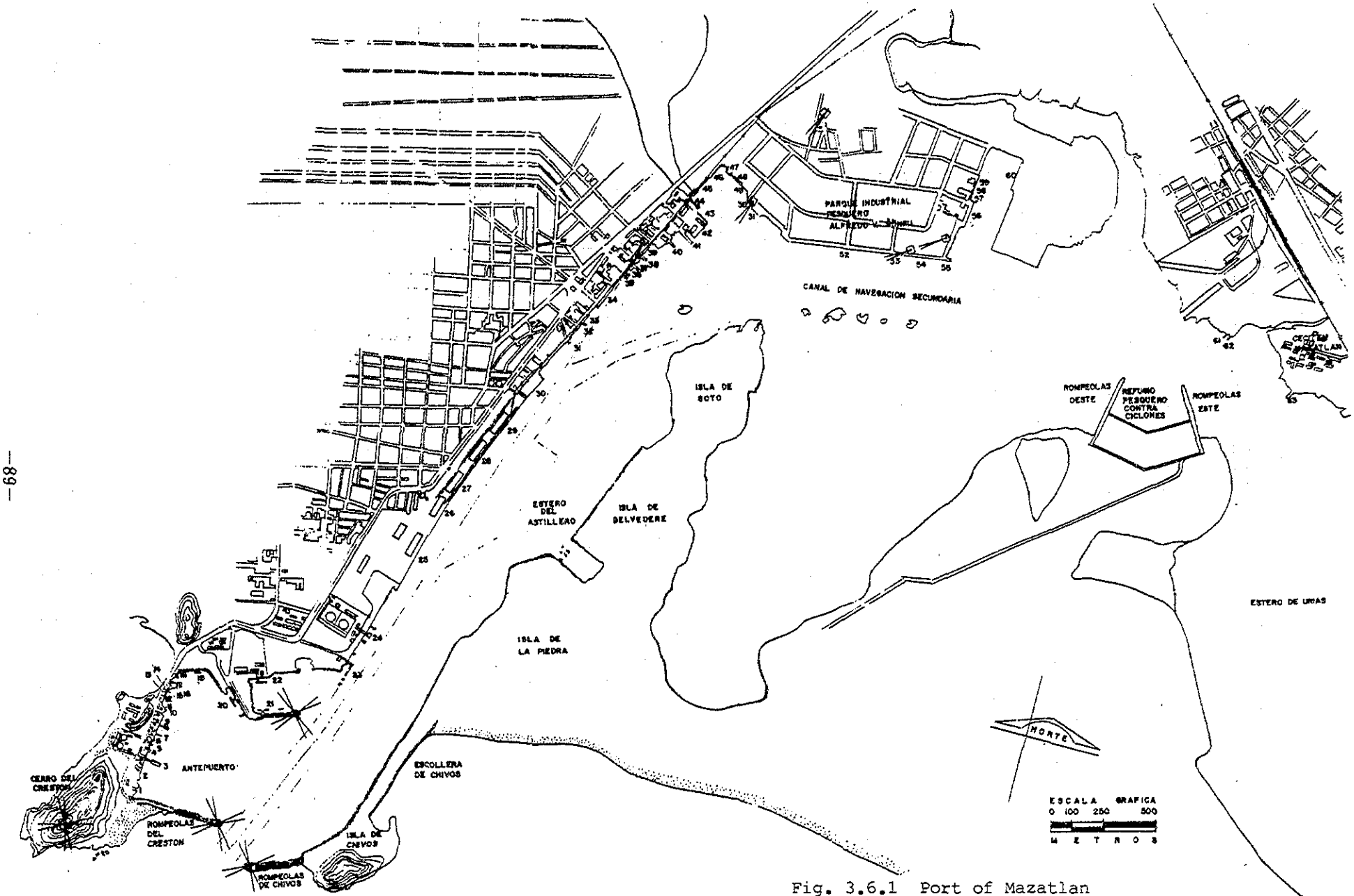


Fig. 3.6.1 Port of Mazatlan
Source: Catastro Portuario 1989, S.C.T.

Table 3.6.1 (a) Main Mooring Facilities

No.	Name of Facilities	Berth Length (m)	Water Depth (m)	Crown Height (m)	Structural Material	Year Construc-ted	Public or Private
21	Atracadero No.2 para Transbordadores	35	-6	+2.0	Reinforced Concrete	-	Public
22	Atracadero No.1 para Transbordadores	36	-6	+2.0	Reinforced Concrete	-	Public
23	Muelle para Barcos de Pasajeros	70	-10	+3.0	Reinforced Concrete	1982	Public (for Cruiser)
24	Muelle de PEMEX	22	-10	+3.2	Reinforced Concrete	1967	Private (PEMEX)
25	Muelle Zona Fiscal No.5	351	-9.8	+3.7	Reinforced Concrete	-	Public
26	Muelle Zona Fiscal No.4	168	-9.8	+3.7	Reinforced Concrete	1979 1980	Public
27	Muelle Zona Fiscal No.3	174	-9.25	+3.7	Reinforced Concrete	1980	Public
28	Muelle Zona Fiscal No.2	185	-8.80	+3.2	Reinforced Concrete	-	Public
29	Muelle Zona Fiscal No.1	260	-8.80	+3.2	Reinforced Concrete	1939 1940	Public
30	Muelle de La Armada	131	-7.00	+3.2	Reinforced concrete	-	Military
52 ~ 55	Pesca Industrial	870	-3.00 ~ -7.00	+2.0 ~ +2.50	Reinforced Concrete	1982 1984	Public (for Fish Boat)

Source: Catastro Portuario 1989, SCT

Table 3.6.1 (b) Main Breakwaters and Channels

Name of Facilities	Length (m)	Crown Height (m)	Width (m)	Water Depth (m)	Structural Material	Year Constructed
Rompeolas del Creston	450	+8.0	6.00 (Crown)	--	20ton Stone	1954 1955
Rompeolas del Chivos	300	+8.0	6.00 (Crown)	--	20tons Stone with 17ton Tetrapod	1953 1954
Channel de Accesso	--	--	130 (Bottom)	-15.0	--	--

Table 3.6.1 (c) Main Storage Facilities

No.	Name of Facilities	Total Area (m^2)	Net Area (m^2)	Year Constructed	Public or Private
72	Bodega No. 1	3,125 (125 x 25)	3,125	--	Public
73	Bodega No. 2	3,000 (120 x 25)	3,000	--	Public
74	Bodega No. 3	3,000 (120 x 25)	3,000	--	Public
75	Bodega No. 4	2,268 (108 x 21)	2,268	--	Public
76	Bodega No. 5	3,600 (120 x 30)	3,600	--	Private (FERTIMEX)

Source: Catastro Portuario 1989, SCT

3.6.2 Utilization of the Port

(1) Number of Vessel Calls

The number of vessel calls at the Port of Mazatlan is shown in Table 3.6.2. But in addition to the vessels shown in the Table about 200 cruising ships call at the port each year, especially from October to March. About 70 foreign trade vessels call at the port each year. These include about 20 refrigerated vessels to export frozen tuna.

Most of the domestic trade vessels are ferry boats connecting Mazatlan with La Paz in Baja California.

Table 3.6.2 Number of Vessel Calls at the Port of Mazatlan

Classification	1981	1982	1983	1984	1985	1986	1987
Foreign Trade	119	150	87	73	70	68	70
Domestic Trade	669	552	551	535	567	496	550
Total	788	702	638	608	637	564	620

Source: Momiviento de Cargo y Buques (1981-1987), SCT

(2) Regular foreign Trade Service

Only one regular liner calls at the Port of Mazatlan, the operator of which is d'AMICO Line. The calling frequency is every 22 days using 5 multipurposes vessels, and its route is Vancouver, West Coast of the U.S.A., Mazatlan, Spain and Italy. The main cargo on this route is frozen tuna in reefer containers and other general cargoes to Europe.

(3) Characteristics of Cargoes

The total cargo volume through the Port of mazatlan has not changed in the past few years, as shown in Table 3.6.3. As for foreign trade, very few cargoes are exported and the main imported cargoes are agricultural bulk products. As for the domestic trade, a major part of the cargoes are discharged petroleum and its derivatives.

The containerized cargo, of which the volume is not so large, is mainly frozen tuna for Europe.

Table 3.6.3 Cargo Volume through the Port of Mazatlan

Classification	1981	1982	1983	1984	1985	1986	1987
Foreign Trade							
(Import)	969,849	583,302	739,719	512,223	592,887	603,843	466,904
General Cargo	91,298	87,204	42,172	41,896	70,970	33,625	-
Agricultural Bulk	729,693	225,717	635,525	379,000	414,123	205,173	138,918
Mineral Bulk	148,858	213,430	62,007	71,327	107,794	252,416	272,793
Liquids (Petr. & Derivs)	-	56,951	-	-	-	112,629	55,193
Perishable	-	-	15	-	-	-	-
(Export)	79,000	51,657	39,776	57,280	43,597	48,400	85,523
General Cargo	66,142	29,586	31,415	26,040	21,754	25,949	47,414
Other Liquids	5,557	13,952	-	25,882	19,979	10,000	14,700
Perishable	7,301	8,119	8,361	5,358	1,864	12,451	23,409
Domestic Trade							
(Discharge)	1,074,644	1,911,828	1,787,069	1,823,838	1,909,168	1,365,907	1,873,289
General Cargo	146,941	186,488	173,339	163,586	187,581	172,004	173,206
Agricultural Bulk	-	3,284	-	-	-	-	-
Mineral Bulk	68,049	102,597	59,287	104,484	184,311	53,885	285,921
Liquids (Petr. & Derivs)	1,472,342	1,605,655	1,538,098	1,540,691	1,515,466	1,116,620	1,379,059
Perishable	17,312	13,804	16,345	15,077	21,810	23,398	35,103
(Loading)	201,844	210,550	217,262	230,227	285,899	266,195	285,524
General Cargo	188,241	201,396	195,556	207,476	258,211	237,162	255,475
Perishable	13,603	9,154	21,706	22,751	27,688	29,033	30,049
T O T A L	2,955,337	2,757,337	2,783,826	2,623,568	2,831,551	2,284,345	2,711,240

Source: Movimiento de Carga y Buques 1987, SCT

Table 3.6.4 Containerized Cargo through the Port of Mazatlan

(Unit: Tons)

	1981	1982	1983	1984	1985	1986	1987
Import	96	300	920	27	--	--	--
Export	--	64	5,084	3,038	555	7,737	3,446
Total	96	364	6,004	2,065	555	7,737	3,446

Source: Movimiento de Carga y Buques (1981-1987), SCT

Note : The weight of the containers themselves is included.

3.6.3 Management and Finance

(1) Scope of Management

The ESP provides services at the Ports of Mazatlan and Topolobampo. But the operations at Topolobampo account for only 5%. The services are as follows:

- Loading/discharging cargoes at public berths
- Transit service of the frozen tuna to/from refrigerating storage
- Cargo storage service
- Tourist transit service to/from the tourist terminal
- Tugboat service
- Fuel supply service
- Food supply service

But as for the loading/unloading operating to/from trucks into/from the port area, it is carried out by the Union belonging to CTM. And the number of staff of this ESP is 141.

(2) Union

There are three cargo handling unions in this port, two of which belong to CROM, with the other belonging to CTM. ESP only makes contracts with unions belonging to CROM, and the other union is independent from the ESP and has its own tariff for direct contracts with shippers and users. The two unions belonging to CROM are the "Union" and "Liga". The number of laborers is a follows:

CROM (Union)	Associated: 58	Non-associated	170
(Liga)	Associated: 71	Non-associated	

(3) Financial Status and Others

The shareholders are as follows:

Federal Government: 99.9% Others: 0.1%

ESP recorded a deficit of 661,945 thousand pesos in 1988 as shown in Table 3.6.5, but in 1987 there was a profit of 936,934 thousand pesos.

Table 3.6.5 Balance Sheet and Profit/Loss Statement at Mazatlan

Monetary unit: 1,000 pesos

Balance Sheet			
Assets		Liabilities & Capital	
Item	Amount	Item	Amount
Current Assets	2,062,697	Current Liabilities	875,096
Fixed Assets	8,154,981	Fixed Liabilities	0
Investment	2,921	Conti Liabilities	0
		(sub total)	875,096
		Capital	9,603,163
		Capital Social	1,203,323
		Legal Stock	4,931
		Surplus for Reval	7,020,514
		Accumulated Profit	1,036,749
		Practice in a year	- 661,945
Total	10,220,599	Total	10,220,599

Contri Liabilities : Contingent Liabilities
Surplus for Rreval : Surplus for Revaluation

Profit/Loss Statement	
Item	Amount
Operating Revenues	8,031,938
Ship & Land Operation	5,453,293
Tugboat	1,547,572
Others	1,031,037
Operating Cost	-7,403,607
Cost of Service	-7,403,607
Administration Cost	-1,297,576
Provision for Tax ect.	- 76,074
Extraordinary Credit	83,900
Total	- 661,945

Source: Informe sobre de Examen de los Estados Financieros(1988 y 1987)

3.6.4 Present Procedures for Ship Entry/Exit, Customs Formalities and Land Transportation

(1) Procedures for Ship Entry/Exit

1) Control by Harbor Master

a. The organization is almost the same as at Salina Cruz.
b. The program committee meets Wednesdays at any time upon request from the member.

2) Application by shipping agents

a. Procedures are almost the same as at Salina Cruz.
b. Berth allotment is basically decided on a "first-come, first-served" basis, giving consideration to a ship's draft.
c. About 200 cruise ships call at the port in the tourist season. It seems they have berthing priority over cargo ships.

3) Aids to ship entry/exit

a. Four (4) pilots and one tugboat are available. If a second tug is required, it has to be sent from PEMEX.
b. Ships with a length of less than 150m and a draft under 30 feet can enter at any time of the day or night.

4) Investigation by officials

a. Free pratique can be granted via VHF radio.
b. Others are the same as at Salina Cruz.

5) Exit clearance

a. Procedures are mostly the same as at Salina Cruz. Applications for departure are accepted at any time.

(2) Procedures for Customs Clearance and Bonded Transit

1) Customs organization

a. The organization system is almost the same as at Salina Cruz. This office also controls the Topolobampo branch.
b. The "committee for modernizing customs procedures" comprises representatives from customs, the ESP, the Chamber of commerce and industry, the Municipal chief and forwarders.

2) Application by forwarders

a. Customs entry is cleared within one or two days.
b. Other procedures are almost the same as at Salina Cruz.

3) Actual procedures

a. Procedures are the same as at Salina Cruz. Physical inspection is executed for about 3 percent of the cargo on a random basis.

4) Bonded transit

a. This system is not used in Mazatlan because no loaded containers are discharged.

(3) Land Transportation by Rail and Truck

1) Rail

a. The supervisory regional office is located in Guadalajara. The operating department of the office controls the following four local divisions: Mexicali, Hermosillo, Guadalajara and Sinaloa. The Sinaloa divisions is located in Mazatlan.
b. Freight cars are ordered by ESP 20-30 days prior to a ship's arrival.
c. The shortage of freight cars is worth noting, especially in the harvest seasons.

d. The national railway marshaling yard is located 3.5km from the port area. In the port area, the ESP operates its own 900 horse-power locomotive.

2) Trucks

a. Transportes Unidos Mazatlan, S.A.(TUMSA) comprises 85 trucking companies with a total of 120 trucks. This growup is linked with Central de Servicio de Carga in Culiacan.
b. The main routes are to Guadalajara, San Luis Potosi, Durango, Juarez, Nogales, Tijuana and la Paz.
c. Monterry is covered by another trucking company, Moterrey-Pacifico Mazatlan Co.

3.6.5 Cargo Handling Operation

(1) Present Operation Procedure

1) Two or three weeks prior to a ship's arrival, the agent sends the ship's schedule information such as ETA, ship's size and cargo quantity to the ESP.

2) One day prior to a ship's arrival, the agent submits to the ESP a document that includes the necessary data for cargo handling operations such as the number of gangs required, necessary equipment, cargo details, handling tonnages and stowage plan. Usually the document is a copy of the application to the Harbor Master.

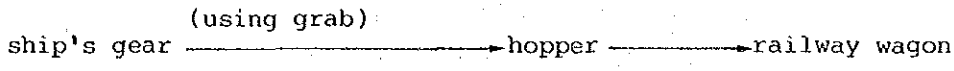
3) The ESP decides the ship's cargo handling operation Plan in consultation with the agent. The plan is also delivered to the relevant sections. The ESP arranges the necessary number of gangs from CROM and equipment from the mechanical section.

4) The Program Committee meets every wednesday as a rule, but actually it meets whenever necessary.

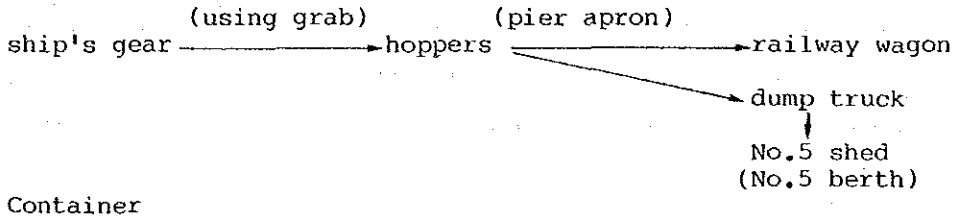
(2) Actual Cargo Handling Operation Flow

The following charts show the main cargo flows in discharging. The handling flow of frozen tuna (e) is limited to loading only.

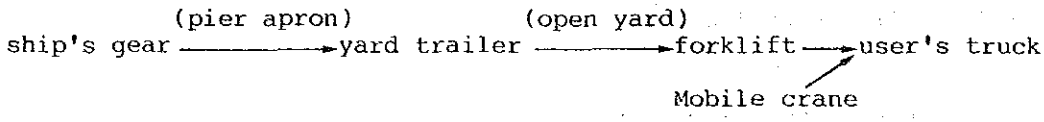
a. Agricultural bulk cargo



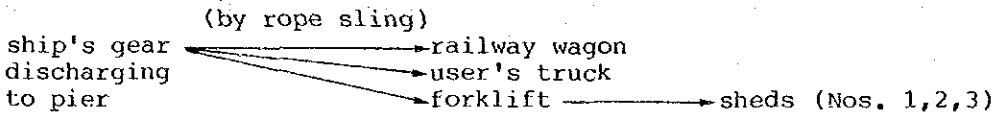
b. Mineral bulk cargo (Urea)



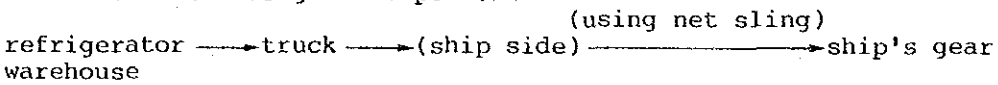
c. Container



d. Sugar in bags



e. Frozen tuna (loading for export)



3.6.6 Cargo Handling Facilities/Equipment and Maintenance System

(1) Cargo Handling Facilities/Equipment

The existing cargo handling facilities/equipment at the port are shown in Table 3.6.6-Table 3.6.8.

Table 3.6.6 List of Cargo Handling/Equipment

Type	Capacity	Year Procured	Age (in years)	No. of Equipment		
				Total	Available	Unavail.
Mobile Crane	160,000 L	1981	8	1	0	1
	80,000 L	1980	9	1	0	1
	36,000 L	1978	11	1	1	
	25,000 L	1976	13	1	1	
	16,000 L	1979	10	1	0	1
	16,000 L	1980	9	1	1	
	80,000 L	1973	16	1	1	
Forklift	80,000 L	(1981)		(1)	0	
	80,000 L	1985	4	1	1	
	30,000 L	1984	5	1	0	1
	20,000 L	1983	6	1	1	
	18,000 L	1983	6	1	1	
	8,000 L	1979	10	6	6	
	8,000 L	1980	9	5	5	
	8,000 L	1981	8	5	5	
	8,000 L	1982	7	5	4	1
	8,000 L	1988	1	4	3	1
	6,000 L	1976	12	1	1	
	4,000 L	1984	5	4	4	
Tractor Shovel	11/2 Yd.3	1978	11	1	1	
	11/2 Yd.3	1981	8	6	6	
	11/2 Yd.3	1984	5	2	2	
	11/2 Yd.3	1985	4	1	1	
	11/2 Yd.3	1986	3	1	1	
	11/2 Yd.3	1987	2	1	1	
	11/2 Yd.3	1988	1	1	1	
Tractor	23,000 L	1982	7	5	5	
	5,000 L	1977	12	1	1	
		1978	11	6	5	1
	5,000 L	1979	10	6	5	1
		1980	9	10	10	
		1982	7	11	8	3
		1983	6	9	9	
Chassis	45 t	1981	8	1	1	
		1988	1	2	2	
	35 t	1982	7	2	2	
Excavator inhold	11/2 Yd.3	1981	8	2	2	
Truck Mobil	900 HP	1981	8	1	1	

Table 3.6.7 Average Age of the Existing Cargo Handling Facilities/Equipment

Name of Group	No. of Units	Average Age	Age	
			Oldest	Newest
Mobile Crane	6	10	13	8
Forklift	34	7	12	1
Tractor Shovel	13	6	11	1
Tractor	48	8	11	6
Chassis	5	5	8	1
Excavator in Hold	2	8	8	8
Truck Mobile	1	8	8	8

Table 3.6.8 Total Working Hours in 1988

Name of Group	No. of Units	Total Working Hours	Per Unit	
			Per Year	Per Month
Mobil Crane	6	1,714	286	24
Forklift	34	20,059	590	49
Tractor Shovel	13	5,483	422	35
Tractor	48	16,415	342	29
Chassis	-	-	-	-
Excavator in Hold	2	254	127	11
Truck Mobil	1	-	-	-

(2) Maintenance System for Cargo Handling Facilities/Equipment

1) Maintenance System

a. Preventive maintenance

The preventive maintenance which is adopted at this port is carried out in accordance with the records of each 100 hours of use of each facility/piece of equipment. All preventive maintenance is performed at the ESP shop.

b. Repair of facilities/equipment

Ordinary repairs are performed at the maintenance shop. Serious

and special repairs that cannot be performed at the shop are entrusted to private outside the ESP.

2) Maintenance shop

There is a maintenance shop that belongs to the ESP in the port. The number of workers in the shop is forty-one (41) persons. The machinery and tools for maintenance in this shop seem to be the most efficient among the six (6) ports, and the ability of this shop is rather excellent.

3) Spare parts

Sufficient spare parts are stored at this shop and are supplied to the shop on a steady basis, so management of the shop seems to be excellent.

3.7 Port of Guaymas

3.7.1 Port Facilities

The Port of Guaymas has a long history. It was constructed by reclaiming a water area between an island and the coast.

The west half of the main port area is an industrial area with some private berths as well as shipbuilding yards (Fig. 3.7.1). The east half of the port has 6 public berths (5,6,7 in Fig. 3.7.1)and a ferry terminal (4 in Fig. 3.7.1).

The PEMEX berths (1,2 in Fig. 3.7.1) are located in the off-water area from the public berths.

ESP mainly provides cargo handling services at the 6 public berths. These facilities are the objects for this study.

The berth named "Muelle para Chalanes" (5 in Fig. 3.7.1) is not used at present. The other five public berths are operated for cargo ships for involved in foreign trade, including container ships.

Behind the berth "Muelle Patio Banda Sur" (7 in Fig. 3.7.1), there is a silo (49 in Fig. 3.7.1)operated by ANDSA.

Table 3.7.1 (a) and (b) show the outlines of the main mooring facilities and the storage facilities in the Port of Guaymas.

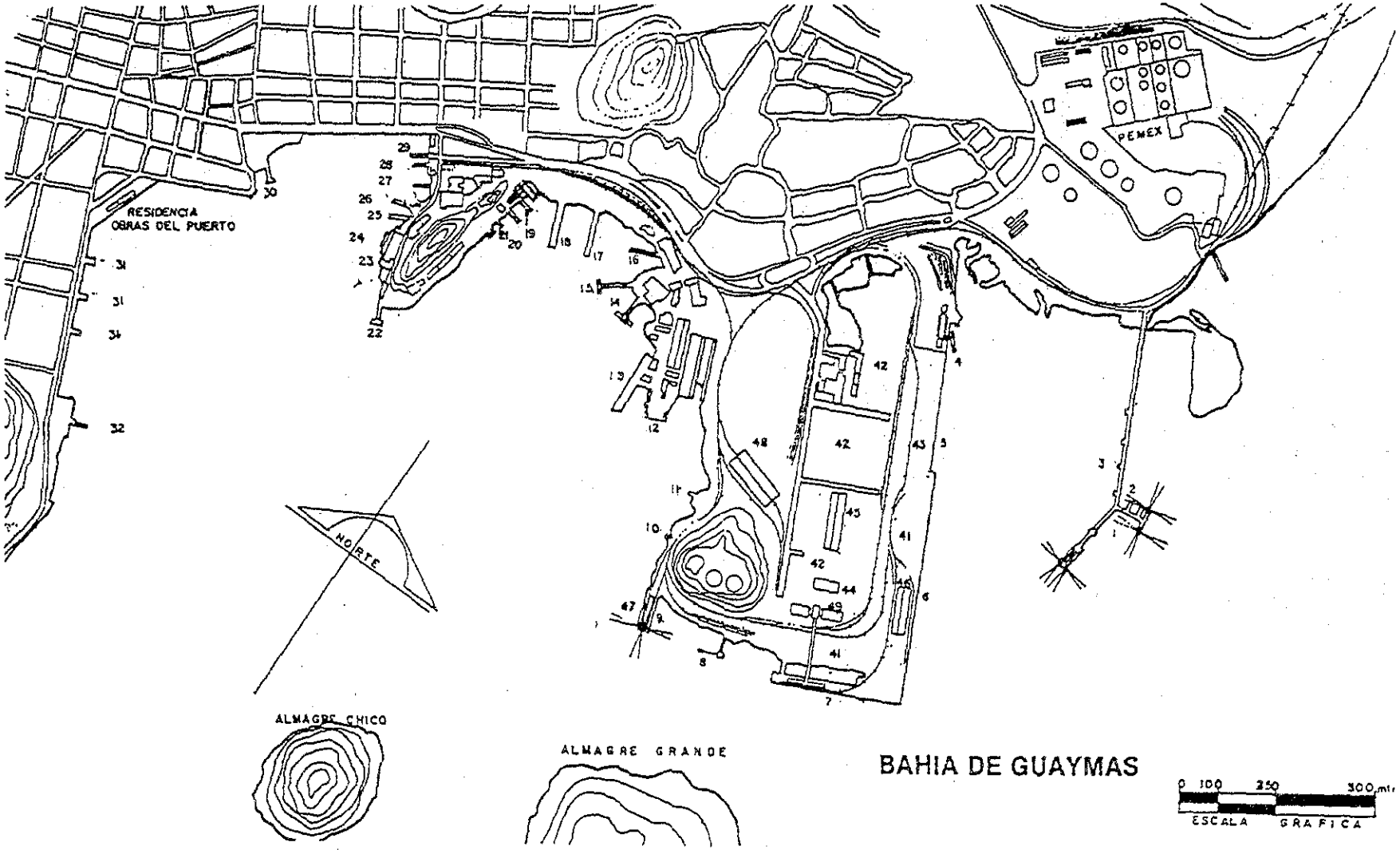


Fig. 3.7.1 Port of Guaymas
Source: Catastro Portuario 1989, S.C.T.

Table 3.7.1 (a) Main Mooring Facilities

No.	Name of Facilities	Berth Length (m)	Water Depth (m)	Crown Height (m)	Structural Material	Year Construc-ted	Public or Private
1	Muelle de PEMEX	220	-10	+3.10	Reinforced Concrete	1961	Private (PEMEX)
2	Muelle de Combustible	234	-10	+3.10	Reinforced Concrete	1961	Private (PEMEX)
4	Muelle del Transbordador	48	-5	+5.50	Reinforced	1972	Public (for Ferry Boat)
5	Muelle para Chalanes (Berth No.1)	145	-4.50	+2.5	Reinforced Concrete	1960	Public
6	Muelle Patio Banda Este (Berth No.2,3,4)	577	-10.50	+4.2	Reinforced Concrete	1954	Public
7	Muelle Patio Banda Sur (Berth No.5,6)	352	-10.50	+4.2	Reinforced Concrete	1954	Public
8	Muelle de Comentos	76	-8.50	+3.0	Steel Pipe Concrete	1983	Private (for cement)

Source: Catastro Portuario 1989, SCT

Table 3.7.1 (b) Main Storage Facilities

No.	Name of Facilities	Total Area (m^2)	Net Area (m^2)	Year Constructed	Public or Private
46	Bodega No.1	4,800 (120 x 40)	3,600	1963	Public
49	Silos ANDSA	70,000ton (Capacity)	--	1964	Private (ANDSA)

Source: Catastro Portuario 1989, SCT

3.7.2 Utilization of the Port

(1) Number of Vessel Calls

The number of vessel calls at the Port of Guaymas is shown in Table 2.7.2. The total number of vessel calls per year ranged between 600 and 700 in the 1980's. The number of foreign trade vessels has varied from year to year because the number of vessels for the import of agricultural bulk cargo have fluctuated. General cargo vessels have not called at the port that often.

The domestic trade vessels are mainly divided into two types: ferries connecting Guaymas and Santa Rosalia in BaJa California and oil tankers mainly coming from Salina Cruz.

Table 3.7.2 Number of Vessel Calls at the Port of Guaymas

Classification	1981	1982	1983	1984	1985	1986	1987
Foreign Trade	110	123	95	158	111	79	126
Domestic Trade	555	494	558	471	513	592	482
Total	665	617	653	629	624	671	608

Source: Movimiento de Carga y Buques (1981-1987), SCT

(2) Regular Foreign Trade Service

There is only one route, that of the TMM liner, which also calls at the other study ports. The main service of this calling is door-to-door service of auto parts of Japan's CKD to Hermosillo. The main cargoes are auto parts (imports) and cellulose and cotton (exports).

(3) Characteristic of Cargoes

The cargo volume through the Port of Guaymas is shown in Table 2.7.3. The total cargo volume was around 5 million tons annually in the 1980's. The volume of agricultural bulk products totals more than 50 percent of all imported cargoes, and mineral bulk accounts for more than 85 percent of all exported cargoes.

As for domestic trade, most of the cargoes discharged are petroleum and its derivatives, and the volume of general cargo is about 120 thousand tons annually.

Table 3.7.3 Cargo Volume through the Port of Guaymas

Classification	1981	1982	1983	1984	1985	1986	1987
Foreign Trade							
(Import)	1,394,597	852,814	1,110,251	1,244,279	1,001,790	370,267	1,424,891
General Cargo	29,971	23,506	4,530	15,482	24,485	10,320	49,562
Agricultural Bulk	1,144,820	657,512	1,073,493	1,007,439	771,870	243,742	798,179
Mineral Bulk	219,806	146,271	32,228	42,014	84,250	32,247	100,436
Liquids (Petr. & Derivs)	-	25,525	-	179,344	121,185	83,458	476,714
(Export)	533,785	383,906	402,120	595,227	411,762	435,067	532,658
General Cargo	105,585	23,06	27,382	37,617	12,815	23,989	59,896
Agricultural Bulk	-	-	-	-	-	-	19,827
Mineral Bulk	428,200	360,400	374,738	557,610	398,947	410,842	451,905
Perishable	-	-	-	-	-	236	1,030
Domestic Trade							
(Discharge)	3,062,917	2,980,036	2,714,015	2,630,574	2,646,115	3,105,415	3,011,225
General Cargo	38,066	31,297	29,859	27,348	22,950	32,679	36,174
Agricultural Bulk	-	23,813	-	-	-	-	-
Mineral Bulk	21,000	5,244	64,318	70,550	166,524	172,289	124,404
Liquids (Petr. & Derivs)	3,003,851	2,919,682	2,619,838	2,532,676	2,456,641	2,900,447	2,850,647
(Loading)	164,249	327,011	936,383	924,362	704,967	1,019,952	858,180
General Cargo	42,160	34,995	73,550	109,917	96,027	97,289	94,003
Agricultural Bulk	47,189	168,262	502,460	259,544	96,600	284,389	84,878
Mineral Bulk	-	27,447	54,956	25,696	52,597	43,049	11,267
Liquids (Petr. & Derivs)	74,900	96,307	305,417	529,205	455,841	577,650	664,571
Other Liquids	-	-	-	-	3,250	15,150	-
	-	-	-	-	652	2,425	3,461
T O T A L	5,155,548	4,543,767	5,162,769	5,394,442	4,764,634	4,930,701	5,826,954

Source: Movimiento de Carga y Buques (1981-1987), SCT

The amount of containerized cargo has rapidly increased since 1986, because auto parts shipments from Japan to Hermosillo started that year.

Table 3.7.4 Containerized Cargo through the Port of Guaymas

	1981	1982	1983	1984	1985	1986	1987
Import	--	--	25	33	4	5,617	47,583
Export	--	--	125			3,667	31,718
Total	--	196	150	33	4	9,284	79,300

Source: Momiviento de Cargo y Buques (1981-1987), SCT
Note : The weight of the containers themselves is included.

3.7.3 Management and Finance

(1) Scope of Management

In the Port of Guaymas the ESP provides the following services:

- .Loading/discharging cargoes at the public berths
- .Loading sulphuric acid at the special plant
- .Loading liquid asphalt at the special plant
- .Cargo storage service in the warehouses
- .Tugboat service
- .Water supply service
- .Food supply service

(Fuel supply service is carried out by PEMEX)

- .The number of authorized staff members of this ESP is 80.

(2) *Unions*

there are two cargo handling unions in this port, one of which belongs to CROM, with the other belonging to CTM. The ESP controls both unions. The cargo handling is carried out by the laborers belonging to CROM, except for work carried out by CTM. The cargoes carried into and taken out from the port area are handled by the laborers belonging to CTM. The numbers of these laborers are as follows:

CROM Associated: 94 Non-associated: 50
CTM Associated: 22 Non-associated: 28

(3) Financial Status and Others

The shareholders are as follows:

Federal Government: 99.9% Union: 0.1%

ESP recorded a deficit of 810,564 thousand pesos in 1988, as shown in Table 3.7.5, but in 1987 there was a profit of 252,164 thousand pesos.

Table 3.7.5 Balance sheet and Profit/Loss statement at Guaymas

Monetary unit: 1,000 pesos

Balance Sheet			
Assets		Liabilities & Capital	
Item	Amount	Item	Amount
Current Assets	1,133,630	Current Liabilities	714,546
Fixed Assets	8,648,959	Fixed Liabilities	0
Fixed Assets	21,850,695	(sub total)	714,546
Depreciation	-13,777,470	Capital	9,603,163
Equipment etc.	500,000	Capital Social	4,000
Other	7,734	Variable	1,783,694
		Contri from federal	1,996,080
		Legal Stock	20,418
		Accusulating Profit	211,965
		Less of Period	810,564
		Surplus for Reval	5,862,458
Total	9,782,597	Total	9,782,597

Surplus for Reval : Surplus for Revaluation

Contri from Federal: Contribution from Federal Gov't

Profit/Loss Statement	
Item	Amount
Operating Revenues	6,595,984
Operating Cost	-6,573,211
Administration Cost	- 980,300
Other Cost or Revenues	10,375
Provision for Tax etc.	0
Total	- 810,564

Source: Estado de Posicion Financiera Servicios Portuarios de Guaymas al 31 de Diciember de 1988 y 1987.

3.7.4 Present procedures for ship Entry/Exit, Customs Formalities and Land Transportation

(1) Procedures for Ship Entry/Exit

1) Control by Harbor Master

a. The organization is almost the same as at Salina Cruz. However, the work of the technical department is not decided yet.
b. The program committee meets 10:00 - 11:00 every day. Members are representatives of the Harbor Master, ESP, shipping agents, forwarders, pilot, truckers and labor unions.

2) Application by shipping agents

a. The procedure is almost the same as at Salina Cruz.

3) Aids to ship entry/exit

a. Three (3) pilots and one tugboat are available.
b. Ships are permitted to enter at any time day or night.

4) Investigation by officials

a. The procedures are the same as at Salina Cruz.

5) Exit clearance

a. Applications for departure clearance are accepted with as little notice as 30 minutes prior to departure as long as all charges and fees have been duly paid.

(2) Procedures for Customs clearance and Bonded Transit

1) Customs organization

a. The organization is almost the same as at Salina Cruz, however the

scale is smaller.

b. The"Committee for improvement of the Customs clearance system" meets periodically with representatives from customs and ESP in order to improve Customs service for users such as shipper, consignees and forwarders.

2) Application by forwarders

a. Almost the same as at Salina Cruz

3) Actual procedures

a. The procedures are the same as at Salina Cruz. It takes only about 30 minutes for clearance as the number of accounts is limited and they are big, regular, reliable accounts.

4) Bonded transit

a. The procedures is the same as at Salina Cruz.

b. Transit containers except CKD are physically checked by opening doors in the port or at the destinations.

(3) Land transportation by Rail and Truck

1) Rail

a. The supervisory office is located in Guadalajara.

b. Forwarders request freight cars from the railway station one week prior to ship's arrival.

c. The railway office can easily arrange 40-50 freight cars per day upon request.

d. The track network in the port area is complicated and not efficient for maneuvering freight cars.

2) Truck

a. There are also two groups of truckers in Guaymas. One is "Alianza

de Camioneros" and the other is "Central de Servicio de Carga".

b. Alianza is composed of 46 trucking companies with about 120 trucks. By concession, they monopolize transportation of port cargoes within a 20 Km area.

c. The main routes are up to Ensenada, Tijunana, Nogales and all of Baja California. They also use three ferry routes: Guaymas-Sta. Rosalia, Topolobampo-La Paz, and Mazatlan-La Paz.

d. Central de servicio de Carga, Hermosillo Branch controls about 90 trucking companies with 4,000 trucks. About 1,000 trucks of 30 trucking companies handle seaborne cargo in Guaymas.

3.7.5 Cargo Handling Operation

(1) Present Operation Procedure

1) Two or three weeks prior to a ship's arrival, the agent sends the ship's schedule information such as ETA, ship's size and cargo quantity to the ESP.

2) One day prior to the ship's arrival, the agent submits to the ESP a document that includes the necessary data for cargo handling operation, such as the number of gangs required, necessary equipment, cargo details and handling tonnages. The agent must submit documents daily for the next day's gangs.

3) The ESP holds an operating meeting at 10:00 every day. Members are the representatives the Deputy Harbor Master, ESP operating section, mechanical section, shipping agents, and CTM/CROM representatives and related personnel if necessary. This meeting decides the next day's cargo working schedule.

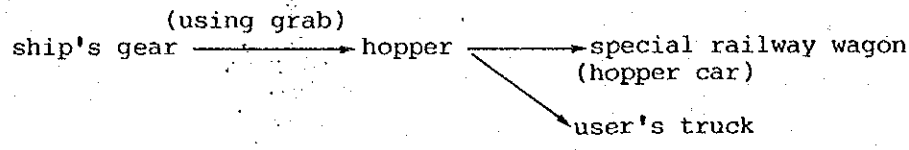
4) The cargoes that are transported into/from the port area are handled by CTM. Other services are provided by ESP/CROM.

(2) Actual Cargo Handling Operation Flow

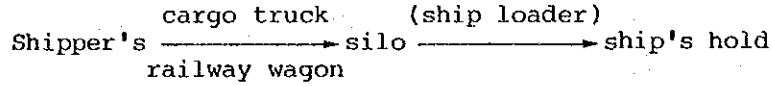
The following charts show the cargo flows in discharging. Agricultural bulk through silo (b) is limited to loading only. Mineral

bulk (c) is also limited to loading only.

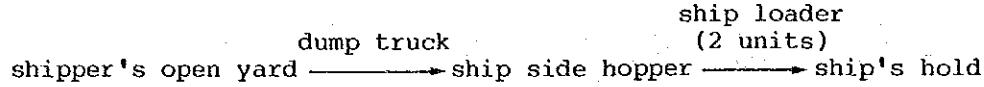
a. Agricultural bulk cargo



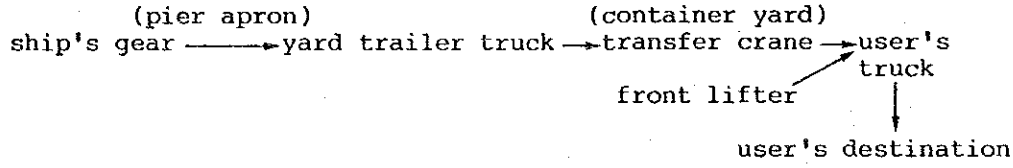
b. Agricultural bulk cargo (loading via silo)



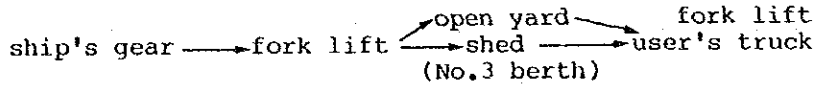
c. Mineral bulk cargo (loading of copper concentrate)



d. Containers



e. General cargo



3.7.6 Cargo Handling Facilities/Equipment and Maintenance system

(1) Cargo Handling Facilities/Equipment

The existing cargo handling facilities/equipment at the port are shown in Table 3.7.6 - Table 3.7.9.

Remarks: Total Days= No. of Equipment x months.

Table 3.7.6 List of Cargo Handling Facilities/Equipment

Type	Capacity	Year Procured	Age (in years)	No. of Equipment		
				Total	Available	Non Avail.
Mobile Crane	40,000 L	1976	13	1		
	35,000 L	1987	2	1		
	10,000 L	1972	17	1		
	10,000 L	1978	11	1		
Forklift	80,000 L	1987	2	1		
	15,500 L	1981	8	3		
	15,000 L	1987	2	1		
	8,000 L	1977	12	1		
	8,000 L	1979	10	1		
	8,000 L	1981	8	3		
	8,000 L	1988	1	2		
	7,500 L	1986	3	1		
	6,000 L	1979	10	1		
	4,500 L	1979	10	5		
	4,500 L	1987	2	4		
	4,500 L	1988	1	2		
Tractor Shovel	133/4 Yd.3	1981	8	1		
	"	1984	5	3		
	"	1987	2	1		
	111/2 Yd.3	1980	9	2		
	"	1988	1	1		
	3/4 Yd.3	1980	9	1		
	5/8 Yd.3	1981	8	2		
Tractor with	40 t	1986	3	6		
Chassis	5,000 L	1978	11	5		
		1979	10	8		
		1981	8	7		
Truck Marble	1.3 t	1980	9	1		

Table 3.7.7 Average Age of the Existing Cargo Handling Facilities/Equipment

Name of Group	No. of Units	Average Age	Age	
			Oldest	Nowest
Mobile Crane	4	11	17	2
Forklift	25	6	12	1
Transfer Shovel	11	6	9	1
Tractor with Chassis	26	8	11	3
Truck Mobile	1	9	9	9

Table 3.7.8 Ratio of Operated Days of the Equipment to Available days of the equipment

Name of Group	Operation	No. of Days Waiting	Total	Percent	Remarks
Mobile Crane	94	59	153	60	3 units
Forklift	934	558	1,492	63	24 units
Tractor Shovel	160	291	451	35	9 units
Tractor with Chassis	1,035	631	1,666	62	26 units
Truck Mobile	36	47	83	43	1 unit

(From Oct. 1 to Dec. 31, for 3 months)

Table 3.7.9 Ratio of Available Days of the Equipment

Name of Group	Available Days (A)	Total Days (B)	Percent (A)/(B)
Mobile Crane	153	276	55
Forklift	1,492	2,208	68
Tractor Shovel	451	828	55
Tractor with Chassis	1,666	2,392	70
Truck-Mobile	83	92	90

(From Oct. 1 to Dec. 31 for 3 months)

(2) Maintenance System for Cargo Handling Facilities/Equipment

1) Maintenance system

a. *Preventive maintenance*

The preventive maintenance at this port is carried out in accordance with a weekly maintenance plan. All machines are taken into the shop at the beginning of every week and checked in accordance with the check list for each machine. Furthermore, they are checked every day before and after work.

b. Repair of broken down facilities/equipment

Approximately eighty (80) percent of repairs are carried out in the maintenance shop. On the other hand, serious and special repairs which cannot be handled at the shop are entrusted to private workshops outside ESP.

2) Maintenance shop

There is a maintenance shop that belongs to the ESP in the port. The number of workers is nine (9) persons. The machinery and tools at this shop seem to be sufficient.

3) Spare parts

The spare parts stored at the maintenance shop seem to be insufficient.

3.8 Port of Ensenada

3.8.1 Port Facilities

The Port of Ensenada is the most northern port on the Pacific coast of Mexico (Fig. 3.8.1).

The number of ocean-going cargo ships calling at this port is not large at present, and they use Berth No. 1 (2 in Fig. 3.8) and Berth No. 2,3 (1 in Fig. 3.8.1).

Cruise ships use, on a preferential basis, Berth No. 2 and No. 3 (1 in Fig. 3.8.1). The domestic berth (4 in Fig. 3.8.1) accommodates domestic ships bound for Cedros Island. The berth between walls (3 in Fig. 3.8.1) is exclusively used for the loading/unloading of tuna fish.

These are the wharves where the ESP provides cargo handling services. Thus, the facilities at these wharves and their related facilities are the objects of this study.

Other waterfront areas are used mainly by fishing boats, the shipbuilding yard and pleasure boats.

The breakwater and the pier protect the water area and wharves from waves which sometimes attach the port severely.

Table 3.8.1 (a), (b) and (c) show the outlines of the main mooring facilities, breakwaters and channels and storage facilities in the Port of Ensenada.

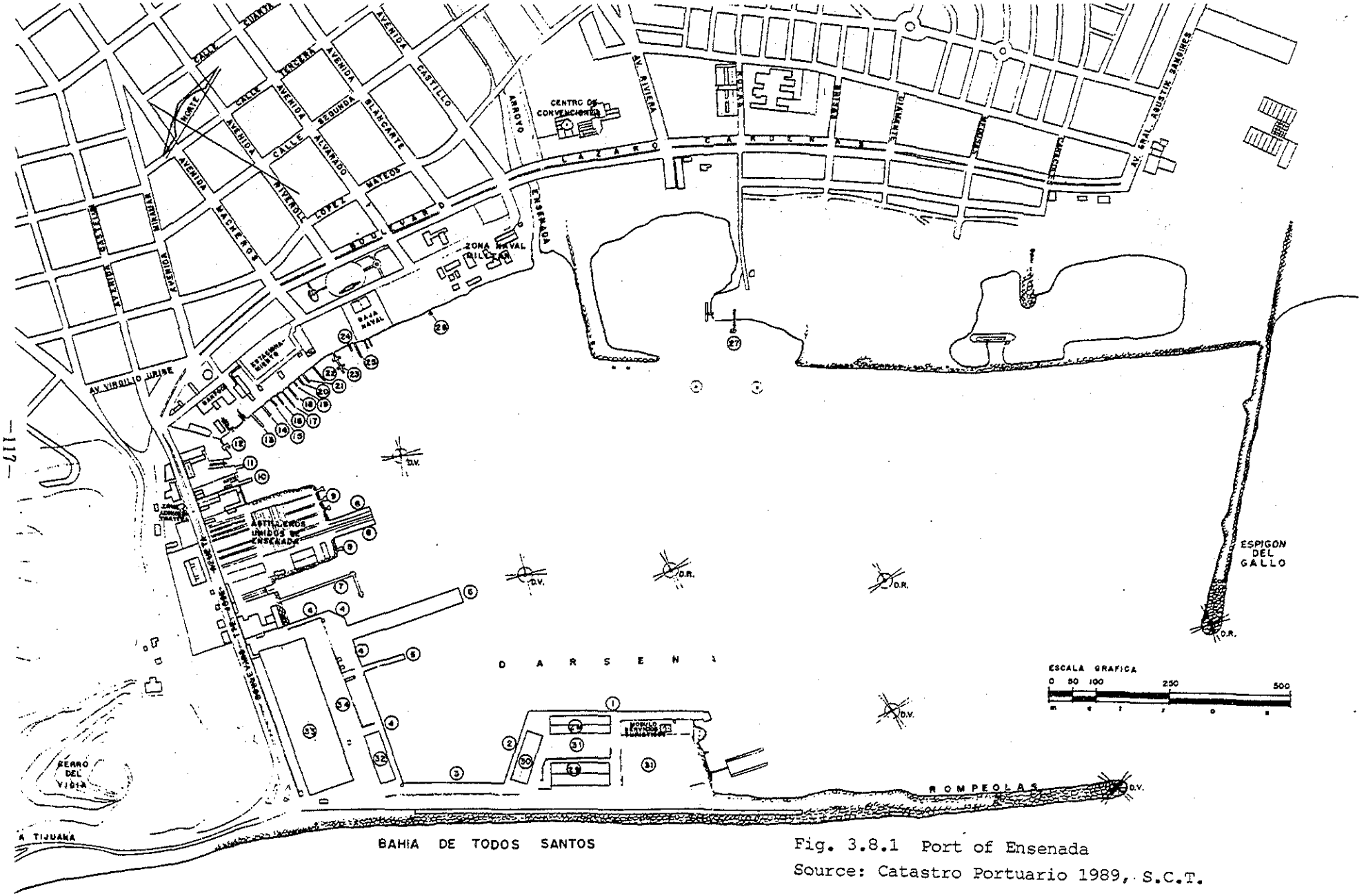


Fig. 3.8.1 Port of Ensenada
Source: Catastro Portuario 1989, S.C.T.

Table 3.8.1 (a) Main Mooring Facilities

No.	Name of Facilities	Berth Length (m)	Water Depth (m)	Crown Height (m)	Structural Material	Year Construc-ted	Public or Private
1	Muelle de Altura (Berth No. 2,3)	370	-9.0	+3.50	Reinforced Concrete	1958 1962	Public
2	Muro Norte (Berth No. 1)	156	-9.2	+3.50	Reinforced Concrete	1957	Public
3	Entre Muros	204	-8.5	+3.50	Reinforced Concrete	1957	Public
4	Muelle de Cabotaje y Pesca	488	-3.0 -6.5	+3.5	Reinforced Concrete	1955 1957	Public
5	Pesquero No. 1	90	-5.0	+3.50	Reinforced Concrete	1979	Public (for Fish Boat)
6	Reparaciones a Flote	510 (Both sides)	-4.0 -6.0	+3.50	Reinforced Concrete	1981	Public (for Fish Boat)

Source: Catastro Portuario 1989, SCT

Table 3.8.1 (b) Main Breakwaters and Channels

Name of Facilities	Length (m)	Crown Height (m)	Width (m)	Water Depth (m)	Structural Material	Year Constructed
Rompeolas	1,640	+6.4 +7.2	6.10 8.90 (Crown)	--	Stone an Concrete Block	1952 1956
Espigon de Gallo	855	+5.40 +5.90	5.0 (Crown)	--	Stone	1982 1983

Source: Catastro Portuario 1989, SCT

Table 3.8.1 (c) Main Storage Facilities

No.	Name of Facilities	Total Area (m^2)	Net Area (m^2)	Year Constructed	Public or Private
28	Bodega de Transito No. 3	3,751 (122 x 30)	2,626	1959	Public
29	Bodega de Transito No. 4	5,058 (117 x 43)	3,541	1964	Public
30	Bodega de Transito No. 2	3,091 (102 x 31)	2,164	1960	Private (ANDSA)
33	Cobertizo	30,789 (315 x 97)	21,552	1972	Public

Source: Catastro Portuario 1989, SCT

3.8.2 Utilization of Port

(1) Number of Vessel Calls

The total number of vessel calls at the Port of Ensenada was about 600 annually in the recent past, as shown in Table 3.8.2. Among them, there were fewer than 40 foreign trade vessels, most of which were refrigerated vessels used to export tuna. Among the domestic trade vessels, fishing boats account for about 50 percent of vessel calls. Vessels for mineral bulk, mainly limestone, represent about 40 percent. The other 10 percent were general cargo vessels.

Table 3.8.2 Number of Vessel Calls at the Port of Ensenada

Classification	1981	1982	1983	1984	1985	1986	1987
Foreign Trade	46	51	33	19	19	35	38
Domestic Trade	600	667	601	574	608	573	592
Total	646	718	634	593	627	608	630

Source: Momiviento de Cargo y Buques (1981-1987), SCT

(2) Regular Foreign Trade Service

There is no regular liner service at the Port of Ensenada. The only regular service is the domestic trade between Ensenada and Cedros Island with a frequency of 2 times per month to transport daily necessities to Cedros Island.

(3) Characteristics of the Cargoes

The cargo volume through the Port of Ensenada was about 1 million tons annually in the 1980s, as shown in Table 3.8.3. The volume of foreign trade cargo is less than 10 percent of the total cargo, and the main cargo is imported agricultural bulk products and exported tuna. The export of cotton, which was the main cargo in the 1970s, stopped in 1986.

As for domestic trade cargo, more than 80 percent of the cargo discharged is mineral bulk, mainly limestone.

Containerized cargo has not been handled since 1984, as shown in Table 3.8.4.

Table 3.8.3 Cargo Volume through the Port of Ensenada

(Unit: Tons)

Classification	1981	1982	1983	1984	1985	1986	1987
Foreign Trade							
(Import)	74,703	14,969	70,898	24,604	12,545	44,913	76,281
General Cargo	74,703	14,969	70,727	24,604	12,545	13,871	3,241
Agricultural bulk	-	-	-	-	-	30,992	72,846
Perishables	-	-	171	-	-	50	194
(Export)	52,868	35,366	7,694	932	8,002	16,686	21,172
General Cargo	51,003	32,325	6,369	932	1,852	750	-
Perishables	1,865	3,041	1,325	-	6,150	15,936	21,172
Domestic Trade							
(Discharge)	990,779	903,513	399,757	776,749	911,264	859,735	932,049
General Cargo	4,061	6,143	4,736	3,166	5,721	4,430	39,645
Mineral Bulk	798,777	702,016	768,666	667,237	747,619	719,092	720,574
Liquids (Petr. & Derivs)	-	-	44,248	-	-	-	-
Perishables	187,941	195,354	82,107	106,346	157,924	136,213	171,830
(Loading)	41,336	23,945	31,172	54,559	56,062	29,612	36,958
General Cargo	40,873	23,803	30,896	10,589	3,923	2,679	2,576
Agricultural bulk	-	-	-	34,796	50,200	25,435	21,840
Mineral Bulk	-	-	-	8,950	-	-	11,100
Liquids (Petr. & Derivs)	-	-	-	-	1,905	1,481	1,336
Perishables	463	142	276	224	34	17	106
T O T A L	1,159,686	977,793	1,009,521	856,844	987,873	950,946	1,066,460

Source: Movimiento de Carga y Buques 1987, SCT

Table 3.8.4 Containerized Cargo through the Port of Eusenada

(Unit:tons)

	1981	1982	1983	1984	1985	1986	1987
Import	--	239	372	--	--	--	--
Export	--	799	1,204	--	--	--	--
Total	--	1,038	1,576	--	--	--	--

Source: Movimiento de Carga y Buques (1981-1987), SCT
Note : The weight of the containers themselves is included.

3.8.3 Management and Finance

(1) Scope of Management

Port services are supplied by two organizations. One is the ESP and the other is the union belonging to CTM. The laborers belonging to CTM only discharge cargoes from ships, while the handling on the shoreside is carried out by laborers belonging to CROM. The services of the ESP are as follows:

- Loading/discharging cargoes at the public berths except when handled by CTM
- Cargo storage service in the warehouse
- Discharging anchovies from fishing boats
- Loading/discharging frozen tuna cargo at the public berths
- Tugboat service
- Water supply service

The number of staff members of this ESP is 50.

(2) Union

There are two cargo handling unions in this port, one of which belongs to CTM, with the other belonging to CROM. The ESP only makes contracts with the union belonging to CROM. The other one is independent from the ESP and has its own tariff for direct contracts with shippers and users. The number of these laborers are as follows:

CROM associated: 41 Non-associated:
CTM associated: 35 Non-associated: 100

(3) **Financial Status and Others**

The shareholders are as follows:

Federal Government: 99.5% CONASUPO: 0.3% Others: 0.2%

ESP recorded a deficit of 138,414 thousand pesos in 1988 as shown in Table 3.8.5, but in 1987 there was a profit of 125,587 thousand pesos.

Table 3.8.5 Balance Sheet and Profit/Loss statement at Ensenada

Monetary unit: 1,000 pesos

Balance Sheet			
Assets		Liabilities & Capital	
Item	Amount	Item	Amount
Current Assets	933,838	Current Liabilities	297,352
Fixed Assets	2,734,537	Fixed Liabilities	98,222
Defered Assets	22,984	(sub total)	395,574
Revaluation	5,156,275	Capital	3,295,795
Investment	19,380,955	Capital Social	228,448
Depreciation	-14,234,680	Contri from Federal	78,025
Other Assets	879,602	Surplus for Reval	3,055,971
		Legal Stock	153
		Accumulated Profit	73,609
		Profit of the year	- 138,414
Total	3,691,369	Total	3,691,369

Contri from Federal : Contribution from Federal Gou't
Surplus for Reval : Surplus for Rrevaluation

Profit/Loss Statement	
Item	Amount
Operating Revenues	2,221,726
Service	2,218,003
Others	3,723
Operating Cost (Service)	-1,894,895
Operating Cost (Equipment)	- 569,211
Financial Product	125,478
Others Product	- 578
Provision for Tax etc.	- 20,934
Total	- 138,414

Source: Estado de Origine y Aplicacion de Recursos al 30 de Diciembre de 1988

3.8.4 Present Procedures for Ship Entry/Exit, Customs Formalities and Land Transportation

(1) Procedures for Ship Entry/Exit

1) Control by Harbor Master

a. The organization's scale seems rather smaller than Salina Cruz.
b. The program committee has not been meeting periodically. However, its is expected to meet every Monday. Members are representatives of the Harbor Master, ESP, Pilot, shipping agents, forwarders, Customs, trucking group, labor unions (CTM, CROM).

2) Application by shipping agents

a. The procedures are almost the same as at Salina Cruz.
b. Berth allotment is decided by the Harbor Master on a "first come, first served" basis. However, cruise ships calling every Thursday and Sunday have berthing priority because their berthing time is only 2 - 4 hours.

3) Aids to ship entry/exit

a. Two (2) pilots and one tugboat are available.
b. A ship can enter at any time of the day or night.

4) Investigation by officials

a. Free pratique can be granted via VHF radio.
b. Other investigations are the same as at Salina Cruz.

5) Exit clearance

a. Applications for departure clearance are accepted with as little notice as 30 minutes prior to leaving the port.

(2) Procedures for Customs Clearance and Bonded Transit

1) Customs organization

a. The organization scale is smaller than at Salina Cruz.

2) Application by forwarders

a. Based on interviews with shipping agents and forwarders, there are no complaints about clearance procedures.
b. There are no container cargoes for bonded transit in Ensenada.

(3) Land Transportation by Rail and Truck

1) Rail

a. There is no railway line in Ensenada.

2) Trucks

a. There are two groups of truckers in Ensenada.
b. One is "Transports de Carga, Sonora, Baja California," which consist of 70 trucking companies with 1,600 trucks. This group covers the whole area of Baja California and up to Monterrey and Mexico City. Their main cargoes are not seaborne goods.
c. The other is "Soc. Coop. Autotransportes". This group belongs to CROM and carries all port cargo within a 30 km area in Ensenada. The main seaborne cargoes are tuna and anchovies.

3.8.5 Cargo Handling Operations

(1) Present Operation Procedures

1) Two or three weeks prior to a ship's arrival, the agent sends the ship's schedule information, such as ETA, ship's size and cargo quantity to the ESP.

2) One day prior to the ship's arrival, the ESP a accepts the next day's cargo operation order and cargo equipment orders by 17:00. According to the application, the ESP arranges the necessary workers and equipment.

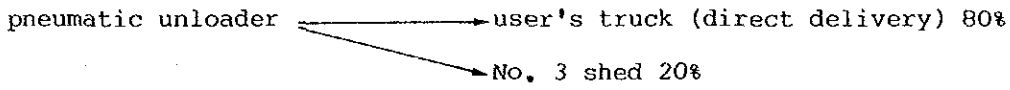
3) As a special condition of this port, CTM has the right to unload ship's cargo independently from the ESP. The other services are provided by ESP/CROM.

4) The program committee meets on Fridays at 17:00. The functions of the committee are the same as at the other ports.

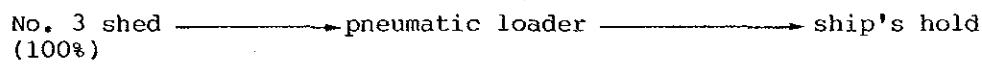
(2) Actual Cargo Handling Operation Flow

The following charts show the main cargo flows in discharging. Frozen tuna (e) is limited to loading only.

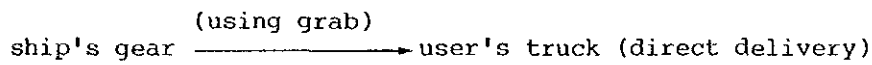
a. Agricultural bulk cargo (wheat)



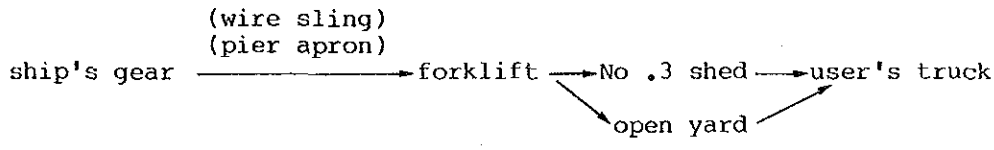
b. Agricultural bulk cargo (wheat loading, domestic)



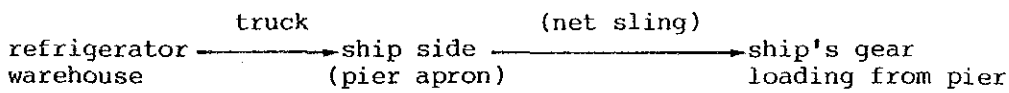
c. Agricultural bulk cargo (maize)



d. Steel bars, sheet in coils



e. Frozen tuna (loading for export)



3.8.6 Cargo Handling Facilities/Equipment and Maintenance System

(1) Cargo Handling Facilities/Equipment

The existing cargo handling facilities/equipment at the port are shown in Table 3.8.6 - Table 3.8.9.

Table 3.8.6 List of Cargo Handling Facilities/Equipment

Type	Capacity	Year Procured	Age (in years)	No. of Equipment		
				Total	Available	Unavail.
Pneumatic Loader/ Unloader	130 t/h		-	5		
Mobile Crane	36.24 t	1980	9	1		
	18.12 t	1979	10	1		
	15,000 L	1972	17	1		
	14,000 L	1972	17	1		
Forklift	15,000 L	1981	8	2		
	10,000 L	1979	10	1		
	10,000 L	1981	8	2		
	8,000 L	1980	9	4		
	8,000 L	1981	8	6		
	6,000 L	1978	11	3		
	6,000 L	1979	10	2		
	5,000 L	1984	5	2		
	4,000 L	1981	8	2		
Tractor Shovel	1 1/2 Yd.3	1985	4	1		
	1 1/2 Yd.3	1986	3	1		
Tractor	4,400 L	1972	17	2		
	5,000 L	1978	11	4		
	5,000 L	1981	8	1		
	5,000 L	1982	7	5		

Table 3.8.7 Average Age of the Existing Cargo Handling Facilities/Equipment

Name of Group	No. of Units	Average Age	Age	
			Oldest	Newest
Pneumatic Loader/ Unloader	5	-	-	-
Mobile Crane	4	11	12	9
Forklift	24	8.5	11	5
Tractor Shovel	2	3.5	4	3
Tractor	12	10	17	7

Table 3.8.8 Ratio of Operating Days of the Equipment to Available Days of the Equipment

(Unit: Hours)

Name of Group	Operation (A)	Number of Days Waiting (B)	Total (C)=(A)+(B)	Percent (A)/(C)
Pneumatic Loader/ Unloader	-	-	-	-
Mobile Crane	2,238	4,007	6,295	36
Forklift	18,992	29,577	48,569	39
Tractor Shovel	1,555	2,897	4,452	35
Tractor	5,866	7,892	13,758	43

(From Jan. 1 to Dec. 31, in 1988, for one year,

Total Hours: 8 (hours) x 300 (days) = 2,400 h/y)

Table 3.8.9 Ratio of Available Days of the Equipment

(Unit: Hours)

Name of Group	Available Hours	Total Hours	Percent
Pneumatic Loader Unloader	-	-	-
Mobile Crane	6,295	9,600	66
Forklift	48,569	57,600	84
Tractor Shovel	4,452	4,800	93
Tractor	13,758	28,800	48

(From Jan. 1 to Dec. 31 in 1988, for one year)

Remark; Total Hours = No. of Equipment x 8 hours x 300 days.

(2) Maintenance System for Cargo Handling Facilities/Equipment

1) Maintenance system

a. Preventive maintenance

The preventive maintenance adopted at this port is carried out according to the periodic maintenance plan, in which equipment is checked every 100 hours, 500 hours and 1,000 hours. The working hours of each facility/equipment are calculated automatically by a meter mounted on each machine. All preventive maintenance is executed at the maintenance shop.

b. Repair of broken-down facilities/equipment

While almost all repairs are carried out at the maintenance shop, the following are entrusted to private work shops outside ESP:

i. Work beyond their capability

ii. Work of an electrical nature

2) Maintenance shop

There is a maintenance shop that belongs to the ESP in the port. The number of workers in the shops is ten (10) persons. The main machinery and tools for maintenance in this shop do not seem to be sufficient. The capability for maintenance at this port does not seem to so good.

3) Spare parts

Based on interviews with the relevant personnel, the policy for spare parts is very good. However, according to the field survey it does not seem to be so good.

Chapter 4 Principal Problems of Each Port

The principal problems of each port based on the site survey at each port and the subsequent examination by the study team are summarized in this chapter.

Many of the significant problems are common to many of the ports, which are described first as common items. Then the principal problems of each port are summarized, port by port.

4.1 Common Items

4.1.1 Utilization of the Ports

Although the cargo handling volume at the ports differs significantly by port, as a whole, the volume now handled at each port cannot said to be at a high level. This is especially the case for those cargoes which are the objects of this study. At some of the ports, the cargo handling volume has remained at almost the same level for the last few years or has even shown signs of decreasing.

While the cargo handling volume at each port is expected to grow in the future as the national and regional economies of Mexico recover and grow, this present situation is a problem in terms of the effective use of port facilities and the sound management of the ports. Thus, measures to promote further utilization of the ports should be examined.

From the same point of view, measures for effective utilization of unused areas and coordinating systems for promoting further utilization should be examined at each port.

4.1.2 General Port Administration

At the objective ports, port management and operation, including the construction work are presently executed by several governmental organizations and the ESPs. At times, the coordination and communication among these organizations seems to be insufficient, creating problems in terms of effective port management and operation.

On the other hand, the financial constitution of the ESPs at the ports can not be said to be firm or sound at present, basically because of a low level of cargo handling volume as well as the lack of efficiency in cargo handling operations.

Measures for improving the situations at each port in terms of these factors should be examined.

4.1.3 Tariff System

Tariffs are the compensation for the cargo handling services provided at each port and provide the main income of the ESPs. At present, however, cost-accounting analysis of tariffs is not carried out sufficiently at all the objective port. It is necessary to analyze costs in order to evaluated the ESPs' finances and to determine the administrative policy of each ESP.

At the same time, tariffs are closely related to cargo handling operations, which are carried out through collective contracts between the ESPs and the labor unions. Therefore, some way of improving the efficiency of cargo handling operations should be considered when looking at the tariff system.

Measures to counteract the matters mentioned above should be considered.

4.1.4 Cargo Handling Union

Cargo handling in a port had better be provided by one organization, based upon the viewpoint of effective and efficient cargo handling. But in some objective ports, cargo handling serviced are provided by two organizations: the ESP and the CTM.

For example, at the Port of Ensenada, unloading operations on board are carried out by the CTM, and others are provided by the ESP. And the ESP is not directly involved in the planning and supervision of the cargo handling carried out by the CTM. Under this situation, the smooth and effective cargo handling operations may be hindered.

In addition to this, some problems in cargo handling operation between the union and the ESP are found at several ports. Recommendations concerning these problems shall be examined in Chapter 8.

4.1.5 Statistics

(1) Necessity of Statistics

The collection and analysis of the basic data concerning port activities is very important and is indispensable in formulating basic port policy. It is required to analyze the historical data of port activities

such as vessels and cargoes to formulate future development plans.

And it is indispensable to analyze past port activities in order to estimate the future financial situation of each ESP and Puertos Mexicanos, which is one of the most important items in terms of achieving the modernization of port management.

This statistical data is also very helpful in simulating the future management and operation of each ESP. The ESP can thus prepare yearly cargo handling plans using the monthly and yearly historical data on vessels and cargoes. And such data is also indispensable in examining the future cargo handling system including the required numbers, types and capacities of cargo handling facilities and equipment.

As for the technical field, statistical data is also very important in examining the required number of berths and their dimensions, storage facilities and so on.

But the present amount and quality data are insufficient.

(2) Statistics of Vessels

As for statistics concerning vessels, only the number of calling vessels is available at present. but it is necessary to have the data concerning each vessel type such as conventional ships, container ships, bulk carriers, oil tankers, cruise ships and fishing boats for the analysis of the characteristics of a port. The capacity and size of each vessel should also be recorded and analyzed according to vessel type.

Another aspect concerning vessels is the statistics regarding berth usage, namely, berth occupancy, which is used in deciding the required number of berths. But as mentioned above, the berth occupancy time is influenced by many items, such as the productivity of loading and discharging, operating hours, berthing times and so on.

(3) Cargo Statistics

As for cargo statistics, these are well analyzed by commodity for export, import, and domestic trade each year.

But as for containerized cargo, the amount and quality of the statistics are not sufficient in terms of analyzing actual container cargo movement. To evaluate container cargo movement, it is necessary to analyze the number of TEUs and the weight of the containerized cargo by commodity and the containerized ratio of each commodity. This statistical data is

required to estimate future container cargo and to formulate container terminal plans.

Another important aspect of the statistics concerning cargoes is usage of storage facilities. There is insufficient statistical data about the usage of the storage facilities such as shed, warehouses and open storage yard. This data is indispensable in estimating the required storage space for general cargo, bulk cargo and containers. This data may be needed in deciding the required land area in the port planning stage.

4.1.6 Procedures of Ship Entry/Exit and Customs Formalities

According to the result of the site survey at each port, the problems in terms of ship entry/exit procedures and Customs formalities are not as serious as other problems.

But, there are some opinions regarding the Customs' bureaucratic and inflexible formalities, as well as criticism regarding the allegedly poor knowledge of importers and exporters, which may prevent the quick dispatch of ships. The work hours of the port-related governmental organizations and ESPs differ from each other, resulting in inefficiency in the series of procedures for import and export.

Almost all of loaded import containers are forced to be fumigated in Mexico at present according to the law and regulation. This situation is unusual compared to other countries in the world. As the handling volume of containers at the ports increase hereafter this will become a big problem, because this will lead to a large scale of required yard for fumigation.

Therefore, further efforts aimed at achieving coordination among concerned organizations are required for the smooth operation of port activities and quick dispatch of ships.

4.1.7 Land Transportation and the Storage System in the Port Area

Considering the locations of the ports and their main hinterlands in the central region of the country, and the difference of the altitude between the two areas, land transportation, which consists of railways and roads, plays a very important role in terms of the smooth operation of the nation's ports.

At present, most of the agricultural bulk cargoes, such as wheat, maize, sorghum, soybeans, sunflower and radish seeds, and most of the

mineral bulk cargoes, such as cement, fertilizer and concentrated copper, are transported by freight cars and trucks between the ports and their origins or destination.

In the case of loading bulk cargoes, the arrangement of land transportation does not present severe problems, because most of them are mineral bulk products and are constantly produced, transported and stored at ports for shipping. For their transportation and loading, specially designed systems and equipment are commonly used by their own shippers. But in the case of discharging bulk cargoes, the arrangement of land transportation, namely, the available number of freight cars, locomotives and trucks, mostly determines the daily productivity of the discharging operation, because most of the bulk cargoes are discharged to freight cars and trucks directly by ship-gear and are transported to their destinations. A very small part of them are stored in silos, sheds and warehouses in the port area.

Most bulk cargoes are discharged in lots of about 20,000 tons per vessel. Thus, considering that the capacity of a freight car is 50-60 tons and that of trucks is about 20 tons, each vessel required about 350-400 freight cars or 1,000 trucks. The consignees require a constant supply of trucks in order to finish discharging as soon as possible and to avoid paying demurrage charges to the shipping companies. The discharging times fluctuate from less than one week to more than one month, depending mainly on the arrangement of land transportation.

As for railway transportation, which is cheaper than trucks for long-distance transport, it is difficult to secure the required number of freight cars for the discharge of bulk cargoes transported by tramper vessels, because the arrangement of freight cars and locomotives for regular domestic services have priority. And at harvest time, from May to July, the transportation of domestic grain causes a severe lack of freight cars and locomotives in the port area.

As for trucks, the number of trucks available for cargo transportation has decreased because of delays in replacing old trucks and repairs of damaged trucks. It is said that though the tariff has not been revised since December 1987, the prices of trucks and spare parts have gone up. And it is also said that many truckers prefer relatively short-distance transport to long-distance transport because of the tariff system and regulations, which may restrict the activities of trucks.

At the ports it is necessary to provide cargo storage capacity to achieve effective discharging and quick dispatch of the calling vessels, which is one of the most basic policies of port management and operation. But the ports do not have sufficient storage capacity for the discharged bulk cargoes at present.

So, the possibility of construction the necessary volume of storage facilities for discharged bulk cargoes, in particular agricultural bulk, should be urgently examined. The most effective and economical system for the storage of discharged bulk cargoes within the ports should be comprehensively studied considering the present and prospective bulk cargo volume, the existing port conditions and the land transportation conditions at each port.

The method of solving this problem should be studied not only at each port but also at Mexico City, because the headquarters of the main bulk shippers and consignees, which decide the shipping schedules, and of the SCT, which makes the basic policy on transportation, are located at Mexico City.

Another problem is rather long dwelling time of containers and break bulk general cargoes at ports. This may be caused by the shortage of storage facilities of shippers and consignees, the long distance between ports and their hinterlands, relatively low level of storage charges and long free-of-charge period at ports and procedural problems for import/export. This will become a big problem, especially in case of containers, as the handling volume of cargoes at the ports increases in the future. Because a large scale of storage facilities will come to be needed at the ports.

The necessary measures to cope with this problem have to examined.

4.1.8 Cargo Handling Operations

(1) FOrmulation of Cargo Handling Plan and Supervision of Cargo Handling Activities by ESPs

1) Importance of ESP supervisors

According to the ports survey, the study team found that ESPs do not make ship cargo operation plans by themselves at present, and that they arrange ships, cargo operations based on the cargo operation plan, which is

made by the shipping agents. It seems that the stevedoring operation is supervised by the shipping agent's supervisor on board instead of by the ESP's supervisors.

It is very important for ESPs to make effective cargo operation plans for all concerned sections and workers, such as equipment sections, leaders of stevedore laborers, cargo handling equipment operators, checkers, shed workers and open yard workers.

When a cargo operation starts, the ESP cargo supervisor should stay on board the vessel and check that the cargo operation is executed. If the ESP supervisor finds any unexpected factors which disturb the cargo operation, he should immediately take suitable action and inform all the sections concerned of any changes.

For the ship's cargo operation, the most important point is to keep the ship's winches or cranes running continuously. When a ship's cargo handling stops for over 15 minutes, the supervisor should check what has happened and take appropriate action.

To make an efficient cargo operation plan, the cargo supervisor's ability is very important. The study team considers the necessary abilities of a cargo supervisor as follows:

i. To have knowledge about ship cargoes, stowage and ship gears.
ii. To know stevedore workers' abilities and their behavior.
iii. To be familiar with warehousing and open yard workers' operations.
iv. To have the capability to negotiate with ship captains or officers regarding stevedoring operations.

2) Necessity of daily cargo working report

At present, the ESP at each port does not make the necessary working reports, which are important in terms of achieving more effective cargo handling operations.

ESP should prepare daily cargo working reports regarding the following items:

i. Time record of each gang's activities.
ii. Tonnages handled by each gang.
iii. Number of containers handled by each gang.

(2) Low Productivity of Container Loading/Unloading

The study team was able to observe TMM's container ship operations at Lazaro Cardenas, Manzanillo and Guaymas.

The details are shown in this progress report in Chapter 2.2.5. According to our time cycle study, the average container handling productivity rate was 7-8 containers per gang per hour. This seems very low compared with foreign ports under the same conditions. According to the records of the container handling operations on seven TMM vessels at Yokohama, the levels of productivity are as follows:

Ship's gear: average 16.8 containers/hours/gang
Gantry crane: average 28.9 containers/hours/gantry crane

The operation productivity by ship gear is reported to be an average of 12 containers per gang per hour at some ports in Southeast Asia.

The study team believes that the container operation productivity of the objective ports should be improved to an average level of more than 10 containers per gang per hour.

The problems seen at some ports are as follows:

i. Too much time is wasted before unloading of containers starts. One reason is that it takes a long time to unlash containers, because of the shortage of unlashing tools, such as pipe wrenches and iron bars.
   Another reason is that the stevedore gang boss might not be well informed of the operation plan by the cargo supervisor.
ii. Observing workers' activities it seems that there may be no leader who indicates properly what workers should do next.
iii. There may be no one to direct trailer drivers properly.
iv. Crane operators and signal men do not seem to be skilfull in handling containers.
v. Unhooking workers on the pier should help each other and cooperate to keep containers stable in order to place them accurately on the trailers.

(3) Necessity of Training Workers

Needless to say, the need to train workers is very important. The following points should be considered regarding the training of workers:

i. Training should be carried out not only for individual workers but also as group training for every gang unit.
ii. Training should be provided for all the workers, including non-associated workers.
iii. It is necessary to establish an effective curriculum and training program.
iv. It is also important to teach workers safe cargo operations to prevent personal injury and cargo damage.
v. A stevedoring cargo work manual should be made for each main cargo commodity.

4.1.9 Cargo Handling Facilities/Equipment and Maintenance System

(1) Insufficient Facilities/Equipment and Imbalance between the Ports

As a result of the field survey at the ports, insufficient facilities and equipment and an imbalance among the ports were found.

Conditions observed in some ports were as follows:

i. Unsuitable cargo handling system due to the lack of grab buckets, pallets and minor handling equipment.
ii. Ineffective cargo handling caused a shortage of minor handling equipment.
iii. The low ratio of the operating days of the equipment to the available days of the equipment.

As one of the main objectives of the establishment of the ESPs is to manage cargo handling facilities/equipment, it is recommended that the following points be studied in order to obtain higher productivity.

i. To examine the kinds, types and the capacity and units of the cargo handling facilities/equipment to be managed, considering the long term cargo forecast.
ii. To examine the effective use and depreciation of the facilities/equipment procured.

(2) Lack of Replacement Plan or Disposal Plan

According to the port survey, the study team found that the ESPs have procurement plans for cargo handling facilities/equipment but do not have any replacement plan or disposal plan for the sames.

The planning of replacement or disposal has been considered less important than the procurement plan from the point of view of budgetary requirements.

However, replacement plan or disposal plan are more important than procurement plan in terms of having the appropriate amount of cargo handling facilities/equipment and also in terms of maintaining the economical cargo handling facilities/equipment.

(3) Need for Preventive Maintenance and Different Maintenance Policy by Port

Preventive maintenance of existing facilities/equipment is particularly important in the Mexican Ports in order to make the best use of these machines. The significance of preventive maintenance is as follows:

i. To maintain the high efficiency of cargo handling facilities/equipment and to secure steady cargo handling operation.
ii. To lower the total costs of facilities/equipment by securing efficient operation.
iii. To keep cargo handling operation safe.

It seems that the personnel of each port understand well the significance of preventive maintenance. However, many of the following problems should be mentioned, based on the surveys at each port:

i. Damage to and trouble with cargo handling facilities/equipment were observed at each port.
   While allowing for the age of the equipment, it still seems that sufficient preventive maintenance is not carried out.
ii. The policy and the implementation method of preventive maintenance differ among the objective ports. It may be said that there is no basic preventive maintenance policy.
iii. The spare parts at most of the objective ports are not sufficient in terms of achieving effective preventive maintenance.

iv. Although every ESP keeps records concerning the operation of cargo handling facilities/equipment, it should be pointed out that these records are neither analyzed nor utilized sufficiently for maintenance planning.

Considering the results of the survey at each port, including the above mentioned points, the following matters should be examined with respect preventive maintenance:

i. It is necessary to establish a preventive maintenance policy. Fundamental matters should be studied such as the extent and degree of maintenance for each type of facility and equipment, the scope of the maintenance carried out by the ESP, the degree and frequency of maintenance and the optimum volume of spare parts held by the ESP.
ii. An implementation manual for preventive maintenance should be prepared, as the present manuals are insufficient.
iii. Utilization of the records or documents of the operation and damage/maintenance of facilities/equipment should be studied in maintenance planning.
iv. Organization and systems under the auspices of the ESPs for the effective implementation of preventive maintenance should be studied.

(4) Need to Upgrade the Maintenance Shops and Spare Parts Considering the Financial Aspect

The policy on maintenance and maintenance shops was studied in the "Programa de Modernizacion de la Administracion Portuaria 1983". However, the policy recommended in this report has not been carried out.

The scope of work to be carried out at ESP maintenance shops should be examined in advance of the planning of the maintenance shops and spare parts. The scope of this work depends on the existing facilities/equipment to be repaired and varies according to the abilities of the private workshops outside the ports.

1) Maintenance shops

According to the field survey, none of the maintenance shops have any definite scope of work.

The machinery and tools in the maintenance shops are insufficient, and vary among the ports.

The required machinery and tools should be examined considering the following:

i. Scale and quantity of the existing cargo handling facilities/ equipment.
ii. Technical level and number of engineers and workers at the maintenance shops.
iii. Capability of the private workshops outside the ports.
iv. Working frequency of the machinery and tools to be used.

2) Spare Parts

According to the field survey, the delivery term needed to get spare parts differs greatly among the objective ports. In general, the stock of spare parts at the maintenance shops is insufficient.

On the other hand there are some old spare parts which have not been used for a long time.

In order to repair machinery quickly, it is very important to have sufficient spare parts. However, excessive inventory of spare parts is a problem from the financial point of view and the number of unusable parts will increase due to deterioration caused by holding them in stock for long periods.

The kinds and quantities of spare parts to be held at the maintenance shops should be examined considering the following factors:

i. The required interval of use.
ii. The unit price of spare parts.
iii. The delivery term.
iv. The loss and inconvenience due to delayed repairs.

4.1.10 Port Facilities (Except Cargo Handling Facilities/Equipment)

At most of the ports, the superannuation and deterioration of port facilities were observed. This is because many facilities were constructed a long time ago and the required rehabilitation of these facilities has not been executed due to limited funds for port construction and repair work.

At some ports, construction of the facilities such as wharves and warehouses is now suspended. This may be caused, for one thing, by

insufficient estimates of future demand and the requirements of the ports. Effective utilization of these facilities should be examined.

4.2 Principal Problems of the Port of Salina Cruz

4.2.1 Utilization of the Port

(1) Promotion of Further Utilization

The biggest problem of the Port of Salina Cruz may be the decreasing volume of cargo handled. A good example of this is that the container cargoes of Nissan moved from this port to the Port of Lazaro Cardenas.

Considering the present situation, it is necessary to examine carefully the causes of the decreasing cargo volume and measures to cope with it.

(2) Strong Winds

The Port of Salina Cruz suffers from strong winds from October to March. During this period it is sometimes impossible for calling vessels to enter the port. Container handling must also be suspended at times.

Countermeasures against these strong wind shall be examined.

4.2.2 Port Administration and Management

In this port, the points to be examined are as the same as mentioned in the common items, so the essential item of the new service and cargo handling union shall be mentioned in Chapter 8.

4.2.3 Procedures for Ship Entry/Exit and Customs Formalities

There seem to be no particular problems here. During our five-day site survey, no ship called at this port.

4.2.4 Land Transportation

i. The locomotives and freight cars provided in this area are not sufficient. This will become a problem if cargoes handled at this port increase.

ii. The number of tracks in the marshalling yard of the railway station is not sufficient. If more than 100 freight cars were to come to the station, some freight cars would have to be moved onto the tracks in the container yard of the port temporarily.

iii. There seem to be no particular problems in arranging trucks.

4.2.5 Cargo Handling Operations

(1) Cargo Handling Operations

i. Actual measurements of cargo handling and productivity
The study team had planned to carry out a survey on the actual level of cargo handling and to measure the productivity of each kind of cargo at each vessel staying at berths by watching and counting the time cycle of cargo handling per hour per gang.
However, the study team had, unfortunately, no chance to measure any actual cargo handling at this port, since no vessel called at the port during the survey.

ii. The data regarding the productivity of cargo handling is shown as follows:

Kind of Cargo	Cargo Handling Productivity According to Interviews with ESP	Measurement by the Study Team
General Cargo (unitized)	70-85 t/h. gang	N/A
General Cargo (un-unitized)	35-40 t/h. gang	N/A
Agricultural Bulk	50-60 t/h. gang	N/A
Mineral Bulk	50 t/h. gang	N/A
Container/Gantry	16-18 units/h. gantry	N/A
Container/Gear	10-12 units/h. gear	N/A

* N/A : not available

(2) **Present Situation to be Examined**

i. The Port of Salina Cruz is one of the few ports equipped with a gantry crane for containers. Thus, effective container handling should be main characteristic of this port.
This is the most important factor from the viewpoint of port sales. The slot locations and the numberings in the container yard should be clearly marked, for this makes cargo handling operations, inventory control and the yard plan clear and smooth.

ii. The transfer cranes at this port are not in good condition. They should be maintained and repaired properly, for their repeated breakdowns detract from the potential capability of this port.

iii. The apron surface conditions at the general cargo berth are not smooth and flat, so pavement rehabilitation should be implemented for the safe and effective operation of the forklifts.

iv. Grab-buckets and hoppers should be prepared to handle agricultural/ mineral bulk cargo more efficiently.

v. Small (3-5 tons) bulldozers should be prepared for the upgrading of cargo handling operations in the holds of vessels.

vi. The existing warehouses should be protected from the leakage of water to secure the storage of the agricultural and mineral bulk cargoes which are specially prejudiced against their hygroscopic individualit-ies.

vii. The others should be referred to Chapter 8, as mentioned in the latter part of this report.

4.2.6 Cargo Handling Facilities/Equipment and Maintenance System

(1) Conditions of the Transfer Cranes

Three transfer cranes for container handling were installed at the container terminal in 1981.

As a result of the field survey, their conditions were found to be as follows:

i. No. 1 Transfer crane
   The traveling motor had broken down 2 weeks previously.
   The motor might be repaired within a week.

ii. No. 2 Transfer crane
   The crane was in good condition.

iii. No. 3 Transfer crane
   The traveling motor had broken down 2 weeks previously.
   The motors might be repaired within 2 or 3 days.

The recommended items are as follows:

i. Motors are usually one of the most reliable components of cranes and trouble with motors are very rare. The cause of the breakdowns should be investigated. Thus it may be assumed that inadequate design or insufficient maintenance is the cause of their breaking down.

ii. To keep stand-by
   Though the net operating time of cranes for container handling is generally no so long, the cranes should be kept in "stand-by-condition". The cranes should be kept in good condition during the intervals between container ships' arrivals.

(2) Insufficient Spare Parts

It is necessary for the maintenance shop to keep sufficient amount of spare parts in order to repair the existing cargo handling facilities/equipment rapidly.

Compared with the existing cargo handling facilities/equipment, the quality and quantity of the stored spare parts seemed insufficient. On the

other hand, it is not economical to hold too many spare parts which will not be used for a long time.

The data on the replaced or exchanged spare parts should be analyzed. Thus, the question of how many spare parts should be kept in stock needs to be examined carefully.

(3) The Low Ratio of Available Days of the Equipment

Forklifts are one of the most popular cargo-handling machines in a port.

A result of the analysis of the available days of each forklift at this port shows the lowest ratio among the six ports studied.

The figures shown in Table 2.1.8 of Chapter 2 may suggest a low maintenance level and/or too many forklifts.

4.2.7 Port Facilities (Except Cargo Handling Facilities/Equipment)

(1) Rough and Unlevelled Apron Surface at General Cargo Berths

These berths were constructed in 1904 and since then they have never been upgraded.

The surface of the apron is very uneven and not smooth. Forklifts are widely used for general cargo handling in modern ports. However, it is very difficult and dangerous to use forklift on the apron at present. The pavement on the apron should be repaired.

(2) Disposal of Wrecked Ships

There are three wrecked ships in the port at present. They should be disposed of in the near future to maintain safety and to use the port facilities fully.

(3) Others

There are some other items to be examined.

i. The narrow width of the channel
ii. Maintenance dredging
iii. Rehabilitation of the old sheds
iv. Rehabilitation of the fenders

4.3 Principal Problems of the Port of Lazaro Cardenas

4.3.1 Utilization of the Port

The following items should be examined:

i. Repair of the damaged grain silo and wharf
ii. Effective utilization of the unused area behind the general cargo berths
iii. Effective use of the incomplete CFS and the yard

4.3.2 Port Administration and Management

The points to be examined are as follows:

i. The new servies, which are fuel, water supply and garbage collection services, have been conceived by the ESP. The plan for these services shall be mentioned in Chapter 8.
ii. As for the personnel many people are retiring from the ESP, which detracts from the management of the ESP. It should be taken into consideration.
iii. The offices of the ESP are located in three different places and communication among them is in sufficient.
iv. The number of cargo-handling workers seems rather small compared with the cargo handling volume.

4.3.3 Procedures for Ship Entry/Exit and Customs Formalities

There seem to be no particular problems here.

4.3.4 Land Transportation

i. The roads connecting Lazaro Cardenas and the hinterlands, Mexico City in particular, are in poor condition. This is one of the biggest problems for the development of the port. The road condition between Lazaro Cardenas and Acapulco is especially bad for container trailers, because of its bad pavement and narrow width. The roads connecting to Uruapan and Morelia also have many problems.
ii. The arrangement of trucks seems to be conducted smoothly, with fairly good coordination among private trucking companies, although

the number of trucks, trailers in particular, is not sufficient. The fact that Central de Servicio de Carga has no office here may be one of the reasons for this good coordination.

iii. Public roads through the bonded ports are should be removed as soon as possible. A new road project parallel to the railway tracks beside the shoreline should be promoted.

iv. The shortage of freight cars for discharging grain and appropriate countermeasures should be considered.

4.3.5 Cargo Handling Operations

(1) Cargo Handling Operations

i. Actual measurements of cargo handling and productivity

The study team carried out a survey of the actual cargo handling and measurements on the productivity of each kind of cargo at each vessel staying on berth by watching and counting each time cycle of cargo handling per hour per gang.

The measurements by the study team in this report just indicate the rough figures.

ii. The data regarding the productivity of cargo handling is as follows:

Kind of Cargo	Cargo Handling Productivity According to Interviews with ESP	Measurement by the Study Team
General Cargo (unitized)	88 t/h. gang	N/A
General Cargo (un-unitized)	N/A	N/A
Agricultural Bulk	40 t/h. gang	N/A
Mineral Bulk (Iron ore Pellets)	540 t/h. line	550 t/h. line
Steel Plates	N/A	168 t/h. gang
Steel Ingots	34 t/h. gang	N/A
Pulp	18 t/h. gang	N/A
Container/Gantry	N/A	15 unit/h. gang
Container/Gear	N/A	9 unit/h. gang

* N/A = not available

(2) Present Situation to be Examined

i. The Port of Lazaro Cardenas is also one of the few ports which is equipped with a gantry crane for containers, so effective container handling should be a distinguishing characteristic of this port. However, the out-reach length of the existing gantry crane is unfortunately insufficient for the handling of the farthest containers on deck.

The slot locations and numbering in the container yard should be clearly marked. In addition, preparation of a manual for the container terminal operation should be looked into.

ii. Furthermore, a gang shortage of stevedores may result in delayed dispatch, so the optimum number of workers should be carefully examined.

iii. A shortage of railway wagons is a great impediment to bulk grain handling, for the study team found that a bulk wheat carrier had been obliged to stay at this port over twenty (20) days due to a lack of wagons.

Countermeasures to meet this situation should be comprehensively studied.

iv. Restoration of the grain silo complex which was damaged by the earthquake in 1985 seems to be one of the most urgent matters.

v. Moreover, the grain silo should have a proper loading capacity, for it seems to be mainly designed for unloading, and industrial progress due to take place in the next few years is apt to change the conditions in the hinterland.

vi. The others will be referred to in Chapter 8 as mentioned in the latter parts of this report.

4.3.6 Cargo Handling Facilities/Equipment and Maintenance System

(1) Study of the Number of Cargo Handling Facilities/Equipment

It is difficult to determine the optimum quantity of cargo handling facilities/equipment. However, the number of the facilities/equipment will be determined according to the data.

Table 4.3.1 shows the data for mobile cranes at the port.

The total operation days of the five (20 t and 23 t) cranes are only 231 days per year, which seems small, even considering that the number of cranes required changes day by day.

Judging from Table 4.3.1, it is necessary to study the optimum quantity of cargo handling facilities/equipment.

Table 4.3.1

(Unit:days)

Group	Capa-city	Pro-cured Year	Symbol of the crane		Term				
					1 Jan. 31 Mar.	1 Apr. 30 Jun.	1 Jul. 30 Sep.	1 Oct. 31 Dec.	Total
I	80t	85	G-03	Operation	24	1	6	0	31
				Stand-by	67	90	80	50	287
				Total	91	91	86	50	318
II	23t	82	G-06	Operation	0	0	0	30	30
				Stand-by	0	0	3	60	63
				Total	0	0	3	90	93
		82	G-09	Operation	15	10	5	0	30
				Stand-by	76	73	18	0	167
				Total	91	83	23	0	197
		82	G-08	Operation	0	0	0	0	0
				Stand-by	0	0	0	13	13
				Total	0	0	0	13	13
	20t	80	G-05	Operation	24	23	27	24	98
				Stand-by	67	68	64	65	264
				Total	91	91	91	89	362
		80	G-05	Operation	0	0	36	37	73
				Stand-by	0	0	40	84	94
				Total	0	0	76	91	167
Group II Total				Operation	39	33	68	91	231
				Stand-by	143	141	125	192	601
				Total	182	174	193	283	832

(From 1 Jan. to 31 Dec. in 1988)

(2) Preventive Maintenance

The maintenance shop has no periodic preventive maintenance plan.

The purposes of preventive maintenance are as follows:

i. To maintain safety
ii. To save money caused by accidents
iii. To keep equipment in good conditions
iv. To keep to the cargo working plan smoothly
v. To extend the service lives of equipment
vi. To reduced the total cost of maintenance and repair

The introduction of periodic preventive maintenance at this port should be examined.

(3) Proper Maintenance Cost

The cost of the cargo handling facilities/equipment consists of the following items:

i. Running costs (personnel expenses, fuel oil or electric power cost, etc.)
ii. Depreciation cost
iii. Maintenance cost

However, running costs are nearly constant and are not influenced by age and maintenance level. Then the cost per hour due to equipment use will be influenced only by the yearly depreciation cost and the sum of the maintenance and repair costs, and its service life will depend on its maintenance level.

It is necessary to examine the proper maintenance cost based on actual data.

4.3.7 Port Facilities (Except Cargo Handling Facilities/Equipment)

(1) Arrangement and Cleaning

One of the most important points in maintaining high safety and productivity is the good arrangement and cleaning of aprons, open storage yards and sheds. Many scraps and much refuse and trash were found in these areas. They should be disposed of and the areas should be kept clean.

(2) **Incomplete C.F.S. and Yard**

The remainders of a big CFS remain and a wide area of yard in front of it is not being used at present.

The utilization of this area should be urgently considered.

4.4 Principal Problems of the Port of Manzanillo

4.4.1 Utilization of the Port

The following items should be examined:

i. Examination of the future volume of cargo handling at this port (bulk grains and container cargoes in particular) and the construction of new wharves and the provision of equipment.

ii. Reclamation of the area behind No. 7 - No. 9 berths.

4.4.2 Port Administration and Management

The points to be examined are as follows:

i. It may be necessary to make the duties and functions of each section of the ESP clear and distinct.

ii. As for the cargo handling workers, some system should be found to achieve higher efficiency and productiviy in cargo handling.

4.4.3 Procedures for Ship Entry/Exit and Customs Formalities

There were some opinions that Customs formalities are bureaucratic and troublesome. But, considering international procedures, they do not seem unusual.

4.4.4 Land Transportation

i. The shortage of freight cars and trucks is remarkable. In order to attain quick dispatch of ships, countermeasures in the port area should be studied as well as further coordination with the railway.

ii. The access roads and rails run through the central area of the city. Particularly, freight cars from/to Manzanillo Wharf, which is located in front of the downtown area, hinder public traffic. Thus, a new access road project from the north of the port should

be implemented on an urgent basis.

4.4.5 Cargo Handling Operations

(1) Cargo Handling Operations

1) Actual measurements of cargo handling and productivity

The study team carried out a survey on the actual cargo handling and measurements regarding the productivity of each kind of cargo at each vessel staying at berths by watching and counting the time cycle of cargo handled per hour per gang.

The measurements by the study team in this report indicate just the rough figures.

2) The data regarding the cargo handling productivity are as follows:

Kind of Cargo	Cargo Handling Productivity According to ESP	Measurement by the Study Team
General Cargo (unitized)	200 t/h. gang	N/A
General Cargo (un-unitized)	N/A	N/A
Agricultural Bulk	47 t/h. gang	Turnip Seed 55 t/h. gang
Agricultural Bulk	N/A	Sorghum 56 t/h. gang
Mineral Bulk (iron ore Pellets)	300 t/h. loader	280-360 t/h.
Mineral Bulk (urea)	37 t/h. gang	50 t/h. gang
Cement Bulk	198 t/h. line	N/A
Container/Gear	8 unit/h	8 unit/h. gang

* N/A = not available

(2) Present Situation to be Examined

1) The shortage of railway wagons for agricultural and mineral bulk cargoes causes a serious situation at this port. A 20,000 ton carrier must stay twenty (20) to thirty (30) days to unload an agricultural bulk cargo at the time of the survey.
The present situation seems to have improved a little after an inspector of the Guadalajara General Management was assigned to the port. However, the shortage problems are still serious.

2) Small (3-5 ton) bulldozers to be used in the holds of vessels should be provided.

3) A large amount of bulk cargo spills out from grab-buckets and hoppers. This may result in cargo shortage and contamination. It may be caused by insufficient maintenance.

4) The working conditions at the cement warehouse should be considered carefully, for there may be serious health hazards.

5) The others will be referred to Chapter 8 as mentioned in the latter part of this report.

4.4.6 Cargo Handling Facilities/Equipment and Maintenance/System

(1) Insufficiency of Minor Cargo Handling Facilities/Equipment

According to interviews with relevant organizations, it is necessary to increase the number of minor handling facilities/equipment, especially equipment used in ships' holds.

According to the given data, the ratio of operating equipment at the port shows the highest figures among the ports. This may show that the cargo handling facilities/equipment at the port are effectively utilized.

However, the high ratio may also show a shortage of facilities/equipment. An increase of the minor handling facilities/equipment should be studied.

4.4.7 Port Facilities (Except Cargo Handling Facilities/Equipment)

i. The inner port area is being developed under the master plan, and there seems to be no major particular problem at present.

ii. On the other hand, the aprons and sheds of the outer port area (Manzanillo Wharf) are superannuated and not in good condition. The need to rehabilitate the wharf should be examined, given that there are plans for this area become a base for cruise ships. The widening of the entrance channel should be considered in the future.

iii. The capacity of storage facilities are insufficient at the port because of the limited storage area. This will become a significant problem when the quantity of containerized cargoes increases.

4.5 Principal Problems of the Port of Mazatlan

4.5.1 Utilization of the Port

(1) Prospect of Cruise Ships Traffic

During the tourist season from October to April, two to four cruise ships call at this port almost every day, staying the whole day and causing considerable congestion. Judging from this situation, it will be necessary to examine the future prospect of cruise ship traffic together with appropriate countermeasures.

(2) Others

The following items should be examined:

i. Effective utilization of the former ferry berth, which is not being used at present.

ii. Measures for use of the PEMEX berth near the public berths for cruise ships.

4.5.2 Port Administration and Management

The points to be examined are as follows:

i. There are two cargo handling operators, the ESP and the CTM union, in this port, which seems to prevent smooth cargo handling operations. This should be taken into consideration. As well, the items of cost accounting and port finance should be mentioned in Chapter 8.

4.5.3 Procedures for Ship Entry/Exit and Customs Formalities

There seem to be no particular problems.

4.5.4 Land Transportation

i. The ESP should sincerely discuss the arrangement of the necessary number of freight cars with the railway.

ii. Using sheds for discharging fertilizer seems effective in case freight cars are not available.

4.5.5 Cargo Handling Operation

(1) Cargo Handling Operation

1) Actual measurements of cargo handling and productivity

The study team carried out a survey on the actual cargo handling productivity of each kind of cargo at each vessel staying at berths by watching and counting the time cycle of cargo handling per hour per gang.

The measurements by the study team in this report indicate just the rough figures.

2) The data regarding cargo handling productivity are as follows:

Kind of Cargo	Cargo Handling Productivity According to Interviews with ESP	Measurement by the Study Team
General Cargo (unitized)	N/A	N/A
General Cargo (un-unitized)	20-25 t/h. gang	N/A
Agricultural Bulk	70 t/h. gang	N/A
Mineral Bulk	30 t/h. gang	23 t/h. gang
Sugar in Bags	20 t/h. gang	27 t/h. gang
Frozen Tuna in Bulk	25 t/h. gang	18 t/h. gang
Frozen Tuna Fillets Unitized	N/A	32 t/h. gang

* N/A = not available

(2) Present Situation to be Examined

i. The shortage of railway wagons for the agricultural and mineral bulk cargoes should be resolved.

ii. Pavement repair required for safe and smooth cargo handling by forklifts.

iii. The slot locations and numbering in the container yard should be clearly marked to facilitate cargo handling operation, inventory control and yard planning.

Preparation of more reefer plugs for the refrigerated containers should be examined.

iv. The grab buckets, generally speaking, should be maintained in good condition.

v. The hoppers should be suitable for each type of bulk cargo.

vi. Port handling operations should be under the control of the ESP, and all cargo handling operations in the port should be through and consistent.

vii. Sweeping of the apron should be done with more throughness. A carrier captain told the study team that the situation on the day was the same as the previous berthing of few months ago.

viii. The others will be referred to the Chapter 8 as mentioned in the

latter parts in this report.

4.5.6 Cargo Handling Facilities/Equipment and Maintenance System

(1) Maintenance System

The machinery in the maintenance ship of this port is the most numerous of the six ports. The spare parts at the mainteannce shop are sufficient and the maintenance level is said to be good.

Periodic maintenance, except for every 100 hours, has never been carried out at this port. The introduction of a combination mainteannce system (e.g. 100 hrs., 500 hrs., 1000 hrs.) to save on maintenance costs and to get high productivity should be considered.

4.5.7 Port Facilities (Except Cargo Handling Facilities/Equipment)

(1) Different Level Between the Rail Top Surface and the Pavement Surface on the Apron

When the berths were constructed, the railtop surface and the pavement surface of the apron were on the same level. The rails were replaced with larger size rails. However, the bases of the rails were not changed.

Overlays near the rail have been prepared, but permanent measures to obtain a smooth surface on the apron should be examined.

(2) The Deeping and Widening of the Entranc Channel

As a result of the interviews with relevant persons, there were some requests for the deeping and widening of the entrance channel.

The requests should be examined in accordance with the forecast size of vessels calling at the port.

4.6 Principal Problems of the Port of Guaymas

4.6.1 Utilization of the Port

(1) Prospect of Container Cargoes

The prospect of container cargoes from now on will largely affect the utilization of the port. The container vessels of TMM are suspended from calling at the port because of the change of production policy of Ford.

The utilization of the port area and the provision of equipment should be examined based on this.

(2) Others

The utilization of No. 1 berth should be examined.

4.6.2 Port Administration and Management

In this port, the points to be examined are the same as those mentioned in common items. So the study team will comment on the essential items of tariff and cargo handling unions in Chapter 8.

4.6.3 Procedures for Ship Entry/Exit and Customs Formalities

There seem to be no particular problems.

4.6.4 Land Transportation

The arrangement of trucks seems to present no particular problems.

4.6.5 Cargo Handling Operations

(1) Cargo Handling Opeartions

1) Actual measurements of cargo handling and productivity

The study team carried out a survey on the actual cargo handling and measurements as to the productivity of each kind of cargo at each vessel staying on berth by watching and counting the time cycle of cargo handling per hour per gang.

The measurements by the study team in this report indicate just rough figures.

2) The data regarding the productivity of cargo handling are as follows:

Kind of Cargo	Cargo Handling Productivity According to Interviews with ESP	Measurement by the Study Team
General Cargo (unitized)	48 t/h. gang	N/A
General Cargo (un-unitized)	25 t/h. gang	N/A
Agricultural Bulk	70-75 t/h. gang	N/A
Mineral Bulk	58 t/h. gang	N/A
Mineral Bulk	175 t/h. gang	N/A
Cotton	17 t/h. gang	N/A
Container/Gantry	7 units/h. gantry	11 unit/h. gang
Agricultural Bulk (silo)	500-600 t/h. line	500-600 t/h. line

* N/A : not available

(2) Present Situation to be Examined

i. The spilling out of bulk cargo in the agricultural and mineral handling operation should be lessened.

ii. A shortage of yard trailers is apparent, especially in the case of the container handling operation by three gangs. More tractors and trailers should be added to secure higher container handling productivity.

iii. Shortage of forklift and bulldozers were observed.
Provision of forklifts with a capacity of 7-19 tons to be used for removing hoppers and of bulldozers with a capacity of 2-3 tons to be used for leveling in the holds of bulk carriers should be examined to increase productivity.

iv. Port handling operations should be under the control of the ESP through all operation proccesses, and the co-existence of the different unions may be an impediment to consistent control under the ESP.

v. The others will be referred to in Chapter 8 as mentioned in the latter part of this report, moreover, especially the prevention of pollution.

vi. The shortage of portable wireless telephone sets for the cargo operation use.

4.6.6 Cargo Handling Facilities/Equipment and Maintenance System

(1) The Examination of the Optimum Number of Minor Cargo Handling Facilities/Equipment

As a result of interviews with relevant organizations, there are requests for an increase in minor cargo handling equipment. An examination of the optimum number of the minor cargo handling facilities/ equipment should be carried out considering the following points:

i. Number of cargo handling facilities/equipment needed to get good productivity.
ii. Expected operating ratio of cargo handling facilities/equipment.
iii. Financial aspects.

The optimum number of cargo handling facilities/equipment is affected by the cargo volume, the cargo packing type, the variety of cargoes to be handled, the cargo handling method and other factors. Therefore, the optimum number and suitable type of cargo handling facilities/equipment should be reviewed occasionally according to changes in these factors.

(2) Review of the Weekly Maintenance System

All of the cargo handling facilities/equipment, including equipment in good condition, are checked weekly. They are also checked daily before and after operation. So they are supposed to be in good condition. However, it should be recognized that there are other types of periodical maintenance, such as every 500 hours and 1,000 hours, which should probably be introduced to reduce total maintenance cost and to maintain high efficiency.

(3) Disposal of Very Old and Useless Facilities/Equipment

As a result of the field survey, there were found to be many facilities/equipment, components and parts which are very old and useless. The disposal of these items should be examined.

4.6.7 Port Facilities (Expect Cargo Handling Facilities/Equipment)

(1) Connection Lines and Rearrangement of Railway Lines

The railway lines in the port are complicated, making freight cargo handling in the port difficult.

Considering the complicated and inefficient freight car handling, it is necessary to look into new connection lines.

At the same time, the complicated railway lines make the utilization of port areas ineffective.

Rearrangement of the railway lines within the port should be considered in the future.

(2) Supply or Replacement of Rubber Fenders

As a result of the field survey, damaged and missing rubber fenders were found at the No. 2 berth.

Sufficient fenders are required to maintain safety.

(3) Pavement

There are some craters behind the apron of No. 2 berth, which may disturb safe operations on the apron.

Thus there is an urgent need to fill the craters.

4.6.8 Others

Grain dust, especially husks, which are scattered all over the land and water area of the port, not only polute the environment but are also potentially dangerous, such as possibly causing a dust explosion. Appropriate countermeasures should be examined.

4.7 Principal Problems of the Port of Ensenada

4.7.1 Utilization of the Port

(1) Prospect of Cargoes and Cruise Ships

The cargo handling volume of this port has been at a low level. Considering this situation, it will be necessary to examine the causes of this and measures to promote ship calls.

Many cruise ships call at this port. It will also be necessary to

examine the future prospect of calls by cruise ships at the port.

(2) Others

There is a shed in the port area which is not used for maritime cargoes. The utilization of this shed for maritime cargoes should be examined.

4.7.2 Port Administration and Management

The points to be examined are as follows:

i. There are two cargo handling operators, the ESP and the CTM union, in this port, which seems to prevent smooth cargo handling operations. This factor should be considered.
As well, several items concerning the port administration and management shall be examined in Chapter 8.

4.7.3 Procedures for Ship Entry/Exit and Customs Formalities

Adjustment of berths for cruise and cargo ships seems to be carried out well.

4.7.4 Land Transportation

There seems to be no particular problems with arranging trucks because there is not so much seaborne cargo, except tuna and anchovies.

4.7.5 Cargo Handling Operations

(1) Cargo Handling Operations

1) Actual measurements of cargo handling productivity
The study team carried out a survey on the actual cargo handling and measurements of the productivity of each kind of cargo handling at each vessel staying on berth by watching and counting the time cycle of cargo handling per hour per gang.
The measurements by the study team in this reort indicate just the rough figures.

2) The data regarding cargo handling productivity are as follows:

Kind of Cargo	Cargo Handling Productivity According to Interviews with ESP	Measurement by the Study Team
General Cargo	10 t/h. gang	N/A
Agricultural Bulk (wheat) to truck by using pneumatic	30-35 t/h. gang	N/A
Agricultural Bulk (wheat) to warehouse by using pneumatic	20-24 t/h. gang	N/A
Agricultural Bulk to truck by using grab-bucket	17 t/h. gang	N/A
Agricultural (sugar in bag)	N/A	19 t/h. gang
Steel bar/coil	65 t/h. gang	N/A
Container by using mobile crane	5-10 unit/h. crain	N/A

* N/A = not available

(2) Present Situation to be Examined

i. The insufficient capacity of the refrigerated warehouse may hinder the quick handling of tuna.

ii. Control of all processes of operation by the ESP is necessary at all ports, but the situation at this port is quite different from at the other ports. The CTM carries out unloading operations on board under direct contracts with the consignees. On the other hand, the CROM carries out other operations under the control of the ESP.

iii. Adequate container handling equipment should be considered.

4.7.6 Cargo Handling Facilities/Equipment and Maintenance System

(1) Advanced Maintenance System at the Port

There is a maintenance manual which is prepared for cargo handling facilities/equipment of the ESP. This manual consists of three parts: for 100 hours, 500 hours and 1,000 hours.

All the cargo handling facilities/equipment have meters which indicate the running hours. They are maintained according to the meters and the manual. This kind of maintenance system has not been adopted at other ports.

(2) The Low Ratio of Operating Days of the Equipment to Available Days of the Equipment

As a result of the analysis of the Tables in Chapter 1, the ratio of the operating days of the equipment to available days of the equipment is the lowest among the six ports.

It will be necessary to examine the causes for this ratio.

(3) New Equipment Which Has not Been Used

As a result of the field survey at the port, new equipment which has not been used since it was purchased was found in the warehouse.

The new equipment consists of a vertical bucket elevator, large hoppers chuters and a belt conveyer which were purchased about 2 years ago.

However, there is no plan for the effective use of the equipment at present. The treatment and utilization of the equipment should be considered.

4.7.7 Port Facilities (Except Cargo Handling Facilities/Equipment)

(1) The Calm Sea at the Port

The port is protected by the south breakwater and the south-east jetty. However, based on the interviews with relevant organizations, the calmness level in the port seems to be insufficient.

Measures to maintain sufficient calmness at the basins of the port, such as extension of the breakwaters should be examined.

(2) Overtopping Wave and Overflow of the Seawater from the Breakwater

According to the field survey, both the breakwater and the jetty have been damaged.

When big waves come, the overtopping and overflow of big waves beyond the south breakwater seem to huge. The repair and improvement of the breakwater should be carried out to prevent the overtopping waves and the overflow of seawater.

However, complete improvement would be expensive. Therefore, the most economical and effective measures should be studied.