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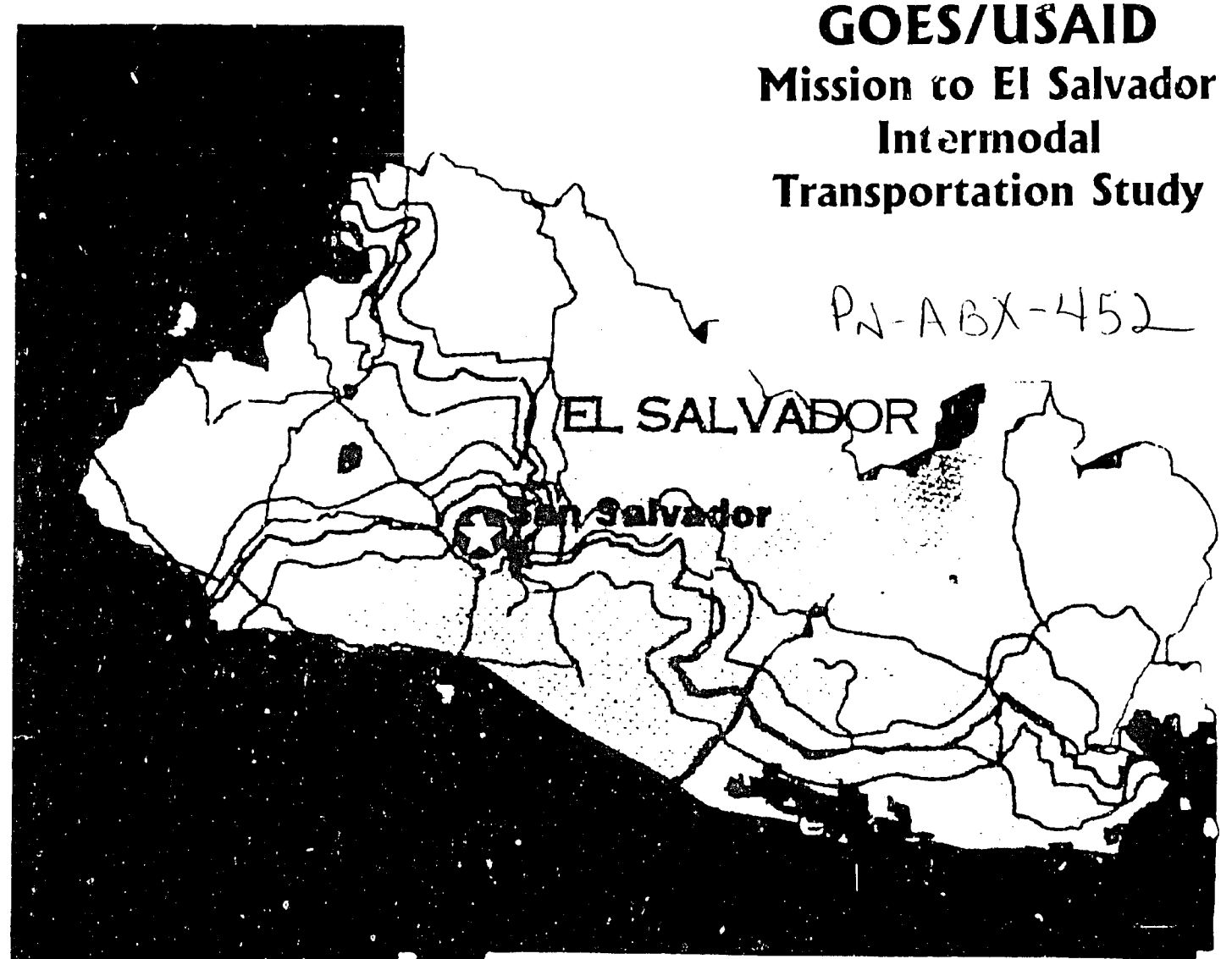

Final Report
TASK 5
PORT
STUDIES
prepared by
Frederic R. Harris, Inc.
in association with
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and
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San Salvador, June 26 1995

Mr. Ernesto Girón, CTO
USAID Mission in El Salvador
San Salvador.

Ref.: Intermodal Transportation Study
Contract No. 519-0384-C-00-4112-00
Final Report, Task 5

Dear Mr. Girón:

In compliance with section C.3.5 of above referenced contract enclosed herewith are 10 (ten) copies. in English, of the **Final Report of Task 5, "Port Studies".**

We are calling it Final Report rather than Final In-Depth Report because we are now incorporating in one single volume phases, 1 (Assessment) and 2 (Analysis) of the Study.

Sincerely yours,

José H. Cosío, P.E.
Team Leader

PN-ABX-452

TASK 5

PORT STUDIES

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GLOSSARY OF TERMS

ARENEP	Asociación de Representantes de Empresas Navieras y Empresas Portuarias
AUSTRAMA	Asociación de Usuarios del Transporte Marítimo
CEPA	Comisión Ejecutiva Portuaria Autónoma
FENADESAL	Ferrocarriles Nacionales de El Salvador
FES	Ferrocarriles de El Salvador
FENASAL	Ferrocarriles Nacionales Salvadoreños
IRCA	Ferrocarriles Internacionales de Centro América
SIPES	Sindicato de la Industria Portuaria de El Salvador

5.1 Assessment of the Port Sector

5.1.1 Introduction

This section presents the results of the First Phase of the Intermodal Transportation Study of El Salvador as it relates to waterborne commerce. It describes and analyzes the current situation of the country's port sector for the purpose of identifying restrictions, deficiencies and bottlenecks that affect the operation or retard the development of ocean transport in El Salvador.

In Section 5.2, the problems identified here will be analyzed in depth and the Consultants will present their recommendations on actions required for the port sector to adequately meet the future demands of maritime cargo.

The port sector in El Salvador consists of only two ports: Acajutla and Cutuco. Acajutla is by far the more important, handling in 1993 more than a million and a half tons of cargo, or 97% of the country's total port traffic. In addition, through RASA's installations adjacent to the port, approximately one million tons of crude oil and refined products were imported in that year.

This traffic, however, represents only a fraction of El Salvador's foreign trade. Cargoes between El Salvador and the Eastern Coast of the USA and Western Europe use the Atlantic ports in neighboring Guatemala and Honduras. This represents a substantial amount of Salvadorean imports and exports, which flow through Santo Tomás de Castilla in Guatemala and Puerto Cortés in Honduras.

Cargo using the Pacific ports mostly utilize Acajutla and, to a very minor extent, Cutuco. Recently, Salvadorean container cargo, because of better facilities and schedules in Puerto Quetzal in Guatemala, has been substantially diverted to this port.

CEPA estimates that in 1993 Acajutla was used by 44.6% of total Salvadorean foreign trade.

5.1.2 Institutional Structure

In El Salvador, several institutions and agencies play a role in maritime activities, among others the following: Comisión Ejecutiva Portuaria Autónoma (CEPA); Dirección General de Transporte Marítimo, an agency of the Vice Ministry of Transport; the Capitanías de Puerto, from the Ministry of Defense; Ferrocarriles Nacionales del Salvador (FENADESAL); Asociación de Representantes de Empresas Navieras y Empresas Portuarias (ARENEP); Asociación de Usuarios de Transporte Marítimo (AUSTRAMA); and Sindicato de la Industria Portuaria del Salvador (SIPES). They are described in the following sections.

a. CEPA

In May 1952 CEPA was established by the government for the purpose of developing the Port of Acajutla to meet the demands of the international trade of El Salvador.

In 1974 CEPA was assigned the responsibility of planning, building and operating a new international airport in El Salvador.

In 1975 the government gave to CEPA the direction and administration of the railroad system operated by FENADESAL, which includes the Port of Cutuco.

In consequence, CEPA today directs, administers and operates the country's main ports and airports and dictates the policies and oversees the operation of the railroad system of El Salvador.

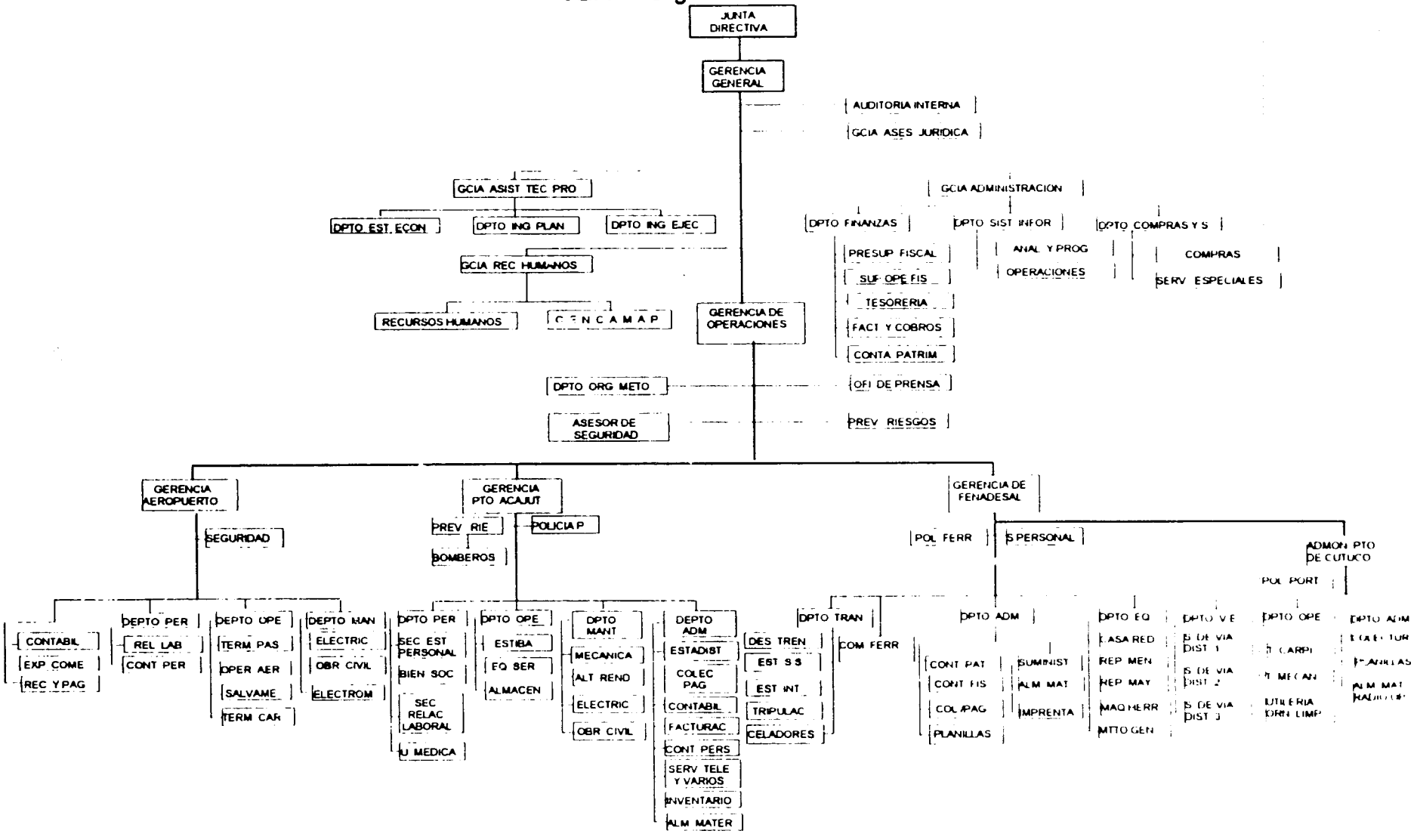
To perform its diverse functions CEPA operates through three central departments: Gerencia de Asistencia Técnica y Proyectos, Gerencia de Administración and Gerencia de Operaciones, under the coordination of a Gerencia General. Heading the organization is a Board of Directors that dictates the policies of the institution and closely supervises its operation.

The Management of Acajutla, the Management of the Airport and the Management of FENADESAL are field offices subordinated to the Gerencia de Operaciones. Cutuco is operated by FENADESAL. Figure 5.1.1 shows the Organization Chart of CEPA.

Ninety percent of the work force of the port is unionized in Sindicato de la Industria Portuaria de El Salvador. Every two years, CEPA enters into collective work contracts with the union, which generally result in increased salary and fringe benefits, modification of work rules and further limitation of CEPA's freedom to organize certain operations. The increased costs of these labor contracts are not compensated by increased productivity of labor and, as a result, CEPA has been forced to increase tariffs every two years, until it is reputed to be an expensive port in Central America.

In the Second Phase of this Study the organization of CEPA will be examined in detail and recommendations will be made relative to efficiency, decentralization and privatization of some of its activities.

FIGURE 5.1.1
CEPA - Organization Chart



b. Vice-Ministry of Transport

In June of 1993, the Vice Ministry of Transport was instituted to formulate and coordinate all transport policies and, at the same time, the Dirección General de Transporte Marítimo was created to implement those policies related to waterborne transport. This new agency is in charge of:

1. Formulation and implementation of legislation and maritime policies;

2. Representation of El Salvador in international organizations and vigilance over the observance of obligations and treaties relative to ocean transport activities

3. Promotion and development of the port sector.

At this time, the Dirección General de Transporte Marítimo is in the process of organization, its Ley Orgánica (Organizational Law) is under consideration in Congress and personnel specialized in the required disciplines is being recruited. DGTM requires qualified professional personnel which is not available in the country .

c. Ministry of Defense

Until now the Capitanías de Puerto, units of the Ministry of Defense, have been charged with the responsibility for all technical, legal, commercial and economic aspects of maritime transport, in addition to its functions in the defense and surveillance of the coasts of El Salvador. In practice, the Capitanías have limited their functions to surveillance of the coast and authorization to ships for entering and leaving the ports. New legislation that redefines the responsibilities of the Capitanías del Puerto is now being prepared.

d. FENADESAL

As a result of the merger of Ferrocarriles Nacionales de Centroamérica (District 1) and Ferrocarriles of El Salvador (District 3) in 1975, FENADESAL has been operating the country's railroads, including the Port of Cutuco. Today under policies dictated by CEPA, FENADESAL carries out the very sporadic operations of this port.

e. User's Groups

There are two organizations directly related to port activity, ARENEP (Asociación de Representantes de Empresas Navieras y Empresas Portuarias) and AUSTRAMA (Asociación del Transporte Marítimo). Both organizations are users of the ports and as such CEPA consults with them on questions related to tariffs. Also CEPA requests their comments on projects and procedures that may result in improved port service.

The port sector at its highest level (operates under the Vice-Ministry of Transport) thus the Comision Ejecutiva Portuaria Autónoma (Autonomous Executive Port Commission), CEPA. Task 1, Chapter I of this report, deals in detail the relationships among these Government agencies.

f. Port of Acajutla Organization and Management

This section describes the organization and management at the Port of Acajutla, the only port directly operated by CEPA.

The Organization Chart, in Figure 5.1.2 shows the Departments, Sections and Operation Units of the port, which employed some 1,203 people in 1994.

Heading the organization is the Port Manager and his staff who supervise, coordinate and control the day to day activities of the port, through four Departments: Operations, Maintenance, Personal and Administration.

- Port Manager

The Port Manager, the highest authority at the port, is responsible for planning, direction, coordination and control of all activities of the port, in accordance with policies and procedures established by CEPA. He answers directly to the Gerente de Operaciones of CEPA in El Salvador.

The staff units which support the activities of the manager are: Risk Prevention Port Security.

- Operations Department

This Department, the port's largest, employees is in charge and performs all operational functions of the port, including: ship berthing and deberthing; stevedoring, transfer and storage of cargo; and receipt, delivery and custody of all shipments through the port.

The Department is made up of three sections: Stevedoring on Wharfs, Equipment and Services, and Warehouses.

- Maintenance Department

The Maintenance Department is responsible for the maintenance of port infrastructure and equipment through four sections named: Mechanical Shops; Dry Bulk Handling Equipment Maintenance (Alto Rendimiento); Electrical Shop; and Civil Works.

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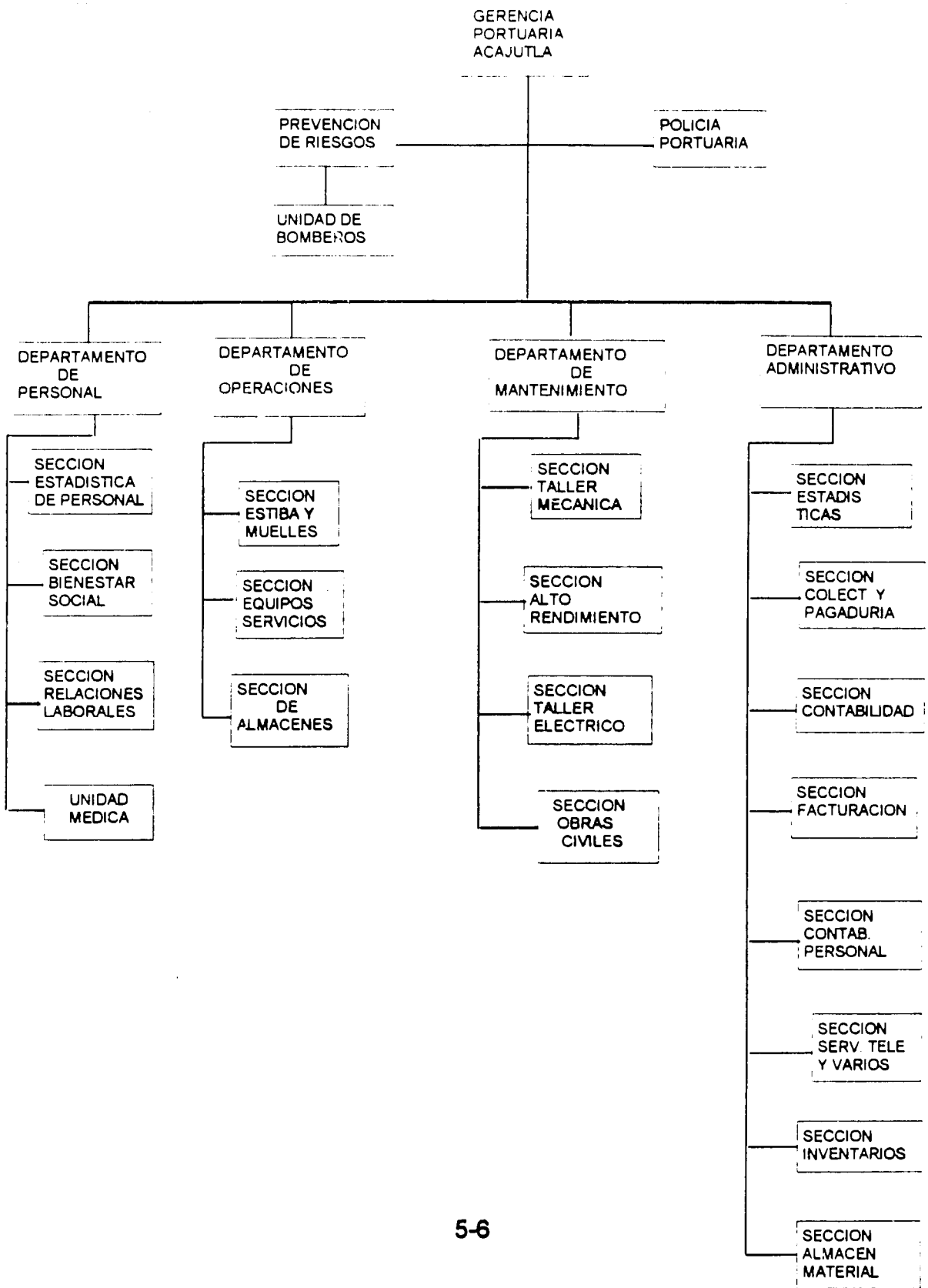
FIGURE 5.1.2
Port of Acajutla Organization Chart



The Alto Rendimiento Section is a unit specialized in the maintenance of the gantry crane and belt conveyors in Pier B which handle the dry bulks.

- Personnel Department

This Department with 12 employees implements Human Resources Programs and procedures including recruiting, selection and training of personnel, as well as salary administration and labor relations.

It is divided in three sections: Personnel Statistics, Personnel Welfare and Labor Relations.

- Administrative Department

This department with 55 employees performs all the administrative functions of the port. For this purpose it has eight sections as follows: Statistics; Collection and Payment; Accounting; Billing; Personnel Accounting; Inventories; Materials Warehouses; Telephone Services and Miscellaneous Services.

5.1.3 Financial Diagnosis

This section includes the financial diagnosis of CEPA, consolidated and for the ports of Acajutla, and of FENADESAL'S port of Cutuco. AIES and FENADESAL's (rail activities). This diagnosis are presented on the respective modal reports. This section presents CEPA's consolidated balance sheet and the income statements for the port of Acajutla, Port of Cutuco, and total consolidated.

Beginning 1995, as part of the modernization process of the Treasury Ministry, it is anticipated that CEPA's financial results will be reported according to the Central Government Accounting System. To date, CEPA continues to use the accounting system developed to fit its own purposes, and these results are presented below.

a. Balance Sheet

Table 5.1.1 presents the consolidated balance sheet, covering the Central Office, Port of Acajutla and AIES, for the years 1991 to 1993. The sheet is broken down by its main components, assets, liabilities, and equity. During the period, the most noticeable accounting changes were the following:

- The cleansing of exchange fluctuations related accounts and re-negotiation of long term debt, which allowed an accounting reduction of long term liabilities and the decrease of equity's "exchange fluctuations" items.

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TABLE 5.1.1
Comisión Ejecutiva Portuaria Autónoma - General Balance
(in thousands of Colones)

ITEM	1991	1992	1993
ASSETS			
CURRENT ASSETS			
Cash and Banks	54,300	101,568	155,416
Accounts Receivable	31,856	43,488	51,705
Uncollectible Accounts Reserves	(6,995)	(10,182)	(13,706)
Inventory	23,327	42,775	36,612
Inventories Reserves	(500)	(4,278)	(5,492)
TOTAL ASSETS	101,988	178,461	224,535
Buildings and Structures	185,858	187,592	187,615
Machinery and Operating Equipment	88,211	135,578	141,662
Other Assets	21,405	24,186	49,663
Depreciations	(143,795)	(158,246)	(174,686)
Total Assets	151,679	189,110	209,254
DEFERRED ASSETS	2,828	6,143	10,443
OTHER ASSETS	7,362	11,881	6,990
TOTAL ASSETS	263,857	380,595	446,222
LIABILITIES			
CURRENT LIABILITIES			
Accrued Payables	110,065	135,030	88,809
Reserves	24,293	49,899	54,808
Total Current Liabilities	134,358	184,929	143,617
LONG - TERM LIABILITIES			
Long - Term Department	354,768	624,988	158,357
Total Long - Term Liabilities	354,768	624,988	158,357
EQUITY			
Original Capital Contribution	1,927	1,927	1,927
Retained Earnings (Losses)	(55,717)	(58,716)	(53,712)
Current Earnings (Losses)	(2,999)	5,207	36,728
Subsidies to Airport	26,685	26,685	26,685
Fixed Assets Donations	2,930	26,802	160,115
Exchange Fluctuations	(198,095)	(431,227)	(27,495)
Total Equity	(225,269)	(429,322)	144,248
TOTAL LIABILITIES AND EQUITY	263,857	380,595	446,222

Source: CEPA

- The significant increase of equity's "donations" item, which is reflected, in it majority, in increases of machinery, operating equipment , and other fixed assets of the Port of Acajutla.

- The low book value of fixed assets, particularly land values, which may not reflect their actual market value.

- The significant increase of current assets during the period, particularly cash and banks. For 1994, it is anticipated an even greater increase in current assets, as a consequence of the increase in operating utilities which, by the middle of 1994, were already above fifty million colones. This high level of current assets shows a sound short term financial position, which makes possible the introduction of long term improvements.

As a result of the above mentioned positive accounting movements, CEPA's financial liquidity indexes (see Figures 5.1.3 and 5.1.4) presente high levels, with current liabilities covered by more than 1.5 times with current asets and cash and banks, and long term liabilities totally covered by assets and more than 90 percent covered by equity. These indexed, plus the anticipated utilities for 1994, show that CEPA can, if so is required to fulfill its objectives, almost triple its long term liabilities without jeopardizing its sound financial condition.

In clonclusion, during the 1991-1993 period, a significant improvement in CEPA's financial condition is shown, with a higher debt capacity to develop the required improvements so as to increase CEPA's operating yields and competitive capacity.

b. Income Statement

- *Consolidated:*

Table 5.1.2 presents CEPA's consolidated income statement, for the years 1991 to 1993. From the revenues side, the results show a noticeable increase in participation of AIES revenues and relative reductions of Port of Acajutla and Central Office revenues, being AIES now the major revenue generating division[1].

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[1] It should be noted that Central Office revenues are generated, almost in its entirety, from accounting charges for services rendered to the Port of Acajutla, AIES, and FENADESAL. Therefore, these revenues are accounted for twice, first as revenues in the income statement of Central Office and, second, as distributed expenses in the income statement of Port of Acajutla, AIES, and FENADESAL.

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FIGURE 5.1.3
CEPA - Financial Liquid Indexes - Short Term

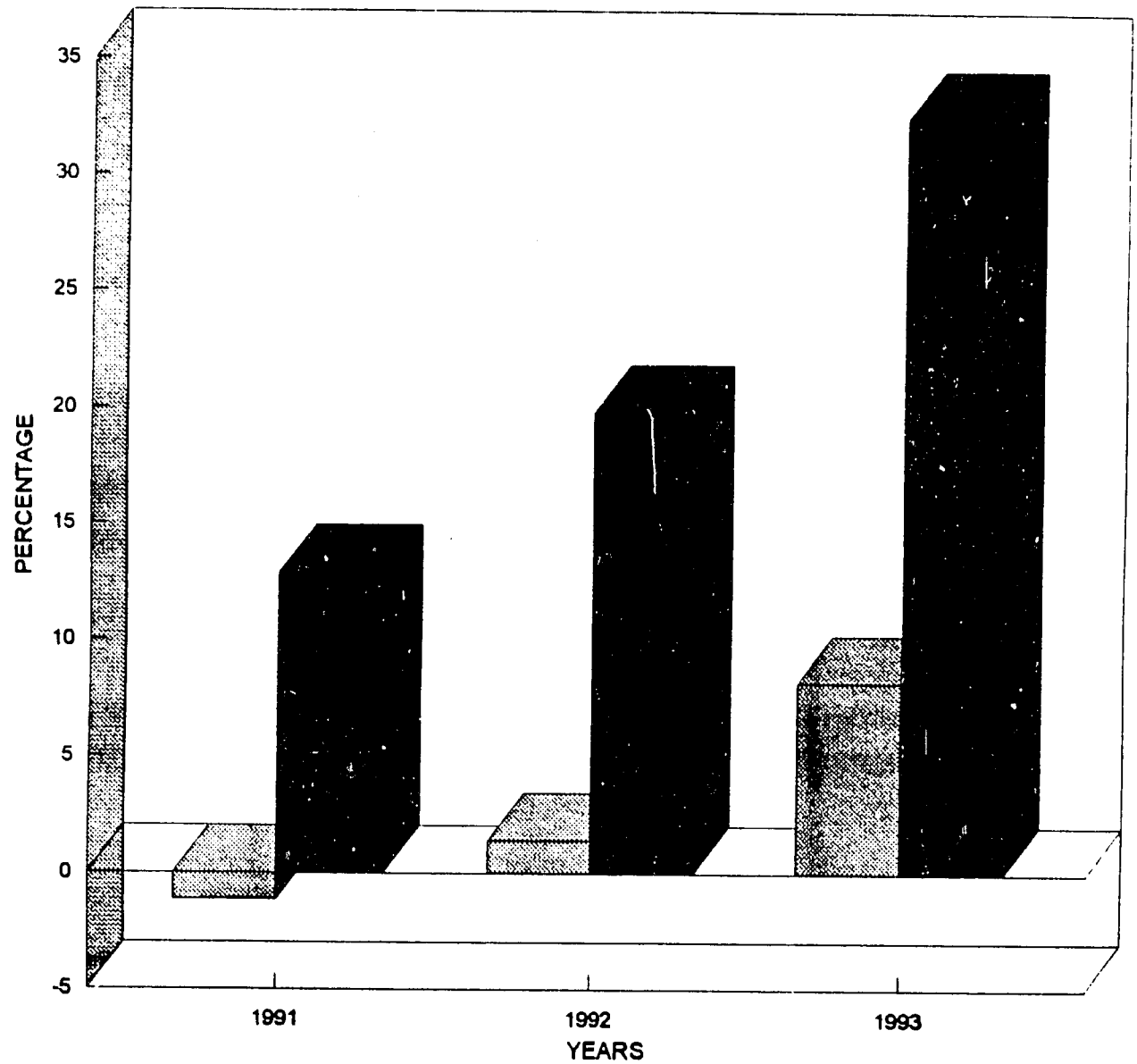

FIGURE 5.1.4
CEPA - Financial Liquid Indexes - Long Term

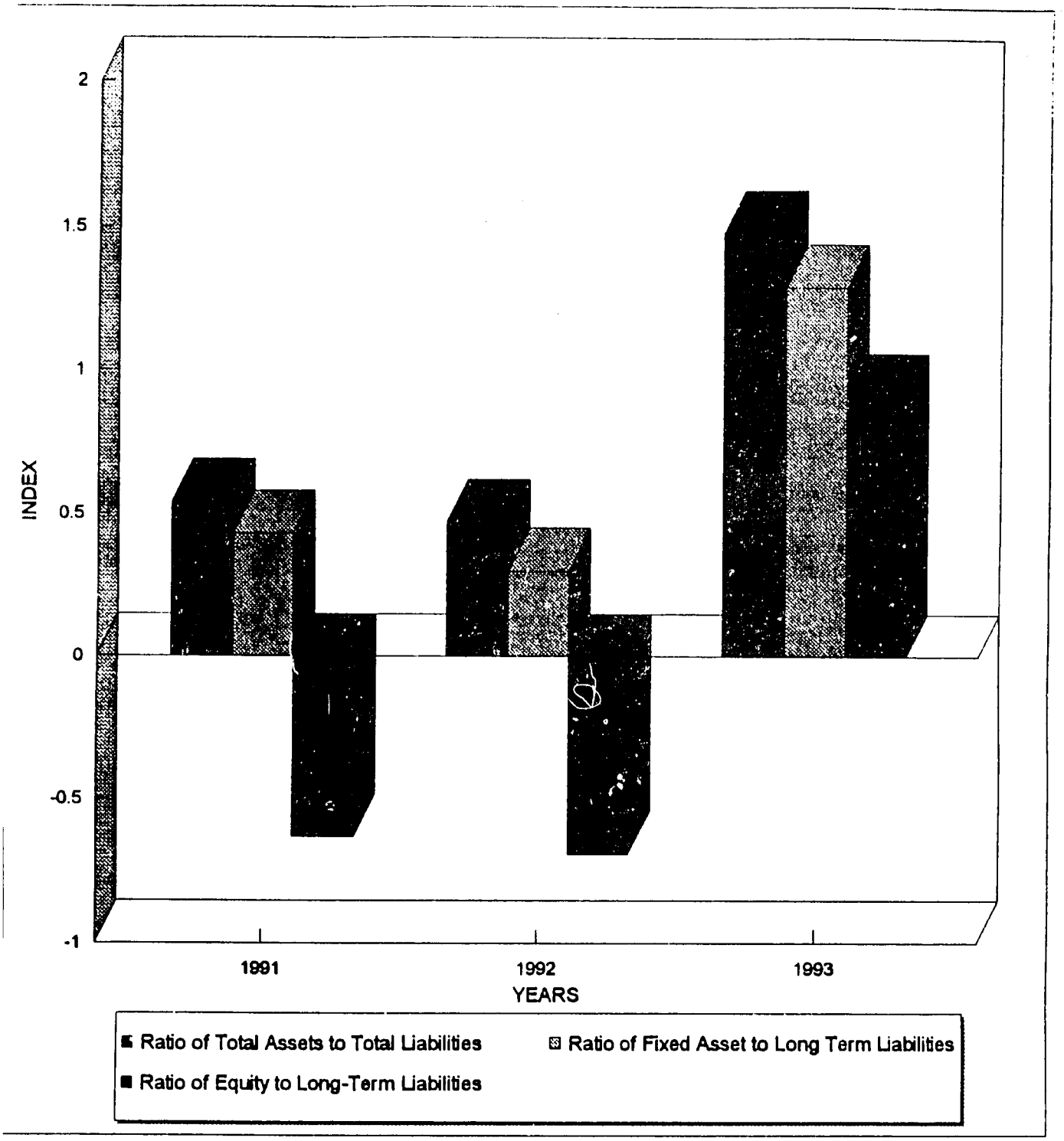

TABLE 5.1.2
Comisión Ejecutiva Portuaria Autónoma - Consolidated
(in thousands of colones)

ITEM	1,991.00		1,992.00		1,993.00	
INCOME						
Port of Acajutla		52.90%		48.40%	119,74	45.9%
AIES		38.80%		43.50%	123,73	47.4%
Central Office		8.30%		8.10%	176.61	6.7%
Total Revenue		100.0%		100.0%	261,08	100.0%
EXPENSES						
Operating Expenses						
Salaries		13.70%		12.9%	32,556.	16.6%
Indemnizations in Salaries		9.30%	17,255.00	8.3%	4,412.0	2.30%
Other Fringe Benefits in Salaries		7.30%	12,493.00	6.00%	15,019.	7.7%
Wages		12.3%		11.8%	29,354.	15.0%
IndemnizationinWages		5.00%		5.40%	3,823.0	2.00%
Other Benefits in Wages		4.20%		4.1%	10,340.	5.30%
Other		2.40%		3.50%	7,554.0	3.90%
Material and Consumable		7.00%		6.6%	17,022.	8.7%
Remuneration of External		12.3%		11.3%	22,954.	11.7%
Depreciation and Amortization		5.6%		7.3%	17,209.	8.8%
Travel and Representation		0.5%		0.5%	694.00	0.4%
Services Rendered		6.1%		6.1%	15,213.	7.8%
TOTAL OPERATING EXPENSE		85.%6		83.80%	176,15	90.0%
Prior Fiscal Years Expenses		2.70%	1,084.00	0.5%	1.00	0.0%
Financial Expenses		11.7%		15.7%	19,666.	10.00%
Total Expense		100.00		100.0%	195,81	100.0%
CURRENT PROFIT (LOSS)	(3,000)		9,235.00		65,269.00	

Source: CEPA

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From the expenses side, during the 1991-1993 period, the majority of the items show increases in value, in particular salaries, wages, depreciations and amortization, and distributed expenses, and reductions in salary and wage related indemnization. Excluding indemnization, the relative participation of personnel expenses, salaries, wages and fringe benefits, increased from 39.9 percent in 1991 to 48.3 percent in 1993; depreciation and amortization increased from 5.6 percent in 1991 to 8.8 percent in 1993; distributed expenses increased from 6.1 percent in 1991 to 7.8 percent in 1993; and indemnization decreased from 14.3 percent in 1991 to 4.3 percent in 1993.

Taken together, CEPA's revenues increased almost fifty percent between 1991 and 1993, while its expenses increased in less than ten percent only, and even diminished between 1992 and 1993. Therefore, CEPA's profits increased from ¢3 million of negative profits in 1991 to ¢65 million of positive profits in 1993. As a result, for CEPA as a whole, the financial profitability indexes (see Figure 5.1.5) show substantial improvements during the 1991-1993 period.

- *Port of Acajutla*

Table 5.1.3 show the Port of Acajutla income statement, for the years 1991 to 1993. From the revenues side, the results show an increase of almost 28 percent between 1991 and 1993. This increase is shown in all major revenue items, so that their relative participation stayed the same. It is noted that port tariff were adjusted during this period, so that new tariff started to be applied in 1992. Thus, the increase in revenues reflect both increases in cargo movement in the last years and increases in port tariffs.

From the expenses side, during the 1991-1993 period, the same relative changes as CEPA as a whole are exhibited, but more accentuated. Excluding indemnization, the relative participation of personnel expenses, salaries, wages and fringe benefits, increased from 43.0 percent in 1991 to 54.5 percent in 1993; depreciation and amortization increased from 4.2 percent in 1991 to 9.4 percent in 1993; distributed expenses increased from 5.5 percent in 1991 to 8.2 percent in 1993; and indemnization decreased from 19.0 percent in 1991 to 4.8 percent in 1993. It is noted that, during the 1991-1993 period, there were no salary adjustments of collective contract personnel. Also, during the period, the Port of Acajutla received operating equipment donations, which is reflected the relative increase in the depreciation and amortization item.

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FIGURE 5.1.5
CEPA - Financial Profitability Indexes

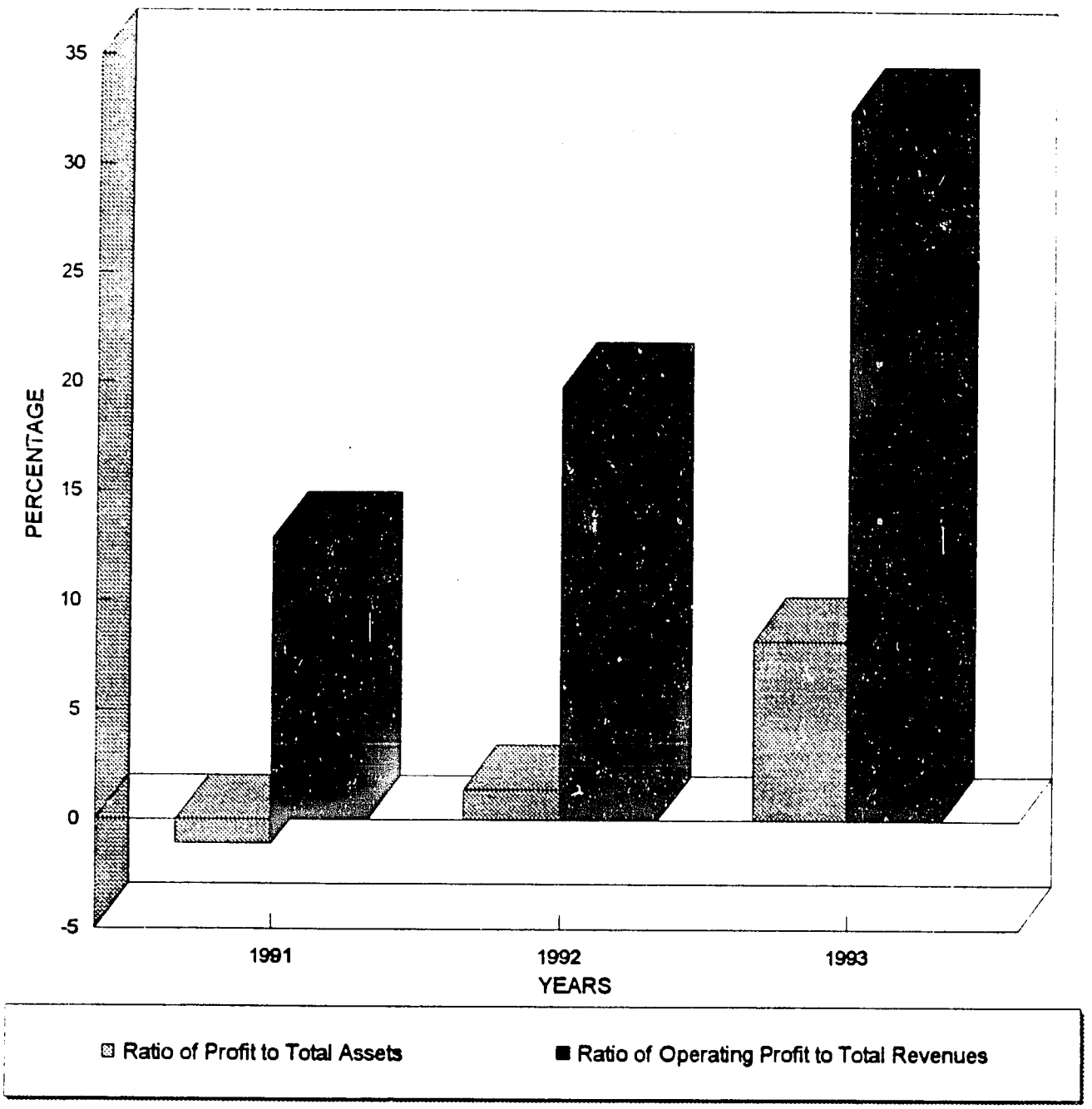


TABLE 5.1.3
Comision Ejecutiva Portuaria Autonoma - Puerto de Acajutla - Results
(in thousands of colones)

ITEM	1991		1992		1993	
INCOME						
General Cargo	37,030.0		44,171	42.2%		41.1%
Container Service	12,256		11,831	11.3%		15.1%
Solid Bulk Cargo	25,741		26,863	25.6%		22.9%
Liquid Bulk Cargo	3,237		4,286			4.3%
Service to Ships	11,137		13,179	12.6%		12.0%
Other Revenues	4,176					4.8%
Total Income	93,577	100.0%	104,794	100.0%	119,746	100.0%
EXPENSES						
Operating Expenses						
Wages	24,695		26,794	22.2%	32,556	27.5%
Wages Compensation	16,651		17,255	14.3%	4,412	3.7%
Other Wages Fringes	13,132		12,493	10.4%	15,019	12.7%
Salaries	7,135		7,703	6.4%		7.5%
Salaries Compensation	5,362		3,563	3.0%		1.1%
Other Salary Fringes	2,468			2.2%		2.6%
General Benefits	2,475			3.9%		4.1%
Materials and Consumable	7,692			7.0%	10,350	8.8%
External Service Remuneration	10,306		10,621	8.8%		
Depreciations and Amortizations	4,905			7.9%		
Travel and Representation	200			0.1%		
Distributed Expenses	6,376			6.1%		
Total Operating Cost	101,397		111,136	92.1%	111,074	93.9%
Previous Fiscal Years Expenses	5,948					
Financial Expenses	8,907			7.0%	7,163	6.1%
Total Expenses	116,252	100.0%	120.644	100.0%	118,237	
UTILIITIES (LOSS)TO APPLY	(22,675)		(15,850)		1,509.00	

Source: CEPA

Taken together, the Port of Acajutla expenses were keep constant between 1991 and 1993. Therefore, the Port of Acajutla profits increased from ¢27 million of negative profits in 1991 to ¢1.5 million of positive profits in 1993. As a result, for the Port of Acajutla, the financial profitability indexes (see Figure 5.1.6) show substantial improvements during the 1991-1993 period.

Figure 5.1.7 show the Port of Acajutla operating expenses for 1993, broken down by expense responsibility areas, Departments and Sections of the Operations and Maintenance Departments. Annex 5.1.1 show the expenses broken down in grater detail, subdividing expenses to the level of cost center and expense account. These data was obtained from CEPA's Finance Department report titled "Analysis of Costs and expenses".

This report presents all of CEPA's expenses (Central Office, Port of Acajutla, and AIES) broken down by cost center and expense account.

In Figure 5.1.7 it is noticeable the high proportion of the administrative departments (General Management, Administrative Department, and Personnel Department), with 17 percent of the total port expenses, and of the Maintenance Department, with 30 percent of the total port costs, and the low proportion of the Operations Department, with 44 percent of the total port costs. The remaining 11 percent is accounted for non-allocated expenses, including indemnization (¢3.1 million), financial expenses (¢7.2 million), and Central Office expenses distributed to the Port of Acajutla, but not allocated to the department level (¢1.6 million).

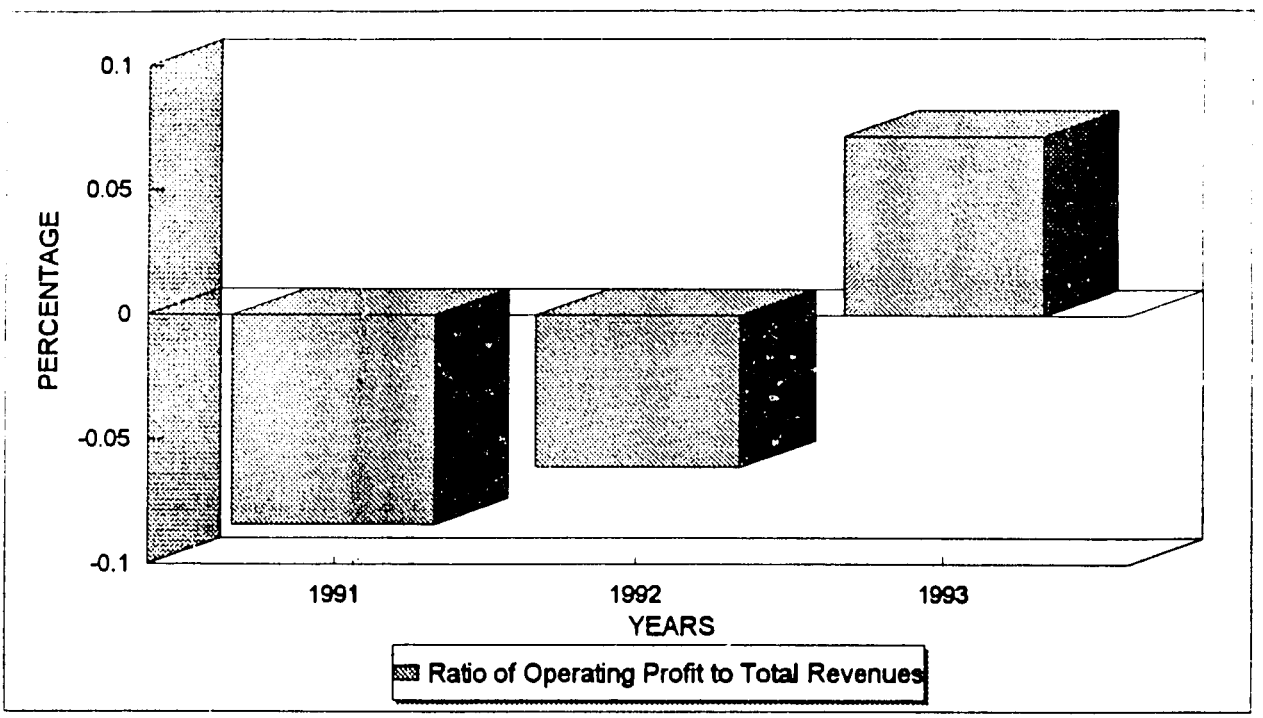
Other important aspects related to the reported expenses in Figure 5.17 and Annex 5.1.1 include the following:

- Expenses at the department level include Central Office distributed expenses, allocated proportionally between the five departments and the Port of Acajutla as a whole, corresponding approximately ¢1.6 million per department. These expenses are not allocated to the section level.

- The Administrative Department includes all electricity expenses, about ¢2 million.

- The Chief Office of the Personnel Department includes, among other, indemnization expenses (¢1.9 million).

FIGURE 5.1.6
CEPA - Financial Profitability Indexes - Port of Acajutla



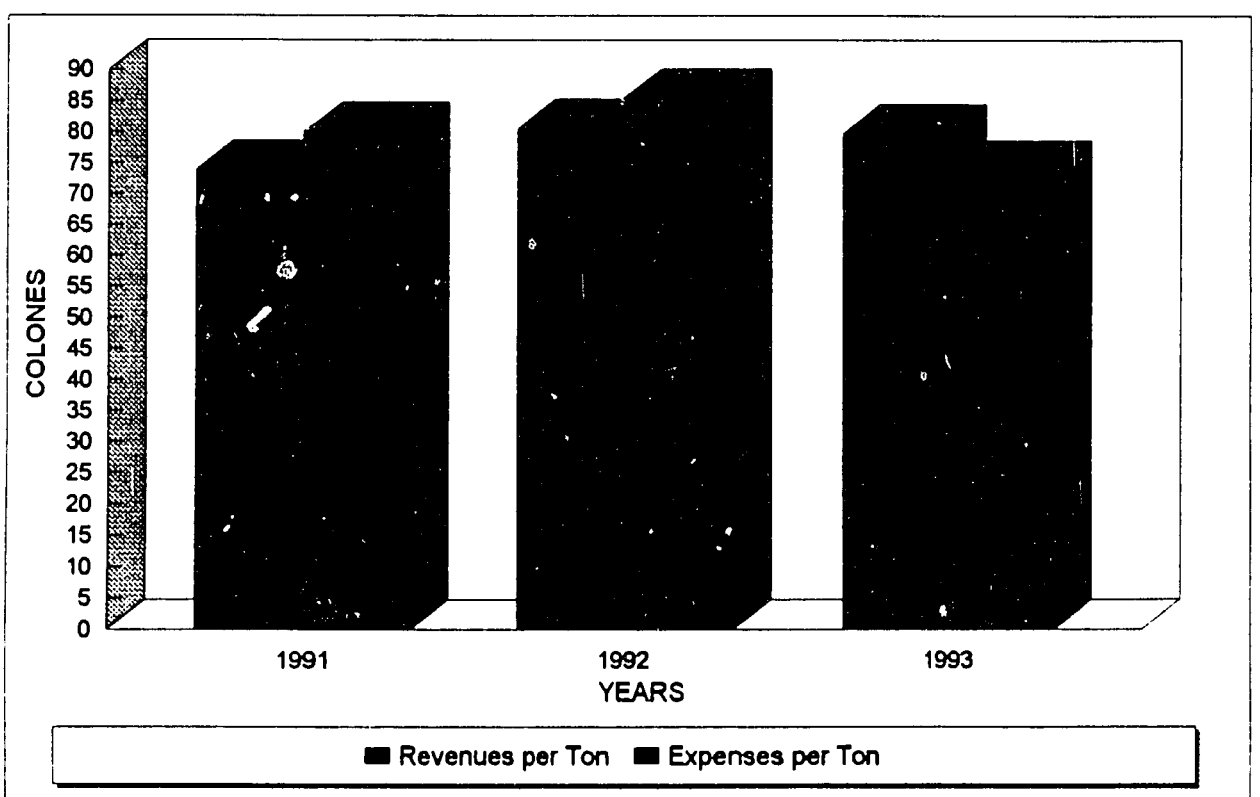


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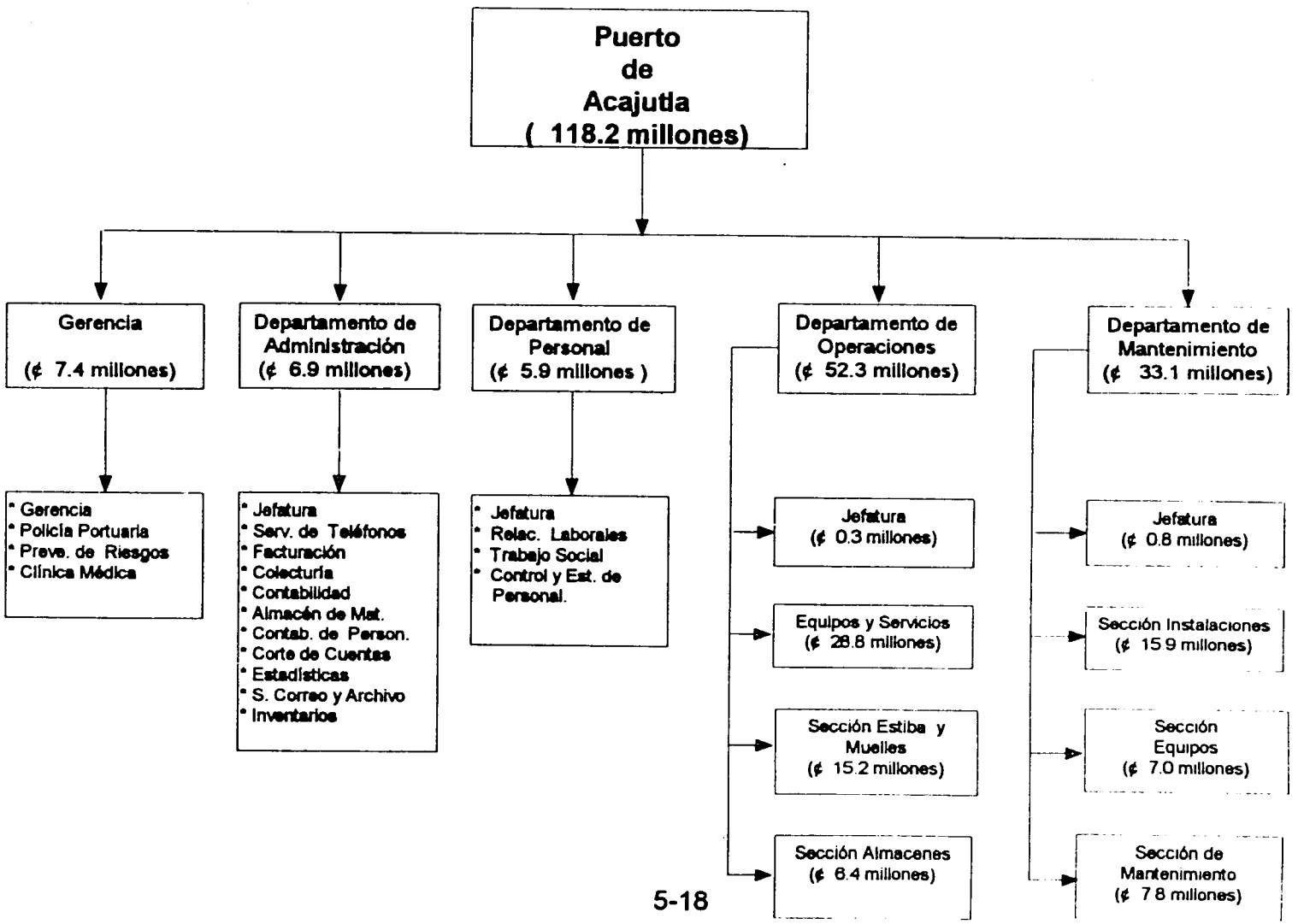
FIGURE 5.1.7
Comision Ejecutiva Portuaria Autonoma
Port of Acajutla - Operating Expenses
(period of 1993)



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- The Equipment and Services Section of the Operations Department includes, among other, the indirect expenses of stevedores (¢5.4 million), longshoremen (¢5.0 million), and equipment operators (¢2.6 million), and equipment depreciation costs (¢7.2 million).

- In the Stevedore and Longshoremen Section of the Operations Department, almost fifty percent of the expenses correspond to general cargo movement expenses. In the Warehouse Section such percentage increases to more than sixty percent.

- The Installations Section of the Maintenance Department includes, among other, the cost of the installations' insurance (¢4.0 million) and depreciation (¢2.8 million). The Equipment Section includes the cost of the equipment insurance (¢0.7 million).

- The Maintenance Section includes major workshops (¢5.1 million) and minor workshops (¢2.7 million).

- *Port of Cutuco*

Table 5.1.4 show FENADESAL's Port of Cutuco income statement, for the years 1991 to 1993. From the revenues side, the results show no movement of general cargo in 1993.

From the expenses side, during the 1991-1993 period, salary related expenses declined significantly, but was partly compensated by increases in wages. In total, the relative participation of personnel expenses, salaries, wages and fringe benefits, declined from 71.3 percent in 1991 to 56.1 percent in 1993. It is also noticeable the high proportion of the Central Office distributed expenses, which in 1993 reached 20.5 percent of the total port expenses.

Taken together, the Port of Cutuco expenses declined by 33.1 percent between 1991 and 1993, which, together with increases in revenues of 55.6 percent in the same period, resulted in a reduction of losses from ¢3.2 million in 1991 to ¢1.5 million in 1993. As a result, for the Port of Cutuco, the financial profitability indexes (see Figure 5.1.8) show substantial improvements during the 1991-1993 period.

TABLE 5.1.4
Port of Cutuco - Income Statement - (in thousands of colones)

ITEM	1991		1992		1993	
INCOME						
General Cargo	321	44.4%	335	35.8%		0.0%
Solid Bulk Cargo	122	16.9%	165	17.6%	311	27.6%
Liquid Bulk Cargo	58	8.0%	78	8.3%	10	0.9%
Service to Ships	42	5.8%	36	3.8%	21	1.9%
Other Income	180	24.9%	323	34.5%	783	69.6%
Railroad Freight Rates	0.00	0.0%	0.00	0.0%		0.0%
Railroad Passenger	0.00	0.0%	0.00	0.0%		0.0%
Other Revenues	0.00	0.0%	0.00	0.0%		0.0%
Total Income	723	100.0%	937	100.0%	1,125	100.0%
Expenses						
Operations Expense						
Wages (including Wages Benefits)	1,263	32.6%	206	7.5%	133	5.1%
Salaries (including Salary Benefits)	1,238	31.9%	1,261	45.8%	1,247	48.1%
Benefits	263	6.8%	106	3.8%	76	2.9%
Material and Consumable Products	170	4.4%	175	6.3%	111	4.3%
Remunerations and Amortizations	287	7.4%	294	10.7%	358	13.8%
Depreciactions and Amortizationes	33	0.9%	46	1.7%	50	1.9%
Travel and Representations Expenses	7	0.2%	6	0.2%	1	0.0%
Total Operating Cost	3,261	84.0%	2,094	76.0%	1,976	76.1%
Prior Fiscal Years Expenses	0.00	0.0%	68	2.5%	66	2.5%
Financial Expenses	103	2.7%	86	3.1%	21	0.8%
Distributed Expenses	516	13.3%	508	18.4%	532	20.5%
Total Expenses	3,880	100.0%	2,756	100.0%	2,595	100.0%
UTILITIES (LOSS) TO APPLY	(3,157)		(1,819.00)		(1,470.00)	

Source: CEPA

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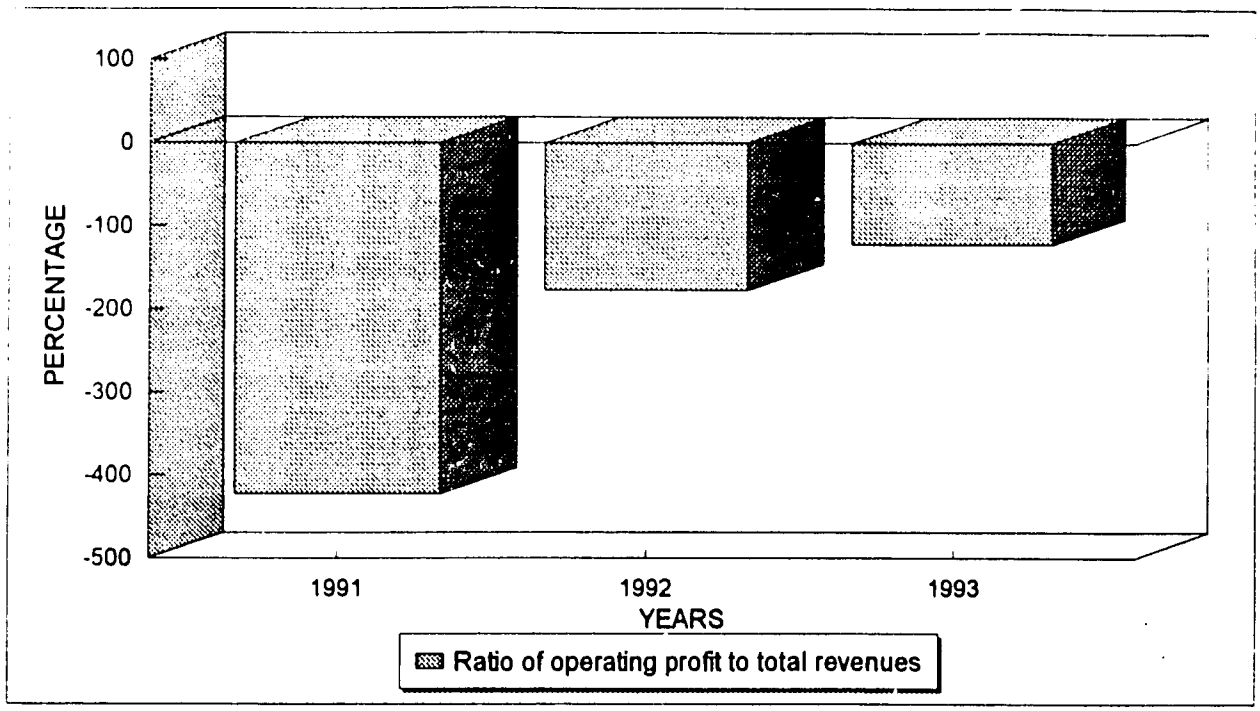
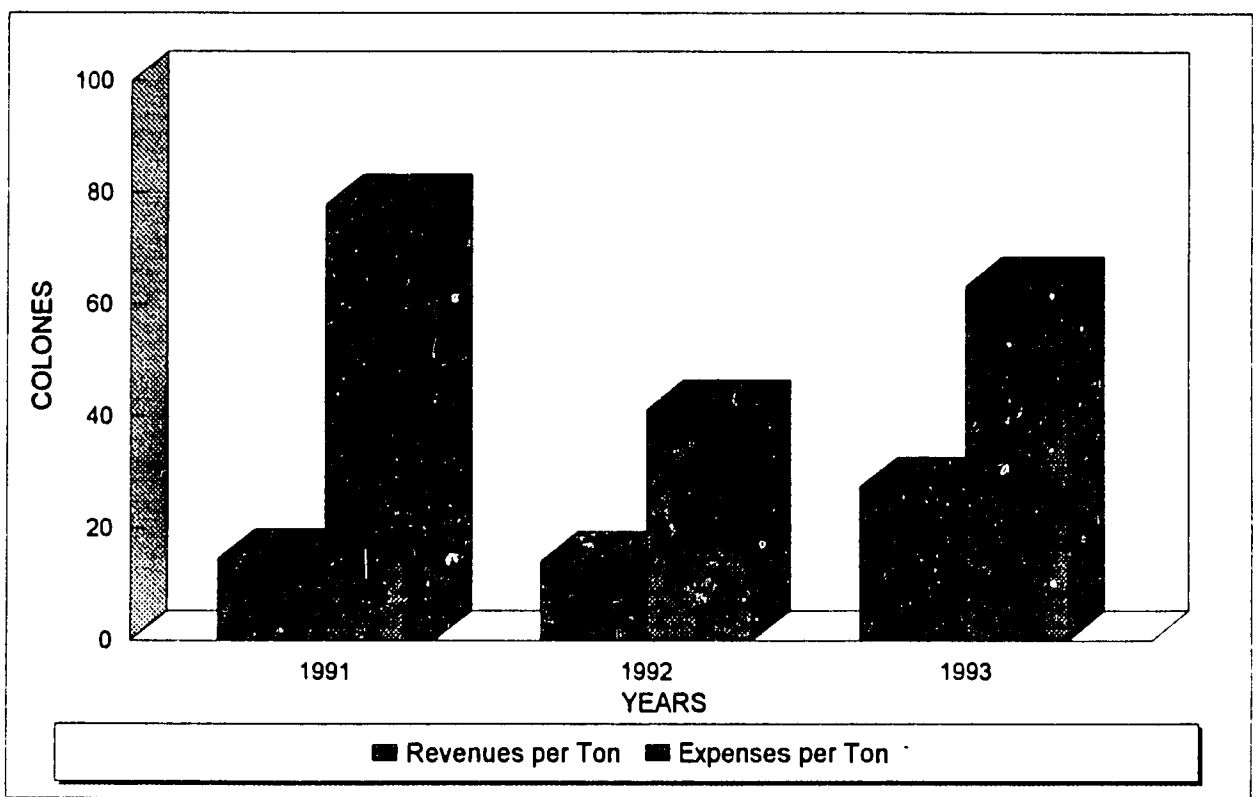
FIGURE 5.1.8
FENADESAL - Port of Cutuco - Financial Profitability Indexes





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5.1.4 Port of Acajutla - General

The Port of Acajutla in the western region of the country, is a complex of port installations built around a harbor created by a combination of breakwater and wharf (Piers A and C) and a finger pier, (Pier B).

The configuration of the port is fairly efficient for handling bulk cargo, but difficult for moving break bulk and containerized loads, that most travel some 1500 meters to storage yards and warehouses located on land.

The location of the port is open to the sea and during bad weather the port must close, on the average 2 to 3 weeks a year in the rainy season.

Perhaps a more serious problem is the agitation of ' basin by long period waves entering the basin, that causes the interruption of ope :ons and occasionally breaks mooring lines and fenders and forces the ships to cast off and leave port. These problems close the port two or three times a year for periods of two to three days.

The installations within the port boundaries include warehouses, storage yards, sheds, shops, administration buildings and other facilities that occupy some 37 hectares in a piece of land of more than one hundred hectares owned by CEPA.

In addition, outside the port boundaries but adjacent to the port, private operators own important facilities that include: silos, warehouses and tanks for the storage of solid and liquid bulks. These installations are important and constitute a fundamental component of the port complex.

5.1.5 Port Infrastructure of Acajutla

In this section the infrastructure of the port is described and its present conditions are analized.

a. Road Access

Table 5.1.5 shows the main highway corridors that lead to Acajutla.

TABLE 5.1.5
Port of Acajutla - Highways Leading to Acajutla

ORIG/DEST. ZONES	HIGHWAY	MAIN LOADS	DISTANCE Kms.	CONDITION
Sn. Salvador-Sonsonate-Acajutla	CA1-CA8 CA12	Food stuffs, hardware, sugar, veehicles, grains, Industrial Products and fertilizers	85	Good (Being widened to a four lane highway
Sn. Miguel-Sn. Salvador-Acajutla	CA1-CA8 CA12	Coffee and Sesame	225	50% Good, 50% Fair
Zona Sur Oriental, Sur Central-Acajutla	CA2-CA12	Melons and Sugar	230	Fair
Snta. Ana- Sonsonate-Acajutla	CA12	Coffee, Honey, Balsamo	60	Good
Ahuachapán-Sonsonate-Acajutla	CA8-CA12	Coffee	60.00	Good

The main Origins and Destinations of Salvadorean Foreign Trade are linked to the port by either the San Salvador-Sonsonate-Acajutla Highway or by the Litoral Highway.

Most of the port traffic uses the San Salvador-Sonsonate-Acajutla Highway. This is presently being widened to four lanes, significantly improving the access to the port for 90% of its cargo.

b. Railroad Access

Acajutla is the terminal point of District 3 of FENADESAL. This transport mode is used by 4.5% of the port traffic, consisting mostly of steel products, coffee and grains. In 1993 the railroad transported some 68,300 tons. Table 5.1.6 shows the principal origins and destinations of cargo linked to the port by railroad.

TABLE 5.1.6
Origins/Destinations of Port Cargo Linked to Acajutla by Railroad

ORIG./DEST. ZONES	ROUTES	MAIN PRODUCTS	DISTANCE Kms.	CONDITIONS
Sn. Miguel-Usulután, Sn. Salvador-Acajutla	Distrito 1 Distrito 3	Coffee, Steel prod./Cotton	292	Distrito 1 Bad, Distrito 3 Fair
Sta. Ana-Sitio del Niño, Sonsonate-Acajutla	Distrito 2 Distrito 3	Coffee	107	Fair

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c. Harbor Entrance

With the protecting breakwater advancing to a depth of 19 m, the harbor has easy and ample access from the sea through a natural channel that requires no dredging and has few limitations other than shallow depths of less than 8 m in the western area of the basin.

Outside the breakwater there is convenient anchorage for ships waiting to berth at the port.

d. Piers and Berths

Tables 5.1.7 and 5.1.8 show the main characteristics of piers and berths in Acajutla.

TABLE 5.1.7
Port of Acajutla - Piers

PIER	TYPE OF CONSTRUCTION	YEAR	LENGHT, MTS	WIDTH, MTS	DEPTH, MTS	CONDITION
A	Steel Sheet Piling Cells and Reinforced Concrete Deck	1961	310	37	10-12	Requires Repair
B	Reinforced Concrete Deck on Piles	1970	348	28	10-12	Fair
C	Sand Filled Reinforced Concrete Boxed and Reinf. Concrete Decks	1976	270	19	13.5-19	Good

TABLE 5.1.8
Port of Acajutla - Berths

PIER	BERTHS	MA. LENGHTX	CONSIST.	UTILIZATION	FIXED INSTALLATIONS
A	A1	152	9	General Cargo Liquid and Bulks	Itransit Chades and semi-portal cranes on deck
	A2	183	10	General Cargo, Liquid and Dry Bulks	
B	B3	137	9	General Cargo and Bulk	Gantry cranes for Loading unloading bulk cont. and heavy loads, belt conv . system
	B4	198	10	General Cargo and Bulk	
	B5	137	9	General Cargo and bulk	
	5	152	9	General Cargo and bulk	
C	C7	128	12	General Cargo, Liquid and Dry Bulks and containers	None
	C8	128	12	General Cargo, Liquid and Dry Bulks and containers	None

- Pier A

This is the port breakwater, built with a core of sheet piling cofferdams and cells protected on the ocean side by layers of rock and tetrapods. The top is a reinforced concrete deck that accommodates two berthing positions on the harbor side. Connecting to the shore, the pier has a transition area built on rock fill and rock armor that supports the access road to the installations on land.

Sections of structure and transition zone are in urgent need of maintenance and repair due to corrosion of the sheet piling and movement of the tetrapods under wave pounding.

CEPA has tried to resolve the problem with limited results. A more permanent solution is now under study and will require important expenditures. In the section "Programs of Rehabilitation and Maintenance of Infrastructure" of this report, this matter is discussed in further detail.

- Pier B

This pier, built in the basin sheltered by Pier A, is a reinforced concrete deck on piles with berthing facilities on both sides for handling of dry bulks.

Especially designed for this purpose, the pier is equipped with a travelling portal crane (Unidad de Carga) capable of unloading on the western berths and loading on the eastern side.

The crane is linked by a system of belt conveyors on trestles to silos, warehouses, tanks and unloading facilities on shore. Some of these storage installations are property of the port, but the more important facilities are privately owned.

The equipment on the pier is old and of low efficiency and the crane requires major rehabilitation. At this time, the pier fender system is being replaced at a cost of some 2.5 million dollars.

- Pier C

Pier C is an extension of breakwater A, built on reinforced concrete boxes filled with sand. The top is a reinforced concrete deck and its length provides for two 128 - meter berths, the deepest berths in the port, down to about 19 meters below sea level.

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The pier has no fixed facilities on its deck of reinforced concree. It is used mostly by liquid bulk carriers and general cargo ships carrying containers on deck.

For handling containers the pier is open and wide enough to permit the operation of tractors and trailers that move containers, loaded and unloaded by ship's gear, to a storage patio about 1,800 meters from the pier.

For liquid bulks, mostly fuel oil and vegetable oils, the pier is equipped with pipelines conneced to storage tanks on the mainland. This pier is kept in good condition.

e. Warehouses

For storage and protection of general cargo, the port has warehouses and sheds. Their size and characeristics are listed in Table 5.1.9.

TABLE 5.1.9
Port of Acajutla - General Cargo Warehouse

WARE HOUSE	TYPE OF CONSTRUCTION	YEAR	AREA m2	CAPACITY	UTILIZATION	CONDITION
General Cargo Transit Shed	Steel Struct.	1960	4142	4200	Gen. Cargo	Fair
Warehouse1	Reinf. Concrete Structure	1960	6000	5600	Gen. Cargo Exports	Bad, req. Repairs
Warehouse2	Reinf. Concrete Structure	1960	5600	5600	Gen. Cargo Imports, Boxes and Cartons	Bad ,req. Repairs
Warehouse3	Reinf. Concrete Structure	1960	6000	5600	Stripping, and Stuffing of Containers	Bad, Req. Repairs
Warehouse4	Reinf. Concrete Structure	1960	4800	4000	Gen. Cargo Imports, Barrels, Bags	Bad, req. Repairs
Open Shed	Steel Structures W/O walls	1978	10000	2000	Gen. Cargo Imports	Fair

For storage of dry bulks there are warehouses owned by the port, and silos and other facilitiesowned by private operators. Most of these installations are directly linked to the mechanized bulk handling system of Pier B. The main features of these storage structures are shown in Tables 5.1.10 and 5.1.11.

TABLE 5.1.10
Port of Acajutla - Bulk Storage Owned by the Port

WAREHOUSE	TYPE OF CONSTRUCTION	YEAR	CAPACITY	UTILIZATION	CONDITION
Transit Warehouse	Reinf. Concrete	1980	18,000	Wheat, Corn	Good
Bulk, Sugar Warehouse	Reinf. Concrete, A Frame	1970	12,000	Fertilizer, Soy Flour, Sugar	Good

TABLE 5.1.11
Port of Acajutla - Privately Owned Bulk Storage

OWNER	PRODUCT	CAPACITY TONS	TIYPE OF CONSTRUCTION	YEAR	CONDITION
ALCASA	Grains, Flour, Fertilizer	105,000	Reinf. Concrete	1963 a 1986	Good
ALMAPAC	Sugar, Fertilizer	40,000	Concrete and Brick	1979	Fair
EXICASA	Fertilizer	8,000	Concrete and Brick		Fair
DISFERSA	Fertilizer	20,000	Concrete and Brick	1978	Good
SAGRISA	Fertilizer	12,000	Concrete and Brick	1972	Fair
FERTICA	Fertilizer	168,000	Reinf. Concrete	1964; 1975 1993	Good
SERTESA	Fertilizer	20,000	Concrete and Brick		Good
UCAFES	Fertilizer	10,000	Concrete and Brick		Fair

f. Open Storage

For cargo that does not need closed storage protection, the port has open yards: one for large steel products and heavy loads, another for storage of automobiles and a third, fenced and concrete paved, for the storage of containers. These yards are described in Table 5.1.12

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TABLE 5.1.12
Port of Acajutla - Storage Yards

Yard	Area M2	Surface	Utilization	Condition
Vehicles	42,000	Unpaved	Storage of Vehicles	Bad
Containers	30,000	Concrete	Storage of Containers	Good

g. Shops and Service Installations

The port has several shops for the repair and maintenance of its equipment. These are: the Mechanical Shop, the Electrical Shop, the Shop of "Alto Rendimiento" that maintains the belt conveyors, and other minor shops.

The Mechanical Shop is being enlarged and the spare parts warehouse is being moved to a new location, in preparation for the acquisition of new shop equipment.
Table 5.1.13 shows the characteristics of these installations.

TABLE 5.1.13
Port of Acajutla - Shops and Service Facilities

SHOP	TYPE OF CONSTRUCTION	AREA, M2	UTILIZATION	CONDITION
Mechanical	Steel Structure w/Asbestos Cement Roofing	2,000	Equipment Repair	Being enlarged
Electrical	Saltex walls w/asbestos Cement Roofing	450	Maint. of Electric System	Good
Belt Conveyors	Saltex Walls w/Asbestos Cement Roofing	250	Maint. of Belt Conveyors	Fair
Carpentry	Steel Structure, Saltex Walls and Asbestos Roofing	275	Maint. of Civil Works	Good
Painting	Steel Strucutre, Saltex Walls and Asbestos Cement Roofing	80	Preparation of Paint Mixtures	Good
Parts and Supplies	Steel Structure and Asbestos Cement Roofing	602	Parts and Supplies	Under Construction (Relocation)
Washing	Steel Structure and Asbestos Cement Roofing	225	Washing of Equipment	Bad
Lubrication	Open	108	Lubrication	Bad
Fire Protection	Steel Strucutre, Saltex Walls	60	Fire Station	

h. Other Buildings and Installations

The port has a two story building, of reinforced concrete structure, to house its administrative offices and services and those of government agencies related to port activities, such as: Dirección General de la Renta de Aduanas (Customs), Delegación de la Corte de Cuentas (Central Auditing), Servicio Meterológico (Weather Station), Medical Service, Security offices and communications and Control Tower. Also, some shipping agents have their offices in this building. The building is well maintained and sufficient for the administrative needs of the port.

Inside the port boundaries there are other buildings and installations, including: entrance and security gatehouses, conveyor control houses, offices for operations and equipment operators, emergency power plant, incinerator, platform scales and other appurtenances. On adjacent grounds the port has athletic fields and residences for port executives. For a description of these facilities see Table 5.1.14.

TABLE 5.1.14
Port of Acajutla - Other Buildings and Facilities

BIDG OR FACILITY	TYPE OF CONSTRUCTION	AREA, M2	UTILIZATION	CONDITION
Administrav. Bldg.	Reinf. Concrete Struct.	3,220.00	Administrative Offices	Fair
Belt Conveyors Control House	Reinf. Concrete Struct.	144	Belt Conveyors Control	Fair
Equip. Operators House	Reinf. Concrete Struct.	30	Equip Operators' Supervisory Personnel	Fair
Emerg. Power Plant	Saltex and Asbestos Cement Roofing	116	Emerg. Power Generation	Good
Operations Office	Reinf. Concrete Struct.	76	Operations Supervisory Personnel	Bad
Residences	Prefabricated	3,021.78	Exec. Living Quartes	Fair
Sports Fields	Open	16,270	Sports	Bad
Security Gatehouses	Cement block	87	Security	Cood
Weight Sstations	Open	87	Weigh Recording	Good
Incinerator	Open	4,336	Waste Incineration	Bad

i. Internal Traffic Circulation

The port has about 4 kilometers of paved roadways fairly well maintained for interiorirculation. Under normal conditions, there is no congestion or bottlenecks and traffic seems to flow smoothly, at present port throughput.

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There are unpaved parking areas for trucks waiting to enter the port boundaries. Their area seems sufficient for today's traffic.

The railroad trackage of the port consists of two spurs, one in front of Warehouse 3 and the other in front of Warehouse 1.

j. Rehabilitation and Infrastructure Maintenance Programs

The port is presently undertaking important projects of rehabilitation and maintenance of its infrastructure. Their principal characteristics are described in Table 5.1.15.

TABLE 5.1.15
Port of Acajutla - Program Improvement of Port Infrastructure

PROJECT	DESCRIPTION	COST *	FINAN.	SCHED.
Repair of Pier A nd its access	Rehabilitation of the sstructure and the breakwater of Pier A at Cells 14 and 15. Cathdic protection on top of sheet piling facing the ocean	3.031	German	1995
Drainage System	Rehabilitation of the drainage system	328	German	1995
Fire Control System	Improvement of fire fighting sysems including firemen's barracks, equipment and a tug	2.093	German	1995
Warehouses	Two warehouses for hazardous cargo	0.706	German	1995
Warehouse Rehabiliation	Repair if stirage waregiyses	4.025	German	1995
Shed for Crane Storage	Steel structure shed	0.459	German	1995
Container Terminal (not schedule yet)	Pier and terminal, concept B, as recommended by Frederick R. Harris	61	To be obtained	

* Millions of US dollars of 1994
Source: CEPA

k. Other Infrastructure Projects

There are other infrastructure projects studied but not programmed yet. The most important is a container terminal.

The project has been under study since the late 70's when Frederic R. Harris, Inc. studied the port conditions and produced a Feasibility Study for a container terminal. The Consultant found feasible a combination breakwater/pier connected to a container yard on land, for which designs and specifications were prepared.

In early 1992 the Study was updated and the Consultant determined that the terminal will be needed before 2001 and will require an investment of some 61 million dollars.

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5.1.6 Acajutla Port Equipment

a. Fixed Installations

The port has a number of installations of equipment both on the piers and on land. These are:

- Two semi-portal cranes on Pier A
- One gantry crane on Pier B
- A system of belt conveyors on metal structures that carry dry bulk cargo between Pier B and silos and storage warehouses
- Pipelines between Piers A and C and storage tanks on land.

- Semi -Portal Cranes

There are two units on Pier A, running on one rail on the pier deck and another on the roof of a transit warehouse built on this pier. These are antiquated pieces of equipment of 3 ton capacity and of very limited use.

- Gantry Crane

Commonly know in the port as "Unidad de Carga", the gantry crane installed on Pier B is a machine that uses a clam shell to unload and a telescopic pipe to load dry bulk cargo.

Investigations conducted by German Consultants have revealed that the electrical systems of the crane require total replacement and the translation mechanism needs a complete overhaul.

- Belt Conveyors

The belt conveyors systems, hoppers and other appurtenances that serve the gantry on Pier B, are mounted on metal structures on the deck and on their way to silos, to other storage facilities and to unloading points.

The conveyors have an average throughput of 250 tons per hour, transporting fertilizers, grains, soy flour, sugar and other dry bulks. The system is in fair condition but requires considerable maintenance.

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- Pipelines

For loading and unloading bulk liquids a number of pipelines have been installed along Piers A and C. Table 5.1.16 shows their main characteristics and utilization.

TABLE 5.1.16
Port of Acajutla - Pipelines for handling of liquid bulks

PIER/BERTH	DIAMETER IN.	LENGH, MTS	UTILIZATION
Pier A (1)	8	800	Animal Fats, Vegetable Oils
Pier A (1)	6	900	Animal Fats, Vegetable Oils
Pier A (1)	16	1200	Molasses
Pier A (1)	8	800	Vegetable Oils
Pier A (1)	8	2000	Diesel Oil, Allcohol
Pier A (1)	6	2050	Diesel Oil, Allcohol
Pier A (1)	4	900	Caustic Soda, Alcane
Pier A (2)	10	1900	Diesel Oil
Pier A (2)	4	1000	Causstic Soda, Alcane
Pier A (2)	8	2100	Diesel Oil, Allcohol, Chemical Products
Pier A (2)	8	2050	Lubricants
Pier (2)	16	1350	Molasses
Pier C (7)	6	2000	Alcohol
Pier C (7)	10	2200	Diesel Oil
Pier C (8)	6	3000	Butane gas

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b. Moving Equipment

Table 5.1.17 shows the cargo handling equipment available at port piers, yards and warehouses. With important acquisitions recently made, the port now has sufficient equipment in good operating conditions to satisfy present requirements. Listed here is only equipment in good condition. Since those in poor conditions have been sold at auction.

TABLE 5.1.17
Port of Acajutla - Moving Equipment

EQUIPMENT	UNITS	CAPACITY	CONDITION
Front lift for handling containers	1 Unit	40 Tons	New
Lift trucks	54 Units	3,000 Kgs.	Good
Clamp lift rucks	6 Units	3,000 Kgs.	Good
Stevedoring lift trucks	30 Units	3,000 Kgs.	Good
Lift trucks	10 Units	3,500 Kgs.	Good
Lift trucks	8 Units	5,000 Kgs.	Good
Lift trucks	6 Units	9,000 Kgs.	Good
Lift trucks	5 Units	10,000 Kgs.	Good
Front loaders	9 Units	1.3 Cubic Mts.	Good
Front loaders	1 Unit	3.7 Cubic Mts.	Good
Tractors	15 Units	1.3 Cubic Mts.	New
Pull tractors	20 Units	10,000 lbs.	Two Good
Transtainers	4 Units	35 Tons	Two bad
Tractors and trailers	8 Units	Contenedor 40	New
Pull tractors	4 Units	10,000 lbs.	New
Wagons	41 Units	30-50 Tm/ Cap.	Good
Front loaders	13 Units	1.0-1.5 Ydas^3	Good

c. Tugs

The port of Acajutla has 3 tugs for docking operations and 2 small tugs to transport pilots and tanks ship gangs. Table 5.1.18 shows their characteristics and present operating conditions.

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TABLE 5.1.18
Port of Acajutla - Tugs

TUG	POWER	YEAR	CONDITION
CUSCATLAN	1,700 HP.	1977	Good
ACAXUAL	1,200 HP.	1954	Built in the U.S. It still operates, buth with probably half of its original power
SONSONATE	800 HP.	1969	Built in the U.S. May be used in berthing operations.
CALUCO	225 HP.		Built in the U.S. Only used for personnel transport between anchorage and piers
SAN MIGUEL	250 HP.		Good

d. Equipment Improvement Program

The port is carrying out several programs of rehabilitation and acquisition of equipment. The main components of these programs are described in Table 5.1.19.

TABLE 5.1.19
Port de Acajutla - Port Equipment Improvement Program

PROJECT	DESCRIPTION	COSTO *	FINAN.	SCHED.
Rehabilitation of gantry crane	Rehabilitation and replac. of certain crane comp. necessary to put mach. in good operat. conditions	2.325		1995
Equip. for maintenanc. Shop	A set of tools, equip. and instrumentation req . to put the maint. shops in good condition	0.262		1995
Multi -Purpose 40 ton crane for Pier C	A crane for handling containes, dry bulks and heavy loads	8.5		1996

5.1.7 Acajutla Port Operations

Acajutla handles dry and liquid bulks, break bulk and containerized cargoes. This section describes the manner in which these operations are carried out and the productivity achieved.

a. Dry Bulk Cargo

Table 5.1.20 shows the volumes of dry bulks moved through Acajutla in 1993.

TABLE 5.1.20
Port of Acajutla
Traffic of Dry Bulks in 1993

PRODUCT	TRAFFIC IN 1993	AVER. SHIPMENT TONS	NUMBER OF SHIPS	AVERAGE TIME IN PORT
Imports: Fertilizer, grain, soy flour, corn clour, sodium, bicarbonate, others	597,767	12,000	51	92 Hrs
Exports- Sugar	78,277	10,000	8	

For loading and unloading dry bulk cargo, Pier B, with four berths, is used. Normally unloading ships dock on the west side, at berths B3 and B4, while those loading use the east side, berths B5 and B6.

This berth assignment is dictated by the design of the gantry crane that is equipped with clam shell unloading gear on one side and telescopic loading pipes on the other. For the transfer between pier and storage facilities belt conveyors are used in an operation totally mechanized. When the product is to be transported to storage not directly served by the conveyors, the product is carried on the belts to an installation called "El Trompo", where trucks are loaded for transferring the cargo to the warehouse.

Occasionally, bulk carriers berth at Pier B and at other piers to unload bulks with ship's gear directly into trucks, when the installation at Pier B is operating with another ship or, for other reasons, is not available.

Depending on the type of operation, to silo, "trompo de carga" or direct unloading to truck, the requirements of manpower and equipment vary as described in Table 5.1.21

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TABLE 5.1.21
Port of Acajutla - Handling of Dry Bulks

GANG COMPOSITION	EQUIPMENT	BERTH	PRODUCTI VITY TONS PER HOUR	
			PER GANG	PER HOUR SHIP OPERAT.
UNLOADING TO SILOS OR STORAGE WAREHOUSE OR LOADING(TROMPO DE CARGA)				
On Ship 1Supervisor 2 equip. oerators 2 crane operators 5 stevedores On Deck 2 operators of belt conveyors equip. operator 2 mechanics 2 electricians 2 stevedores	Gantry crane and belt conveyors	B3 y B4	250	250
UNLOADING ON HOPPER				
On Ship 4 stevedores 2 equipment operat. 2 Crane Operat. 1 supervisor 2 electricians On Deck 4 stevedores 1 equip. operator 1 supervisor 1 checkman	Gantry Crane	B3 y B4	250	250
UNLOADING DIRECTLY ONTO TRUCKS WITH SHIP'S GEAR				
On Ship 8 estevedores 2 wincwayman 2 Equipment Operat. 1 hatchwayman 1 Supervisor 1 Auxiliary stevedores On Deck 4 Stevedores 1 equipment operator 1 supervisor 1 checkman	Ship's Gear Clam Shells Buhlers Front loaders Bulldozers	A1; A2 B3; B4 B5; B6	25	75

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b. General Cargo - Break Bulk

For the loading and unloading of break bulk, ships normally dock at Pier A where a transit shed is available, or in Pier C when Pier A is occupied.

For certain products, mostly coffee in bags, the transit shed is used to assemble shipments in advance of ships arrival. For other products the shed is an intermediate point of marshalling cargo, between ship side and port warehouses, sheds and yard. The transfer between transit shed and storage facilities is made on platforms pulled by tractors. Solid and liquid bulks are also unloaded at berths C7 and C8.

Table 5.1.22 shows the main products handled as break bulk at the port and Table 5.1.23 indicates the manpower, equipment required and productivity of the cargo handling operation.

TABLE 5.1.22
Port of Acajutla - Break Bulk Trafic in 1993

PRODUCT	TRAFFIC IN 1993	AVERAGE SHIPMENT	NUMBER OF SHIPS	AVER. SHIP TIME IN PORT/HOURS
Break bulk imports: Steel products	92,469	1,200	141	31
Products for Industry	19,264			
Grain in bags	19,668			
Other imports	37,324			
Total imports	168,725			
Exports: Sugar in bags	40,879	1,200	100	31
Sesame seeds	2,152			
Coffee in bags	57,115			
Other exports	21,270			
Total exports	121,416			

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TABLE 5.1.23
Port of Acajutla - Break Bulk Handling

GANG COMPOSITION	EUIPMENT	BERTHS	PRODUCTIVITY TONS PER HOUR	
			PER GANG	P/HOUR SHIP IN OPERATION
On Ship 1 supervisor 8 stevedores 2 winchman 1 hatchwayman 2 auxiliary stevedores	Ship's gear	A1, A2 C7, C8	20	60
On Deck 1 equip.operator 1 supervisor 4 stevedores 1 checker 1 Foreman	Lift trucks		20	60
In Warehouse Reception and Delivery 1 warehouseman 2 checkers 1 equipment operator 4 workers	Wagons		10	N/A

c. Containerized Cargo

Table 5.1.24 lists the products handled in containers at the port and the quantities of imports and exports that used this system in 1993.

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TABLE 5.1.24
Port of Acajutla - Container Traffic in 1993

PRODUCT	TRAFFIC IN 1993 TONS	AVERAGE. SHIPMENT TONS	NUMBER OF SHIPS	AVERAGE TIME SHIP IN PORT IN HOURS
Imports: Spare parts Machinery Hardware Lubricants Foodstuffs Products for Industry Other imports	4,617 2,908 2,193 2,130 5,190 5,821 46,151	1,800		
Total imports	69,010	5,750	12	20
Exports Coffee Foodstuffs Sesame seeds Other exports	 43,198 1,064 1,322 18,265			
Total Exports	63,849	6,400	10	

Acajutla does not have a specialized container facility. The containers are transported in combined break bulk/container ships of about 15,000 T.R.B., lengths of 150 mts. and draft of 10 mts.

The containers are loaded and unloaded with ship's gear directly on to and from tractor-trailers. These vehicles transfer the boxes between shipside and container yard where transtainers and a front lift stack the containers up to three high. The manpower and equipment requirements for this operation and its average productivity are shown in Table 5.1.25.

The operation of stripping and stuffing containers takes about 30 minutes per 20' box.

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TABLE 5.1.25
Port of Acajutla - Container Handling

GANG COMPOSITION	EQUIPMENT	BERTHS	PRODUCTIVITY TONS P/HOUR	
			PER GANG	HOURS OPERATION
On ship 12 stevedores 1 Foreman 1 stevedoreman aux. On deck 1equipment operator 1 supervisor 4 stevedores 1 checker	Ship's gear Tractors and trailers	C7, C8 preferebly	8	8
In storage yard Recei./Deliv. 1 checker 2 equipment operat. 1 yard supervisor	Transtainer Front lift		10	
Stripping and stuffing 1 checker 1 equipment operat. 4 workers	Transtainer Lift truck		2 TEUs Por hora	

d. Liquid Bulks

Liquid bulk tankers dock at Piers A and C and connect to pipelines installed along the decks to transfer the product between tanker hold and storage tanks. The main products and the volumes handled in 1993 are shown in Table 5.1.26.

TABLE 5.1.26
Puerto de Acajutla - Liquid Bulk Traffic in 1993

PRODUCT	TRAFFIC	AVERAGE SHIPMENT/TONS	NUMBER OF SHIPS	AVERAGE TIME OF SHIP IN PORT
Imports: Diesel oil Lubricants Butane Cotton seed oil	168,750.00 46,171.00 38,710.00 31,977.00	5,700	74	50 Hrs
Exports: Molasses Alcohol	46,145.00 25,510.00			

The unloading of imports use the ship pumps and for loading exports there are pumping stations on land. The requirements of manpower and equipment and the productivity of this operation are shown on Table 5.1.27

TABLE 5.1.27
Port of Acajutla - Handling of Liquid Bulks

GANG COMPOSITION	EQUIPMENT	BERTH	PRODUCTIVITY	
			PER GANG	TONS PER HR OF SHIP OPERATION
Iniciation and completion of operation: 10 stevedores	Imports: Ship's pumps	A1, A2, C7 o C8	130	130
During loading/unloading 5 stevedores	Exports: Storage pumps			

The port consists of one pier, with one berth on each side, that handles break bulk and liquid and solid bulk. The pier is a reinforced concrete deck on piles connected to land by an access trestle about 91 mts long.

5.1.8 Port of Cutuco- General

The Port of Cutuco on the Gulf of Fonseca in the eastern region of the country is located 185 kms by road and 252 kms by rail from San Salvador.

Both the substructure and the superstructure show advanced deterioration by corrosion and are in urgent need of repair.

FENADESAL is the owner of the port and the pier can be reached and operated only through the railroad.

5.1.9 Port Infrastructure of Cutuco

a. Inland Access

While the pier itself cannot be reached by road (the trestle is a railroad trestle only) the warehouses on land have highway access. The highway corridors that connect the region to the rest of the country are shown on Table 5.1.28.

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TABLE 5.1.28
Port of Cutuco - Highway Corridors leading to Cutuco

ORIG/DEST ZONES	HWY	MAIN PROUCTS	DISTANCE.	CONDITION
Zacatecoluca, Usulután, La Unión	CA2	Cotton, and coffee	142	Fair
Usulután, San Miguel, La Unión	CA1	Coffee, cotton, fertelizar, oils	90	Fair
Morazán , La Unión	CA7, CA1	Fertelizer	85	Fair

b. Railroad Access

Cutuco is the eastern terminal of District 1 of FENADESAL that links San Salvador with the principal cities of the central and eastern regions of the country (Cojutepeque, San Vicente, Zacatecoluca, Usulután, San Miguel and La Unión).

All cargo has to be moved to or removed from the pier by railroadcar or platform.

In 1993 37,062 tons of dry b[illegible] and 3,902 tons of liquid bulks were imported through Cutuco. The Port had no o[illegible]r activity.

c. Harbor Access

To reach Cutuco ships follow a natural channel that connects the southern part of the La Unión Bay with the Fonseca Gulf. The channel does not require dredging but has a limiting depth of 23' at low tide. Ships needing a deeper draft must wait for high tide to enter the port.

East of the berth there is convenient anchorage with depths of 12 to 14 mts.

d. Piers and Berths

The only pier of the port has a berth on each side. The ocean conditions are calm and operations are seldom interrupted by bad weather.

The characteristics of the berths are shown on Table 5.1.29.

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TABLE 5.1.29
Port of Cutuco - Berths

BERTH	MAX LENGHT	DRAFT	UTILIZATIO N	INSTALL. ON DECK
North	152 Mts.	9.15 mts.	Gen. Cargo liquid/solid bulk	Transit shed and raiload tracks
South	124 Mts.	7.62 Mts.	Gen. Cargo	

The one track line coming to the port provides one spur to the south berth and two to the north.

e. Warehouses

The port has 7 warehouses for storage of general cargo owned by the port and one owned by Dirección General de la Renta de Aduanas. The total area of these buildings is 26,000 m^2 and their total capacity is estimated at 16,700 tons. Table 5.1.30 shows the characteristics of the warehouses.

TABLE 5.1.30
Port of Cutuco - Cargo Warehouse Characteristics

WAREHOUS NUMBERS	TYPE OF CONSTRUCTION	YEAR	AREA M2	UTILIZATION AND CAPACITY	CONDITION
1	Steel structure	1910	2229	General cargo 500 MT	Bad
2	Saltex and steel roofing	1955	2384	General cargo 2.900 MT	Fair
3	Open with steel roof	1958	8,428.00	Cotton 5,600 MT	Good
5*	Saltex w/plastic roofing	977	2,596	Coffee 5,700 MT	Fair
6	Open w/ plastic roofing	1979	3,610	Ge neral Cargo 4,000 MT	Fair(Rented)

*Warehouse No. 4 was abandoned

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f. Other Storage Facilities

The port does not own facilities for bulk storage but private operators have warehouses adjacent and in the vicinity of the port with highway and rail access. These warehouses provide storage for some 28,000 tons.

Also the port has open storage yards more than adequate for present needs.

g. Other Buildings and Installations

Other installations in the port include:

An administrative building that houses the office of CEPA, FENADESAL, Customs and the Weather Station.

Maintenance shops of 189 m^2 for railroad equipment, lift trucks and other port equipment, and a storage room for spare parts and office supplies.

A combination barracks/office of 156 m^2 in very poor condition for the port security guards.

5.1.10 Cutuco Port Equipment

The port does not own cargo handling equipment and operates with a few lift trucks and front loaders, almost obsolete, on loan from Acajutla. The only fixed equipment in the port is a 180,000 lbs. scale.

The port has no tugs. Ships can berth without tug assistance but they require a pilot.

Table 5.1.31 shows the equipment available at Cutuco.

TABLE 5.1.31
Port of Cutuco - Movil Equipment

NUMBER	TYPE OF EQUIPMENT	CAPACITY	CONDITION	OBSERVATION
5	Lift trucks	3,000 Lbs.	Fair	Lack spares
2	Front loaders	1 Cubic Yard	Fair	Very old equipment
1	Front loader	1.5 Cubic Yard	Fair	
9	Gondolas	80,000 Lbs.	Fair	
4	Gondolas	40,000 Lbs.	Fair	

The average age of the equipment is over 20 years. The port has no maintenance program, limiting its work to emergency repairs only.

5.1.11 Port Operation and Productivity in Cutuco

The participation of Cutuco in handling Salvadorean waterborne cargo has been greatly reduced, decreasing from 205,000 tons in 1979 to only 41,000 tons in 1993. Its traditional exports, cotton and coffee, are no longer exported through Cutuco: Cotton because El Salvador ceased to be an exporter of cotton years ago and coffee because the plantations in the Eastern region were heavily damaged during the war. In 1993 only fertilizer in bulk and some liquids in bulk were imported.

a. Dry Bulks

The unloading of dry bulk uses chinguillos that are filled by hand in the hold to be raised by ship's gear to unload into railroad gondolas which transport the product to the warehouses.

Normally 3 or 4 gangs operate filling simultaneously 3 or 4 gondolas. Their productivity is about 21 tons/hour/gang.

The gang consists of the following:

IN THE HOLD	*ON DECK*
1 Foreman	1 Supervisor
1 Supervisor	1 Checker
2 Winchmen	6 Stevedores
1 Hatchwayman	
12 Stevedores	

b. Liquid Bulks

Liquid bulks may be handled in both berths although preferably the south berth is used. Tankers connect to pipelines and pump the product tc storage tanks at rates of 175 to 200 tons per hour. Both the pipelines and the storage tanks are privately owned.

5.1.12 The Competitive Position of the Ports

Cutuco and Puerto Quetzal on the Pacific and Santo Tomás de Castilla and Puerto Cortez on the Atlantic coast are geographic positions to compete for cargoes handled by Acajula.

Cutuco because of its lack of facilities and services is not really a competitor and only attracts a very small amount of bulk cargoes with destinations close to Cutuco. Only a resurgence of the export commodities of the region, coffee mostly, together with construction of a new facility or complete rehabilitation of the pier and provision of highway access to ther berths, could change this situation in the medium to long term.

The Atlantic ports, more than competitors, are complements to the Salvadorean port sector, compensating the lack of national ports on the Atlantic for trade with the Gulf of Mexico, the Eastern Coast of the United States and Europe. Therefore, the main competition of Acajutla with ports that serve the same hinterlands is only Quetzal.

In this phase of the study, the competitive position of Puerto Quetzal vs. Acajutla is analyzed. In the second phase, an analysis will be made to determine if Central American ports on the Atlantic in fact have lower costs and higher efficiencies to divert cargo that should be using Acajutla.

a. Cargoes

Not all cargoes handled in Acajutla can be handled by Puerto Quetzal.

Liquid bulks should be handled only in Acajutla (where all storage facilities are located). Puerto Quetzal only becomes and option if the difference in port costs is sufficient to compensate the cost of 270 kms of land transport in tanker trucks from Quetzal to Acajutla and the inconveniences and costs of crossing the border, paying the tankers' empty return and the double handling of the product. It can be shown that this is not the case, and that the cost of shipping Salvadorean liquid bulks through Quetzal is considerably higher compared to shipping through Acajutla, as indicated in Table 5.1.32.

For solid bulk cargo the situation is very similar since the large importers of products in bulk have in Acajutla important storage facilities exceeding 300,000 tons of capacity which Quetzal lacks. With the same analysis it can by demonstrated that Quetzal is no competition for the handling of this cargo.

In general cargo there could be competition in containers, steel products and grains in bags.

Some container traffic that should go to Acajutla is now using Puerto Quetzal. The most important factor in container transport is the level of service. An examination of shipping line schedules for both ports indicates that the container service in Quetzal is by far superior to that offered in Acajutla because of the lack of equipment in Acajutla for handling containerships. Without this equipment only general cargo ships with containers on deck can be handled in Acajutla, which offer poor schedules and slow service.

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It is academic to compare the present level of costs for handling containers in both ports since regardless of the difference in cost Acajutla cannot offer the service and, therefore, cannot attract containerized cargo.

It should be noted, however, that existing infrastructure of Acajutla could be improved for handling containerships, with expenditures considerably lower than those required to build a specialized container terminal. A container crane could be installed on Pier C and thus the port could accommodate container vessels (without ship's gear) which today cannot use the port. This solution is already under consideration and it is estimated that Pier C with the new crane could handle fifteen to twenty containers an hour. The container yard in Acajutla and the yard equipment could be sufficient for this improved operation.

b. Costs

A preliminary comparison of port costs indicates that Quetzal is not atractive for Salvadorean traffic since the cost of its operations are higher than in Acajutla in most cases, as shown in Table 5.1.32.

TABLE 5.1.32
Cost of Operations - Acajutla vs. Quetzal

	ACAJUTLA	QUETZAL
1. Unloading Steel and iron Dry Bulks Liquid Bulks Containers	¢ 74.64/tm ¢15.65/TM ——— ¢ 231.85/cont.	¢41.48/tm ¢40.88/TM ——— ¢ 192.76/Cont.
2. Dockage	¢/TM	¢/TM
Steel and iron Dry Bulks Liquid Bulks Containers FCL (Ship Charges) Containers FCL (user)	54.30 21.10 10.55 365.85 45.30	64.40 38.65 37.70 466.75/Cont. 120.10/Cont.
3. Land Freight Quetzal-San Salvador ¢ 100/MT		

Source: Frederic R. Harris, Inc. (Annex 5.1.2)

The table shows that most charges are lower in Acajutla and in those that are higher, the difference is not sufficeint to offset the cost of land freigth. Consecuently, for general cargo, solid bulks and liquids Acajutla offers lower costs and better infraestructure and handling than Puerto Quetzal.

Future competition among the ports of Acajutla, Cutuco and Quetzal is analyzed in Annex 5.1.3 in terms of differences in land and sea costs.

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5.1.13 Conclusions and Recommendations

a. Port of Acajutla

- Institutional Structure

Until 1994 when Dirección General de Transporte Marítimo was created, there was no specialized agency in the country involved in the regulation, control and promotion of maritime transport. El Salvador is not signatory of most of the international agreements relative to maritime activity. It is expected that this new organization will fill a void that is retarding the growth of this activity en El Salvador and denying the country its many benefits.

There is no real autonomy given to the Port Manager of Acajutla except for routine aspects of daily operation. All major decisions and functions are in the hands of CEPA in San Salvador, making the management process slow and cumbersome.

There is an absence of planning and engineering functions in Acajutla, capable of responding directly to the needs of the port. It is recommended that a department, in charge of these functions, be created in Acajutla.

There is no unit in charge of environmental protection in spite of the fact that port operations may significantly affect the ecological balance of the region. It is recommended that such unit be created.

There is no unit in charge of supervising the safety of private installations on the port grounds. Numerous pipelines run along the piers and require careful maintenance that should be supervised by the port. It is recommended that this situation be evaluated and a unit be created for this purpose.

There is no unit in charge of the promotion of the port and its services. It is recommended that such unit be created.

- Port Property

The land owned by CEPA in Acajutla - more than 100 hectares - is more than enough for any foreseen enlargement of the port.

Part of this land is in the periphery of the port proper and could be used to promote, by sale or lease, its utilization by private users, in the construction of industrial installations related to the port activity. An industrial park here could be a source of income for CEPA and of traffic for the port.

- Piers and Berths

Pier A urgently needs repair in order to stop its process of deterioration. It is urgent to finalize the agreements for securing the necessary funds, in order to implement the rehabilitation of this structure as soon as possible.

Pier B is presently undergoing installation of new fendering systems. Once this work is completed this pier will be in good operating condition and will not require investments in its infrastructure, for the short term.

- Warehouses and Storage Yards

The roofs of the general cargo warehouses are in very poor condition, significantly reducing storage capacity, currently being repaired. Once the warehouses are repaired the port will have sufficient storage capacity to satisfy the demand for storage until there is a substantial increase in traffic. See Table 5.1.33 where static capacity of warehouses and percentage of utilization are indicated.

TABLE 5.1.33
Port of Acajutla - Capacity and Utilization of Storage Facilities

Facility	Utilization1993	Annual Capac.MT/Yr	Utilization percentage
B. Warehouses - Port	50	216	23
B. Warehouses - Private	600	Over 1,000	65
Break B. Warehouses	210	235	89
Automobile Yard	10,000 units	14,000 units	71
Open Storage	100	150	67
Containers Yard	23,744 TEUs	32,400 TEUs	73

B. = Bulks

- Fixed Equipment Installations

The port's most productive system, the gantry crane and its belt conveyors on Pier B, requires important rehabilitation, for which a Feasibility Study has

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been prepared. The implementation of this project will enable Pier B and its installations to operate satisfactorily for the next ten years.

On Pier A the installation of a multi-purpose crane is for handling bulk cargo, heavy loads and containers is presently under consideration. This would be an important addition to the port, which could handle containerships without ship's gear and would be a short term alternative to a specialized container terminal. It is recommended that a detailed study be made to optimize this equipment for handling containers.

- Cargo Handling Equipment

The port has received important additions of new equipment for handling break bulk and containers. With this new equipment the port should be able to reduce maintenance costs and should have ample capacity to handle cargo at present levels.

- Pipelines

The port handles various liquid products, chemicals and fuels through pipelines that run along Piers A and C to the storage tanks. These pipelines are privately owned but occupy strategic locations in the port, where an accident could create complete disruption of port operations.

It is recommended that the port supervise and oversee the maintenance given to these pipelines by the users, as their failure could result in severe damage to life, environment and the port.

- Shops and Maintenance Procedures

The maintenance function is difficult and expensive as a result of the age of installations and equipment, the proliferation of machines of different makes and the lack of appropiate equipment and tools in the machine shops.

Purchase of new equipment for the shops and modernization of the facilities are underway. Also procedures have been changed to permit larger participation of private machine shops in the repair of port equipment. It is expected that these programs will improve the maintenance functions of the port and reduce its costs.

- Cargo Handling

Many of the requirements of the labor contract with the port workers' union impose duplication of personnel, some of whom are paid overtime. The stevedoring gangs involved in cargo handling, as required by the union, have excessive manpower and follow procedures that are inefficient and obsolete.

The cargo handling operations show very low productivity. Numerous factors have contributed to the deterioration of productivity while increasing costs. This subject will be analyzed in detail in the second phase of the Study.

There is a clear disregard for safety regulations in the operation of the port. It is recommended that the unit of industrial safety reorganize its procedures in order to enforce safer work practices.

b. Port of Cutuco

- Pier

The pier is in very poor condition. A thorough engineering and safety inspection of the structure is recommended together with a preparation of an estimate of the cost of its rehabilitation. A report on this subject prepared in April of 1993 does not furnish information sufficient to make decisions on this structure.

- Utilization

After handling more than 300,000 tons a year in the 1970s, the operation of Cutuco today is sporadic and minimal as a result of the war. The port seems to be gaining in activity and at present the marginal costs of keeping the port operating are low and its income may be sufficient to cover costs.

For the middle term it is necessary to decide whether it is feasible to keep the port in operation. The preparation of such study is recommended.

5.2 Port Analysis - Introduction

In the First Phase of this Study a diagnosis of the conditions of the port sector was made for the purpose of determining the capacity of the ports and their sufficiency to serve port traffic demand in the period 1995-2015.

The diagnosis indicated that improvements would be needed in two basic areas:

- ✓ The Procedures of Cargo Handling, and
- ✓ The Ports Infrastructure

Consequently, the analyses of changes in operation and infrastructure improvements that may be required are the subjects of this Second Phase of the Studies.

Some of the work included in this report has been prepared for the critical examination of certain aspects of today's operations. An example of this type of analysis is the study of cargo handling at each berth in Acajutla during 1993.

Other studies presented here measure the impact, especially the financial impact, of the initiatives and recommendations of the Consultants. For this purpose a structure of cost of Acajutla was prepared which facilitates the evaluation, in financial terms, of changes in the existing systems of operation and permits the calculation of the impact of future variations in the composition of the cargo handled by the port.

The Study starts with the design of an "Improved Operation" intended to eliminate the deficiencies in operation observed in the First Phase of the Study and estimates the additional capacity that could be obtained at the ports and savings the implementation of the "Improved Operation" would report to CEPA.

The Consultants then analyzed the traffic assigned to the ports by the Transportation Model of the Intermodal Study, which contemplates two alternative scenarios for the future development of the highway system. For these scenarios the Consultants identified the improvements in infrastructure and installations required by the ports to satisfy the demand, and calculated the financial feasibility of required investments.

In the last Section of the Report, the Consultants study the potential privatization of the operation of the ports, identifying the activities that can be handled by private operators and estimating the income that such concessions could generate for Port Authorities or for the government of El Salvador. This analysis, though preliminary, gives an idea of the potential of this system of port operation.

At the end of each analysis the Consultants present their conclusions and recommendations.

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Most of the tables included in the report and its Appendices are the result of computations and estimates made by the Consultants. Whenever the information is from a different source, the source is identified at the bottom of the table.

5.2.1 Utilization and Capacity of Acajutla

In the First Phase of the Study the low productivity of Acajutla was identified as a deficiency that increases port costs and impairs the competitive position of the port. In this Second Phase the analysis has been expanded, examining in detail the performance of each berth in 1993 and designing an "Improved Operation" with practices more in keeping with a modern port.

To analyze the causes of the problem and probable solutions the Consultants have gathered information from the Executive Personnel of the port, especially in the divisions of operations maintenance, administration and systems. These functionaires of CEPA have generously contributed information, comments and their own experience. The Consultants thank them for their valuable contributions.

The analysis of berth performance is based on records that CEPA maintains of the attention given to each ship, indicating berth used, hours at berth, hours of operation, delays and interruptions. The Consultants have combined this information with data on volume of cargo handled and, as a result, they have obtained a detail of the performance of each berth, the time of actual operation and the productivity obtained at each berth by type of cargo.

a. Idle Time at Berth

The type of information that the database contains, which includes 396 ships, is illustrated in Table 5.2.1. Probably the most relevant information shown here is the length of time that ships remain idle at berth, which averages about 30% of the ship's time at berth.

Worse yet, when idle times and interruptions of the operation at berths of high productivity are analyzed, the Consultants find delays even higher that seriously impact on the productivity and costs of the port. As indicated in Table 5.2.2, at berth B4, the most productive of the port, ships were idle 43% of the time. This additional time of ships at berth represents an annual extra cost of one million dollars for the users of that berth.

Of course not all interruptions can be eliminated. About ten percent are due to weather, ocean conditions or other unforeseen events, but in 1993 most of the delays were caused by lack or deficiency of equipment, but more often by union requirements and labor practices of interruption of work that have become routine in this port.

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TABLE 5.2.1
Acajutla - Bulk Mobilization and Berth Occupation in 1993

	BULK MT	CLASS	UNLOAD MT	HANDLING TIME
	21284	GENERAL BULK	27379	771 21
BERTH A-1	41348	LIQUID BULK	152995	1284 38
	0	DRY BULK	16986	77 35
	3164	CONTAINER	5299	151 55
				2284 49
BERTH A-2	79116	GENERAL BULK	58650	1926 76
	9886	LIQUID BULK	131331	815 95
	0	DRY BULK	5250	52 5
	3164	CONTAINER	1784	88 86
				2883 77
	STAY AT PIER "A"	6750 HOURS		
BERTH B-3	959	GENERAL BULK	6229	101 55
	0	LIQUID BULK	8613	276 23
	0	DRY BULK	114012	917.1
	2572	CONTAINER	2750	56.2
				1351.08
BERTH B4	126	GENERAL BULK	5092	82.3
	0	LIQUID BULK	0	0
	78277	DRY BULK	411398	2002.19
	2776	CONTAINER	3263	61.2
				2145.69
BERTH B-5	2364	GENERAL BULK	35172	317 85
	0	LIQUID BULK	0	0
	0	DRY BULK	15772	278 5
	11719	CONTAINER	10236	294.45
				890 6
	STAY AT PIER "B"	7168 HOURS		
BERTH C-7	23491	GENERAL BULK	62334	1098.2
	25447	LIQUID BULK	51295	718 62
	0	DRY BULK	35153	228.5
	13088	CONTAINER	16242	445.13
				2490.45
BERTH C-8	0	GENERAL BULK	1483	30 1
	0	LIQUID BULK	11965	110.15
	0	DRY BULK	0	0
	3144	CONTAINER	1252	39.2
				179.45
	STAY AT PIER "C"	3586 HOURS		

TOTAL TIME AT PIER	INACTIVE TIME AT PIER	HANDLING TOTAL TIME
17504	5278.27 HOURS 30%	12225.73 HOURS

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CUADRO 5.2.2
Comportamiento del Atracadero B4 - Acajutla en 1993

	TIME EN PIER	BULK MOVEMENT	CLASS	HANDLING EFFECTIVE TIME	OPERATION OUTPUT	IDLE TIME	
J A N U A R Y							
ENTRE RIOS II	14 50	859	6	8	105	6 30	
OMINA	53 50	11074	3	29	389	25 00	
FANNIE ANNE	117 10	25000	3	81	308	35 90	
TOTAL IN PIER	185.10						67 2
MONTHLY IDLE TIME %						36	
BERTH B-4							
F E B R U A R Y							
PRIME	100.40	10798	3	57	189	43 20	
VIRGINIA	98 10	16075	3	75	213	22 61	
NAVARINO	76 10	14038	8	52	272	24 55	
JAG VISHNU	154 27	25342	3	87	293	67 77	
EVAGELISTRIA	65 12	15239	8	49	309	15 82	
TOTAL IN PIER	493 99						173 95
MONTHLY IDLE TIME %						35	
BERTH B-4							
M A R C H							
MINI LIMPH	29 30	2798	3	20	137	8 90	
LEADERMAN	103 40	20805	3	67	308	35 95	
OMINA	25 41	1818	3	18	103	7 86	
TOTAL IN PIER	158.11						52.71
MONTHLY IDLE TIME %						33	
BERTH B-4							
A P R I L							
PANADROS	87.00	11000	8	55	199	31.85	
HAFNIA	82.10	9201	3	55	169	27 60	
WOOD PIONEERS	132.40	14699	3	63	233	69.35	
TOTAL IN PIER	301.50						128 8
MONTHLY IDLE TIME %						43	
BERTH B-4							
M A Y							
LARAS	85.40	7458	3	28	271	57 90	
STELLA	173.00	20899	3	46	451	126 65	
POPI	95.15	27128	3	70	387	25 05	
FUJISAN MARU	130.17	14000	8	61	229	68 97	
NICOL	128.13	18250	3	78	234	50.03	
TOTAL IN PIER	611.85						328 8
MONTHLY IDLE TIME %						54	
BERTH B-4							
J U N E							
HORNFELSS	13.05	495	6	8	61	4 90	
TIERRA DE FUEGO II	15 20	1245	1	9	135	6.00	
YOU XIU	84 58	21967	3	51	431	33.58	
TOTAL IN PIER	112.83						44.48
MONTHLY IDLE TIME %						39	

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b. Present Utilization

The seven berths operating in Acajutla in 1993 (berth B6 was not in operation) shared the handling of cargo with berth occupations ranging from 15 to 36% of the annual available time. See Table 5.2.3. The highest percentage of occupation is shown at Berth B4 where normally the "Unidad de Carga" (pier crane for bulk cargo) operates. This is the most productive berth of the port, handling more than half a million tons a year.

In general, ships waiting for service at the port have delays of less than 10% of service time, as calculated by Queuing Theory and a Poisson distribution in the time of arrival, which is considered adequate.

c. Capacity Under Present Conditions

The Consultants have calculated the capacity of the port to handle cargo under present conditions and, from the point of view of berth occupancy and acceptable waiting time, estimate that, on average, the port is utilized at 50% of its capacity. At maximum berth occupancy the existing berths could handle up to three million tons a year, assuming a composition of the cargo similar to the one observed today. These estimates are shown in Table 5.2.4.

d. Improvement of Operations

In addition to the delays, interruptions and idle times of ship at berth described in the previous paragraphs, the Consultants have identified other causes that reduce the effectiveness of the operations and increase costs. Among others, the following are the most important:

- ✓ The present contract with the Port Workers' Union dictates obsolete practices and requires excessive number of personnel, especially in the operations of loading and of unloading of cargo.

- ✓ The lack of certain equipment and the poor maintenance of other pieces of equipment created significant delays in 1993. This deficiency, however, has been reduced to a minimum with the acquisition of new equipment.

- ✓ The coordination in the operations of inspection, acceptance of the ship and commencement of the work caused additional delays attributable to CEPA, the shipping agencies and the users. It is estimated that idle time at berth in 1993 amounted to a total of 5,278 hours.

TABLE 5.2.3
Acajutla - Berth Utilization and Productivity in 1993

TYPE OF BULK		BREAK BULK	LIQUID BULK	SOLID BULK	CONTAINER
	Tons	40390	194342	16986	14509
BERTH	HOURS	1013	1268	118	182
A1	Prod * (1)	40	153	143	80
% HANDLED	(2)	15	45	3	11

OCCUPATION Total- HOURS: 2926 — OCCUPATIO % : 34

TYPE OF BULK		BREAK BULK	LIQUID BULK	SOLID BULK	CONTAINER
	Tons	114347	141197	2550	8115
BERTH	HOURS	1872	908	61	48
A2	Prod * (1)	61	155	42	169
% HANDLED	(2)	43	33	0	6

OCCUPATION Total- HOURS: 3078 — OCCUPATIO % : 36

TYPE OF BULK		BREAK BULK	LIQUID BULK	SOLID BULK	CONTAINER
	Tons	5974	8613	114012	8728
BERTH	HOURS	163	85	1378	73
B3	Prod * (1)	37	101	83	119
% HANDLED	(2)	2	2	17	7

OCCUPATION Total- HOURS: 2127 — OCCUPATIO % : 25

TYPE OF BULK		BREAK BULK	LIQUID BULK	SOLID BULK	CONTAINER
	Tons	4331	0	489873	9904
BERTH	HOURS	136	0	2855	84
B4	Prod * (1)	32	0	172	117
% HANDLED	(2)	2	0	73	7

OCCUPATION Total- HOURS: 3736 — OCCUPATIO % : 43

TYPE OF BULK		BREAK BULK	LIQUID BULK	SOLID BULK	CONTAINER
	Tons	31158	0	15772	36006
BERTH	HOURS	364	0	353	320
B5	Prod * (1)	86	0	45	112
% HANDLED	(2)	12	0	2	27

OCCUPATION Total- HOURS: 1314 — OCCUPATIO % : 15

TYPE OF BULK		BREAK BULK	LIQUID BULK	SOLID BULK	CONTAINER
	Tons	71235	76742	35153	48265
BERTH	HOURS	1438	621	398	399
C7	Prod * (1)	50	124	88	121
% HANDLED	(2)	27	18	5	36

OCCUPATION Total- HOURS: 3072 — OCCUPATIO % : 36

TYPE OF BULK		BREAK BULK	LIQUID BULK	SOLID BULK	CONTAINER
	Tons	1231	11965	0	7209
BERTH	HOURS	40	112	0	37
C8	Prod * (1)	31	107	0	193
% HANDLED	(2)	0	3	0	5

OCCUPATION Total- HOURS: 288 — OCCUPATIO % : 3

NOTES :

(1) Productivity in tons per Pier-Hour

(2) Percentage of load type handled by each berth

The stay in berth information is approximated based on "Declaración General de Naves"

SUMMARY OF PRODUCTIVITY		BREAK BULK	LIQUID BULK	SOLID BULK	CONTAINER
ALL	Tons	268664	432859	674146	132737
	HOURS	5026	2994	5160	1145
BERTHS	Prod. (1)	53	145	131	116

TABLE 5.2.4
Acajutla - Capacity in Present Conditions

			BERTHS							
			A1	A2	B3	B4	B5	B6	C7	C8
			TOTAL AVAILABILITY OF BERTH BY HOURS PER YEAR							
			4320	4320	4320	4320	4320	4320	4320	4320
BREAK BULK	**MT / YEAR**	387040								
USING HOURS OF BERTH			3120	3120					1000	
MOBILIZED BULK @ MT./ HOUR-PIER		53.46	166791	166791					53459	
SOLID BULK	**MT / YEAR**	607154								
USING HOURS OF BERTH			1200	1200					1200	600
MOBILIZED BULK @ MT./ HOUR-PIER		144.56	173473	173473					173473	86736
DRY BULK	**MT / YEAR**	1490400								
USING HOURS OF BERTH					4320	4320	4320	4320		
MOBILIZED BULK @ MT./ HOUR-PIER (BULK UNITY)						743040				
MOBILIZED BULK @ MT./ HOUR-PIER (BUHLER)					358560					
MOBILIZED BULK @ MT./ HOUR-PIER (TRUCKS)							194400	194400		
CONTAINERS	**MT / YEAR**	677098								
USING HOURS OF BERTH									2120	3720
MOBILIZED BULK @ MT./ HOUR-PIER		116							245796	431302
			4320	4320	4320	4320	4320	4320	4320	4320
			OCCUPATION HOURS OF BERTH							

PORT CAPACITY IN ANNUAL MT 3,161,692

HANDLED TONS IN 1994 1,876,000

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The Consultants consider that the conditions of the port could improve in the short term and most of the causes for delay in the operations would disappear as a result of the following:

- ✓ The important increase in port traffic expected in the short term will create a better atmosphere to negotiate with the Port Workers' Union a modernization of work practices and the reduction of unnecessary personnel. These reductions could be made without discharging personnel as a result of the greater activity of the port.

- ✓ The present policy of the government of inserting the Salvadorean economy in global trade requires an efficient transportation infrastructure and, in particular, competitive ports, with modern installations and operations, capable of lowering costs and facilitating imports and exports. This policy should provide incentives to all participants in port activities to better coordinate their operations and optimize the total operation of the port.

- ✓ The recent acquisition of cargo handling equipment and the programs of rehabilitation of installations at the piers and at the yards will give CEPA the capacity to respond promptly to equipment requirements, thus eliminating to a large extent the delays observed in 1993.

Based on these considerations, the Consultants have designed an improved operation characterized by:

- ✓ Gangs tailored to each task, including only the necessary number of stevedores and equipped to produce throughputs normally obtained at modern ports. See Table 1 to 15 in Annex 5.2.1.

- ✓ Reduction of idle time at the berth, eliminating delays for lack of coordination, equipment shortage and obsolete labor practices and limiting idle time to a maximum of 20% of the ship's time at berth.

The design of the improved operation is described in detail in Annex 5.2.1 and Tables 5.2.5 to 5.2.8 illustrate the main characteristics of present operation and those of the "Improved Operation".

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TABLE 5.2.5
Forming Gangs and Estimate of Operation Costs

BULK: CONTAINERS

OPERATION: SHIP TO PIER	PRODUCTIVITY IN MT/ HOUR 139.14	OUTPUT EN MT/ HOUR - MAN 11.60

GANGS	N°	WAGES PER HOUR	COST OF EQUIPMENT USE	COST OF MATERIAL
ON BOARD				
STEVEDORES	4	¢93.82	1 PIER CRANE	ELECTRIC ENERGY
GANGWAY OPERATOR	1	¢23.45	¢3,212.54	(303 kW / HOUR))
STEVEDORMAN AUXILI	1	¢23.45		¢250.00
CRANE OPERATOR	2	¢47.32		
AT PIER				
PIER LABORERS	2	¢46.91		
SUPERVISOR	1	¢16.35		
CHECKMAN	1	¢15.51		
	12	¢266.82	¢3,212.54	¢250.00

LABOR COST	COST OF EQUIPMENT AND MATERIAL	DIRECT COST
¢266.82 COLONES / HOUR	¢3,462.54 COLONES / HOUR	¢3,729.35 COLONES / HOUR

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TABLE 5.2.6
Comparison between Present and Improved Operation

BULK	OPERATION	MEN PER GANG		MT /GANG/ HOUR	
		PRESENT OPERATION	IMPROVED OPERATION	PRESENT OPERATION	IMPROVED OPERATION
GENERAL BULK	STOWING / UNSTOWING	20	14.5	20	27
	DOCKAGE (Transference)	5	2	20	27
	RECEPTION AND DISPATCH AT WAREHOUSE	9	8	10	10
DRY BULK					
UNLOAD TO WAREHOUSES	STOWING / UNSTOWING	13.25	10	170	250
	TRANSFERENCE	7	5	170	250
UNLOAD TO "Trompo"	STOWING / UNSTOWING	13.25	10	150	180
	TRANSFERENCE	7	5	150	180
UNLOAD TO DUCT	STOWING / UNSTOWING	19.25	13	150	180
UNLOAD TO TRUCKS 1>	STOWING / UNSTOWING	20.5	15.5	25	80
UNLOAD TO BUHLER	STOWING / UNSTOWING	20.5	12.5	80	100
LIQUID BULK	SHIPPING / UNLOADING	10	5	130	150
CONTAINER CARGO	SHIP TO PIER	20	12	61.8	139.14
	PIER TO YARD	6	6	61.8	139.14
	RECEIPT / DELIVERY - PIER	4	3	61.8	139.14
	RECEIPT / DELIVERY - USER	4	3	61.8	139.14

1> Includes a higher capacity Clampshell and a mobile chutee for unloading to trucks

TABLE 5.2.7
Acajutla - Effort Reduction with Improved Operation

		PRESENT OPERATION		IMPROVED OPERATION	
		OUTPUT *	EFFORT *	OUTPUT *	EFFORT *
BREAK BULK	STOW / UNSTOW	0.70	1 43	1 49	0 67
	TRANSFERENCE	2.80	0.36	10 80	0 09
	RECEIPT AND DELIVERY - USER	0.88	1 14	1 00	1 00
	RECEIPT AND DELIVERY - PIER	1 00	1 00	1 14	0 88
	Total				

		PRESENT OPERATION		IMPROVED OPERATION	
		OUTPUT *	EFFORT *	OUTPUT *	EFFORT *
CONTAINERS	STOW / UNSTOW	2.06	0 49	11 60	0 09
	TRANSFERENCE	7.21	0 14	23 19	0 04
	RECEIPT AND DELIVERY - USER	10.82	0.09	46 38	0 02
	RECEIPT AND DELIVERY - PIER	10.82	0 09	46 38	0 02
	TRANSFERENCE FROM YARD TO WAREHOUSE	3.61	0.28	5 15	0 19
	CONSOLIDATION / DESCONSOLIDATION	1.80	0.55	2 58	0 39
	Total				

		PRESENT OPERATION		IMPROVED OPERATION	
		OUTPUT *	EFFORT *	OUTPUT *	EFFORT *
DRY BULKS	STOW / UNSTOW TO CONVEYOR	8.98	0 11	20 00	0 05
	UNSTOW TO DUCT	5 45	0 18	11 08	0 09
	UNSTOW TO "Trompo"	7.92	0 13	14 40	0 07
	TRANSFERENCE TO WAREHOUSE	17.00	0 06	40 00	0 03
	TRANSFERENCE TO "Trompo"	15.00	0.07	28 80	0 03
	UNSTOW WITH BUHLER	2.73	0 37	6 40	0 16
	UNSTOW TO TRUCKS	0.85	1 17	1 29	0 78
	Total				

		PRESENT OPERATION		IMPROVED OPERATION	
		OUTPUT *	EFFORT *	OUTPUT *	EFFORT *
LIQUID BULKS	SHIPPING / UNLOADING	9.10	0.11	24 00	0 04
	Total				

* OUTPUT IN Tons Hour / Man

* EFFORT in Hours - Man/ Ton

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TABLE 5.2.8
Summary of Costs Improved Operation - 8% Interest

		Productive Tons / Hour	Power Man Cost	Equipment Cost	Materials Cost	Total Cost	Cost per Ton	Total Cost US $	Cost per Ton US $
	STOWING / UNSTOWING	27	233.09	13.28	6.09	252.45	9.35	28.85	1.07
BREAK BULK	TRANSFERENCE	27	31.25	69.24	23.49	123.98	4.59	14.17	0.52
	RECEIPT / DELIVERY - PIER	10	125.36	14.24	6.09	145.69	14.57	16.65	1.67
	RECEIPT / DELIVERY - USER	10	125.36	14.24	6.09	145.69	14.57	16.65	1.67
	STOWING / UNSTOWING	139.14	266.82	3212.54	250.00	3729.35	26.80	426.21	3.06
	TRANSFERENCE	139.14	107.92	1478.23	62.64	1648.79	11.85	188.43	1.35
CONTAINERS	RECEIPT / DELIVERY - PIER	139.14	63.67	762.67	41.76	868.10	6.24	99.21	0.71
	RECEIPT / DELIVERY - USER	139.14	63.67	762.67	41.76	868.10	6.24	99.21	0.71
	TRANSFERENCE FROM YARD TO WAREHSOUSE	15.46	63.67	762.67	41.76	868.10	56.15	99.21	6.42
	CONSOLIDATION / DESCONSOLIDATION	15.46	92.39	267.08	6.09	365.56	23.65	41.78	2.70
	STOW / UNSTOW TO CONVEYOR	250	185.65	2055.59	260.44	2511.68	10.05	287.05	1.15
	UNSTOW TO DUCT	180	244.87	2055.59	260.44	2560.90	14.23	292.67	1.63
DRY BULK	UNSTOW TO "Trompo"	180	185.65	2046.45	260.44	2502.54	13.90	286.00	1.59
	TRANSFERENCE TO WAREHOUSE	250	84.83	2034.61	113.85	2233.39	8.93	255.24	1.02
	TRANSFERENCE TO "Trompo"	180	84.83	2034.61	113.85	2233.39	12.41	255.24	1.42
	UNSTOW WITH BUHLER	100	226.65	145.27	47.57	419.49	4.19	47.94	0.48
	UNSTOW TO TRUCKS	80	279.40	45.88	10.44	335.72	4.20	38.37	0.48
	UNSTOW OF CEREALS	300	679.92	525.12	142.71	1347.75	4.49		
	TRANSFERENCE	300	84.83	4759.04	250.00	5093.97	16.98		
LIQUID BULK	SHIPPING / UNLOADING	150	71.26	0.00	0.00	71.26	0.48	8.14	0.05

e. Costs of Improved Operation

- Costs of Savings and of Improved Operation

The Consultants estimated the cost of each cargo handling operation of the "Improved Operation", including:

- ✓ The costs of manpower required using CEPA salaries in 1994 plus 86% to cover Social Benefits in force in 1994.
- ✓ The cost of the equipment based on market price and amortization time according to the type of equipment which varies between five and twenty years. As a rule 8% interest has been used for major equipment that the port already owns or could purchase with development loans. Twelve percent interest has been used for equipment purchased with CEPA funds or by concessionaires at market prices.
- ✓ The price of fuel and materials at 1994 prices.
- ✓ The annual cost of maintenance of the equipment that varies from 2 to 4% of acquisition price depending on the equipment.

These costs make up the unit cost of each operation per ton of throughput. Tables 5.2.5, 5.2.8 and 5.2.9 illustrate the process.

The savings obtained with the improved operation are of important magnitude. Using the variable costs described in Section 5.2.2 -Port Costs of Acajutla the Consultants estimate that in 1993 the port could have saved over 15 million Colones using the Improved Operation, over four times the profit made by the port in that period.

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TABLE 5.2.9
Gang Payroll - 8% Interest

EQUIPMENT	PURCHASE PRICE IN COLONES	YEAR	XCHANGE RATE	UTILITY YEARS	INTEREST RATE	ANNUAL PAYMENT	HOURS PER YEAR	FUEL CONSUMPTION PER HOUR	DIESEL COST	CONSUMPTION OF ELECTRIC FUEL IN KW / HOUR	COST OF ELECTRIC ENERGY	OPERATION COST PER HOUR	MAINTENANCE COST	TOTAL COS WITHOUT FUEL	TOTAL COST PER HOUR
EQUIPMENT FOR BULKS															
CARGO UNIT	44,000,000	71		20	8%	4,481,497.19	2400				261.53	1,867.29	134.64 1>	2,001.93	2,263.46
CONVEYOR BELT	44,000,000	71		20	8%	4,481,497.19	2400			138.00	113.85	1,867.29	167.32 2>	2,034.61	2,148.46
BUHLER	1,500,000	78		20	8%	152,778.31	2000			55.00	45.38	76.39	30.00	106.39	151.76
Bazooka	28,000	83		10	8%	3,874.77	2000			7.50	6.19	1.94	0.52	2.46	8.64
FRONT-END LOADERS	411,402	91		10	8%	61,311.03	2000	1.50	13.05			30.66	8.23	38.88	51.93
BELT TRACTORS	365,186	91		10	8%	54,423.48	2000	1.50	13.05			27.21	7.30	34.52	47.57
Clampshell 2.6 MT.	156,301	80		10	8%	23,283.46	2000					11.65	3.13	14.77	14.77
Clampshell 4 MT.	59,553	77		10	8%	8,875.90	2000					4.44	1.19	5.63	5.63
Clampshell 6 MT.	74,082	77		10	8%	11,037.42	2000					5.52	1.48	7.00	7.00
EQUIPMENT FOR CONTAINERS															
PIER CRANE	77,000,000	88		20	8%	7,842,620.08	3400			500.00	412.50	2,306.65	905.88	3,212.54	3,625.04
Noell- Transtainer CRANE	8,069,347	91		10	8%	1,202,570.86	2000	4.80	41.76			601.29	161.39	762.67	804.43
Pismarine FRONT CARRIAGE	1,028,991	91		5	8%	257,717.44	1600	1.20	10.44			161.07	25.72	186.80	197.24
CART	328,165	91		5	8%	82,191.04	1600					51.37	8.20	59.57	58.57
FORKLIFT Taylor - Front Lift	2,825,801	91		10	8%	421,127.88	2000	2.50	21.75			210.56	56.52	267.08	288.83
BARGES															
TUGBOAT Seaconsorte	11,000,000	81		10	8%	1,638,324.38	2000	65.00	565.50			819.66	220.00	1,039.66	1,605.16
TUGBOAT Cesarstân	26,000,000	73		10	8%	3,874,786.71	2000	129.50	1,127.52			1,937.36	520.00	2,457.38	3,584.90
TUGBOAT San Miguel	4,000,000	81		10	8%	596,117.95	2000	36.00	313.20			298.06	80.00	378.06	691.26
TUGBOAT Amazonas	17,000,000	78		10	8%	2,533,501.31	2000	120.00	1,044.00			1,266.75	340.00	1,606.75	2,650.75
TUGBOAT Cabres	4,000,000	81		10	8%	596,117.95	2000	36.00	313.20			298.06	80.00	378.06	691.26
FIBERGLASS BOAT															
GENERAL BULK EQUIPMENT															
FORKLIFT 3,000 Kgs.	140,466	91		10	8%	20,933.58	2000	0.70	6.09			10.47	2.81	13.28	19.37
FORKLIFT CLAMP TYPE (3,000 Kgs.)	182,783	91		10	8%	27,240.06	2000	0.70	6.09			13.62	3.66	17.28	23.37
FORKLIFT STEVEDORE TYPE (3,000 Kg	181,525	91		10	8%	27,052.58	2000	0.80	6.96			13.53	3.63	17.16	24.12
FORKLIFT (5,000 Kgs.)	150,653	91		10	8%	22,451.74	2000	1.00	8.70			11.23	3.01	14.24	22.94
FORKLIFT (9,000 Kgs.)	231,827	91		10	8%	34,548.08	2000	1.80	15.66			17.27	4.64	21.91	37.57
FORKLIFT (10,000 Kgs.)	418,258	91		10	8%	62,332.48	2000	1.80	15.66			31.17	8.37	39.53	55.19
LOAD TRACTORS (10,000 Lbs.)	318,054	91		10	8%	47,101.37	2000	2.00	17.40			23.55	6.32	29.87	47.27
WAGONS	30,780			10	8%	4,588.82	2000					2.29	0.62	2.91	2.91

1> Taken from maintenance cost /93 (323,142)
2> Taken from maintenance cost /93 (401,570)

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f. Conclusions and Recommendations

Now that the country wishes to compete internationally with its exports, it is indispensable to update current practices, in particular those that affect its foreign trade. Slow and inefficient port operations not only raise costs but also impose delays and lack of services to exporters and importers that make it difficult for them to fulfill their international commitments.

The "Improved Operation" recommended here mirrors the procedures and organization of the work where the operator has to compete to obtain his share of the market. This is the situation in the American ports, in most European and in some Asiatic ports.

The reductions in the number of workers resulting from the "Improved Operation" are significant but can be implemented with qualified personnel motivated by the recognition of productivity in the work. **Remuneration by ton of throughput per gang** with freedom of makeup in the gang force, normally produces efficient gangs and intensive use of mechanization, as the worker realizes that his remuneration depends on his personal effort and the productivity of his gang.

Perhaps, properly designed training of the worker may be necessary in order that the work force would have a clear idea of the benefits offered by a progressive and dynamic port, open to competition, where the productivity of operations is stimulated and rewarded.

The Consultants recommend that the port set up as an immediate objective the betterment of its operations along the lines proposed in the "Improved Operation" and implement a policy of education and communication with the labor force that permits the modernization of its cargo handling procedures.

5.2.2 Port Costs of Acajutla

The cost structure of the Port of Acajutla by cargo type and type of service cannot be obtained from the financial statements produced by the accounting of CEPA.

It is necessary to distribute aggregate costs to numerous activities and accounting items in order to establish a structure of cost that allow the projection of future income and expenses in function of the types and volumes of traffic that the port will handle until year 2015.

a. Methodology

The assignment and distribution of costs to the different types of cargo has been prepared using the items of cost of the financial statements of 1993 published by CEPA. These

aggregate amounts have been distributed by operation and cargo type in accordance with criteria applicable to the nature of the expenditure.

The disaggregation of costs by type of cargo is of particular importance in the expenses of the Operations Department since it is here where the changes of the "Improved Operation" are reflected with greater impact. In addition, since port costs are a function of cargo type it is necessary to have costs by cargo type to prepare financial forecasts.

In short, as a result of this exercise of cost assignment the expenditures of the different departments of CEPA are distributed in terms of cost per ton of throughput for the four types of cargo considered in this Study: break bulk, containerized cargo, dry bulk and liquid bulk.

The analysis is made utilizing, first, the results of 1993 operating under present conditions to establish a basis for comparison. Then, the changes resulting from the "Improved Operation" are introduced, especially those related to productivity and manpower effort required by each procedure, in order to determine the costs of the Operations Department with "Improved Operation" by cargo type. With these costs, then, the financial results of the port are estimated for the future years, using the composition by cargo type forecasted by the Study Transportation Model.

The assignment criteria used by the Consultant are **expenditures related to services to the ships**, desegregated to establish the cost of such services.

✓	Cargo	This criteria is applied to expenditures related to cargo handling when the cost is a function mainly of the volume of the cargo handled. This cost is distributed proportionally to the volume of cargo of each category.
✓	Equipment Operation	This criteria is applied to aggregate expenditures related to equipment operators. These costs are distributed in function of the number of operators required by the handling of each type of cargo, as reflected in Port Statistics.
✓	Direct Costs	This criteria is applied to desegregate operation and maintenance costs of general

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	application to the handling of the cargo. The cost is assigned in function of the sum of direct costs of operation and maintenance required by the handling of each type of cargo.
Equipment	This criteria is applied to desegregate expenditures of operation and maintenance that reflect the nature of the equipment. These expenditures are distributed in function of the value of each piece of equipment and is assigned to the type of cargo that uses each piece of equipment.

b. Results

A summary of the results obtained with the assignment of costs is shown in the following Tables and their sequence illustrates the process of assignment followed by the Consultant.

The Tables are:

Table 5.2.10	Shows the discrimination of income in function of the type of cargo.
Table 5.2.11	Shows the distribution of the Operations Department costs as assigned to each type of cargo.
Table 5.2.12 & 5.2.13	Detail of fixed and variable costs.
Table 5.2.14 & 5.2.15	Shows fixed and variable costs for each type of cargo under present conditions and for Improved Operation.
Tables 5.2.16 & 5.2.17	Summary of costs for all departments of the port under present and Improved Operations.
Table 5.2.18	Reduction of Costs Obtained Through Improved Operation.

TABLE 5.2.10
Acajutla Income - 1993

CONCEPT	INCOME	SERVICE TO SHIPS	HANDLING GENERAL BULK	HANDLING SOLID BULK	HANDLING LIQUID BULK	CONTAINER HANDLING	OTHER SOURCE INCOME
SERVICE TO SHIPS							
BERTHING / UNBERTHING	10,345,871	10,345,871	MEASURED AVERAGE: ¢ 3.47 PER TRB				
STAY	2,884,398	2,884,398	MEASURED AVERAGE LENGTH OF 150 Mts. = ¢ 140.37/ HOUR				
OTHERS	588,222	588,222					
TOTAL SERVICES TO SHIPS	13,818,491						
STOW / UNSTOW							
GENERAL BULK (2)	28,782,040		28,782,040				
TRANSSHIPMENT	324,781		324,781				
CONTAINERS	2,152,044					2,152,044	
SOLID BULKS (3)	15,327,577			15,327,577			
LIQUID BULKS	5,107,088				5,107,088		
TOTAL STOW / UNSTOW	51,703,530						
TRANSFERENCE							
GENERAL BULK	16,488,054		16,488,054				
CONTAINERS (4)	6,191,755					6,191,755	
SOLID BULK	11,153,682			11,153,682			
TOTAL TRANSFERENCE	33,831,491						
STORAGE							
GENERAL BULK	2,495,571		2,495,571				
CONTAINERS (4)	9,721,054					9,721,054	
SOLID BULK	911,807			911,807			
TOTAL STORAGE	13,128,432						
OTHER AREAS							
EQUIPMENT RENTAL	1,563,796						1,563,796
RENT PREMISES AND PLOTS	1,100,445						1,100,445
WATER, COMMUNICATIONS & ELEC. SERVIC	768,015						768,015
INTERESTS	2,774,162						2,774,162
OTHERS	1,057,899						1,057,899
TOTAL	7,264,317						
TOTALS	119,746,261	13,818,491	48,088,446	27,393,066	5,107,088	18,064,853	7,264,317
Annual freight volumes in MT - 1993			269480	678044	424937	132859	
Average collection per Tons, in Colones			$178.48	$40.52	$12.02	$135.97	
Average income per Tons, in Cutuco				11.77	2.86		

TABLE 5.2.11
Determining Variable Costs with Present Operation

	TOTAL	SHIPS	GENERAL B	SOLID B	LIQUID B	CONTAINERS
			0.41	0.3		0.29
OPERATIONS DEPARTMENT	1,616,462	267387	712696	278531	60053	297796
OPERATION HEAD OFFICE	142	23	63	24	5	26
OPERATIONS OFFICE	268,860	44,473	118,540	46,327	9,988	49,531
TOTAL OPERATIONS HEAD OFFICE	269,002					
SUBTOTAL OPERATIONS DEPARTMENT	1,885,464	311,884	831,298	324,882	70,046	347,353
EQUIPMENT AND SERVICE SECTION						
HEAD OFFICE OF EQUIPMENT AND SERVICES	147,011	24318	64,817	25,331	5,462	27,083
INDIRECT EXPENSES STEVEDORES	5,448,266	901225	2,402,132	938,785	202,407	1,003,717
INDIRECT EXPENSES PIER WORKERS	4,980,202	823,800	2,195,763	858,134	185,018	917,487
INDIRECT EXPENSES EQUIPMENT OPERATIONS	2,551,532		1,046,128	765,460	0	739,944
EQUIPMENT OPERATORS UNIT	350,425		143,674	105,128	0	101,623
TRANSPORT UNIT	641,763	106,157	282,952	110,582	23,842	118,230
FUEL SUPPLY	168,427		69,055	50,528	0	48,844
UTILITY WAREHOUSE	954,625	157,909	420,893	164,491	35,465	175,868
PERSONNEL CONTROL AND RECEPTION	274,771	45,451	121,146	47,346	10,208	50,620
RADIO SERVICE	216,556	35,822	95,479	37,315	8,045	39,895
BERTHING AND UNBERTHING UNIT	2,331,665					
SHIPMENTS UNIT	393,514	65,093	173,500	67,808	14,619	72,496
EQUIPMENT DEPRECIATION	7,238,058					
EQUIPMENT OPERATION	3,132,350		1,284,264	939,705	0	908,382
TOTAL EQUIPMENT AND SERVICE SECTION	28,829,165	2159776.22	8,299,803	4,110,609	485,068	4,204,188
STOW AND PIERS SECTION						
HEAD	2,841	470	1,253	490	106	523
STOW UNIT	81,738		43,181	16,876	3,638	18,043
PIERS UNIT	1,559,787		824,001	322,031	69,431	344,304
GENERAL EXPENSES STOW AND PIERS SECTION	905,127		478,165	186,873	40,291	199,798
OPERATIONS DIRECT EXPENSES	2,549,473	470	1,346,599	526,269	113,466	562,669
SUM OF DIRECT OPERATIONS EXPENSES	21,337,349	3,529,519	9,407,603	3,676,618	792,697	3,930,912
PERCENTAGES FOR OPERATIONS EXPENSES		0.17	0.44	0.17	0.04	0.18
SUM OF DIRECT EXPENSES WITHOUT SHIP OPER	17,807,830		9,407,603	3,676,618	792,697	3,930,912
% FOR DIRECT EXPENSES WITHOUT SHIP OPERATION			0.53	0.21	0.04	0.22
BERTH UNIT / UNBERTHING DIRECT EXPENSE		2331665				
CARGO TRANSFERENCE	366,998		366,998			
MOORING	1,197,854	1,197,854				
STOWING / UNSTOWING GENERAL BULK	5,159,325		3,455,673			1,703,652
STOWING / UNSTOWING BREAK BULK	2,322,655			2,322,655		
PIER OPERATION GENERAL BULK	1,985,393		1,329,800			655,593
PIER OPERATION BREAK BULK	663,762			663,762		
TRANSPORT GENERAL BULK	131,640		131,640			
HANDLING LIQUID BULK	792,697				792,697	
WAREHOUSES SECTION						
HEAD OFFICE WAREHOUSE ADMINISTRATION	132,958		132968			
GENERAL BULK UNIT	439,201		439201			
IN YARD FOR VEHICLES	146,539		146539			
CONTAINER UNIT	1,571,666					1571666
BREAK BULK UNIT	689,974			689974		
GENERAL BULK WAREHOUSE	3,404,787		3404787			
BREAK BULK WAREHOUSE	227			227		
(OPERATION % WILL BE HERE)						
TOTAL WAREHOUSES SECTION	6,385,362	7059038	18815206.9	7353236	1585394	7861823.105
TOTAL OPERATION DEPARTMENT	52,269,808					
TOTALS	52269786	6001649.317	19,885,304	8,638,379	1,461,275	9,045,121

TABLE 5.2.12
Expenses of the Operations Department - Present Conditions - 1993

CONCEPT	FIXED COSTS	VARIABLE COSTS				
OPERATIONS DEPARTMENT		SHIPS	GENERAL B.	SOLID B.	LIQUID B.	CONTAINERS
EXPENSES RELATED TO OPERATIONS DEPT.	1,616,462					
HEAD OFFICE OPERATIONS	269002					
EQUIPMENT DEPRECIATION	7238058	SUITE	EQUIPMENT OPERATIONS			
EQUIPMENT AND SERVICE SECTION						
HEAD OFFICE OF EQUIPMENT AND SERVICES	147,011					
INDIRECT EXPENSES STEVEDORES		901225.2817	2402131.8677	938785.4529	202408.7804	1003716.817
INDIRECT EXPENSES PIER WORKERS		823800.4441	2195783.18993	858133.7971	185017.8851	917486.6838
INDIRECT EXPENSES EQUIPMENT OPERATIONS		0	1048128.12	765459.6	0	739944.28
EQUIPMENT OPERATORS UNIT		0	143674.25	105127.5	0	101623.25
TRANSPORT UNIT		106157.2692	282952.292309	110581.5628	23841.9311	118229.9449
FUEL SUPPLY			69055.07	50528.1	0	48643.83
UTILITY WAREHOUSE		157909.3577	420892.653589	164490.5118	35464.96879	175867.5101
PERSONNEL CONTROL AND RECEPTION		45451.26319	121146.099588	47345.52565	10207.92918	50620.18239
RADIO SERVICE	216,556					
BERTHING AND UNBERTHING UNIT		2,331,665	0	0	0	0
SHIPMENTS UNIT		65093.14441	173499.700599	67808.01731	14619.31223	72495.82545
EQUIPMENT OPERATION		0	1284264	939705	0	906381.5
TOTAL EQUIPMENT AND SERVICE SECTION	7,601,625	4,431,302	8,139,507	4,047,963	471,559	4,137,210
STOW AND PIERS SECTION						
HEAD	2,841					
STOW UNIT	81,738					
PIERS UNIT	1,559,767					
GENERAL EXPENSES STOW AND PIERS SECTION	805,127					
	2,549,473					
CARGO TRANSFERENCE						
MOORING			366998			
STOWING / UNSTOWING GENERAL BULK		1197854				
STOWING / UNSTOWING BREAK BULK			3455872.79712			1703652.203
PIER OPERATION GENERAL BULK				2322655		
PIER OPERATION BREAK BULK			1329799.85048			655593.3495
TRANSPORT GENERAL BULK				663782		
HANDLING LIQUID BULK			1316[illegible]			
					792697	
WAREHOUSES SECTION						
HEAD OFFICE WAREHOUSE ADMINISTRATION						
GENERAL BULK UNIT			132968			
IN YARD FOR VEHICLES			439201			
CONTAINER UNIT			146539			
BREAK BULK UNIT						1571668
GENERAL BULK WAREHOUSE				689974		
BREAK BULK WAREHOUSE			3404787			
				227		
TOTAL OPERATIONS DEPARTMENT	12,036,562	5,629,156	17,547,111	7,724,581	1,264,256	8,068,121

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TABLE 5.2.13
Expenses of the Operation Department - Improved Conditions - 1993

CONCEPT	FIXED COSTS	VARIABLE COSTS				
OPERATIONS DEPARTMENT		SHIPS	GENERAL B	SOLID B.	LIQUID B.	ONTAINER
EXPENSES RELATED TO OPERATIONS DEPT.	1,616,462					
HEAD OFFICE OPERATIONS	269002					
EQUIPMENT DEPRECIATION	7238058	SUITE... EQUIPMENT OPERATIONS				
EQUIPMENT AND SERVICE SECTION						
HEAD OFFICE OF EQUIPMENT AND SERVICES	147,011					
INDIRECT EXPENSES STEVEDORES		901225.3	1609428.3514	469392.7	101203.4	250929.15
INDIRECT EXPENSES PIER WORKERS		823800.4	1471161.3373	429066.9	92508.94	229371.67
INDIRECT EXPENSES EQUIPMENT OPERATIONS		0	795057.3712	497548.7	0	125790.53
EQUIPMENT OPERATORS UNIT		0	109192.4300	68332.88	0	17275.953
TRANSPORT UNIT		106157.3	189578.0358	55290.78	11920.97	29557.486
FUEL SUPPLY			46268.8969	252640.5	0	12210.958
UTILITY WAREHOUSE		157909.4	281998.0779	82245.26	17732.48	43968.878
PERSONNEL CONTROL AND RECEPTION		45451.26	81167.8867	23672.78	5103.965	12655.046
RADIO SERVICE	216,556					
BERTHING AND UNBERTHING UNIT		2,331,685	0.0000	0	0	0
SHIPMENTS UNIT		65093.14	116244.7994	33903.01	7309.658	18123.956
EQUIPMENT OPERATION		0	976040.2600	610808.3	0	154424.86
TOTAL EQUIPMENT AND SERVICE SECTION	7,601,625	4,431,302	5676135.4469	2,522,902	235,779	894,308
STOW AND ... RS SECTION						
HEAD	2,841					
STOW UNIT	81,738					
PIERS UNIT	1,559,767					
GENERAL EXPENSES STOW AND PIERS SECTION	905,127					
	2,549,473					
CARGO TRANSFERENCE						
MOORING			245887.3200			
STOWING / UNSTOWING GENERAL BULK		1197854				
STOWING / UNSTOWING BREAK BULK			2315300.7741			425913.05
PIER OPERATION GENERAL BULK				1161328		
PIER OPERATION BREAK BULK			890965.7658			163898.34
TRANSPORT GENERAL BULK				331881		
HANDLING LIQUID BULK			88198.8000			
					396348.5	
WAREHOUSES SECTION						
HEAD OFFICE WAREHOUSE ADMINISTRATION						
GENERAL BULK UNIT			89088.5600			
IN YARD FOR VEHICLES			294264.6700			
CONTAINER UNIT			98181.1300			
BREAK BULK UNIT						392916.5
GENERAL BULK WAREHOUSE				344987		
BREAK BULK WAREHOUSE			2281207.2900			
				113.5		
TOTAL OPERATIONS DEPARTMENT	12,036,562	5,629,156	11979229.7565	4,261,211	632,128	1,877,034

TABLE 5.2.14
Summary of Expenses of the Operations Department - Present Conditions - 1993

CONCEPT	FIXED COSTS	VARIABLE COSTS				
		SHIPS	GENERAL B.	SOLID B.	LIQUID B.	CONTAINERS
OPERATIONS DEPARTMENT						
EXPENSES ALLOCATED TO THE OPERATIONS D	1,616,462					
OPERATIONS HEAD OFFICE	269,002					
EQUIPMENT DEPRECIATION	7,238,058					
EQUIPMENT AND SERVICES SECTION	7,601,625	4,431,302	8,139,507	4,047,963	471,559	4,137,210
ELECTRIC ENERGY - GENERAL	1,470,000					
ELECTRIC ENERGY - PIER B				530,000		
STOW PIERS AND WAREHOUSES						
GENERAL EXPENSES STOW / PIERS AND WAREH	2,549,473					
DIRECT EXPENSES STOW / PIERS AND WAREHO		1197854	9407604	3676618	792697	3930911
TOTAL OPERATIONS DEPARTMENT	12,036,562	5,629,158	17,547,111	8,254,581	1,264,256	8,068,121
MOBILIZED CARGO			269490	676044	424937	132859
VARIABLE OPERATION COSTS PER MOVED TON			65	12	3	61

TABLE 5.2.15
Summary of Expenses of the Operations Department - Improved Conditions - 1993

CONCEPT	FIXED COSTS	VARIABLE COSTS				
OPERATIONS DEPARTMENT		SHIPS	ENERAL B	SOLID B.	LIQUID B.	CONTAINERS
EXPENSES ALLOCATED TO THE OPERATIONS DE	1,616,462					
OPERATIONS HEAD OFFICE	269,002					
EQUIPMENT DEPRECIATION	7,238,058					
EQUIPMENT AND SERVICES SECTION	7,601,625	4,431,302	5676135	2,522,902	235,779	894,306
ELECTRIC ENERGY - GENERAL	1,470,000					
ELECTRIC ENERGY - PIER B				530,000		
STOW PIERS AND WAREHOUSES						
GENERAL EXPENSES STOW / PIERS AND WAREH	2,549,473					
DIRECT EXPENSES STOW / PIERS AND WAREHO		1197854	6303094	1838309	396348	982728
TOTAL OPERATIONS DEPARTMENT	12,036,562 44,283,377	5,629,156	11979229	4,891,211	632,127	1,877,034
MOBILIZED CARGO			269490	676044	424937	132859
VARIABLE OPERATION COSTS PER MOVED TON, IN COLONES			44	7	1	14

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TABLE 5.2.16
Cost Structure of Acajutla Port at Present Conditions - 1993

CONCEPT	FIXED COSTS	VARIABLE COSTS				
		SHIPS	ENERAL B	SOLID B.	LIQUID B.	CONTAINERS
OPERATIONS DEPARTMENT						
EXPENSES ALLOCATED TO THE OPERATIONS DE	1,616,462					
OPERATIONS HEAD OFFICE	269,002					
EQUIPMENT DEPRECIATION	7,238,058					
EQUIPMENT AND SERVICES SECTION	7,601,625	4,431,302	5676135	2,522,902	235,779	894,306
ELECTRIC ENERGY - GENERAL	1,470,000					
ELECTRIC ENERGY - PIER B				530,000		
STOW PIERS AND WAREHOUSES						
GENERAL EXPENSES STOW / PIERS AND WAREH	2,549,473					
DIRECT EXPENSES STOW / PIERS AND WAREHO		1197854	6303094	1838309	396348	982728
TOTAL OPERATIONS DEPARTMENT	12,036,562 44,283,377	5,629,156	11979229	4,891,211	632,127	1,877,034
MOBILIZED CARGO			269490	676044	424937	132859
VARIABLE OPERATION COSTS PER MOVED TON, IN COLONES			44	7	1	14

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TABLE 5.2.17
Cost Structure of Acajutla Port with Improved Operations - 1993

CONCEPT	FIXED COSTS		VARIABLE COSTS				
		SHIPS	GENERAL B.	SOLID B.	LIQUID B.	CONTAINERS	CONT.
PORT MANAGEMENT	7.20%	7,416,555					
ADMINISTRATIVE DEPARTMENT	6.69%	6,888,749					
OPERATIONS DEPARTMENT	11.68%	12,036,562	5,629,156	11,979,229	4,891,211	632,127	1,877,034
MAINTENANCE DEPARTMENT	17.79%	18,322,188	1,309,343	6,041,145	5,083,633	113,226	2,210,634
PERSONNEL DEPARTMENT	5.73%	5,906,551					
GENERAL EXPENSES NOT DISTRIBUTED	12.30%	12,672,433					
TOTAL VARIABLE COSTS	38.60%		6,938,499	18,020,374	9,974,844	745,353	4,087,668
TOTAL FIXED EXPENSES		63,243,038					
MOVED TONS		103009776		269490	676044	424937	132859
VARIABLE COSTS PER TON				66.87	14.75	1.75	30.77

TABLE 5.2.18
Cost Reduction with Improved Productivity
Estimate Based on Volumes of Cargo Moved in 1993

CONCEPT	PRESENT PRODUCTION	%	IMPROVED PRODUCTION	%
MANAGEMENT	7416555	6.3	7416555	7.2
ADMINISTRATION	6888749	5.8	6888749	6.7
OPERATION	52269786	44.2	36515321	35.6
MAINTENANCE	33080169	28.0	33080169	32.3
PERSONNEL	5906551	5.0	5906551	5.8
GENERALS	12672433	10.7	12672433	12.4
TOTALS	118234243	100 %	102479778	100%

SAVINGS	15754465

c. Projections of Income and Expenses for CEPA

Using the cost factors per ton of throughput and assuming the implementation of improved operation, a projection of income and expenditures for CEPA has been prepared to year 2015. As the Tables show the operation of CEPA will produce very important financial benefits as a result of the implementation of the Improved Operation. See Tables 5.2.19 and 5.2.20.

These projections have been prepared for Scenarios 1 and 2 as described in Section titled "Demand Projections and Investments".

d. Conclusions and Recommendations

1. The financial reporting of the port does not produce management reports that permit the evaluation of the effectiveness and costs of its diverse operations. This is due to the lack of cost accounting for the determination of cost of operations by type of cargo. The disaggregation of costs made by the Consultants is not a substitute for cost accounting.

2. Cost accounting is an indispensable tool of analysis, control and planning.

3. Cost accounting is the basis for the establishment of tariffs, identification of cross subsidies and the setting and monitoring of goals and objectives.

4. Cost accounting allows the analysis of operation and cargo handling alternatives and permits the measurement of their financial impact.

The Consultants recommend the establishment of systems that would support cost accounting designed to permanently track the cost of major cargo handling operations by cargo type.

5.2.3 Utilization and Capacity of Cutuco

a. Present Utilization

The Port Assessment of this report dealt with the situation of Cutuco and its present condition of disrepair.

An observation of the pier structure indicates that corrosion of piles and superstructure has reached a dangerous extent which may affect the stability of the structure. In that Section the Consultants have recommended that, before continuing the use of the port, a safety inspection of the pier should be made and important rehabilitation of its structure started.

TABLE 5.2.19
Cost and Income Projections - CEPA - Scenario 1

BULK IN MT.	YEARS 2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
GENERAL BULK	408868	416728	424796	432865	440935	449005	483518	518032	552545	587059	621572	670517
CONTAINERS	834332	882446	930561	978675	726790	774904	860943	946982	1033022	1119061	1205100	1345410
SOLID BULKS	958618	976219	993822	1008425	1022028	1037631	1063606	1089581	1115556	1141531	1167506	1197032
LIQUID BULKS	356492	369005	380517	393030	405542	418055	429615	441175	452735	464295	475855	489154
N° OF SHIPS	393	398	402	407	411	416	435	455	475	494	514	540
TIME AT PIER	21081	21654	22247	22841	23434	24027	24976	25926	26876	27826	28776	30290
INCOME												
SERVICE TO SHIPS	18194148	18782304	19330456	19898616	20466771	21034927	21544042	22053157	22562272	23071387	23580502	26271249
SERVICE TO FREIGHT	222959799	234805647	246651498	258497344	270343193	282189042	306746291	331307541	355866791	380426041	404985291	443135245
TOTAL INCOME	241153946	253587951	265981956	278396960	290809964	303223969	328292334	353360899	378429063	403497428	428565793	469410544
COSTS												
PORT MANAGEMENT	9900000	9998000	9792000	9888000	9984000	10080000	10180800	10281600	10382400	10483200	10584000	10688640
ADMINISTRATIVE DEPARTMENT	10035000	10176480	10315960	10456470	10598960	10737430	10887574	11037697	11187821	11337944	11488068	11652374
OPERATIONS DEPT	14997120	15207126	15417133	15627139	15837146	16047152	16271642	16496131	16720621	16945110	17169600	17412208
MAINTENANCE DEPT	23720000	24194400	24668800	25143200	25617600	26092000	26626412	27160823	27695235	28229646	28764058	29338268
PERSONNEL DEPT	9024750	9114998	9205246	9295493	9385740	8475987.5	9570619	9665251	9760882	9855314	9950145	10049561
VARIABLE COSTS OF CARGO	58544802	60616765	63088827	65361089	67833252	69905414	75264112	80622411	85981509	91340208	96698906	104747959
COST OF SERVICE TO SHIPS	9097074	9381152	9665230	9949308	10233386	10517464	10772021	11026579	11281136	11535694	11790251	13135624
GENERAL EXPENSES NOT DISTRIBUTE	12872433	How these expenses evolve is to be determined										
PIER												
INFRASTRUCTURE COST	2342879	2342879	2342879	2342879	2342879	2342879	2342879	2342879	2342879	2342879	2342879	2342879
EQUIPMENT COST	22815357	22815357	22815357	22815357	22815357	22815357	22815357	22815357	22815357	22815357	22815357	22815357
INFRASTRUCTURE MAINTENANCE	525000	525000	525000	525000	525000	525000	525000	525000	525000	525000	525000	525000
EQUIPMENT MAINTENANCE	5070000	5070000	5070000	5070000	5070000	5070000	5070000	5070000	5070000	5070000	5070000	5070000
GRAIN TERMINAL												
EQUIPMENT COST	2241000	2241000	2241000	2241000	2241000	2241000	2241000	2241000	2241000	2241000	2241000	2241000
EQUIPMENT MAINTENANCE	1618750	1618750	1618750	1618750	1618750	1618750	1618750	1618750	1618750	1618750	1618750	1618750
CONTAINER TERMINAL												
INFRASTRUCTURE COST				16254182	32870866	48762486	48762486	48762486	48762486	48762486	48762486	48762486
EQUIPMENT COST				6623479	13816183	20770438	20770438	20770438	20770438	20770438	20770438	20770438
INFRASTRUCTURE MAINTENANCE						5489575	5489575	5489575	5489575	5489575	5489575	5489575
EQUIPMENT MAINTENANCE						5424000	5424000	5424000	5424000	5424000	5424000	5424000
TERMINAL ADMINISTRATION AND SUPERVISION						2960448	2960448	2960448	2960448	2960448	2960448	2960448
SERVICES AND COMMUNICATIONS						100000	100000	100000	100000	100000	100000	100000
INSURANCE AND SECURITIES						600000	600000	600000	600000	600000	600000	600000
COSTS OF SERVICE TO SHIPS	9097074	9381152	9665230	9949308	10233386	10517464	10772021	11026579	11281136	11535694	11790251	13135624
TOTAL COSTS	191481839	182580968	183431539	213489634	248721614	282982964	289906333	296837893	303910273	309922743	316046213	328396422
OPERATION MARGIN												
PERCENTAGE	49762967	70997982	79669426	64906326	60088481	21131106	38227900	67322905	75418799	93574686	111519580	140943122

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TABLE 5.2.19 (continued...)
Cost and Income Projections - CEPA - Scenario i

BULK IN MT.	2012	2013	2014	2015
GENERAL BULK	718482	768407	817352	866297
CONTAINERS	1485720	1626031	1766341	1906651
SOLID BULKS	1228558	1256085	1285611	1315137
LIQUID BULKS	502454	515753	529053	542352
Nº OF SHIPS	567	594	620	647
TIME AT PIER	31804	33318	34832	36346
INCOME				
SERVICE TO SHIPS	28931995	31652742	34343488	37034236
SERVICE TO FREIGHT	481293299	519447303	557601307	595755311
TOTAL INCOME	510255294	551100045	591944795	632789546
COSTS				
PORT MANAGEMENT	10795680	10901520	11007360	11113200
ADMINISTRATIVE DEPARTMENT	11816581	11980987	12145294	12309600
OPERATIONS DEPT	17650816	17891424	18132032	18372640
MAINTENANCE DEPT	29914478	30469888	31084898	31640108
PERSONNEL DEPT	10148878	10248382	10347807	10447222.5
VARIABLE COSTS OF CARGO	112797071	120846154	128896236	136944318
COST OF SERVICE TO SHIPS	14480998	15828371	17171744	18517117
GENERAL EXPENSES NOT DISTRIBUTE How these e. penses evolve is to be determined				
PIER "C"				
INFRASTRUCTURE COST	2342879	2342879	2342879	2342879
EQUIPMENT COST	22815357	22815357	22815357	22815357
INFRASTRUCTURE MAINTENANCE	525000	525000	525000	525000
EQUIPMENT MAINTENANCE	5070000	5070000	5070000	5070000
GRAIN TERMINAL				
EQUIPMENT COST	2241000	2241000	2241000	2241000
EQUIPMENT MAINTENANCE	1618750	1618750	1618750	1618750
CONTAINER TERMINAL				
INFRASTRUCTURE COST	48782486	48782486	48782486	48782486
EQUIPMENT COST	20770438	20770438	20770438	20770438
INFRASTRUCTURE MAINTENANCE	5489575	5489575	5489575	5489575
EQUIPMENT MAINTENANCE	5424000	5424000	5424000	5424000
TERMINAL ADMINISTRATION AND SUP	2980448	2980448	2980448	2980448
SERVICES AND COMMUNICATIONS	100000	100000	100000	100000
INSURANCE AND SECURITIES	600000	600000	600000	600000
COSTS OF SERVICE TO SHIPS	14480998	15828371	17171744	18517117
TOTAL COSTS	[illegible]	[illegible]	[illegible]	[illegible]
OPERATION MARGIN				
PERCENTAGE	[illegible]	[illegible]	[illegible]	[illegible]

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TABLE 5.2.20
Cost . d Income Projections - CEPA - Scenario 2

BULK IN MT.	YEARS								
	2000	2001	2002	2003	2004	2005	2006	2007	2008
GENERAL BULK	415866	421023	426380	431737	437094	442451	467306	492161	517015
CONTAINERS	572144	557715	543286	528858	514429	500000	500000	500000	500000
SOLID BULKS	922290	944686	967081	989477	1011872	1034268	1042003	1049735	[illegible]
LIQUID BULKS	355492	367775	380058	392342	404625	416908	426008	435105	[illegible]
N° OF SHIPS	397	396	395	394	393	393	401	410	418
TIME AT PIER	20949	21194	21440	21686	21932	22177	22769	23361	23953
INCOME									
SERVICE TO SHIPS	18343796	[illegible]	18867925	19129989	19486851	19654118	20390169	21126220	21862271
SERVICE TO FREIGHT	230261072	[illegible]	228512015	227637486	226762957	225888428	230747311	235606194	240465078
TOTAL INCOME	**248604868**	**247982404**	**247379940**	**246767476**	**246248808**	**245542546**	**251137480**	**256732416**	**262327249**
COSTS									
PORT MANAGEMENT	9600000	9696000	9792000	9888000	9984000	10080000	10180800	10281600	10382400
ADMINISTRATIVE DEPARTMENT	10035000	10175490	10315980	10456470	10596960	10737450	10887574	11037697	11187821
OPERATIONS DEPT.	14997120	15207126	15417133	15627139	15837146	16047152	16271642	16496131	16720621
MAINTENANCE DEPT.	23720000	24194400	24668800	25143200	25617600	26092000	26626412	27160823	27695235
PERSONNEL DEPT.	9024750	9114998	9205245	9295493	9385740	9475987.5	9570819	9665651	9760482
VARIABLE COSTS OF CARGO	59626345	59892424	60158503	60424582	60690661	60956740	62748794	64540849	62332902
COST OF SERVICE TO SHIPS	9171898	9302930	9433962	9564995	9743426	9827059	10195085	10563110	10931136
GENERAL EXPENSES NOT DISTRIB	12672433	How these expenses evolve is to be determined							
PIER "C"									
INFRASTRUCTURE COST	2342879	2342879	2342879	2342879	2342879	2342879	2342879	2342879	2342879
EQUIPMENT COST	22815357	22815357	22815357	22815357	22815357	22815357	22815357	22815357	22815357
INFRASTRUCTURE MAINTENANCE	525000	525000	525000	525000	525000	525000	525000	525000	525000
EQUIPMENT MAINTENANCE	5070000	5070000	5070000	5070000	5070000	5070000	5070000	5070000	5070000
GRAIN TERMINAL									
EQUIPMENT COST	2241000	2241000	2241000	2241000	2241000	2241000	2241000	2241000	2241000
EQUIPMENT MAINTENANCE	1618750	1618750	1618750	1618750	1618750	1618750	1618750	1618750	1618750
TOTAL COSTS	**183,460,532**	**172,186,354**	**173,604,608**	**175,012,864**	**176,488,518**	**177,829,376**	**181,094,111**	**184,358,847**	**187,623,583**
OPERATION MARGIN	**65,144,337**	**75,796,050**	**73,775,330**	**71,754,611**	**69,761,290**	**67,713,171**	**70,043,369**	**72,373,568**	**74,703,766**
PERCENTAGE									

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TABLE 5.2.20 (continued...)
Cost and Income Projections - CEPA - Scenario 2

BULK IN MT.

	2009	2010	2011	2012	2013	2014	2015
GENERAL BULK	541870	566725	592121	617517	642914	668310	693706
CONTAINERS	500000	500000	500000	500000	500000	500000	500000
SOLID BULKS	1065207	1072942	1100651	1128360	1156070	1183779	1211488
LIQUID BULKS	453309	462409	470803	478797	486990	495184	503378
Nº OF SHIPS	427	435	444	454	463	472	481
TIME AT PIER	24545	25136	25865	28594	27322	28051	28780
INCOME							
SERVICE TO SHIPS	22621412	23334374	24185874	25037375	25888875	21051701	27591877
SERVICE TO FREIGHT	245323961	250182844	255938824	261690804	267444784	273198764	278952744
TOTAL INCOME	**267945373**	**273517218**	**280122698**	**286728179**	**293333660**	**294250465**	**306544621**
COSTS							
PORT MANAGEMENT	10483200	10584000	10689840	10795680	10901520	11007360	11113200
ADMINISTRATIVE DEPARTMENT	11337944	11488069	11652374	11816681	11980987	12145294	12309600
OPERATIONS DEPT.	16945110	17169600	17410208	17650816	17891424	18132032	18372640
MAINTENANCE DEPT.	28229646	28764058	29338288	29914478	30489688	31064898	31640108
PERSONNEL DEPT.	9855314	9950145	10049561	10148976	10248392	10347807	10447222.5
VARIABLE COSTS OF CARGO	68124957	69917011	72038305	74159598	76280892	78402186	80523480
COST OF SERVICE TO SHIPS	11310708	11667187	12092837	12518687	12944438	10525850	13795938
GENERAL EXPENSES NOT DISTRIBUTED							
PIER "C"							
INFRASTRUCTURE COST	2342879	2342879	2342879	2342879	2342879	2342879	2342879
EQUIPMENT COST	22815357	22815357	22815357	22815357	22815357	22815357	22815357
INFRASTRUCTURE MAINTENANCE	525000	525000	525000	525000	525000	525000	525000
EQUIPMENT MAINTENANCE	5070000	5070000	5070000	5070000	5070000	5070000	5070000
GRAIN TERMINAL							
EQUIPMENT COST	2241000	2241000	2241000	2241000	2241000	2241000	2241000
EQUIPMENT MAINTENANCE	1618750	1618750	1618750	1618750	1618750	1618750	1618750
TOTAL COSTS	**190,889,884**	**194,153,065**	**197,885,479**	**201,617,903**	**205,350,327**	**206,238,413**	**212,816,176**
OPERATION MARGIN	**77,045,509**	**79,364,153**	**82,237,220**	**85,110,276**	**87,983,333**	**88,012,052**	**93,728,446**
PERCENTAGE							

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As long ago as 1978 the advanced deterioration of the pier was a serious concern of FENADESAL, the owner of the port. At that time the company ordered the preparation of designs and opened a Tender for its reconstruction. But for various reasons the Tender was declared deserted and the project was not implemented.

The war of the 80's that had very serious impact on the eastern regions of the country devastated almost completely the production of the zone eliminating the traffic of the port. Not until 1993, after years of inactivity, did the port start its recovery with a few loads of dry bulk (37,000 tons) and liquid bulk (3,900 tons).

The fact that the pier has no ready access for trucks limits to a great extent the operation of the port that has to transfer all cargo in railroad cars for movement in and out of the pier and hauls of less than 4 km.

To make the situation worse, the port only has very limited cargo handling equipment, all in very poor state of repair. See the Assessment chapter where the conditions of port and equipment are described in more detail.

b. Capacity in Present Conditions

It is a risk to operate the port in its present condition. But assuming that investments are made to make the operations safe and provide truck access to the pier, the port would have two berths available, North and South, for ships up to 150 M in length and drafts of 9.15 and 7.62 M respectively.

The capacity of these berths to handle cargo would depend on the composition of the cargo and could be estimated using the mixture of loads forecast for Cutuco in year 2000 by the Transport Model. On this basis Cutuco, with the investment required for the safety of the pier and truck access, could handle some 540,000 tons a year, as indicated in Table 5.2.21.

c. Improvement of the Installations

- Pier

It is outside the scope of this study to make the engineering analysis necessary to estimate the cost of rehabilitation of the Cutuco pier.

However, to obtain an idea of the order of magnitude of the investment, the design prepared in 1978 by Narvaes, Hinds and Associates, estimated then in 9 million Colones was used as a basis.

TABLE 5.2.21
Cutuco Pier Capacity with Cargo Allocation from Scenario 2

YEAR 2015

TYPE OF BULK	MT ANNUAL CA	HOURS SOUTH	HOURS NORTH
GENERAL BULK	313251	2,651	2,651
DRY BULKS	165064	1269	1269
LIQUID BULKS	62067	217	217
TOTAL	540382		
OCCUPATION OF BERTHS		4,137	4,137

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This amount in terms of Colones of 1995 could be of the order of 50 million Colones.

This work, however, should be examined in the context of a feasibility study for a container terminal in Cutuco that is about to be contracted to a Japanese firm. Such study probably would analyze as possible options:

- ✓ The rehabilitation of the Cutuco pier and its utilization for handling dry and liquid bulks, separating physically these operations from the container pier, or

- ✓ The construction within the container port of berths to handle the cargo destined for Cutuco, dismantling the existing pier.

In any event, regardless of the configuration of the port that may result from the study, Cutuco performs an important function in the development of the port sector of El Salvador, as analyzed in the following Section.

5.2.4 Demand Projections and Investments

a. Scenarios for Projections

The flow of Salvadorean cargo to its ports, Acajutla and Cutuco, reflects a situation characterized by:

- ✓ The geographic position of Acajutla near the principal centers of economic activity: San Salvador, Santa Ana, Sonsonate, in the most developed region of the country, has promoted the growth of the port and the establishment of maritime services for importers and exporters.

- ✓ Cutuco, on the other hand, limited to the handling of cargo for the few enterprises with installations near the port, does not offer regular services for the general public and depends on sporadic shipments to these companies. The lack of truck access to the pier limits its function, even more.

- ✓ The war and the economic destruction suffered by the Eastern Provinces of El Salvador has aggravated this situation to the point that Cutuco has almost ceased operating.

This situation, nevertheless, could change in the middle term as a result of:

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- ✓ The growing difficulty of cargo originating in the eastern region of the country to reach the Port of Acajutla, having to cross the congested city of San Salvador. This serious obstacle, that increases the cost of land transport and augments considerably the transit time of the cargo from Orient, will become worse in the short term and its solution will require very large investments. Importers and exporters east of San Salvador will be forced to use Cutuco, increasingly, for the shipment of their trade.

- ✓ The desire of the government to reactivate the eastern region and provide easy access through a port complex in the area of Cutuco.

- ✓ The economic activity that seems to be returning gradually to the region indicates that the government's efforts are producing their desired effects.

To examine the implications of this situation on the demand for port services two scenarios are analyzed in this Study.

Port flows for 1995 are computed for a defined supply scenario. Then, two supply scenarios are analyzed to project demand and evaluate the impact of these conditions on the port system: the first emphasizes Acajutla and the second, Cutuco. Next, these alternate projections are compared.

1995 Projections

The TRANUS model demand matrices were estimated for 1992 (base year for which all demand information was available at the beginning of the study, especially highway traffic counts), 2000, 2005, 2010 and 2015. To estimate 1995 port demand, the Consultant analyzed the available port traffic data for 1994 and the first quarter of 1995.

These results, shown in Annex 5.2.4, indicate that projections made for future years may be surpassed. This is clearer for solid and liquid bulks, while breakbulk and container projections may not be met for lack of adequate container services and competition of other ports. This information is not used elsewhere in this Study.

Scenario 1

This Scenario assumes that the road transportation system will expand with investments already programmed and any others that may be required to correct its restrictions. In other words, the assumption is that all investments required to facilitate traffic around San Salvador will be made and that the obstacles to port cargo originating in Orient will be eliminated.

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In this Scenario the Transportation Model assigns most of the growth to Acajutla and forecasts a very moderate increase in Cutuco traffic. See Table 5.2.22.

Under these conditions, while the present installations of Cutuco, rehabilitated as suggested in previous section "Utilization and Capacity of Cutuco", would be sufficient for the satisfaction of the demand, Acajutla would have very significant growth of its infrastructure, as indicated in Table 5.2.23. It includes:

- ✓ An installation to handle containers with cranes on Pier C prior to year 2000.
- ✓ A specialized terminal for containers to start operations in 2005; Pier D as shown in Figure 5.2.1.
- ✓ A terminal for cereals in bulk to start operating on 2010.

Scenario 2

This Scenario assumes that the land transportation system will receive the investments already programmed, but that the obstacle to the traffic from Orient to Acajutla created by the congestion of San Salvador will not be resolved. In this case a port in Cutuco would attract a growing proportion of the port cargo generated east of the city of San Salvador.

The traffic assigned by the Transportation Model is shown in Table 5.2.24.

To analyze this Scenario it is further assumed that:

- ✓ The results of the Feasibility Study of the port in Cutuco that GOES is planning to contract are positive and that a port complex would be built in the area of Punta Gorda, including a container terminal and the FENADESAL pier.
- ✓ The traffic of containers to Acajutla is limited to the volume that can be handled by Pier C (around 500,000 tons a year). Consequently, according to this Scenario, the specialized container terminal designed by Frederic R. Harris for Acajutla would not be built.

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TABLE 5.2.22
Forecast Estimation of Salvadorean Cargo - Highway Scenario

TYPE OF CARGO AND PRODUCT	FORECAST 2000			FORECAST 2005			FORECAST 2010			FORECAST 2015		
	Acajutla	Cutuco	Total	Acajutla	Cutuco	Total	Acajutla	Cutuco	Total	Acajutla	Cutuco	Total
BREAK BULK												
IRON AND STEEL	103,859	7,879	111,738	114,095	13,936	128,031	150,274	19,001	169,276	197,926	25,908	223 834
CEREALS	12,206		12,206	11,608		11,608	13,234		13,234	15,088	1,975	17 063
FERTILIZERS	441		441	369		369	387		387	407	53	460
VEHICLES (2)	24,727	2,753	27,480	29,819	3,642	33,462	41,731	5,277	47,007	58,400	7,644	87,162
OTHERS	263,398	17,796	281,194	291,030	39,425	330,455	415,945	55,388	471,333	594,475	77,815	672 290
COFFEE	4,025		4,025	2,084		2,084	0		0	0	0	0
SUGAR	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL (3)	408,655	28,428	437,084	449,005	57,003	506,008	621,572	79,666	701,238	866,297	113,395	979 693
CONTAINERS									0			
COFFEE	55,804	0	55,804	58,021	0	58,021	49,509	0	49,509	43,878	0	43 878
OTHERS	478,528	0	478,528	716,883	0	716,883	1,155,591	0	1,155,591	1,862,773	0	1,862 773
TOTAL	534,332	0	534,332	774,904	0	774,904	1,205,100	0	1,205,100	1,906,651	0	1,906,651
DRY BULK						1 45			1 56			
FERTILIZERS	331,866	47,108	378,974	387,900	47,380	435,279	426,612	53,943	480,555	469,188	61,415	530,603
CEREALS / FLOUR	484,629	0	484,629	508,690	0	508,690	589,711	0	589,711	683,637	0	683 637
SUGAR	117,185	0	117,185	113,817	0	113,817	119,623	0	119,623	125,725	0	125 725
OTHERS	25,936	0	25,936	27,224	0	27,224	31,560	0	31,560	36,587	0	36,587
TOTAL	959,616	47,108	1,006,724	1,085,010	47,380	1,132,390	1,167,508	53,943	1,221,449	1,315,136	61,415	1,376,552
LIQUID BULK												
PETROLEUM	1,342,687	0	1,342,687	1,633,584	0	1,633,584	1,893,771	0	1,893,771	2,195,400	0	2,195 400
PET. DERIVATIVES	110,823	11,200	122,023	132,300	16,160	148,460	152,777	19,318	172,095	176,424	23,093	199,517
MOLASSES	71,977	0	71,977	75,649	0	75,649	79,508	0	79,508	83,564	0	83 564
OTHERS	172,692	0	172,692	210,106	0	210,106	243,570	0	243,570	282,364	0	282,364
TOTAL	1,698,179	11,200	1,709,379	2,051,638	16,160	2,067,798	2,369,626	19,318	2,388,944	2,737,752	23,093	2,760,845
GENERAL TOTAL	3,600,782	86,736	3,687,519	4,360,558	120,542	4,481,100	5,363,804	152,926	5,516,731	6,825,837	197,904	7,023,741

(1) Includes all road investments with committed funds, which are required to correct road capacity restrictions, plus two multipurpose cranes, a grain handling system and the container terminal.
(2) Supposes that Cutuco will have the capacity to handle vehicles, fertilizers and petroleum products.
(3) The following maximum capacities for general bulk are estimated: 750 thousand t Acajutla, 100 thousand t Cutuco.
However, it is supposed that solutions to increase productivity and handle small exceeding volumes will be found until 2015
Source: Frederic R. Harris, Inc. Interpolation and breakdown of portuary traffic forecast and scenario allocation.

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TABLE 5.2.23
Extension of Port Facilities Project - Scenario 1

■ INSTALLATION OF MULTI-PURPOSE CRANES ON PIER C IN ACAJUTLA TO HANDLE CONTAINERS AND DRY BULK CARGOS		
TO OPERATE IN YEAR 2000	PROJECT COST	¢ 179 MILLIONS
■ SPECIALIZED CONTAINER TERMINAL IN ACAJUTLA		
TO OPERATE IN YEAR 2005	PROJECT COST	¢ 700 MILLIONS
■ GRAIN TERMINAL IN PIER B AT ACAJUTLA		
TO OPERATE IN YEAR 2010	PROJECT COST	¢ 132 MILLIONS
■ RECONSTRUCTION OF THE CUTUCO PIER		
IMMEDIATE OPERATION	PROJECT COST	¢ 44 MILLIONS

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FIGURE 5.2.1
Port of Acajutla Installations

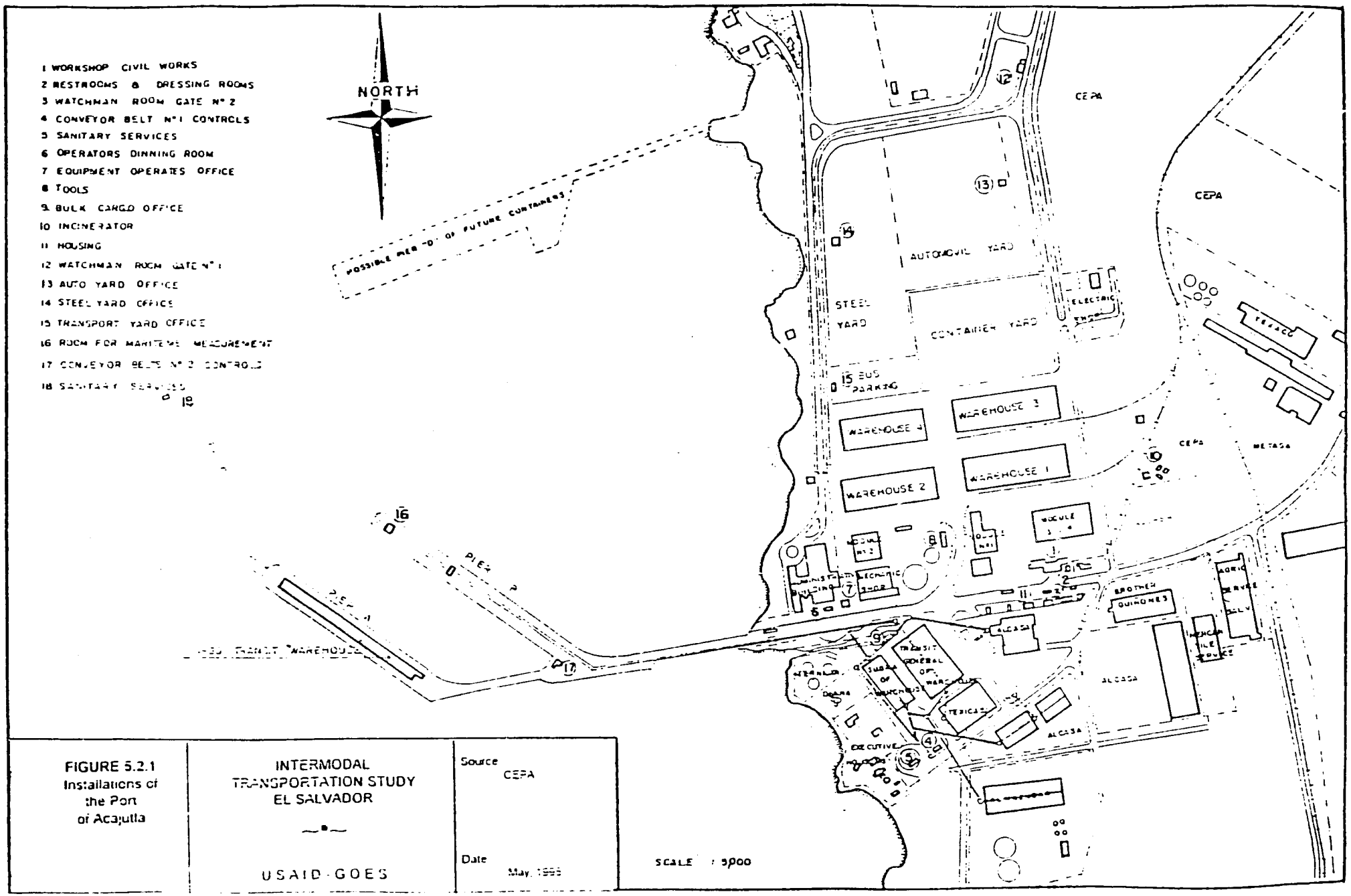

FIGURE 5.2.1 Installations of the Port of Acajutla	INTERMODAL TRANSPORTATION STUDY EL SALVADOR USAID-GOES	Source CEPA Date May, 1995

TABLE 5.2.24

Traffic Forecast Estimation for Acajutla and Cutuco - Period 2000-2015 - Scenario 2

TYPE OF CARGO AND PRODUCT	FORECAST 2000			FORECAST 2005			FORECAST 2010			FORECAST 2015		
	Acajutla	Cutuco	Total	Acajutla	Cutuco	Total	Acajutla	Cutuco	Total	Acajutla	Cutuco	Total
BREAK BULK												
IRON AND STEEL	102,670	8,275	110,944	112,429	14,836	127,265	133,439	32,585	166,074	158,494	71,570	230,064
CEREALS	12,066		12,066	11,439		11,439	11,756		11,756	12,082	5,456	17,538
FERTILIZERS	436		436	364		364	344		344	326	147	473
VEHICLES (2)	36,135	4,275	40,410	48,393	6,386	54,779	59,938	14,631	74,569	74,237	33,522	107,759
OTHERS	260,381	32,688	293,069	286,782	41,720	328,502	361,197	99,243	460,440	454,922	236,078	691,000
COFFEE	3,979		3,979	2,053		2,053	0		0	0	0	0
SUGAR	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL (3)	415,666	45,238	460,904	442,451	62,941	505,392	566,725	146,459	713,184	693,706	313,251	1,006,958
CONTAINERS									0			0
COFFEE	55,804	0	55,804	58,021	0	58,021	46,509	3,000	49,509	37,281	6,596	43,878
OTHERS	516,340	0	516,340	641,979	0	641,979	653,491	341,128	994,619	662,719	755,148	1,417,867
TOTAL	572,144	0	572,144	700,000	0	700,000	700,000	344,128	1,044,128	700,000	761,744	1,461,745
DRY BULK												
FERTILIZERS	331,705	47,108	378,813	384,537	50,742	435,279	332,048	148,536	480,584	365,539	165,064	530,603
CEREALS / FLOUR	455,532	0	455,532	508,690	0	508,690	589,711	0	457,938	683,637	0	683,637
SUGAR	110,674	0	110,674	113,817	0	113,817	119,623	0	92,893	125,725	0	125,725
OTHERS	24,379	0	24,379	27,224	0	27,224	31,560	0	24,508	36,587	0	36,587
TOTAL	922,290	47,108	969,398	1,034,268	50,742	1,085,010	1,072,942	148,536	1,221,478	1,211,488	165,064	1,376,552
LIQUID BULK												
PETROLEUM	1,342,687	0	1,342,687	1,633,584	0	1,633,584	1,893,771	0	1,893,771	2,195,400	0	2,195,400
PET DERIVATIVES	110,823	11,200	122,023	131,153	17,306	148,459	139,331	32,774	172,105	137,450	62,067	199,517
MOLASSES	71,977	0	71,977	75,649	0	75,649	79,508	0	79,508	83,564	0	83,564
OTHERS	172,692	0	172,692	210,108	0	210,108	243,570	0	243,570	282,364	0	282,364
TOTAL	1,698,179	11,200	1,709,379	2,050,491	17,306	2,067,797	2,356,180	32,774	2,388,954	2,698,778	62,067	2,760,845
GENERAL TOTAL	3,608,279	103,546	3,711,825	4,227,211	130,989	4,358,200	4,695,847	671,897	5,367,744	5,303,973	1,302,127	6,606,100

(1) Includes all road investments with committed funds, which are required to correct road capacity restrictions, plus two multipurpose cranes, a grain handling system and the container terminal.

(2) Supposes that Cutuco will have the capacity to handle vehicles, fertilizers and petroleum products.

The trend scenario, with at least the committed road investments, reallocates the container traffic from Cutuco to Acajutla and keeps in general the allocation of other cargoes. The road scenario, with additional road investment, which will improved between the eastern and western part of the country, should reassign the greater part of cargo from Cutuco back to Acajutla.

Source: Frederic R. Harris, Inc. Interpolation and breakdown of portuary traffic forecast and scenario allocation.

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The infrastructure improvements required in Scenario 2 are indicated in Table 5.2.25.

Scenario Comparison

There are minor differences between the two scenarios projections for 2000 and 2005. Scenario 2 includes Cutuco's new road access and rehabilitation of the rail network, investments which permit a marginal improvement in the competitiveness of Salvadorean ports, slightly reducing Quetzal, Santo Tomas de Castilla and Puerto Cortes market shares of total Salvadorean cargo.

For 2010 and 2015, the differences are also due to the Cutuco Container Terminal operations (assumed to begin in 2010, although this could occur sooner) and non-building of the one at Acajutla in Scenario 2, which results in the loss of about 400,000 tons of container cargo from Salvadorean to other ports and the occasional use of the Cutuco Container Terminal to service other ships.[1]

b. Calculations of Berth Occupancy

The Consultants have prepared a model to compute berth occupancies which allows the investigation of the conditions under which berths would operate under the traffic assigned by the Transportation Model. Annex 5.2.3 shows the results and the sufficiency of the projects recommended by the Consultants.

c. Description of the Projects

- Installation of Gantry Cranes on Pier C in Acajutla

This initiative has been contemplated by port officials for several years and presently the financing of a 40 ton multi-purpose crane is under negotiation. This piece of equipment will be installed on the pier to handle containers and dry bulk cargos.

[1] An annex to Chapter 2 also contains projections for a scenario with container terminals in both ports.

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TABLE 5.2.25
Extension of Port Facilities Project - Scenario 2

■ INSTALLATION OF MULTI-PURPOSE CRANES ON PIER C IN ACAJUTLA TO HANDLE CONTAINERS AND DRY BULK CARGOS		
TO OPERATE IN YEAR 2000	PROJECT COST	¢ 179 MILLIONS
■ SPECIALIZED CONTAINER TERMINAL IN ACAJUTLA		
TO OPERATE IN YEAR 2010	PROJECT COST	¢ 700 MILLIONS
■ REHABILITATION OF CUTUCO		
IMMEDIATE OPERATION	PROJECT COST	¢ 44 MILLIONS
■ SPECIALIZED CONTAINER TERMINAL AT CUTUCO		
O OPERATE IN YEAR 2010	PROJECT COST	¢ 437 MILLIONS

The assignment of traffic made by the Transportation Model indicates that under any scenario the demand of containerized cargo will be very high and before year 2000 it will be necessary to provide facilities to handle in excess of 500,000 tons of containers a year in Acajutla.

To satisfy this requirement one crane would not be sufficient. Two cranes would be needed, converting Pier C in an installation almost exclusively dedicated to the handling of containers.

It should be noted however, that such installation would have restrictions due to the limitations imposed by the width of the pier and the distance that separates the berths from the container storage yard on the mainland.

These limitations require that the operations be executed under very exacting controls, especially in the sequence of loading containers onto the ship and it is probable that at high traffic levels the operation would become difficult and productivity would lower substantially. It is estimated that to maintain good conditions the berth would handle a maximum of 500,000 tons a year.

It would be prudent to install initially only one crane and, depending on the results obtained, the second crane could be installed at a later date.

The cranes also would be used to lighter or discharge completely (depending on demand for the berth) large bulk carriers of 40,000 T.R.B. or more that, cannot berth at Pier B fully loaded.

To accommodate the forecast container traffic it will be necessary to enlarge the existing container yard adding about four hectares to it.

The cost of this project has been estimated as follows:

- ✓ 2 cranes including civil works, erection, engineering and supervision, 161.602 million Colones.
- ✓ Container yard of 40,000 m^2 - 17.500 million Colones.

Manufacture and erection of the cranes may take from 12 to 18 months.

The financial feasibility of the project has been calculated assuming that before year 2000 both cranes will be in operation. For the first one, that will

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be financed by the German government with very soft financing, amortization based on 20 years at interest of eight percent has been assumed. For the second crane commercial financing at 12% interest and 20 years amortization has been estimated.

The operation costs which include labor, cost of equipment and materials, and maintenance of equipment are those estimated for the "Improved Operation" described in previous Section in this report. The costs of administration and supervision of the operation have been estimated as shown in Table 5.2.26.

The margin of operation, according to these computations, indicates very high profitability for this terminal at Pier C (see Table 5.2.27) It is considerably higher than the margin that could be generated by specialized terminals in Acajutla or Cutuco. The reason for this high profit margin is the very low investment in infrastructure that this project requires (some 7.5 million Colones) while the terminal in Acajutla needs almost 550 million Colones in infrastructure and in Cutuco some 390 million Colones.

Often this is the case with specialized container terminals, projects that are capital intensive and require high tariffs and throughputs to be profitable. In Mexico, for instance, the tariff to handle containers is double that presently charged in Acajutla, reflecting the fact that, while in Acajutla containers are handled with ship's gear, in a general cargo pier, in Mexico the operations are carried out in specialized terminals.

This aspect is treated in detail at the end of this Section where a tariff of at least 200 Colones per metric ton of containerized cargo is recommended for operations in specialized terminals.

- Specialized Container Terminal in Acajutla.

This terminal was specifically designed for handling containers and, consequently, avoids the restrictions to the handling of this type of traffic encountered in Pier C.

The traffic assignment model indicates that under Scenario 1 the demand of containerized traffic in the year 2005 will exceed the 500,000 ton capacity of Pier C and will grow to reach almost two million tons a year by 2015.

TABLE 5.2.26

Containers Terminal - Pier C - Specialized Container Terminal - Acajutla
Specialized Container Terminal - Cutuco
Personnel Organization

		MONTHLY SALARY
	ACCOUNTING	
1	ACCOUNTANT	8,000.00
2	ASSISTANTS	8,000.00
1	SECRETARY	3,000.00
	OPERATIONS	
1	SUPERINTENDENT	70,000.00
1	YARD HEAD	6,000.00
1	PIER HEAD	6,000.00
1	ASSISTANT	4,000.00
1	SECRETARY	5,000.00
	OPERATORS	
4	YARD OPERATOR	20,000.00
1	WAREHOUSE HEAD	5,000.00
4	ASSISTANTS	12,000.00
3	WATCHMEN	5,400.00
	CARGO CONTROL	
1	CONTROL HEAD	12,000.00
2	COMPUTER OPERATORS	8,000.00
	SERVICE	
1	HEAD SERVICE	3,000.00
3	SHOP PERSONNEL	6,000.00
	MONTHLY TOTAL	181,400.00
	ANNUAL TOTAL	**2,960,448.00**

BENEFITS	
SOCIAL SECURITY	14%
CHRISTMAS BONUS	8.3%
VACATION	5.8%
HOLIDAYS	4.1%
SICK LEAVE	3.6%
	0.358
SUM OF MONTHLY SALARIES	181,400.00
SOCIAL BENEFITS	0.36
MONTHLY TOTAL	246,704.00
ANNUAL TOTAL	2,960,448.00

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TABLE 5.2.27

Cash Flow - Container Handling at Pier C - Acajutla - Scenarios 1 and 2 - Up to 500,000 TM Per Year

	2000	2001	2002	2003	2004	2005	2006	2007
CARGO								
TONS PER YEAR	534332	567466	600599	633733	700000	500000	500000	500000
CONTAINERS	59370	63052	66733	70415	77778	50000	49091	48182
TEUs								
ANNUAL SHIPS	49	53	56	59	65	42	41	40
SIZE OF THE TBR SHIP	28000	28000	28000	28000	28000	28000	28000	28000
SHIPMENT AVERAGE IN CONTAINERS	1200	1200	1200	1200	1200	1200	1200	1200
TIME IN PIER - HOURS	2523	2880	2836	2993	3306	2107	2069	2031
INCOME								
SERVICE TO SHIPS	5397446	5732138	6066830	6401523	7070907	4541405	4458834	4376263
CARGO SERVICES	106866400	113493120	120119840	126746560	140000000	100000000	100000000	100000000
OTHER INCOME								
TOTAL INCOME	**112263846**	**119225258**	**126186670**	**133148083**	**147070907**	**104541405**	**104458834**	**104376263**
COSTS								
AMORTIZATION OF NEW INFRASTRUCTURE AT 12 %	2342879	2342879	2342879	2342879	2342879	2342879	2342879	2342879
AMORTIZATION OF NEW EQUIPMENT	Included in operation. A crane at 8 % and a crane at 12 %.							
MAINTENANCE OF NEW INFRASTRUCTURE	525000	525000	525000	525000	525000	525000	525000	525000
OPERATION AND MAINTENANCE OF NEW EQUIPMEN	Included in operation							
ADMINISTRATION AND SUPERVISION	2960448	2960448	2960448	2960448	2960448	2960448	2960448	2960448
SERVICES AND COMMUNICATIONS	100000	100000	100000	100000	100000	100000	100000	100000
INSURANCE AND SECURITIES	600000	600000	600000	600000	600000	600000	600000	600000
SERVICE TO SHIPS COSTS	1095225	1163139	1231053	1298967	1434796	922369	905598	888828
OPERATION (1)	35294766	37483373	39671980	41860586	46237800	33027000	33027000	33027000
OTHER COSTS								
TOTAL COSTS	42918317	45174838	47431359	49687880	54200922	40477695	40460925	40444155
OPERATION MARGIN	69345529	74050420	78755311	83460202	92869985	64063709	63997909	63932108
PRESENT VALUE OF BENEFITS		624726918						

NOTE:
(1) Includes labor, equipment, maintenance and material costs

TABLE 5.2.27 (continued...)

Cash Flow - Container Handling at Pier C - Acajutla - Scenarios 1 and 2 - Up to 500,000 TM Per Year

	2008	2009	2010	2011	2012	2013	2014	2015
CARGO								
TONS PER YEAR	500000	500000	500000	500000	500000	500000	500000	500000
CONTAINERS	47273	46364	45455	44697	43939	43182	42424	41667
TEUs								
ANNUAL SHIPS	39	39	38	37	37	36	35	35
SIZE OF THE TBR SHIP	28000	28000	28000	28000	28000	28000	28000	28000
SHIPMENT AVERAGE IN CONTAINERS	1200	1200	1200	1200	1200	1200	1200	1200
TIME IN PIER - HOURS	1992	1954	1916	1884	1852	1820	1788	1756
INCOME								
SERVICE TO SHIPS	4293692	4211121	4128550	4059741	3990931	3922122	3853313	3784504
CARGO SERVICES	100000000	100000000	100000000	100000000	100000000	100000000	100000000	100000000
OTHER INCOME								
TOTAL INCOME	**104293692**	**104211121**	**104128550**	**104059741**	**103990931**	**103922122**	**103853313**	**103784504**
COSTS								
AMORTIZATION OF NEW INFRASTRUCTURE AT 12 %	2342879	2342879	2342879	2342879	2342879	2342879	2342879	2342879
AMORTIZATION OF NEW EQUIPMENT								
MAINTENANCE OF NEW INFRASTRUCTURE	525000	525000	525000	525000	525000	525000	525000	525000
OPERATION AND MAINTENANCE OF NEW EQUIPMENT								
ADMINISTRATION AND SUPERVISION	2960448	2960448	2960448	2960448	2960448	2960448	2960448	2960448
SERVICES AND COMMUNICATIONS	100000	100000	100000	100000	100000	100000	100000	100000
INSURANCE AND SECURITIES	600000	600000	600000	600000	600000	600000	600000	600000
SERVICE TO SHIPS COSTS	872058	855287	838517	824542	810566	796591	782616	768641
OPERATION (1)	33027000	33027000	33027000	33027000	33027000	33027000	33027000	33027000
OTHER COSTS								
TOTAL COSTS	40427384	40410614	40393844	40379868	40365893	40351918	40337943	40323967
OPERATION MARGIN	63866307	63800507	63734706	63679872	63625038	63570204	63515371	63460537
PRESENT VALUE OF BENEFITS								

NOTE
(1) Includes labor, equipment, maintenance and material costs

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The construction cost of this project, has been updated to costs of 1995 and indicates investments of 549 million Colones in civil works and 151.4 million Colones in equipment.

It is estimated that the construction of the terminal would take from 30 to 36 months.

The profitability of the project has been calculated following the same criteria utilized for Pier C except that the tariff has been estimated at 200 Colones per ton of containerized cargo. See Table 5.2.28.

Reduction of the Agitation of the Basin

The specialized container berth has been designed to serve at the same time as a breakwater for the protection of the port harbor that today, open to the sea, is affected by the agitation produced by long period waves.

This phenomenon principally affects Pier B during the rainy season when the operation is difficult due to the movement of ships berthed at the pier. It is estimated that the productivity of the operations of loading and unloading are reduced by 20% during the period that commences in May and ends in November. On occasion this movement has been of such magnitude that it breaks moorings and it is necessary to take the ships out of the port.

The designers of the terminal, Frederic R. Harris, Inc., simulated in a mathematical model the conditions of the basin in order to place the breakwater in a manner that would reduce to a minimum the movement in the harbor.

The savings produced by the breakwater consist of those obtained by higher productivity in the handling of dry bulk cargo in Pier B during the rainy season and the consequent reduction of ships' time at berth. Table 5.2.29 shows the magnitude of these savings.

- Grain Terminal in Acajutla

The traffic of dry bulks assigned by the Transportation Model to Acajutla indicates that the gantry crane on Pier B will not be sufficient to handle the assigned volumes and the operation with ship's gear or Buhler machines unloading directly onto trucks would increase greatly.

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TABLE 5.2.28
Cash Flow - Container Terminal - Acajutla - Scenario 1

	YEARS							
CARGO	2005	2006	2007	2008	2009	2010	2011	2012
TONS PER YEAR								
CONTAINERS	274904	360943	446982	533022	619061	705100	845410	985720
TEUs	27490	34812	42134	49456	56778	64100	74724	85348
ANNUAL SHIPS								
SIZE OF THE TER SHIP	20	25	30	35	41	46	53	61
SHIPMENT AVERAGE IN CONTAINERS	28000	28000	28000	28000	28000	28000	28000	28000
TIME IN PIER - HOURS	1400	1400	1400	1400	1400	1400	1400	1400
	1708	1779	1849	1920	1990	2060	2402	2743
INCOME								
SERVICE TO SHIPS								
CARGO SERVICES	54980800	72188640	89396480	106604320	123812160	141020000	169082040	197144080
OTHER INCOME	2307583	2832199	3356815	3881432	4406048	4930664	5747891	6565118
TOTAL INCOME	**57288383**	**75020839**	**92753295**	**110485752**	**128218208**	**145950664**	**174829931**	**203709198**
COSTS								
AMORTIZATION OF NEW INFRASTRUCTURE AT 12 %	48762486	48762486	48762486	48762486	48762486	48762486	48762486	48762486
AMORTIZATION OF NEW EQUIPMENT	Included in operation costs							
MAINTENANCE OF NEW INFRASTRUCTURE	5489575	5489575	5489575	5489575	5489575	5489575	5489575	5489575
OPERATION AND MAINTENANCE OF NEW EQUIPMEN	Included in operation costs							
ADMINISTRATION AND SUPERVISION	2960448	2960448	2960448	2960448	2960448	2960448	2960448	2960448
SERVICES AND COMMUNICATIONS	100000	100000	100000	100000	100000	100000	100000	100000
INSURANCE AND SECURITIES	600000	600000	600000	600000	600000	600000	600000	600000
SERVICE TO SHIPS COSTS	434679	550454	666228	782003	897777	1013551	1181541	1349531
OPERATION (1)	16867010	22146031	27425052	32704073	37983094	43262116	51870988	60479861
OTHER COSTS								
TOTAL COSTS	75214198	80608993	86003789	91398585	96793380	102188176	110965038	119741901
OPERATION MARGIN	-17925814	-5588154	6749506	19087167	31424827	43762488	63864892	83967297
PRESENT VALUE OF BENEFITS	301046502							

NOTE:
(1) Includes labor, equipment, maintenance and material costs

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TABLE 5.2.28 (continued...)
Cash Flow - Container Terminal - Acajutla - Scenario 1

	YEARS		
	2013	2014	2015
CARGO			
TONS PER YEAR	1126031	1266341	1406651
CONTAINERS	95973	106597	117221
TEUs	69	76	84
ANNUAL SHIPS	28000	28000	28000
SIZE OF THE TBR SHIP	1400	1400	1400
SHIPMENT AVERAGE IN CONTAINERS	3085	3426	3768
TIME IN PIER - HOURS			
INCOME			
SERVICE TO SHIPS	225206120	253268160	281330200
CARGO SERVICES	7382345	8199573	9016800
OTHER INCOME			
TOTAL INCOME	**232588466**	**261467733**	**290347000**
COSTS			
AMORTIZATION OF NEW INFRASTRUCTURE AT 12 %	48762486	48762486	48762486
AMORTIZATION OF NEW EQUIPMENT	Included in operation costs		
MAINTENANCE OF NEW INFRASTRUCTURE	5489575	5489575	5489575
OPERATION AND MAINTENANCE OF NEW EQUIPMEN	Included in operation costs		
ADMINISTRATION AND SUPERVISION	2960448	2960448	2960448
SERVICES AND COMMUNICATIONS	100000	100000	100000
INSURANCE AND SECURITIES	600000	600000	600000
SERVICE TO SHIPS COSTS	1517521	1685511	1853501
OPERATION (1)	69088733	77697806	86306479
OTHER COSTS			
TOTAL COSTS	128518764	137295626	146072489
OPERATION MARGIN	104069702	124172107	144274512
PRESENT VALUE OF BENEFITS			

NOTE:
(1) Includes labor, equipment, maintenance and material costs

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TABLE 5.2.29
Saving Produced by Reducing Dock Movement - Acajutla

	YEARS 2000	2001	2002	2003	2004	2005	2006	2007
DRY BULKS PIER B - MT/ YEAR	959616	975219	990822	1006425	1022028	1037631	1063606	1089581
TIME OF SHIP AT PIER B PRESENT CONDITIONS - HOURS	8432	8543	8653	8764	8874	8985	9238	9490
REDUCTION OF TIME AT PIER WITH BREAKWATER - HOURS	1686	1709	1731	1753	1775	1797	1848	1898
OPERATION COSTS AT PRESENT CONDITIONS IN COLONES	10479007	10649391	10819776	10990161	11160546	11330931	11614578	11898225
OPERATION COSTS WITH BREAKWATER IN COLONES	8383205	8519513	8655821	8792129	8928437	9064744	9291662	9518580
SAVINGS DUE TO INCREASED EFFICIENCY	2095801	2129878	2163955	2198032	2232109	2266186	2322916	2379645
SAVINGS DUE TO TIME AT PIER REDUCTION @ US. $ 600 PER HOUR, IN COLONES	8853600	8969730	9085860	9201990	9318120	9434250	9699480	9964710
SAVINGS IN COLONES	**10949401**	**11099608**	**11249815**	**11400022**	**11550229**	**11700436**	**12022396**	**12344355**

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TABLE 5.2.29 (continued...)
Saving Produced by Reducing Dock Movement - Acajutla

	YEARS 2008	2009	2010	2011	2012	2013	2014	2015
DRY BULKS PIER B - MT/ YEAR	1115556	1141531	1167506	1197032	1226558	1256085	1285611	1315137
TIME OF SHIP AT PIER B PRESENT CONDITIONS - HOURS	9743	9995	10248	10538	10828	11119	11409	11699
REDUCTION OF TIME AT PIER WITH BREAKWATER - HOURS	1949	1999	2050	2108	2166	2224	2282	2340
OPERATION COSTS AT PRESENT CONDITIONS IN COLONES	12181872	12465519	12749166	13071592	13394018	13716444	14038870	14361296
OPERATION COSTS WITH BREAKWATER IN COLONES	9745497	9972415	10199332	10457273	10715214	10973155	11231096	11489037
SAVINGS DUE TO INCREASED EFFICIENCY	2436374	2493104	2549833	2614318	2678804	2743289	2807774	2872259
SAVINGS DUE TO TIME AT PIER REDUCTION @ US. $ 600 PER HOUR, IN COLONES	10229940	10485170	10760400	11065110	11369820	11674530	11979240	12283950
SAVINGS IN COLONES	**12666314**	**12988274**	**13310233**	**13679428**	**14048624**	**14417819**	**14787014**	**15156209**

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The movement of the product by truck from pier to silo or storage facility is a slow and costly operation. To avoid it and transfer the bulks directly to storage belt conveyors could be installed on elevated structure on the pier in an arrangement similar to the belts existing at present.

Such structure would occupy the northern side of the pier, running between the existing gantry crane parallel to the existing belts. Ships would berth at B5 and B6, and would be unloaded with Buhlers that would convey the product to the belts through hoppers and appropriate appurtenances.

It is estimated that, under these circumstances, the existing gantry would be used almost exclusively for handling fertilizers while the new belts would be used for the transfer of grain.

A detailed study could determine if it is desirable to install on the berth unloading equipment more efficient than the Buhlers. For the purpose of this Report three Buhlers have been assumed with capacities of 100 to 150 tons per hour and the belts sized to transfer some 600 tons per hour.

The project including belts, supporting structure with a length of 300 meters to the ALCASA silos and accessory equipment is estimated at 72 million Colones.

Savings obtained with this project have been calculated comparing its cost to the cost of transporting the grain in trucks to the receiving gates of the silos. Also included is the saving of time at berth that results from a higher productivity of the grain handling operation. See Table 5.2.30.[2]

- Reconstruction of the Cutuco Pier

In previous section titled "Utilization and Capacity of Cutuco", the cost of rehabilitation of the pier was estimated at some 50 million Colones.

The transit shed on the pier is in such state of disrepair that it should be demolished, clearing the deck and further facilitating cargo handling operations. It might be profitable to repair some of the other warehouses around the port which may be used, some for the operation of the port and others to be rented to port users.

2 If cereals projections for 2000 and thereafter are exceeded, as 1994 and first trimester 1995 flows begin to indicate, it might become necessary to carry out this investment earlier than predicted.

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TABLE 5.2.30
Cash Flow - Grain Terminal in Acajutla - Scenario 1

CARGO	2000	2001	2002	2003	2004	2005	2006	2007
GRAINS	484629	489441	494253	499066	503878	508690	524894	541098
UNLOAD TO TRUCK								
UNLOAD DURATION AT 100 MT/ HOUR	4846	4894	4943	4991	5039	5087	5249	5411
STAY 20 %	969	979	989	998	1008	1017	1050	1082
TIME AT PIER - HOURS	5816	5873	5931	5989	6047	6104	6299	6493
OPERATION COST	484633	489445	494258	499070	503882	508694	524898	541103
TRANSPORTATION COST BY TRUCK	5330919	5383853	5436787	5489722	5542656	5595590	5773836	5952082
COST OF SHIP AT PIER	30531627	30834796	31137964	31441133	31744301	32047470	33068335	34089199
COST FOR A COMPARISON BASE	**35862546**	**36218649**	**36574752**	**36930854**	**37286957**	**37643060**	**38842171**	**40041282**
UNLOAD TO CONVEYOR BELT								
UNLOAD DURATION AT 300 MT/ HOUR	1615	1631	1648	1664	1680	1696	1750	1804
STAY	323	326	330	333	336	339	350	361
TIME AT PIER - HOURS	1939	1958	1977	1996	2016	2035	2100	2164
EQUIPMENT ANNUAL COST AT 8%	7352456	7352456	7352456	7352456	7352456	7352456	7352456	7352456
OPERATION COST	10404985	10508303	10611620	10714938	10818256	10921574	11269478	11617383
MAINTENANCE COST	892500	892500	892500	892500	892500	892500	892500	892500
COST OF SHIP AT PIER	10177209	10177209	10177209	10177209	10177209	10177209	10177209	10177209
TOTAL COST OF UNLOADING TO CONVEYOR BELT	**28827150**	**28930468**	**29033786**	**29137104**	**29240422**	**29343740**	**29691644**	**30039548**
SAVINGS								
UNLOAD TO TRUCK	35862546	36218649	36574752	36930854	37286957	37643060	38842171	40041282
UNLOAD TO CONVEYOR BELT	28827150	28930468	29033786	29137104	29240422	29343740	29691644	30039548
ANNUAL SAVINGS	7035396	7288181	7540966	7793751	8046536	8299320	9150527	10001734

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TABLE 5.2.30 (continued...)
Cash Flow - Grain Terminal in Acajutla - Scenario 1

CARGO	2008	2009	2010	2011	2012	2013	2014	2015
GRAINS	557303	573507	589711	608496	627281	646067	664852	683637
UNLOAD TO TRUCK								
UNLOAD DURATION AT 100 MT/ HOUR	5573	5735	5897	6085	6273	6461	6649	6836
STAY 20 %	1115	1147	1179	1217	1255	1292	1330	1367
TIME AT PIER - HOURS	6688	6882	7077	7302	7527	7753	7978	8204
OPERATION COST	557307	573511	589715	608500	627286	646071	664856	683641
TRANSPORTATION COST BY TRUCK	6130329	6308575	6486821	6693458	6900095	7106733	7313370	7520007
COST OF SHIP AT PIER	35110064	36130928	37151793	38335261	39518728	40702196	41885663	43069131
COST FOR A COMPARISON BASE	**41240392**	**42439503**	**43638614**	**45028719**	**46418824**	**47808928**	**49199033**	**50589138**
UNLOAD TO CONVEYOR BELT								
UNLOAD DURATION AT 300 MT/ HOUR	1858	1912	1966	2028	2091	2154	2216	2279
STAY	372	382	393	406	418	431	443	456
TIME AT PIER - HOURS	2229	2294	2359	2434	2509	2584	2659	2735
EQUIPMENT ANNUAL COST AT 8%	7352456	7352456	7352456	7352456	7352456	7352456	7352456	7352456
OPERATION COST	11965287	12313191	12661095	13064413	13467732	13871050	14274368	14677686
MAINTENANCE COST	892500	892500	892500	892500	892500	892500	892500	892500
COST OF SHIP AT PIER	10177209	10177209	10177209	10177209	10177209	10177209	10177209	10177209
TOTAL COST OF UNLOADING TO CONVEYOR BELT	**30387452**	**30735356**	**31083260**	**31486579**	**31889897**	**32293215**	**32696533**	**33099852**
SAVINGS								
UNLOAD TO TRUCK	41240392	42439503	43638614	45028719	46418824	47808928	49199033	50589138
UNLOAD TO CONVEYOR BELT	30387452	30735356	31083260	31486579	31889897	32293215	32696533	33099852
ANNUAL SAVINGS	10852940	11704147	12555354	13542140	14528927	15515713	16502500	17489286

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The profitability of this project has been analyzed assuming that it would commence operation around year 2000. It is assumed that the infrastructure would be amortized in 30 years at a rate of interest of 8% and that its maintenance cost will be 3% of construction cost per year.

Costs of administration and supervision have been computed as shown in Table 5.2.31 and the cash flow of the project is indicated in Table 5.2.32.

- Specialized Container Terminal in Cutuco

CEPA has indicated that GOES is interested in evaluating the feasibility of a container terminal near Cutuco in the area near Punta Gorda. Figure 5.2.2 shows the project's area.

The project would satisfy the containerized traffic demand of the eastern regions of the country and possibly those of the neighboring countries, Honduras and Nicaragua. The project is of special interest for the government given its desire to reactivate this area so badly affected by the war.

There is no information available on possible locations for the project and it is outside the scope of this Study to define them. Nevertheless the Consultants have made conceptual, preliminary estimates to establish an order of magnitude for the required investment as follows:

- It is estimated that an entrance channel of some four kilometers in length and 14 meters in depth may be dredged in soft material.

- A basin of some 10 hectares and a turning basin of 600 meters in diameter may be dredged, also in soft material.

- A marginal wharf of some 300 meters in length and 14 meters in depth would be built connecting to a landfill of 12 to 15 hectares, which may be hydraulic in part.

- The pier for bulk cargo and break bulk would be the existing FENADESAL pier.

- It is estimated that dredging and civil works may cost some 350 million Colones and the equipment some 87.5 million Colones.

The terminal could be built in 24 to 30 months.

TABLE 5.2.31
Personnel Required for Cutuco

	MONTHLY SALARY	SALARY + BEN.	ANNUAL SALARY
MANAGEMENT			
1 MANAGER	12,000	16,320	195,840
1 SECRETARY	3,000	4,080	48,960
1 ASSISTANT	4,000	5,440	65,280
ADMINISTRATIVE DEPT.			
1 ADMINISTRATIVE HEAD	8,000	10,880	130,560
1 ACCOUNTANT	6,000	8,160	97,920
2 ASSISTANTS	8,000	10,880	130,560
1 SECRETARY	3,000	4,080	48,960
OPERATIONS DEPT.			
1 OPERATIONS HEAD	10,000	13,600	163,200
1 ASSISTANT	4,000	5,440	65,280
1 PIER HEAD	7,000	9,520	114,240
1 WAREHOUSES AND YARD HEAD	7,000	9,520	114,240
1 SECRETARY	3,000	4,080	48,960
TOTAL.	75,000	102,000	1,224,000

SUM OF MONTHLY SALARIES	75,000
SOCIAL BENEFITS	0.36
TOTAL MONTHLY BENEFITS	102,000
ANNUAL TOTAL	**1,224,000**

BENEFITS

SOCIAL SECURITY	14%
CHRISTMAS BONUS	8.3%
VACATION	5.8%
HOLIDAYS	4.1%
SICK LEAVE	3.6%
TOTAL	0.358

TABLE 5.2.32
Cash Flow - Pier at Cutuco - Scenario 2

	YEARS										
CARGO	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
GENERAL BULK	45238	48778.6	52319.2	55859.8	59400.4	62941	79645	96348	113052	129755	146459
SOLID BULK	47108	47834.8	48561.6	49288.4	50015.2	50742	70301	89860	109418	128977	148536
LIQUID BULK	11200	12421.2	13642.4	14863.6	16084.8	17306	20400	23493	26587	29680	32774
CONTAINERS	0	0	0	0	0	0	68826	137651	206477	275302	344128
ANNUAL SHIPS	30	32	33	35	36	38	47	57	66	76	85
SIZE OF TRB SHIP	8000	8000	8000	8000	8000	8000	8000	8000	8000	8000	8000
TIME AT PIER - HOURS	1594	1673	1752	1831	1910	1988	2594	3199	3804	4410	5015
INCOME	CONTAINERS GO TO THE CONTAINER TERMINAL AT CUTUCO										
SERVICE TO SHIPS	34999	36723	38447	40172	41896	43620	56862	70104	83346	96587	109829
CARGO SERVICES	8658331	9302061	9945790	10589519	11233248	11876977	15096672	18316366	21536061	24755755	27975450
OTHER INCOME											
TOTAL INCOME	**8906501**	**9457623**	**10109546**	**10769663**	**11410890**	**12081612**	**15402345**	**18745078**	**22086811**	**25428544**	**28770276**
COSTS											
AMORTIZATION OF NEW INFRASTRUCTURE AT 8 %	3886200	3886200	3886200	3886200	3886200	3886200	3886200	3886200	3886200	3886200	3886200
AMORTIZATION OF NEW EQUIPMENT	Included in operation										
MAINTENANCE OF NEW INFRASTRUCTURE	875000	875000	875000	875000	875000	875000	875000	875000	875000	875000	875000
OPERATION AND MAINTENANCE OF NEW EQUIPME	Included in operation										
ADMINISTRATION AND SUPERVISION	1224000	1224000	1224000	1224000	1224000	1224000	1224000	1224000	1224000	1224000	1224000
SERVICES AND COMMUNICATIONS	20000	20000	20000	20000	20000	20000	20000	20000	20000	20000	20000
INSURANCE AND SECURITIES	60000	30000	60000	60000	60000	60000	60000	60000	60000	60000	60000
SERVICE TO SHIPS COSTS	24299	25493	26687	27881	29075	30269	37824	45379	52934	60488	68043
OPERATION (1)	2587022	2774493	2961964	3149435	3336906	3524377	4490122	5455868	6421613	7387358	8353103
OTHER COSTS											
TOTAL COSTS	8676521	8885186	9053851	9242516	9431182	9619847	10583147	11566447	12539747	13513047	14486347
OPERATION MARGIN	129980	592337	1054694	1517051	1979409	2441766	4810199	7178631	9547064	11915497	14283930
PRESENT VALUE OF BENEFITS		74449291									

NOTE:
(1) Includes labor, equipment, maintenance and material costs

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TABLE 5.2.32 (continued...)
Cash Flow - Pier at Cutuco - Scenario 2

	YEARS 2011	2012	2013	2014	2015
CARGO					
GENERAL BULK	179817	213176	246534	279893	313251
SOLID BULK	151842	155147	158453	161758	165064
LIQUID BULK	38633	44491	50350	56208	62067
CONTAINERS	427651	511174	594698	678221	761744
ANNUAL SHIPS	98	112	125	138	151
SIZE OF TRB SHIP	8000	8000	8000	8000	8000
TIME AT PIER - HOURS	5667	6318	6970	7622	8273
INCOME	CONTAINERS GO TO THE CONTAINER TERMINAL AT CUTUCO				
SERVICE TO SHIPS	124084	138340	152595	166850	181105
CARGO SERVICES	33983748	39992046	46000344	52008642	58016940
OTHER INCOME					
TOTAL INCOME	**34915540**	**41068904**	**47218068**	**52367332**	**58516586**
COSTS					
AMORTIZATION OF NEW INFRASTRUCTURE AT 8 %	3886200	3886200	3886200	3886200	3886200
AMORTIZATION OF NEW EQUIPMENT	Included in operation				
MAINTENANCE OF NEW INFRASTRUCTURE	875000	875000	875000	875000	875000
OPERATION AND MAINTENANCE OF NEW EQUIPME	Included in operation				
ADMINISTRATION AND SUPERVISION	1224000	1224000	1224000	1224000	1224000
SERVICES AND COMMUNICATIONS	20000	20000	20000	20000	20000
INSURANCE AND SECURITIES	60000	60000	60000	60000	60000
SERVICE TO SHIPS COSTS	78668	89293	99917	110542	121167
OPERATION (1)	10097951	11842799	13587647	15332495	17077343
OTHER COSTS					
TOTAL COSTS	16241819	17997292	19752765	21508237	23263710
OPERATION MARGIN	18677721	23071512	27465304	31859095	36252886
PRESENT VALUE OF BENEFITS					

NOTE:
(1) Includes labor, equipment, maintenance and material costs

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FIGURE 5.2.2
Installations of the Port of Cutuco

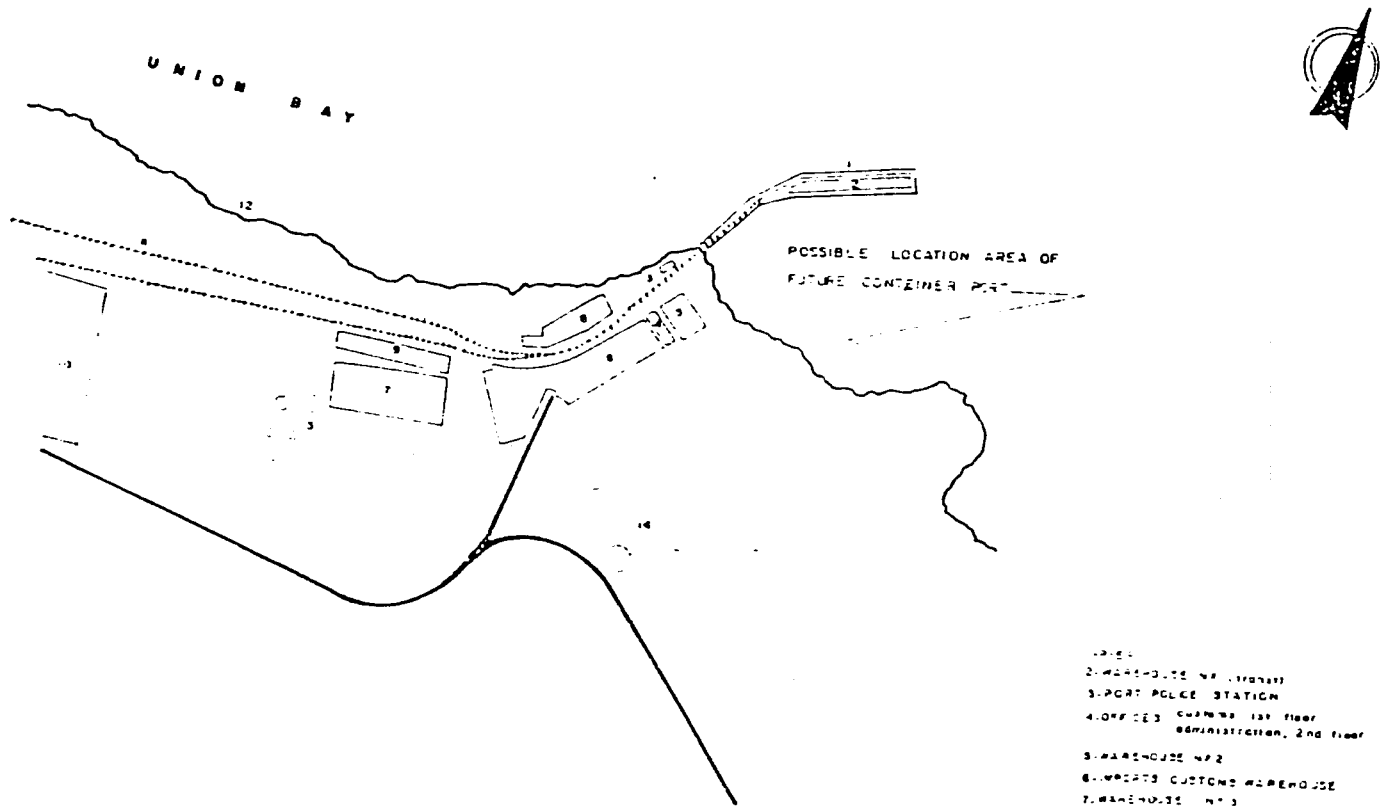

FIGURE 5.2.2 Installations of the Port of Cutuco	INTERMODAL TRANSPORTATION STUDY EL SALVADOR USAID-GOES	Source: GEPA Date: May 1992

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The profitability of the Project has been evaluated using these estimated costs and assuming the it would commence operations in 2010. See Table 5.2.33.

As in all other projects analyzed in this Report, the costs of operation assumed are those of Improved Operation. The tariff for containerized cargo has been assumed at 200 Colones per ton as explained in the following Section.

- The Profitability of Specialized Container Terminals

As mentioned before, the handling of containers in Acajutla is a slow operation performed with ship's gear in a general cargo pier.

This manner of handling containers may be used when the traffic is sporadic or does not exceed 200,000 tons a year, but for higher volumes, when the port needs to establish regular services with reliable itineraries served by cellular container ships, it is necessary to have specialized installations which require cranes on the wharf and infrastructure behind the wharf of 10 or more hectares per berth.

The service offered by this type of operation is substantially different from that existing today; it allows the establishment of frequent sailings, reliable shipping and handling of high volumes of traffic.

The cost of the installations, however, is high when handling less than 600,000 tons a year.

For the financial analysis of the specialized terminals examined in this Report we have assumed a tariff of 200 Colones per metric ton of containerized cargo which is comparable to that used in ports with specialized container terminals.

d. Conclusions and Recommendations

The projects analyzed in this Report appear to be profitable assuming that port costs are reduced to those of the Improved Operation.

This Improved Operation is feasible whether the port is operated by CEPA or by private operators through the system of concessions described in the next Section.

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TABLE 5.2.33
Cash Flow - Specialized Container Terminal - Cutuco - Scenario 2

CARGO	2010	2011	2012	2013	2014	2015	2016	2017	2018
TONS PER YEAR	344128	427651	511174	594698	678221	761744	914093	1066442	1218790
CONTAINERS	31284	37723	44162	50601	57040	63479	70031	76925	85070
TEUs									
ANNUAL SHIPS	22	27	32	36	41	45	54	63	73
SIZE OF THE TBR SHIP	28000	28000	28000	28000	28000	28000	28000	28000	28000
SHIPMENT AVERAGE	1400	1400	1400	1400	1400	1400	1400	1400	1400
TIME IN PIER - HOURS	912	1143	1373	1603	1833	2063	2476	2888	3301
INCOME									
SERVICE TO SHIPS	2299217	2778376	3257534	3736693	4215852	4695011	5634013	6573015	7512017
CARGO SERVICES	68825600	85530240	102234880	118939520	135644160	152348800	182818560	213288320	243758080
OTHER INCOME									
TOTAL INCOME	**71124817**	**88308616**	**105492414**	**122676213**	**139860012**	**157043811**	**188452573**	**219861335**	**251270097**
COSTS									
AMORTIZATION OF NEW INFRASTRUCTURE AT 8 %	30219093	30219093	30219093	30219093	30219093	30219093	30219093	30219093	30219093
AMORTIZATION OF NEW EQUIPMENT	Included in operation costs								
MAINTENANCE OF NEW INFRASTRUCTURE	3402000	3402000	3402000	3402000	3402000	3402000	3402000	3402000	3402000
OPERATION AND MAINTENANCE OF NEW EQUIPMEN	Included in operation costs								
ADMINISTRATION AND SUPERVISION	2960448	2960448	2960448	2960448	2960448	2960448	2960448	2960448	2960448
PUBLIC SERVICES	20000	20000	20000	20000	20000	20000	20000	20000	20000
INSURANCE AND SECURITIES	600000	600000	600000	600000	600000	600000	600000	600000	600000
OPERATION (1)	21114318	26238967	31363616	36488266	41612915	46737565	56085078	65432591	74780104
OTHER COSTS									
TOTAL COSTS	58315858	63440508	68565157	73689807	78814456	83939106	93286619	102634132	111981645
OPERATION MARGIN	12808959	24868108	36927257	48986406	61045556	73104705	95165954	117227203	139288453
PRESENT VALUE OF BENEFITS		909260405							

NOTE:
(1) Includes labor, equipment, maintenance and material costs

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TABLE 5.2.33 (continued...)
Cash Flow - Specialized Container Terminal - Cutuco - Scenario 2

CARGO	2019	2020	2021	2022	2023	2024	2025
TONS PER YEAR	1371139	1523488	1618790	1714093	1809395	1904698	2000000
CONTAINERS	97766	126957	144324	163758	182242	190183	166667
TEUs							
ANNUAL SHIPS	82	91	96	102	108	113	119
SIZE OF THE TBR SHIP	28000	28000	28000	28000	28000	28000	28000
SHIPMENT AVERAGE	1400	1400	1400	1400	1400	1400	1400
TIME IN PIER - HOURS	3714	4126	4184	4242	4300	4359	4417
INCOME							
SERVICE TO SHIPS	8451019	9390021	9949344	10508667	11067989	11627312	12186634
CARGO SERVICES	274227840	304897600	323758080	342818560	361879040	380939520	400000000
OTHER INCOME							
TOTAL INCOME	**282678859**	**314087621**	**333707424**	**353327227**	**372947029**	**392566832**	**412186634**
COSTS							
AMORTIZATION OF NEW INFRASTRUCTURE AT 8 %	30219093	30219093	30219093	30219093	30219093	30219093	30219093
AMORTIZATION OF NEW EQUIPMENT	Included in operation costs						
MAINTENANCE OF NEW INFRASTRUCTURE	3402000	3402000	3402000	3402000	3402000	3402000	3402000
OPERATION AND MAINTENANCE OF NEW EQUIPMEN	Included in operation costs						
ADMINISTRATION AND SUPERVISION	2960448	2960448	2960448	2960448	2960448	2960448	2960448
PUBLIC SERVICES	20000	20000	20000	20000	20000	20000	20000
INSURANCE AND SECURITIES	600000	600000	600000	600000	600000	600000	600000
OPERATION (1)	84127617	93475130	99322504	105169878	111017252	116864626	122712000
OTHER COSTS							
TOTAL COSTS	121329158	130676571	136524045	142371419	148218793	154066167	159913541
OPERATION MARGIN	161349702	183410951	197183379	210955808	224728236	238500665	252273093
PRESENT VALUE OF BENEFITS							

NOTE:
(1) Includes labor, equipment, maintenance and material costs

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In either case, present tariffs at 1995 prices are sufficient to show reasonable operating margins with the exception of the tariff for containerized cargo mentioned above.

Consequently the Consultants recommend the implementation of the projects as outlined in this study.

5.2.5 The Privatization of Ports

a. Introduction

The Terms of Reference of the Intermodal Transportation Study of El Salvador puts special emphasis on the analysis that the Consultants should make of the privatization process of the ports, its present status and a conceptual definition of the complete privatization of the Salvadorean ports.

In this Section the Consultants describe the present status of the privatization of Acajutla, examine the basic concepts of privatization, determine the activities that could be privatized and analyze a scheme of privatization to determine the feasibility of the process.

b. Status of Privatization of Acajutla

In 1990 the initiative of privatizing certain activities of the port came out as a result of a study prepared by the Institute of Ports and Navigable Channels of the Louisiana State University together with George Washington University.

The study examined three alternatives of partial privatization of stevedoring break bulk cargo. The analysis was conceptual in nature and some cost estimates were prepared to indicate the merit of each alternative.

To continue the process CEPA created a high level committee with the responsibility of planning and coordinating activities required for the implementation of the privatization schemes recommended in the study.

The privatization project, of very limited scope, advanced in the definition of a work plan and performed some preliminary activities.

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c. General Concepts

- Competition

Privatization of ports in the countries that have tried it has taken different forms that respond to political and national considerations or institutional restrictions, but always intend to reach the same objective:

✓ To allow the free play of the market forces so that competition acting on for profit enterprises, lower costs and optimize the assignment of port resources.

Here the key concept is competition. This is the prod that stimulates different enterprises offering their services to reduce their costs and to increase the level of satisfaction of their clients, for the purpose of capturing the largest possible share of the market. To this end, entrepreneurs program new investments, try advanced work methods, develop intensive marketing and, as a result, the port becomes more efficient, reduces its costs and attracts a larger volume of cargo. This is the environment of competition that has promoted the development of the large international ports.

Unfortunately, often certain port activities , because of their size or for other reasons, do not lend themselves to competition. This is the case, for example, of the concession of a container terminal in a port where traffic is only sufficient for one terminal, and, in these cases, monopoly cannot be avoided and to privatize the operation is to change a state monopoly for a private monopoly.

Here the imposition of tariffs and required level of services become indispensable, and therefore, privatization loses its most important mechanism, competition, to reduce costs and offer a better service.

But even when the regulation of tariffs is inevitable to control monopoly, the effort must be directed toward the reduction of the monopoly, the flourishing of the competition and the eventual disappearance of monopolistic practices.

- The Port Authority

The highest institutional level in the structure of privatization is the Port Authority. This may be a public agency and often it commences as an

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enterprise where all stock is owned by the state which, in the short term, may transfer its interest to private hands.

Normally, its field of activity should be only one port - and not the total port sector - since ideally it should act in an environment of competition with other Port Authorities and thus promote competition between ports. In El Salvador, should a port complex in Cutuco turn out to be feasible, it would be desirable to have a Port Authority in Acajutla and another in Cutuco so that, through their competition, both ports would benefit with lower costs and a higher level of services.

The Port Authority that receives the totality of the state concession, in turn offers in concession to private operators, the services of the port. The scheme described here is that of the Landlord Port Authority, so named to indicate its function as a receiver of a national asset that in turn will be awarded in concession to private operators. In this case, the Port Authority should not operate the port at the same time since this would be the source of many conflicts of interest and the Authority would be in direct competition with its own concessionaires.

The responsibilities of the Port Authority, in addition to administering in the best manner the assets of the state, include:

- ✓ The promotion of the port as the link in the total transportation system and as generator of economic activity related to its own port function.
- ✓ The promotion of a maximum of competition among concessionaires and the rejection of monopolistic practices or activities that tend to reduce competition.
- ✓ The exercise of the authority received from the state over the port facilities in the assignment of berths, enforcement of environmental regulations, conservation and maintenance of the port property and the furnishing of common services to concessionaires or to third parties, when such services cannot be awarded in concession.
- ✓ The preparation and execution of the Master Plan of Development of the Port which would be approved by the Central Government.

- ✓ The construction, maintenance and administration of the port infrastructure not included in the concessions.
- ✓ The formulation and enforcement of operating rules of the port and the vigilance over requirements that must be fulfilled by the concessionaires of port services.
- ✓ The operation of general security services, control of access and traffic in the port proper, without interfering with the responsibilities of Port Captain, Customs and other authorities involved in port activity.
- ✓ The award of concessions, by Public Tender or as required, including the activities of advertising Tenders; preparing Prospectus and the Terms of Reference for the Tender; evaluating proposals; awarding concessions and entering into contracts with the concessionaires.
- ✓ The vigilance over the satisfaction and fulfillment of all contracts on the part of concessionaires and operators.

The Port Authority should be autonomous financially and operationally and its policies should be those dictated by its own governing authorities.

The Port Authority, as a directing and administrating agency but not as a port operator, normally requires a small staff, made up of very high level personnel promoting the activity of the port and working with the operators to achieve effective service with financial success.

Figure 5.2.3 illustrates the organization of a typical Landlord Port Authority.

The income of the Port Authority comes from payments from the operators of the concessions, often including a participation on a per ton basis of cargo moved, and fees for the use of certain port facilities. In certain countries the Port Authority pays the Central Government for overall concession of the port.

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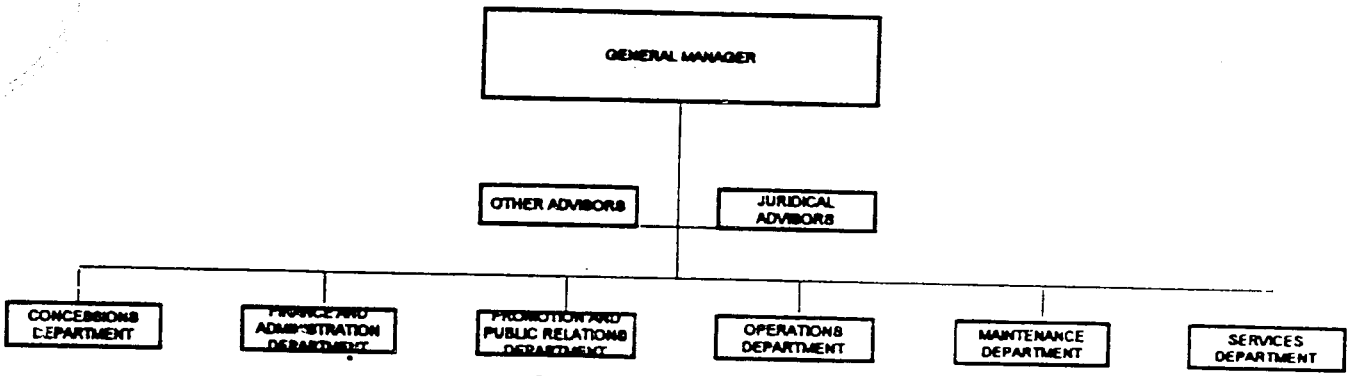
FIGURE 5.2.3
Portuary Authority Organization - Acajutla



SUGGESTED PERSONNEL

GENERAL MANAGER	MONTHLY SALARY
1 MANAGER	$25,000.00
1 ASSISTANT	18,000.00
1 SECRETARY	5,000.00
1 SECRETARY	3,000.00

CONCESSIONS	MONTHLY SALARY
1 MANAGER	$18,000.00
1 SECRETARY	3000

PROMOTION AND PUBLIC RELATIONS DEPARTMENT	MONTHLY SALARY
1 MANAGER	$15,000.00
2 ASSISTANTS	10,000.00
1 SECRETARY	3,000.00

FINANCE AND ADMINISTRATION	MONTHLY SALARY
1 MANAGER	$18,000.00
1 SECRETARY	3,000.00
1 TREASURY	10,000.00
1 TREASURY AUXILIARY	8,000.00
1 ACCOUNTANT	10,000.00
2 ACCOUNTANT AUX.	5,000.00 EACH
1 SYSTEM HEAD	12,000.00
2 ASSISTANTS	6,000.00 EACH
1 RECEPTIONIST	3,000.00

MAINTENANCE	MONTHLY SALARY
1 MANAGER	$15,000.00
1 ASSISTANT	10,000.00
1 SECRETARY	3,000.00

OPERATIONS	MONTHLY SALARY
1 MANAGER	$15,000.00
2 ASSISTANTS	10,000.00 EACH
1 SECRETARY	3,000.00

SERVICES	MONTHLY SALARY
1 MANAGER	$12,000.00
1 ASSISTANT	10,000.00
1 SECRETARY	3,000.00

JURIDICAL ADVISORS	MONTHLY SALARY
1 ASSESSOR	$18,000.00
1 ASSISTANT	3,000.00

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- The Concessions

For a service to be susceptible to privatization it should fulfill at least some of the following requirements:

1. Obviously it should be profitable in the sense that the tariff of the service should be sufficient to pay its costs and leave a profit for the operator. In exceptional cases, because of a government policy, a service can be subsidized and the operator receives payment from the government in addition to the tariff paid by the user. This is a special type of concession not contemplated here since it requires analysis and decisions outside the scope of this report. The concessions analyzed here do not require subsidies and, should some services produce small deficits, it is assumed that these would eliminated through concession payment adjustments.

2. The service must be integral, meaning that one operator, and only one, assumes full responsibility for a complete process. In other words, the stevedoring service is not considered integral unless it includes in addition to stevedoring, the transfer, storage, receipt and delivery of the cargo.

The convenience of integral service, from the point where the vessel delivers the cargo to the point where the user receives it in the warehouse, is obvious since responsibility is not diluted, paper work is simplified and the operator has full control on the chain of activities, which lets him better coordinate and optimize his operation.

All concessions analyzed here are of integral service.

- The Concessionaire

The profile of the ideal concessionaire depends on the service to be privatized, but the following characteristics should be found in any prospective candidate:

1. He must know his profession. He must have successfully operated similar concessions and should possess experience, connections and relationships in his work environment that would facilitate the successful operation of the concession. This requirement is sometimes difficult to fulfill when the

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government wishes to limit concessions to national enterprises only, but may be remedied in part, by requiring that the operator employ as general manager of the operation an individual of recognized experience. This would be a contractual clause stipulating also that, in case of removal or change of the approved manager, the new candidate must have the explicit and previous approval of the Port Authority.

2. The concessionaire must be an entrepreneur accustomed to the evaluation and taking of risks, desirous of competing in the market to obtain its largest share. The concessionaire must have, or should be able to obtain, the capital needed by the operation and should have financial capacity to qualify for insurance and bonds required by his contract with the Port Authority.

3. The concessionaire should be able to guarantee the greatest competence in the conduct of his operation. Certain operators, because of other activities outside the port, may try to reduce competition offering advantages to certain users at the expense of others, or in various ways, restricting the access to the service to certain users, in order to obtain benefits in other subsidiary or related activities outside the port. Certain shipping companies may have conflicts of interest in the operation of port terminals and the Port Authority must be alert to these situations and, when necessary, exclude them from participating in Tenders, or establishing contractual conditions that would reduce to a minimum these negative aspects.

- Regulation of the Concessionaire

The Port Authority has regulatory authority over the port to establish rules of operation, safety measures and protection of environment, persons and cargo. In addition, it must prevent the establishment of discriminatory or monopolistic practices and must promote competition as amply as possible.

In operations where this competition is not possible, the Port Authority must regulate the operation of the concession establishing maximum tariffs and minimum levels of service. The regulation of these tariffs should not prevent

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the operator from offering lower tariffs when he deems it desirable to meet competition or to promote his service.

In general, regulations must be effective, but should not encroach excessively in the freedom of the operator to promote his business and bring more traffic to the port.

Regulation is a necessary evil that should be applied with care and its objective should be to create a level field for operators and users that would increase competition, because the success of regulation is the elimination of monopoly.

d. The Concession Process

In countries where privatization of public services is an innovation, the concession process must follow transparent and open procedures that would guarantee that the award would be made without favoritism or secret negotiations and that only the public interest will prevail in the selection and contracting of the operator.

Consequently the steps of Public Tendering are normally preferred which include the following phases:

Publication of the Tender

The announcement and promotion of the Tender, or public bidding, in the country as well as overseas, when foreign companies are acceptable, is normally done through the media, the specialized publications and press and the Embassies of the country. Frequently a Prospectus of the concession is prepared containing sufficient information for interested parties to decide on their participation.

Prequalification Phase

In this phase, interested proponents submit their qualifications, experience and financial capacity in documentation that allow the Port Authority to judge their background and permit the selection of those that meet the requirements of the Tender. The requirements for tendering must be those really pertinent to

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the success of the operation and the safeguard of the public interest, but without limiting excessively the participation of proponents since it is important that a high degree of competition exist in the whole process.

)ocuments for the Proposal

As is customary in Public Tenders the Proposals must contain all information needed to judge the merits of the Proposal and such information must be submitted in formats that would facilitate the analysis and evaluation of the aspects needed for the selection of the most favorable Proposal. For this purpose the Port Authority should prepare clear and precise Terms of Reference, observing the legal customs of the country but, including as well, concepts and procedures that internationally are considered common for this type of tender.

One of the most important documents in the Proposal is the Business Plan where the prospective operator presents his own evaluation of the future demand for services of the concession, the capital resources necessary, and the equipment and installations that the operator is willing to furnish to satisfy such demand. Also he must include a projected cash flow indicating the ability of the concession to pay concession rights and other payments required by the Port Authority. Often the business plan includes a program of commercialization and promotion that the operator will carry out to promote increased traffic to the port.

The documents for the bidders should include a proforma of the contract containing the main clauses that the Port Authority wishes to incorporate in the concession contract.

Opening of Tenders

On the date stipulated in the Terms of Reference in public act the proposals are opened and the selection phase commences. For this purpose the Port Authority must have established a technical process with precise criteria of qualifications that would permit the proper comparison of the significant aspects of each proposal.

Award of the Concession

A committee of the Port Authority normally makes a technical evaluation of the proposals and submits its recommendations for final decision. The proceedings, from initial announcement of the Tender, to award of the concession, is a delicate process that should be carefully designed since, in part, the initial success of the privatization of a public service depends on the transparency and proper handling of the Tender.

In Annex 5.2.1, at the end of this Section, the Consultants present the principal aspects of the concession that should be dealt with in the Tender and the main clauses that normally are part of concession contracts.

Following a list of possible services to be Concessioned:

① Break bulk Concessions

- **Services to be Concessioned (Break bulk)**

The Port Authority can give in concession all services for the handling of break bulk from ship's hold to delivery of the cargo to the user, including all operations of loading and unloading cargo, transferring it in the port, storing, receiving and delivery of break- bulk imports and exports. It is recommended that these services be concessioned to integral operators since such concession makes the concessionaire responsible for complete handling of the cargo from arrival to the port to the point it leaves it.

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In Acajutla, it seems feasible to concession two break- bulk terminals to different operators so that competition may exist inside the port and, through it, there would be constant improvement of the services and lowering of the costs that two concessionaires would have to pursue to gain their participation of the market. This is possible in Acajutla since the installations in the port permit the separation of two different areas for handling break- bulk, consisting of two storage warehouses each and open yards and modules in each concession sufficient for the handling of the cargo of each operator.

The berths where break bulk ships would be worked on would be under the jurisdiction of the Port Authority, which would assign berth to each ship, and at the berth, either concessionaire contracted by the shipping agent would be able to work.

- Conditions (break bulk)

To perform his services the operator will receive in concession from the port Authority the storage warehouses, the open yards and other installations where the concessionaire will handle, store and deliver the user's cargo.

For the operations of loading, unloading, transfer, storage, reception and inspection of the cargo, the operator will have all necessary equipment, in good state of repair and efficient conditions of operation.

The equipment may be the property of the operator, may be leased or may be purchased from the port and should in quantity, type and condition be in compliance with the requirements specified in the concession contract.

The Port Authority has several options regarding the disposition of the equipment owned by the port. The first option, and probably the most attractive, would be to sell for cash the equipment to the operator that gets the concession, being one of the conditions of the concession, the obligation of the operator to purchase the equipment and include in his proposal the offered price.

A second option would be to rent or lease the equipment to the operator, in which case the operator pays a certain monthly amount for the use of the equipment. In this case it is necessary to agree on the party responsible for the maintenance of the equipment. Normally, it is practical to make the operator responsible for the maintenance of the equipment under periodic vigilance by the Port Authority. In this case the contract includes clauses on

the manner in which the operator must fulfill his obligations relative to the maintenance of the equipment and the remedies available to the Port Authority when the operator does not maintain it as stipulated in the contract. For this purpose the contract includes fines, bonds and gives to the Port Authority the capacity to contract the maintenance of the equipment to a third party, at the expense of the operator.

Similarly, the operator agrees to maintain the infrastructure received in concession in the manner stipulated in the contract, giving the Port Authority the right to supervise such maintenance and, when necessary, award the maintenance to third parties at the expense of the operator. Neglect of the obligations of the operator to maintain equipment and infrastructure is considered a default of the contract and the Port Authority can resort to cancellation of the contract for this cause.

The operator will contract and supply all labor required for the operation of the concession and will observe all requirements relative to fringe benefits, insurance and other labor benefits required by law.

The operator will organize and supervise the operation of the concession in an efficient and safe manner and shall offer the stipulated services in the best manner and in accordance with the port regulations.

The operator will assume total responsibility to shipping agents, users and others for the integrity and safety of the cargo and, through bonds and insurance policies, will answer for damages that the operator may cause to persons or goods, holding harmless the Port Authority for any act of the operator.

- Organization and Resources (break bulk)

For operation of the concession the concessionaire may have available the equipment, resources and installations detailed in Table 5.2.34.

- Projections of Income and Expenditures (break bulk)

Table 5.2.35 shows the estimated income and expenditures of the concession and it indicates that:

1. The concession is profitable and it is feasible to create two break bulk concessions. The income and expenditures shown on the Table are for each one.

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TABLE 5.2.34
Personnel and Resources for Concession of General Cargo

	PERSONNEL	MONTHLY SALARY	BENEFITS	ANNUAL SALARY
	MANAGER	30000	40800	489600
	SECRETARY	6000	8160	97920
	SUPERINTENDENT	20000	27200	326400
1	PIER HEADS	6000	8160	97920
4	WAREHOUSE HEADS	20000	27200	326400
2	YARD HEADS	12000	16320	195840
2	EQUIPMENT HEAD	14000	19040	228480
1	SERVICE HEAD	3000	4080	48960
3	ASSISTANTS	9000	12240	146880
1	ADMINISTRATIVE HEAD	8000	10880	130560
2	ACCOUNTANTS	8000	10880	130560
2	ASSISTANTS	8000	10880	130560

MAINTENANCE INCLUDED IN OPERATION

TOTAL 2350080 ANNUAL

RESOURCES

The concessionaire will count with the necessary equipment for cargo handling, be these its own leased or rented from the Port or from leasing company

TABLE 5.2.35
Cash Flow - Break Bulk Concession

Cargo	2000	2001	2002	2003	2004	2005
TONS PER YEAR	204333	208367	212401	216435	220469	224503
INCOME						
SERVICE TO CARGO	36469265	37189253	37909241	38629230	39349218	40069206
TOTAL INCOME	36469265	37189253	37909241	38629230	39349218	40069206
COSTS						
PAYMENT FOR WAREHOUSE RENT	1740000	1740000	1740000	1740000	1740000	1740000
PAYMENT FOR YARD RENT	300000	300000	300000	300000	300000	300000
PAYMENT FOR EQUIPMENT RENT	1667862	1700789	1733717	1766644	1799572	1832499
ADMINISTRATION AND SUPERVISION	2350080	2350080	2350080	2350080	2350080	2350080
EQUIPMENT OPERATIONS AND MAINT	9108634	9288460	9468286	9648111	9827937	10007763
SERVICES AND COMMUNICATIONS	100000	100000	100000	100000	100000	100000
INSURANCE AND SECURITIES	300000	300000	300000	300000	300000	300000
MAINTENANCE OF INFRASTRUCTURE	703200	703200	703200	703200	703200	703200
TOTAL COSTS	16269776	16482529	16695282	16908036	17120789	17333542
OPERATION MARGIN	20199489	20706724	21213959	21721194	22228429	22735664
PAYMENTS TO PORTUARY AUTHORITY						
PAYMENT FOR WAREHOUSE RENT	1740000	1740000	1740000	1740000	1740000	1740000
PAYMENT FOR YARD RENT	300000	300000	300000	300000	300000	300000
PAYMENT FOR EQUIPMENT RENT	1667862	1700789	1733717	1766644	1799572	1832499
PAYMENT FOR CONCESSION (1)	11000000	11217166	11434331	11651497	11868663	12085828
TOTAL	14707862	14957955	15208048	15458141	15708234	15958327

(1) AT 54 COLONES PER MT.

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2. The operators would be able to pay the Port Authority for the following:

- ✓ Rent for the concession land
- ✓ Rent for the storage warehouses and yards
- ✓ Rent for port equipment, including maintenance and capital costs of the equipment
- ✓ Payment of 54 Colones per ton of cargo handled

3. The operators would be able to make these payments and still maintain the tariffs for cargo handling at the 1995 level.

② I ry Bulk Concessions

- Services to be Concessioned (Dry Bulk)

In Acajutla there are four dry bulk terminals, three private and one public. All three are served by a common system of crane and conveyor belts that loads and unloads ships and transfers the product between pier and storage facility.

This system could constitute a concession for delivery of the service to the terminals and would include:

- ✓ A gantry crane that operates on Pier B
- ✓ A system of conveyor belts that moves the product between the crane and an unloading facility called "trompo", or storage warehouses and silos
- ✓ The trompo for unloading the product onto trucks
- ✓ A loading duct for loading trucks on the pier
- ✓ A transit warehouse for bulk products

This is the system presently in operation which, with a significant rehabilitation of the crane and the conveyor belts, soon to start, will be in good operating condition for the next ten to fifteen years. The throughput of the system is acceptable, its operation is flexible and here an operator

would be able to offer integral service with full responsibility for complete handling of the bulks from ship's hold to storage installation.

In addition, in the near future with the installation of cranes on Pier C, there will be another terminal available for unloading dry bulks, utilizing crane accessories for unloading the product onto trucks. Eventually, and depending on the growth of bulk traffic, the cranes could unload on a system of conveyor belts to the existing storage facilities.

Further, the high volume of grains assigned by the Traffic Model to Acajutla will require specialized installations for unloading and transfer of the grain to the silos. In this Report we refer to these installations as grain terminal on Pier B.

Each one of these three systems constitutes a complete service and is susceptible to become a concession, and potentially the port could have three dry bulk operators. Thus, even though the services are not totally equal, it is possible to create with a minimum of regulation, competition among the three concessionaires with the benefits to the users that competition brings about.

For the purpose of this study it has been assumed that it is feasible to implement at least one of these three concessions and, on this basis, the profitability computations have been prepared. Most likely more detailed studies will indicate that it is practical, feasible and advantageous to implement all three concessions. This is a complex subject that merits detailed study.

- Conditions (Dry Bulk)

The concession consists of the service of handling dry bulks between Pier B and private and public storage facilities including unloading to the duct and delivery to trucks at the "trompo".

For this purpose the operator rents the facilities owned by the port including: the crane on the pier, the conveyor belts, the installations at the "trompo" and the dry bulk transit shed.

The operator pays the Port Authority for the concession:

- ✓ A fixed sum for the rental of the transit shed and the "trompo" installations.

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- ✓ A fixed sum for the rental of crane and conveyor belts which includes the rental of the equipment and maintenance of equipment and installations.

- ✓ A variable sum based on the volume of cargo handled.

The operator that receives a public asset for his operation must use it as a public maritime terminal, available to any user on a fair and non-discriminatory basis and must agree not to create a monopoly or restrict the freedom of commerce or the legitimate use of the terminal. The contract must impose very severe sanctions for the violation of these conditions, including the cancellation of the concession for these reasons.

In this concession it is necessary to consider that, if one of the owners of the storage warehouse linked to the system were to become the concessionaire, a situation of conflict of interest and unfair competition could be created with the other users or with the public in general.

To avoid this situation it would be desirable not to allow individual owners connected to the system to participate in the Tender of the concession, but rather, the terms of the Tender could promote the participation of an association of users as a proponent group. Other groups may be enterprises owned by third parties that would guarantee in the contract their impartiality in the treatment of all users.

Depending on the monopolistic situation that could result from the number of proponents eligible to Tender, the Port Authority may be forced to regulate maximum tariffs and minimum levels of service that the concessionaire must offer to all users.

As in the case of the break bulk operators, the operator of dry bulks will supply all necessary labor and will furnish any additional equipment that the operation requires and will assume full responsibility to shipping companies and users for integrity and safety of the cargo. The operator will hold harmless the Port Authority from any claims for damages to persons or goods resulting from the operation of the concession.

- Organization and Resources (Dry Bulk)

To furnish the services the operator should have available the resources and equipment detailed in Table 5.2.36.

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TABLE 5.2.36
Personnel for the Concession of Dry Bulks for the Cargo Unit

	MANAGER	30000	40800	489600
	SECRETARY	3000	4080	48960
	SUPERINTENDE	70000	95200	1142400
2	PIER HEADS	12000	16320	195840
	ACCOUNTANT	4000	5440	65280
	ASSISTANT	3000	4080	48960
	SECRETARY	3000	4080	48960
2	MECHANICS	8000	10880	130560
2	ELECTRICIANS	8000	10880	130560
			ANNUAL TOTAL	2301120

Note: maintenance of equipment is included in operation costs.

RESOURCES
The concessionaire requires technical and financial capacity to assume the responsibility for management and maintenance of the Cargo unit and its accessory equipment.

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- Projection of Income and Expenditures (Dry Bulk)

Table 5.2.37 shows the projected income and expenditures of the dry bulk concession. It indicates that:

1. The concession is profitable.

2. The operator can pay the Port Authority for the following concepts:

   ✓ Rentals for the dry bulk transit shed and the "trompo" installations

   ✓ Rental for equipment and installations owned by the port including their cost of maintenance

   ✓ Payment of two Colones per ton moved at the terminal

3. The operator will be able to make these payments and obtain a reasonable margin of operation maintaining the tariffs at the 1995 level.

③ Concessions for Containerized Cargo

- Services to be Concessioned (Containerized Cargo)

The handling of containers in Acajutla will increase significantly during the next ten years.

At present only mixed ships carrying break bulk and containers on deck are serviced, utilizing ship's gear for loading and unloading the containers.

The port is now contemplating the installation in one or two years of two multipurpose cranes on Pier C which would be utilized in part for lightering 40,000 T.R.B. bulk carriers, but principally to handle containers carried by specialized cellular container ships. With this new equipment the port will increase considerably its capacity to handle containers and should be able to offer regular service and frequent sailings which will augment significantly the flow of containerized cargo to the port.

The Transportation Model indicates such dynamic growth in containerized cargo that in 2005 the capacity of the system in Pier C will not be sufficient to handle the forecast demand and it will be necessary to build a second container terminal.

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TABLE 5.2.37
Cash Flow - Concession of Dry Bulks - Cargo and Belts Unit

CARGO MT/ YEAR	2000	2001	2002	2003	2004	2005
FERTILIZERS	298679	308766	318852	328938	339024	349110
SUGAR	117185	116511	115838	115164	114491	113817
OTHERS						
TOTAL	415864	425277	434689	444102	453514	462927
TIME AT PIER	2100	2148	2195	2243	2290	2338
INCOME						
CARGO SERVICE AT ¢ 40.52 MT.	16850825.488	17232220.7984	17613616.1088	17995011.4192	18376406.7296	18757802.04
TOTAL INCOME	16850825.488	17232220.7984	17613616.1088	17995011.4192	18376406.7296	18757802.04
COSTS						
PAYMENT FOR EQUIPMENT USE (cargo and belt units	6714613.140704	6866589.1946272	7018565.2485504	7170541.3024736	7322517.3563968	7474493.41032
PAYMENT FOR WAREHOUSE RENT	2400000	2400000	2400000	2400000	2400000	2400000
ADMINISTRATION AND SUPERVISION	2301120	2301120	2301120	2301120	2301120	2301120
OPERATIONS AND MAINTENANCE	1178493.171296	1205166.7469728	1231840.3226496	1258513.8983264	1285187.4740032	1311861.04968
SERVICE AND COMMUNICATION	50000	50000	50000	50000	50000	50000
INSURANCE AND COMMUNICATIONS	600000	600000	600000	600000	600000	600000
TOTAL COSTS	13244226.312	13422875.9416	13601525.5712	13780175.2008	13958824.8304	14137474.46
OPERATION MARGIN	3806599.176	3809344.8568	4012090.5376	4214836.2184	4417581.8992	4620327.58
PAYMENTS TO PORTUARY AUTHORITY						
PAYMENT FOR EQUIPMENT USE	6714613.140704	6866589.1946272	7018565.2485504	7170541.3024736	7322517.3563968	7474493.41032
PAYMENT FOR WAREHOUSE RENT	2400000	2400000	2400000	2400000	2400000	2400000
PAYMENT FOR CONCESSION @ 2 Colones / MT	831729	850554	869379	888204	907029	925854
TOTAL OF PAYMENTS	9114613.140704	9266589.1946272	9418565.2485504	9570541.3024736	9722517.3563968	9874493.41032

Consequently, the operation of containerized cargo could have two different operators in Acajutla by the year 2005.

- Conditions (Containerized Cargo)

To offer container service with the cranes on Pier C, the operator should have the facilities and equipment necessary to handle up to 500,000 tons a year.

The facilities on land should include the existing container yard, an operations shed, an additional yard of 4 hectares and offices in the Administration Building.

Normally the concession should include facilities to strip and consolidate containers LCL. In this case, the operator may opt to subcontract this part of the service to one of the operators of break bulk cargo in order to avoid the construction of a consolidation warehouse. This may be a practical arrangement since the volume of LCLs is expected to decrease gradually and become a marginal service.

To load and unload the containers the operator would rent the port cranes. Since these cranes will also be used by a dry bulk concessionaire the rental may be by the hour for the operation required and would include the cost of maintenance of the cranes. This maintenance would be contracted by the Port Authority to a specialized enterprise.

As for the terminal that would commence operations in 2005, two types of operators may be considered as follows:

- ✓ An operator who takes in concession a terminal built and equipped by the port and whose function is basically that of an enterprise rendering the service with rented equipment and infrastructure, or

- ✓ A concessionaire that builds and equips the terminal with his own capital and operates the concession for a period sufficiently long to recuperate his investment, turning over the ownership of the terminal to the Port Authority at the end of this period.

These two types of concessions are substantially different and will be referred to later in this Section.

- Organization and Resources (Containerized Cargo)

For the operation of the concessions the operators will have available installations and equipment resources as indicated Table 5.2.38.

- Projection of Income and Expenditures (Containerized Cargo)

Table 5.2.39 shows the cash flow of the container operation at Pier C and indicates that:

1. The concession is profitable.

2. The concession produces sufficient income to pay the Port Authority for the items normally included in this type of contract.

3. Because of the utilization of an existing pier, the project has low investment requirements and, even though this is not an ideal terminal for the handling of containers, it serves its purpose of receiving and handling cellular container ships, thus permitting regular service and a relatively intense traffic of containerized cargo.

4. The capital costs of the project are so low compared to those of a specialized terminal that the concession could operate with current tariffs and offer a much higher level of service, which may attract to Acajutla container traffic from Quetzal. Table 5.2.39 shows the calculation using the average tariff that the port collects today for containerized cargo.

5. The financial results of this operation are sufficiently attractive to motivate the concessionaire to invest in the purchase of a second crane once the first crane reaches capacity. It has been estimated that the concessionaire would obtain this crane at commercial terms, financed at 12%. This option, however, requires a concession sufficiently long to amortize the investment of the concessionaire.

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TABLE 5.2.38
Container Terminal - Pier C
Also for Specialized Terminal at Acajutla

	MONTHLY SALARY
MANAGEMENT	
MANAGER	30,000.00
Assistant	10,000.00
SECRETARY	6,000.00
ACCOUNTING	
ACCOUNTANT	8,000.00
2 ASSISTANTS	8,000.00
SECRETARY	3,000.00
SALES	
SALES MANAGER	12,000.00
SECRETARY	3,000.00
OPERATIONS	
SUPERINTENDENT	70,000.00
YARD HEAD	6,000.00
PIER HEAD	6,000.00
ASSISTANT	4,000.00
SECRETARY	5,000.00
OPERATORS	
4 YARD OPERATOR	20,000.00
WAREHOUSE HEAD	5,000.00
4 ASSISTANTS	12,000.00
3 WATCHMEN	5,400.00
CARGO CONTROL	
CONTROL HEAD	12,000.00
COMPUTER OPERATORS	8,000.00
MAINTENANCE	
HEAD MAINTENANCE	12,000.00
ELECTRICIAN	4,000.00
2 MECHANICS	8,000.00
SECRETARY	3,000.00
SERVICE	
HEAD SERVICE	3,000.00
SHOP PERSONNEL	6,000.00

BENEFITS	MONTHLY SALARY
SOCIAL SECURITY	14%
CHRISTMAS BONUS	8.3%
VACATION	5.8%
HOLIDAYS	4.1%
SICK LEAVE	3.6%
	0.358

EQUIPMENT

Concessionaires will have the necessary equipment to handle containers at the yard containers at the yard and in transference

Costs of these equipment is included in operation costs per moved ton, as well as lease and operation costs of pier cranes

Starting equipment includes:
- 2 Transtainer cranes
- 6 front carriage
- 6 carts
- 1 Taylor FORKLIFT

Sum of monthly salaries	269,400.00
Social benefits	"36%
Monthly total	366,384.00
Annual total	4,396,608.00

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TABLE 5.2.39
Cash Flow - Concession of Containers Pier C

	2000	2001	2002	2003	2004	2005
CARGO						
TONS PER YEAR	534332	567466	600599	633733	700000	500000
CONTAINERS	59370	63052	66733	70415	77778	50000
TEUs						
ANNUAL SHIPS	49	53	56	59	65	42
SIZE OF TRB SHIP	28000	28000	28000	28000	28000	28000
AVERAGE SHIPMENTS IN CONTAINERS	1200	1200	1200	1200	1200	1200
TIME AT PIER IN HOURS	2523	2680	2836	2993	3306	2107
INCOME						
CARGO SERVICE AT @ 125.54 C / MT	67080039	71239631	75399224	79558816	87878000	62770000
TOTAL INCOME	**67080039**	**71239631**	**75399224**	**79558816**	**87878000**	**62770000**
COSTS						
PAYMENT FOR WAREHOUSE RENT	2342879	2342879	2342879	2342879	2342879	2342879
PAYMENT FOR CRANE RENT	13470574	14305876	15141178	15976480	17647084	11249221
INFRASTRUCTURE MAINTENANCE	525000	525000	525000	525000	525000	525000
CRANE OPERATION AND MAINTENANCE	6653164	7065722	7478281	7890839	8715957	5556030
OPERATIONS	15168891	16109505	17050119	17990732	19871960	16219749
ADMINISTRATION AND SUPERVISION	4396608	4396608	4396608	4396608	4396608	4396608
SERVICES AND COMMUNICATIONS	100000	100000	100000	100000	100000	100000
INSURANCE AND SECURITIES	600000	600000	600000	600000	600000	600000
TOTAL COSTS	**43257116**	**45445590**	**47634064**	**49822538**	**54199487**	**40989487**
OPERATION MARGIN	**23822924**	**25794042**	**27765160**	**29736278**	**33678513**	**21780513**
PAYMENT TO PORTUARY AUTHORITY						
PAYMENT FOR INFRASTRUCTURE RENT	2342879	2342879	2342879	2342879	2342879	2342879
PAYMENT FOR CRANE RENT	13470574	14305876	15141178	15976480	17647084	11249221
PAYMENT FOR CRANES OPERATION AND MAINTENAN	6653164	7065722	7478281	7890839	8715957	5556030
PAYMENT FOR CONCESSION	10686640	11349312	12011984	12674656	14000000	10000000
TOTAL	33153256	35063788	36974321	38884854	42705919	29148130

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The financial results of the second terminal, that would be built in 2005, are totally different. Here it is necessary to build a combination pier-breakwater that, while creating the container berth, provides sufficient protection to reduce agitation of the basin. This is a costly piece of infrastructure that imposes on the project very high amortization costs.

Table 5.2.40 indicates that the traffic estimated is not sufficient to pay the expenditures of the project and that, at least for two years, the operation would produce a deficit. Under these conditions either the Port Authority subsidizes the operator (not a very common situation) or the operator has to finance his operational deficit.

It should be noted here that:

- ✓ A concession that produces a deficit is not of interest to an operator unless it is compensated with extraordinary advantages that, in the long term, may prove very costly to the Port Authority.
- ✓ A Port Authority with this type of project on its hands is in a difficult position to negotiate with an operator and to persuade him to invest in covering the operating deficit of the concession.
- ✓ A project of this nature may be approached as a B.O.T. (Build, Operate and Transfer) where private investors would make the necessary studies, prove the feasibility of the project, build it and operate it for a period sufficiently long to recuperate their investment and then transfer ownership of the terminal to the Port Authority. This type of project is attractive to certain types of investors and its benefits to them are not limited to those of a simple concession. The project results in the furnishing of a public service by private enterprise, but its characteristics are quite different from those of the privatization of existing facilities, which is the subject of this Study.

④ Pilotage Concession

- Services to be Concessioned (Pilotage)

The Port Authority gives in concession the right to furnish the pilotage service to ships entering and leaving the port, at tariff levels not to exceed those established by the Port Authority for the service.

TABLE 5.2.40
Cash Flow - Specialized Container Terminal - Acajutla - Scenario 1

CARGO	YEARS 2005	2006	2007	2008	2009	2010	2011	2012	2013
TONS PER YEAR	274904	360943	448982	533022	619061	705100	845410	985720	1126031
CONTAINERS	27490	34812	42134	49456	56778	64100	74724	85348	95973
TEUs									
ANNUAL SHIPS	20	25	30	35	41	46	53	61	69
SIZE OF TRB SHIP	28000	28000	28000	28000	28000	28000	28000	28000	28000
AVERAGE SHIPMENTS IN CONTAINERS	1400	1400	14	1400	1400	1400	1400	1400	1400
TIME AT PIER IN HOURS	1708	1779	184[illegible]	1920	1990	2060	2402	2743	3085
INCOME									
CARGO SERVICE AT @ 125.54 C / MT	54980800	72188640	89396480	106604320	123812160	141020000	169082040	197144080	225206120
TOTAL INCOME	54980800	72188640	89396480	106604320	123812160	141020000	169082040	197144080	225206120
COSTS IN COLONES									
PAYMENT FOR INFRASTRUCTURE RENT	48762486	48762486	48762486	48762486	48762486	48762486	48762486	48762486	48762486
PAYMENT FOR EQUIPMENT RENT	12281396	16125217	19969037	23812857	27656677	31500497	37768886	44037275	50305664
INFRASTRUCTURE MAINTENANCE	5489575	5489575	5489575	5489575	5489575	5489575	5489575	5489575	5489575
EQUIPMENT OPERATION AND MAINTENANCE	4585613	6020814	7456015	8891216	10326418	11761619	14102102	16442586	18783070
ADMINISTRATION AND SUPERVISION	4396608	4396608	4396608	4396608	4396608	4396608	4396608	4396608	4396608
SERVICES AND COMMUNICATIONS	100000	100000	100000	100000	100000	100000	100000	100000	100000
INSURANCE AND SECURITIES	600000	600000	600000	600000	600000	600000	600000	600000	600000
OTHER COSTS									
TOTAL COSTS	76215679	81494700	86773721	92052742	97331763	102610784	111219657	119828530	128437402
OPERATION MARGIN	-21234879	-9306060	2622759	14551578	26480397	38409216	57862383	77315550	96768718
PAYMENT TO PORTUARY AUTHORITY									
PAYMENT FOR INFRASTRUCTURE RENT	48762486	48762486	48762486	48762486	48762486	48762486	48762486	48762486	48762486
PAYMENT FOR EQUIPMENT RENT	12281396	16125217	19969037	23812857	27656677	31500497	37768886	44037275	50305664

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TABLE 5.2.40 (continued...)
Cash Flow - Specialized Container Terminal - Acajutla - Scenario 1

CARGO	YEARS 2014	2015
TONS PER YEAR	1288341	1408851
CONTAINERS	108597	117221
TEUs		
ANNUAL SHIPS	76	84
SIZE OF TRB SHIP	28000	28000
AVERAGE SHIPMENTS IN CONTAINERS	1400	1400
TIME AT PIER IN HOURS	3428	3768
INCOME		
CARGO SERVICE AT @ 125.54 C / MT	253288180	281330200
TOTAL INCOME	253288180	281330200
COSTS IN COLONES		
PAYMENT FOR INFRASTRUCTURE RENT	48762486	48762486
PAYMENT FOR EQUIPMENT RENT	58574053	62842442
INFRASTRUCTURE MAINTENANCE	5489575	5489575
EQUIPMENT OPERATION AND MAINTENANCE	21123553	23464037
ADMINISTRATION AND SUPERVISION	4396808	4396808
SERVICES AND COMMUNICATIONS	100000	100000
INSURANCE AND SECURITIES	600000	600000
OTHER COSTS		
TOTAL COSTS	137046275	145655148
OPERATION MARGIN	116221885	135675052
PAYMENT TO PORTUARY AUTHORITY		
PAYMENT FOR INFRASTRUCTURE RENT	48762486	48762486
PAYMENT FOR EQUIPMENT RENT	58574053	62842442

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- Conditions (Pilotage)

The concessionaire may be an enterprise or legally constituted association, capable of contracting and with the number of pilots stipulated in the contract and in accordance with the requirements of the service.

Probably the enterprise may be an association of pilots since this service is normally considered a professional service.

The pilots must be licensed in accordance with current regulations and should be able to demonstrate to the Port Authority and the Captaincy of the port their capability and experience to operate in Acajutla.

The enterprise or association should have accident and liability insurance that would guarantee that CEPA would be held harmless in any claim or litigation that may result from the actions of the pilots.

The enterprise or association will maintain the efficiency specified in the contract for the service.

The enterprise will have an office operating 24 hours a day and have available the launches required under the terms of the contract.

The contract will establish fines for delays or defects in the services rendered and the concessionaire will guarantee with bonds the fulfillment of all stipulations of the contract.

The contract will also establish the manner in which conflicts between the Port Authority and the enterprise will be resolved, normally setting up a system of arbitration. It will also include stipulations on the actions that the Port Authority could take to resolve complaints from the users.

- Estimates of Profitability (Pilotage)

For these estimates it has been assumed that the enterprise or association will have the launches indicated in the cash flow table, an operating office and communication systems on a 24 hour basis, or as required by the service.

The estimates shown in Table 5.2.41 indicate that the concession is profitable with the tariffs currently in force and indicates that the concessionaire could pay the Port Authority the sum of .05 Colones per T.R.B. as payment for the concession.

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TABLE 5.2.41
Cash Flow - Pilotage Concession

YEAR	2000	2005	2010	2015
SHIPS	393	416	514	647
TRB AVERAGE	10800	11200	11500	12000
INCOME				
PILOTAGE FEE @ 0.20 C / TRB	848880	931840	1182200	1552800
EXPENSES				
SALARY FOR COASTAL PILOTS	195300	206730	255431	321524
SALARY FOR BOAT PILOTS	61380	64972	80278	101051
SERVICE AND COMMUNICATIONS	50000	50000	70000	100000
INSURANCE AND SECURITIES	70000	80000	100000	120000
OTHER OPERATION EXPENSES	94170	100425	126427	160644
TOTAL	470850	502127	632136	803219
OPERATION MARGIN	378030	429713	550064	749581
PAYMENT TO PORTUARY AUTHORITY				
PAYMENT FOR CONCESSION @ 0.05 C /	212220	232960	295550	388200

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⑤ Concession of Tugs and Berthing

- Services to be Concessioned (Tugs and Berthing)

The Port Authority gives in concession the service of moving the ships between anchorage and berth at the pier and the operations of mooring and demurring at the berth. The service must be rendered in accordance with existing regulations at Acajutla and subject to the concession contract. The concession also includes the service of connecting tanker lines to the pipelines that carry liquid bulks to storage at the users' installations.

- Conditions (Tugs and Berthing)

The concessionaire must have available or lease the necessary tugs of sufficient capacity to render an efficient service, and will furnish pilots, crews and work gangs as required by his operations.

Also the concessionaire will rent space at the piers for berthing the tugs and will have an office in the port with the necessary communication systems and other necessary services.

The Port Authority may sell or lease the tugs presently owned by the port.

If the concessionaire rents the tugs, the rental will include the cost of maintenance of the tug which would be contracted with a maintenance company. Maintenance will be supervised by the Port Authority which will have the right to periodically inspect the tugs and, in case of finding lack of compliance in the maintenance program, could take measures as specified in the contract, including the right of cancelling the concession for lack of performance.

The Port Authority will require that the tug pilots will have the necessary licenses and that the crews and gangs have the required experience.

The contract will stipulate fines, bonds and insurance policies that would guarantee the compliance with the clauses of the contract and hold harmless the Port Authority against claims for damages resulting from the actions of the concessionaire.

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- Projection of Income and Expenditures (Tugs and Berthing)

Table 5.2.42 shows estimated costs and expenditures of the concession and indicates that:

✓ The concession is profitable.

✓ The concessionaire can pay the Port Authority for the items normally included in the contract.

✓ Present tariffs are sufficient to make the concession profitable.

e. Conclusions and Recommendations

1. With the methods described in this Report as "Improved Operation" which are basically those used by private enterprise in modern and efficient ports, the handling of cargo in Acajutla would be profitable with present tariffs.

2. It is possible, therefore, to privatize the operations of the port and create in it competition among operators that would increase efficiency of the operations and lower the costs providing, at the same time, a center of employment generation where different enterprises would offer their services, and workers, well trained, would find varied and well remunerated employment opportunities.

3. Privatization would end the monopolistic system created by a single employer versus a single union that tends to prolong obsolete work practices and deficient levels of service, increasing costs, retarding the growth of the port, placing it in a difficult position to compete with more dynamic ports in the region and negatively affecting Salvadorean importers and exporters.

4. Once free of its obligations of day to day operation of the port, which today involve a multitude of diverse functions, as: stevedore, electrician, carpenter, equipment operator, etc., activities that private enterprise is in good position to assume, the Port Authority could channel its efforts to the better administration and promotion of this national asset which is of great strategic value for the development of the country.

5. The only operation that does not seem initially profitable is the handling of containers in a specialized terminal in the year 2005, but this result could change completely with an affluence of cargo higher than estimated by the Transportation Model of the Study. The evolution of container cargo could be evaluated with greater certainty once the terminal for containers on Pier C commences operation.

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TABLE 5.2.42
Cash Flow - Tugboats and Berth Concession

TRAFFIC				
YEAR	2000	2005	2010	2015
SHIPS	393	416	514	647
TRB AVERAGE	10800	11200	11500	12000
INCOME				
SHIPMENT / UNLOADING @ 0.20 C / TR	12733200	13977600	17733000	23292000
COSTS				
EQUIPMENT MAINTENANCE AND RENT	5500035	5821920	7193430	9054765
COMBUSTIBLE	2560395	2710240	3348710	4215205
OPERATION	324618	343616	424564	534422
MANAGEMENT	200000	200000	250000	300000
SERVICES AND COMMUNICATIONS	50000	70000	80000	100000
INSURANCE AND SECURITIES	100000	120000	150000	180000
TOTAL COSTS	8735048	9265776	11446704	14384392
OPERATION MARGIN	3998152	4711824	6286296	8907608
PAYMENT TO PORTUARY AUTHORITY				
EQUIPMENT RENT	3780035	4101920	5473430	7334765
PAYMENT FOR CONCESSION @ 0.25 C /	1061100	1164800	1477750	1941000

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In view of the above, the Consultants recommend that CEPA and the agencies in charge of the transportation sector analyze in depth the political, economic and institutional implications of privatizing the ports, which, in light of this Study, seems feasible.

The process is complex, starting from modifications to the existing laws to education and motivation of diverse groups, labor, shipping companies, users, industrial enterprises and local groups. Fundamentally, the privatization of a public service is a political decision and technically this Study indicates that the conditions are present to privatize Acajutla successfully.

ANNEX 5.1.1

Port of Acajutla Costs of 1993 by the Responsibility Center of Costs

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DPTO	SECC	CENTRO DE COSTO	SALARIOS ORDINARIOS	SALARIOS EXTRAORDINARIOS	PRESTACIONES EN SALARIO	SUELDOS ORDINARIOS	SUELDOS EXTRAORDINARIOS	PRESTACIONES EN SUELDO	OTRAS PRESTACIONES	COMBUSTIBLE LUBRICANTES	OTROS MATERIALES Y PRODUCTOS	ENERGIA ELECTRICA	SEGUROS	OTROS SERVICIOS EXTRAORDINARIOS	DEPRECIACIONES	OTROS GASTOS	TOTAL
		Total Bodegas y Patios	110,945	28,986	0	0	0	0	0	422	75,511	0	0	3 273	417 456	0	636 593
		Edificios y Residencias	444,680	136,139	282,624	0	0	0	66,798	236	287,167	0	4,068 362	7 465	125 733	0	5 399 204
		Pavimentos y Recintos	677,204	282,533	135,838	0	0	0	34,451	461	90,960	0	0	50,119	3 547	0	1 275 113
		Sistema Agua Potable	77,946	71,784	35,214				6,600		90,229			26,674	372		308 799
		Sis Energia y luz Electrica	95,906	133,672						29,934	104,863			94 133	4 301		463 309
		Total Seccion de Instalaciones	2,316,048	1,390,949	433,676	0	0	0	107,980	38,956	4,594,490	743	4,068,362	229,919	2 752,904	0	15 934 027
		Seccion Equipos	145	74													219
		Supervision Faja Transportadora	16,769	21,644	9,107	128,570	54	55,138	12,800	6	6,200	1,224		15 723	8 225	1 400	276 860
		Conservacion de Equipos	1,053,375	1,137,543	0	0	0	0	6	247,627	2,752,334	59	696 248	507,559	0	0	6 695 051
		Total Seccion de Equipos	1,070,289	1,159,261	9,107	128,570	54	55,138	12,806	247,633	2,758,534	1 283	696,248	523 582	8 225	1 400	6 972 130
		Seccion de Mantenimiento															
		Talleres Mayores															
		- Taller Mecanico	286,281	127,372	322,710	92,920	9,085	32,784	87,101	14,977	111,893			12.464	23 770	3 105	1,124 462
		- Taller de Engrase	118,319	36,618	116,449	24,934	14,868	18,203	29,563	146,407	29,519			2,610	2,759		538 249
		- Mantenimiento Preventivo	208,562	84,731	242,030	62,199	18,881	28,021	59,442	229	6,478			5 976	2 300	30	716 879
		- Taller Electrico	252,164	94,352	228,849	66,524	10,328	34,410	61,008	996	34,520			5 510	16 942	400	803 999
		- Taller Faja Transportadora	637,577	229,067	675,123	52,363	4,230	22,373	151,826	42,829	96,690	734		27 383	6 774	700	1 947 669
		Total Talleres Mayores	1,502,903	572,140	1,583,161	298,940	57,390	131,791	388,938	205,438	279,100	734	0	53,943	52 545	4 235	5 131 255
		Talleres Menores	66,676	24,461	24,620	59,355		21,325	9,802	12	7,504			1,214			214 989
		- Carpinteria	165,307	48,440	180,028	24,018	9,522	11,685	57,375	12	5,950			4 695	1 477	120	508 629
		- Fontanineria	68,317	18,688	70,769				16,287		2,832			1 640	175		178 708
		- Pintura	131,743	20,609	149,081				33,200		6,747			3 437	1 136	720	347 253
		- Albanileria	118,753	31,723	127,746				37,456		1,095			3 347		20	320 150
		- Tapiceria	9,127	1,575	12,260				3,200	29	509			292	73		27 065
		- Cuadrilla de Sand Blasting	138,198	43,509	96,030				22,772	196	49,717			2 022	1,766		351 208
		- Cuadrilla de Peones	245,016	89,228	242,150			3,097	91,080		6,197			7 365		210	684 323
		- Mecanica Fina	314	50	16,481				3,600	132	1,018			449	463		22 507
		Total Talleres Menores	941,449	278,283	918,145	83,373	9,522	36,107	274,752	381	81,569	0	0	24 461	5,690	1 080	2 654 512
		Total Seccion de mantenimiento	2,444,352	850,423	2,501,306	382,313	66,912	167,898	663,690	205,819	360,669	734	0	78 404	58 235	5 315	7 786 [illegible]
		Total Dpto de Mantenimiento	5,972,912	3,449,034	2,999,999	665,057	77,217	297,328	813,515	493,631	7,828,206	4,742	4,764,610	1 252 370	2 346 549	1 614 999	33 050 169
		DEPARTAMENTO DE PERSONAL															
		Jefatura	39,256	13,436	1,959,015	98,186	115	511,513	982,890		21,325			9 758		1 606 705	1 616 46[illegible]
		Relaciones Laborales	340	128		59,666	79	24,899	15,477		4,140			28 671	13 697	205	3 666 709
		Trabajo Social	13,828	4,920	3,905	86,351	5,261	38,953	163,683		11,777			539	7 574	520	113 362
														2 137	15 103	16 620	362 53[illegible]

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.....Continuación ANEXO 6.1.1

DPTO	SECC	CENTRO DE COSTO	SALARIOS ORDINARIOS	SALARIOS EXTRAORDINARIOS	PRESTACIONES EN SALARIO	SUELDOS ORDINARIOS	SUELDOS EXTRAORDINARIOS	PRESTACIONES EN SUELDO	OTRAS PRESTACIONES	COMBUSTIBLE LUBRICANTES	OTROS MATERIALES Y PRODUCTOS	ENERGIA ELECTRICA	SEGUROS	OTROS SERVICIOS EXTRAORDINARIOS	DEPRECIACIONES	OTROS GASTOS	TOTAL
		Control y Estadistica de Personal	204	104		68,412	21,079	33,958	6,679		9,243			674	5,258	650	146,261
		Seccion 05													1,618		1,618
		Total Departamento de Personal	53,628	18,588	1,962,920	310,615	26,534	609,323	1,188,729	0	46,485	0	0	41,779	43,250	1,624,700	5,908,551
		GASTOS GENERALES															
		Gastos no distribuidos			2,356,404			751,674									3,108,078
		Gastos Financieros														7,162,753	7,162,753
		Cuentas de Ajuste	(540)	517	347,867	(511,940)	0	(16,622)	701,455	5,851	49,251	149,187	(23,448)	78,409	(9,733)	1,631,348	2,401,602
		Total Gastos Generales	(540)	517	2,704,271	(511,940)	0	735,052	701,455	5,851	49,251	149,187	(23,448)	78,409	(9,733)	8,794,101	12,672,433
		TOTAL PUERTO DE ACAJUTLA	105,561,292	105,562,349	108,268,103	105,049,892	105,561,832	106,298,864	106,263,287	105,567,683	105,611,083	105,711,019	105,538,384	105,640,241	105,552,099	114,355,933	118,234,285

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DPTO	SECC	CENTRO DE COSTO	SALARIOS ORDINARIOS	SALARIOS EXTRAORDINARIOS	PRESTACIONES EN SALARIO	SUELDOS ORDINARIOS	SUELDOS EXTRAORDINARIOS	PRESTACIONES EN SUELDO	OTRAS PRESTACIONES	COMBUSTIBLE LUBRICANTES	OTROS MATERIALES Y PRODUCTOS	ENERGIA ELECTRICA	SEGUROS	OTROS SERVICIOS EXTRAORDINARIOS	DEPRECIACIONES	OTROS GASTOS	TOTAL
DEPARTAMENTO DE OPERACIONES																	
		Jefatura de Operaciones	129												9.758	1.606.704	1.616.462
		Oficina de Operaciones	20.110	19,137	9,402	95,968	1,719	39,784	36,851		13						142
		Total Jefatura de Operaciones	20,239	19,137	9,402	95,968	1,719	39,784	36,851		24,016			5.146	14.932	1,815	288,860
		Seccion Equipos y Servicios								0	24,029	0	0	5.146	14.932	1.815	289 002
		Jefatura Equipos y Servicios	2,691	427	6.923	65.956	429	28,958	8,091						22		22
		Gastos Indirectos Estibadores	530.159	185,507	4,148,433	883,229					19,545			6.284	6.917	2,790	147 011
		Gastos Indirectos Muelleros	565,381	187,100	3.571.074			842	582,830					50.938			5 448 286
		Gastos Indirectos Ope de Equip.	1,034,360	302,771	1,020,789			6,288	188,873		1,632			53 065		110	4.960 202
		Unidad Operadores de Equipos	56,880	41,517	30,409	72,791	67,114	32,386	30,384		7,325			16.479		340	2,551,532
		Unidad de Transporte	82,319	64,249	95,599	97,169	89,152	42,128	35,533		3,582			1,748	9.891		350,425
		Suministro de Combustible	88,370	40,149	32,020				6,600		537			130,357	1,380	295	641,763
		Almacen de Utileria	314,511	240,706	157,495	1,294			36,254	1,822	196,230			674	77		188,427
		Control y Recepcion de Personal	26,651	7,212	10,483	89,834	61,436	49,905	12,634	29	7,201			3,595	2,563	55	954 625
		Servicio de Radio	17,460	146	8,004	88,291	65,477	34,348	9,417		2,675			5,008	4.378		274 771
		Unidad Atraque y Desatraque	141,654	116,599	68,722	707,442	611,558	387,236	98,270	39	11,202			2,300	8.438		218,556
		Unidad de Embarques	38,445	27,829	13,293	114,693	51,533	59,974	13,774	17	38,018			185,908	8,342	18,693	2,331,885
		Operacion de Equipos	1,200,315	786,924	0	0	0	0	0	1,145,055	0	56	0	8,329	27,609		393,514
		Total Secc. Equipos y Servicios	4,099,196	1,991,136	9,163,244	1,770,699	946,699	619,865	1,010,640	1,147,062	287,947	56	0	0	7,238,058	0	10 370 408
		Seccion Estiba y Muelles	2,176	665										464,685	7.307 675	20,283	28,829,187
		Jefatura	57	20		49,293		16,323	4,734		4,300						2,841
		Unidad de Estiba	260,849	117,516	177,358	440,233	230,365	249,617	63,613	6	5,504			1,120	5,241	650	81,738
		Unidad de Muelle	126,511	51,933	83,939	309,984	153,367	117,559	45,307	27	4,828			6,642	6,374	1,690	1,569,767
		Transferencia de Carga	67,459	32,779	18,070	104,203	58,534	54,003	17,373	6	10,649			6.307	4,780	585	905,127
		Amarre	301,694	196,718	561,164			14,390	111,731		2,024			965	2,305	650	388,998
		Estiba/Desestiba Carga General	3,294,903	1,864,422										10,133			1,197,854
		Estiba/Desestiba carga Granel	1,233,837	1,088,818													5,159,325
		Ope. en Muelle Carga General	1,195,308	790,085													2,322,655
		Ope. en Muelle Carga Granel	415,644	248,118													1,985,393
		Transporte Carga General	59,730	71,910													663 762
		Manejo de Carga Liquida	86,533	623,329	82,254				225	356							131,640
		Total Secc. estiba y Muelles	7,044,701	5,086,313	922,785	903,713	442,266	451,892	242,983	395	27,305	0	0	25 167	18,700	3,575	15,169,795
		Seccion Almacenes															
		Jefatura Admon. de Almacenaje	973	1,274	5,464	64,299		28,774	7,589		9,925			766	15 304	600	132 968
		Unidad Carga General	147,066	6,255	65,231	87,149	303	62,884	35,643	49	8,201			3 331	19 369	720	439 201
		En Patio para Vehiculos	57,275	9,646	22,780	21,897	4 006	13,631	6,338		7,485			674	2 809		146 539

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.....Continuación ANEXO 5.1

DPTO	SECC	CENTRO DE COSTO	SALARIOS ORDINARIOS	SALARIOS EXTRAORDIN.	PRIMA DOM. SALARIO	SUELDOS ORDINARIOS	SUELDOS EXTRAORDINARIOS	PRESTACIONES EN SUELDO	OTRAS PRESTACIONES	COMBUSTIBLE LUBRICANTES	OTROS MATERIALES Y PRODUCTOS	ENERGIA ELECTRICA	SEGUROS	OTROS SERVICIOS EXTRAORDINARIOS	DEPRECIACIONES	OTROS GASTOS	TOTAL
		Unidad de Contenedores	795,888	174,216	332,657	75,319	19,424	38,142	78,916	46	33,869			8,967	13,702	520	1 571 666
		Unidad de Carga a Granel	138,299	37,442	58,112	188,043	85,214	91,532	33,283	34	37,698			4 130	16 187		689 974
		Almacenaje Carga General	1,355,006	383,658	629,990	134,010	47,252	46,825	153,783	59	39,036			14,878	600 000	290	3 404 787
		Almacenaje Carga a Granel	182	45													227
		Total Secc. Almacenes	2,494,689	612,536	1,117,234	570,717	156,199	279,788	315,550	188	136,214	0	0	32,746	667 371	2,130	6 385 362
		Total Departamento de Operaciones	13,658,825	7,709,122	11,212,665	3,341,097	1,546,883	1,391,309	1,606,024	1,147,645	475,495	56	0	527,744	8,018,436	1,634,507	52,269 808
		DEPARTAMENTO DE MANTENIMIENTO															
		Jefatura de Mantenimiento									4,464			9,757		1,606,704	1,620,925
		Ing. y Admon de Instalaciones	25,890	11,707	15,415	91,885	407	41,148	10,118		20,211			4,386	19,572	765	241,504
		Area Civil	116,333	36,694	40,495	62,289	9,844	33,144	18,921	1,223	89,838	1,982		106,322	7,613	815	525,513
		Total Jefatura de Mantenimiento	142,223	48,401	55,910	154,174	10,251	74,292	29,039	1,223	110,049	1,982	0	110,708	27,185	1,580	767,017
		Seccion de Instalaciones	101												77		178
		Muelles															
		- Muelle "A"	304,443	262,930	0	0	0	0	88	1,817	181,995	0	0	24,830	734 917	0	1,511,020
		- Muelle "B"	273,031	221,356	0	0	0	0	43	5,998	247,985	0	0	3,758	398 623	0	1,150 974
		- Muelle "C"	195,125	131,560	0	0	0	0	0	0	8,906	0	0	0	777,362	0	1,112,953
		- Acceso Muelles	134,676	121,239	0	0	0	0	0	88	3,503,905	0	0	19,667	289,816	0	4,089,392
		Total Muelles	907,275	737,085	0	0	0	0	131	7,903	3,942,772	0	0	48,255	2 200,918	0	7 844 339
		Faros y Boyas	1,991	770							2,988	743					6,492
		Bodegas y Patios	211	96													307
		- Bodegas															
		Bodega No. 1	12,803	3,950							4,484				15,216		36,458
		Bodega No. 2	24,836	6,541						28	12,158				13,761		57,324
		Bodega No. 3	24,833	3,116							14,976			3,273	15,828		62,026
		Bodega No. 4	10,334	2,667							3,571				12,306		28,878
		Bodega de Graneles	1,692	536							139				179,927		182,294
		Total Bodegas	74,503	16,810	0	0	0	0	0	28	35,328	0	0	3,273	237,038	0	366 980
		- Modulos	22,726	10,005	0	0	0	0	0	394	11,229	0	0	0	24,986	0	69 340
		- Patios															
		Patios para Vehiculos	3,108	409							17,576						21 093
		Patios para Contenedores	10,397	1,666							11,378				155 432		178 373
		Total Patios	13,505	2,075	0	0	0	0	0	0	28 954	0	0	0	155 432	0	199 966

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ANEXO 6.1.1

PUERTO DE ACAJUTLA

COSTOS DEL AÑO 1993 POR CENTRO DE COSTO DE RESPONSABILIDAD

DPTO	SECC	CENTRO DE COSTO	SALARIOS ORDINARIOS	SALARIOS EXTRAORDINARIOS	PRESTACIONES EN SALARIO	SUELDOS ORDINARIOS	SUELDOS EXTRAORDINARIOS	PRESTACIONES EN SUELDO	OTRAS PRESTACIONES	COMBUSTIBLE LUBRICANTES	OTROS MATERIALES Y PRODUCTOS	ENERGIA ELECTRICA	SEGUROS	OTROS SERVICIOS EXTRAORDINARIOS	DEPRECIACIONES	OTROS GASTOS	TOTAL
GERENCIA DEL PUERTO																	
									175					9,758		1,606,704	1,616,577
		Gerencia	20,202	5,190	9,705	145,522	3,816	69,886	29,696		7,612		1,690	93,896	25,778	21,474	434,467
		Policia portuaria	248,886	176,120	130,533	1,076,887	692,334	518,825	164,306	355	10,293		15,884	52,582	17,757	28	3,304,772
		Prevencion de Riesgos	847	6					293		128				633	390	2,297
		Seguridad e Higiene Industrial	36,994	17,197	13,313	67,091	1,544	163,225	6,550	6	30,266	838	633	1,963	36,337	775	376,732
		Cuerpo de Bomberos	293,509	248,261	161,614	91,862	63,273	52,628	48,476	222	73,222		4,493	2,166	46,915	100	1,066,761
		Total Secc. Prevencion de Riesgos	331,350	265,464	174,927	158,953	64,817	215,853	55,319	228	103,616	838	5,126	4,149	83,585	1,265	1,465,790
		Clinica medica	22,845	17,167	10,797	150,753	60,038	72,913	205,180	23	15,522	2,169	1,979	21,180	14,038	345	594,949
		Total Gerencia del Puerto	623,263	463,941	325,982	1,532,115	1,021,005	877,477	454,618	606	137,043	3,007	24,679	181,565	141,458	1,629,816	7,416,555
DEPARTAMENTO ADMINISTRATIVO																	
		Jefatura de Administracion	16,095	6,941	8,858	87,270	498	41,007	20,882			2,008,890	219,555	158,679		1,606,704	3,193,828
		Servicio Telefonico	13,533	4,407		37,473	7,192	20,023	4,453	17	56,234			193,088	15,537	2,056	448,482
		Facturacion	115,948	10,206	59,993	99,172	830	47,251	25,148		11,568			111,954	1,675		212,278
		Colecturia	19,755	6,928	7,512	114,382	10,986	48,989	11,839	12	63,238			2,736	11,446	685	436,685
		Contabilidad	79,122	5,201	36,023	78,105	2,282	34,564	16,633	6	9,790		9,375	1,963	10,308	35	251,848
		Almacen de Materiales	102,967	12,702	40,118	96,250	26,117	51,455	20,264		4,207			2,630	7,843	9,000	275,590
		Contabilidad de Personal	67,265	25,575	27,783	98,908	23,091	46,544	18,387	6	7,579			20,785	13,222	35	391,510
		Corte de Cuentas	358			130,077	224	45,398	8,219	6	5,651			2,854	8,023		324,087
		Estadisticas	581	463		41,148	2,455	28,006	5,456		2,838			8,508	7,287	361	201,288
		Servicios (Correo y Archivo)	59,858	12,015	29,222	21,167	556	10,035	8,027		483			584	4,717		81,893
		Inventarios	41,070	5,122	16,146	32,880	6	11,925	6,583	6	681			359	107	10,740	152,773
		Total Dpto. Administrativo	516,552	89,560	225,655	836,822	74,211	383,195	145,871	6	3,143			674	893	105	118,527
										59	165,412	2,008,890	228,930	502,514	81,058	1,629,720	6,888,749

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ANNEX 5.1.2

Comparative Costs of Cargo Handling
Acajutla Vs. Puerto Quetzal

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COSTOS COMPARATIVOS POR MANEJO DE HIERRO Y ACERO SEGUN TARIFAS VIGENTES A DICIEMBRE DE 1994

		ACAJUTLA	QUETZAL
A-	ESTIBA/DESESTIBA		
	Descarga	U.S $ 8.58 TM. 1>	Q 7.50 TM. 1>
	Movimiento a Bordo	-.-	Q 18.75 TM. 1>
	TOTAL	U.S. $ 8.58 TM.	Q 26.25 TM.
	Costo Estimado en Colones	¢ 74.64 TM.	¢ 41.48 TM.
B-	MUELLAJE		
	Transferencia	-.-	Q 7.50 TM. 1>
	Muellaje	¢ 54.30 TM.	Q 18.00 TM.
	Recepción	-.-	Q 4.38 TM. 1>
	Despacho	-.-	Q 4.38 TM. 1>
	Manejo Bulto Pesado (Q 13.00 TM. c/bulto de 2 TM.)	-.-	Q 6.50 TM.
	TOTAL	¢ 54.30 TM.	Q 40.76 TM.
	Costo Estimado en Colones:	¢ 54.30 TM.	¢ 64.40 TM.

C- COSTO ADICIONAL POR TRANSPORTE TERRESTRE QUETZAL-SAN SALVADOR: ¢ 100.00 TM. (APROX. ¢ 5.00 QUINTAL)

1> Incluye recargos por tiempo extraordinario y nocturnidad

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COSTO POR MANEJO DE GRANELES SECOS
SEGUN TARIFAS VIGENTES AL 31 DE DICIEMBRE DE 1994

CONCEPTO	PUERTO ACAJUTLA	PUERTO QUETZAL
A- ESTIBA/DESESTIBA		
Descarga	¢ 15.65 TM.(UCA) 1>	¢ 11.25 TM. 2>
Movimiento a bordo	-.-	¢ 29.63 TM 2>
TOTAL	¢ 15.65	¢ 40.88
B- MUELLAJE		
Transferencia	-.-	¢ 8.61 TM 2>
Recepción	-.-	¢ 3.56 TM 2>
Despacho	-.-	¢ 3.56 TM 2>
Muellaje	¢ 21.10 TM	¢ 22.91 TM
TOTAL	¢ 21.10 TM	¢ 38.64 TM

C- COSTO ADICIONAL TRANSPORTE TERRESTRE QUETZAL-SANSALVADOR: ¢100.00 TM (APROX. ¢ 5.00 X QUINTAL)

1> Incluye recargo en fin de semana y cargo por recepción y despacho tiempo extraordinario.

2> Incluye recargo por jornada nocturna.

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COSTO POR MANEJO DE GRANELES LIQUIDOS SEGUN TARIFAS VIGENTES AL 31 DE DICIEMBRE DE 1994

CONCEPTO	PUERTO ACAJUTLA	PUERTO QUETZAL
• Manejo por tuberías	¢ 10.55 TM	
• Manejo p/camiones tanque	¢ 32.80 TM	
• Descarga		Q 0.80 TM 1>
• Transferencia		Q 4.95 TM 2>
• Recepción		Q 1.80 TM 1>
• Despacho		Q 1.80 TM 1>
• Muellaje		Q 14.50 TM
TOTAL POR TUBERIA	¢ 10.55 TM	
TOTAL POR CAMION TANQUE	¢ 32.80 TM	Q 23.85 TM (¢ 37.68 TM)

COSTO ADICIONAL POR TRANSPORTE TERRESTRE QUEZAL-ACAJUTLA ¢100.00 TM
(APROX. ¢ 5.00 X QUINTAL)

1> Se adiciona 50% de recargo en jornada nocturna
2> Se adiciona 20% de recargo en jornada nocturna

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COSTOS COMPARATIVOS POR MANEJO DE CONTENEDORES SEGUN TARIFAS VIGENTES A DICIEMBRE DE 1994 REFERENCIA: CONTENEDOR FCL DE 40 PIES

	CONCEPTC		ACAJUTLA	QUETZAL
A-	ASIGNABLE A LA LINEA NAVIERA			
	Barco a Muelle	U.S $	26.65 Cont.	Q 122.00 Cont. 1>
	Muelle a Patios	U.S $	9.85 Cont.	Q 64.90 Cont. 2>
	Muellaje		-.-	Q 60.00 Cont.
	Estiba en Patio	U.S $	16.10 Cont.	Q 73.75 Cont. 1>
	Desestiba en Patio	U.S $	16.10 Cont.	Q 73.75 Cont. 1>
	Manejo Bulto Pesado		-.-	Q 23.00 Cont.
	TOTAL	U.S $	68.70 Cont.	Q 417.40 Cont.
	Costo estimado en Colones	¢	597.70 Cont.	¢ 659.50 Cont.
B-	ASIGNABLE AL CONSIGNATARIO			
	Muellaje	¢	45.30 TM.	¢ 120.10 TM. 1>

C- COSTO ADICIONAL POR TRANSPORTE TERRESTRE QUETZAL-SAN SALVADOR: ¢ 2,610.00 POR CONTENEDOR.

1> Incluye 50% de Recargo en Jornada Nocturna

2> Incluye 20% de Recargo en Jornada Nocturna

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ANNEX 5.1.3

Comparative Land and Sea Costs between El Salvador and Extra-Regional Atlantic and Pacific Ports

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COSTOS COMPARATIVOS DE TRANSPORTE TERRESTRE Y MARÍTIMO ENTRE EL SALVADOR Y PUERTOS DEL ATLÁNTICO Y DEL PACÍFICO

Las ventajas comparativas entre los tres puertos - Cutuco, Acajutla y Quetzal - son analizadas por el tipo de carga (carga general y contenedores) y zona externa de origen o destino (Atlántico y Pacífico). Los rubros claves de costos marginales generalizados (incluyendo costos de transporte y de tiempo) son viajes marítimos y terrestres. El análisis está basado sobre los siguientes supuestos: 1) la mayoría de la carga del Pacífico viene del Norte y la carga del Atlántico vía el Canal de Panamá del Sur, 2) Los tres puertos tienen los mismos costos unitarios de operación y tarifas para cada tipo de carga, o similares.

Los Cuadros muestran estas comparaciones de costos para cada uno de los años y escenarios proyectados. En el escenario tendencial, el cuello de botella representado por las congestiones urbanas y periurbanas alrededor de San Salvador tiende a separar aún más los mercados para los servicios de Cutuco y Acajutla, mientras que la distancia entre Quetzal y Acajutla, incrementada efectivamente por los costos en retrasos de las fronteras, tienden a separar los mercados para estos puertos. En el escenario vial la barrera de San Salvador es ampliamente resuelta con costosas inversiones en circunvalaciones. Mayor cooperación entre Guatemala y El Salvador podría reducir los costos de pasar la frontera. Estos cambios promoverían la competitividad entre estos puertos. También, debe notarse que el tráfico del Pacífico tenderá a preferir Acajutla mientras que el tráfico del Atlántico podría preferir Cutuco.

También existe competencia, a pesar de menor, entre los puertos salvadoreños y los centroamericanos del Caribe. Semejante análisis entre las rutas alternas entre El Salvador y los puertos extraregionales del Atlántico vía Acajutla y Cutuco versus vía Santo Tomás de Castilla y Puerto Cortéz deberá considerar no solo los costos de tranporte marítimo y canalero, terrestre y portuario, como también las características distintas de ondas, mareas y tipos de buques de éstas rutas alternas.

CUADRO 1
Ventajas Comparativas Entre Puertos por Tipo de Carga y Escenario

VENTAJAS COMPARATIVAS DE CUTUCO EN COMPARACION CON ACAJUTLA - CARGAS A SAN MIGUEL
CARGA DEL ATLANTICO

TIPO DE CARGA/ RUTA ESCENARIO VIAL	VIA	DISTANCIA	COSTO GENERALIZADO 2000	2005	2010	2015
CARGA GENERAL						
Acajutla - San Miguel	vial	222.4	141 4	134 5	132 5	133 6
Acajutla - Cutuco (costo adicional)	marítima	210 0	72.7	72.7	72 7	72.7
Cutuco - San Miguel	vial	48.5	41 1	41 1	32 8	34 6
Ventaja comparativa			27.6	20.7	27 0	26 3
CONTENEDORES						
Acajutla - San Miguel	vial	222.4	162.5	154.4	150.3	156 0
Acajutla - Cutuco (costo adicional)	marítima	210.0	95.6	95.6	95 6	95 6
Cutuco - San Miguel	vial	48.5	55 9	56 0	48.4	49.1
Ventaja comparativa			11.0	2.8	6.3	11.3
ESCENARIO TENDENCIAL						
CARGA GENERAL						
Acajutla - San Miguel	vial	222.4	141.4	138.1	145.2	164.4
Acajutla - Cutuco (costo adicional)	marítima	210.0	72.7	72.7	72.7	72.7
Cutuco - San Miguel	vial	48.5	41.1	41.1	34.2	34.4
Ventaja comparativa			27.6	24.3	38.3	57.3
CONTENEDORES						
Acajutla - San Miguel	vial	222.4	162.5	156.2	162.3	179.7
Acajutla - Cutuco (costo adicional)	marítima	210.0	95.6	95 6	95.6	95.6
Cutuco - San Miguel	vial	48.5	55.9	56.0	48.3	48.8
Ventaja comparativa			11.0	4.6	18.4	35.3

DESVENTAJAS COMPARATIVAS DE CUTUCO EN COMPARACION CON ACAJUTLA - CARGAS A SAN SALVADOR

TIPO DE CARGA/ RUTA ESCENARIO VIAL	VIA	DISTANCIA	COSTO GENERALIZADO 2000	2005	2010	2015
CONTENEDORES						
Acajutla - San Salvador	vial	90.6	69.3	70.4	69.7	60 3
Acajutla - Cutuco (costo adicional)	marítima	210.0	95.6	95.6	95.6	95.6
Cutuco - San Salvador	vial	180.5	151.5	145.5	139.8	114.0
Desventaja comparativa			-177.8	-170.7	-165.7	-149.3
ESCENARIO TENDENCIAL						
CONTENEDORES						
Acajutla - San Salvador	vial	90.6	69.3	77.2	82.8	115.5
Acajutla - Cutuco (costo adicional)	marítima	210.0	95.6	95.6	95 6	95.6
Cutuco - San Salvador	vial	180.5	151.5	150.5	153.4	185.2
Desventaja comparativa			-177.8	-168.9	-166.2	-165.3

VENTAJAS COMPARATIVAS DE ACAJUTLA EN COMPARACION CON QUETZAL - CARGAS A SAN SALVADOR

TIPO DE CARGA/ RUTA ESCENARIO VIAL	VIA	DISTANCIA	COSTO GENERALIZADO 2000	2005	2010	2015
CONTENEDORES						
Acajutla - San Salvador	vial	90.6	69.3	70.4	69.7	60.3
Quetzal - Acajutla (ahorro de costo)	marítima	230.0	104.7	104.7	104.7	104.7
Quetzal - San Salvador	vial	180.5	357.3	359.0	351.4	353.3
Desventaja comparativa			183.4	184.0	177.1	188.4

Nota: La diferencia importante entre los escenarios es que en el vial se considera la construcción de las vías de circunvalación de San Salvador. Los costos generalizados incluyen el valor del tiempo del usuario.
Fuente: Costos calculados por el Modelo TRANUS, Frederic R. Harris, Inc.

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CUADRO 2
Ventajas Comparativas Entre Puertos por Tipo de Carga y Escenario

VENTAJAS COMPARATIVAS DE CUTUCO EN COMPARACION CON ACAJUTLA - CARGAS A SAN MIGUEL
CARGA DEL PACIFICO

TIPO DE CARGA/ RUTA ESCENARIO VIAL	VIA	DISTANCIA	COSTO GENERALIZADO 2000	2005	2010	2015
CARGA GENERAL						
Acajutla - San Miguel	vial	222.4	141.4	134.5	132.5	133.6
Acajutla - Cutuco (costo adicional)	maritima	210.0	72.7	72.7	72.7	72.7
Cutuco - San Miguel	vial	48.5	41.1	41.1	32.8	34.6
Ventaja comparativa			27.6	20.7	27.0	26.3
CONTENEDORES						
Acajutla - San Miguel	vial	222.4	162.5	154.4	150.3	156.0
Acajutla - Cutuco (costo adicional)	maritima	210.0	95.6	95.6	95.6	95.6
Cutuco - San Miguel	vial	48.5	55.9	56.0	48.4	49.1
Ventaja comparativa			11.0	2.6	6.3	11.3
ESCENARIO TENDENCIAL						
CARGA GENERAL						
Acajutla - San Miguel	vial	222.4	141.4	138.1	145.2	164.4
Acajutla - Cutuco (costo adicional)	maritima	210.0	72.7	72.7	72.7	72.7
Cutuco - San Miguel	vial	48.5	41.1	41.1	34.2	34.4
Ventaja comparativa			27.6	24.3	38.3	57.3
CONTENEDORES						
Acajutla - San Miguel	vial	222.4	162.5	156.2	162.3	179.7
Acajutla - Cutuco (costo adicional)	maritima	210.0	95.6	95.6	95.6	95.6
Cutuco - San Miguel	vial	48.5	55.9	56.0	48.3	48.8
Ventaja comparativa			11.0	4.6	18.4	35.3

DESVENTAJAS COMPARATIVAS DE CUTUCO EN COMPARACION CON ACAJUTLA - CARGAS A SAN SALVADOR

TIPO DE CARGA/ RUTA ESCENARIO VIAL	VIA	DISTANCIA	COSTO GENERALIZADO 2000	2005	2010	2015
CONTENEDORES						
Acajutla - San Salvador	vial	90.6	69.3	70.4	69.7	60.3
Acajutla - Cutuco (costo adicional)	maritima	210.0	95.6	95.6	95.6	95.6
Cutuco - San Salvador	vial	180.5	151.5	145.5	139.8	114.0
Desventaja comparativa			-177.8	-170.7	-165.7	-149.3
ESCENARIO TENDENCIAL						
CONTENEDORES						
Acajutla - San Salvador	vial	90.6	69.3	77.2	82.8	115.5
Acajutla - Cutuco (costo adicional)	maritima	210.0	95.6	95.6	95.6	95.6
Cutuco - San Salvador	vial	180.5	151.5	150.5	153.4	185.2
Desventaja comparativa			-177.8	-168.9	-166.2	-165.3

VENTAJAS COMPARATIVAS DE ACAJUTLA EN COMPARACION CON QUETZAL - CARGAS A SAN SALVADOR

TIPO DE CARGA/ RUTA ESCENARIO VIAL	VIA	DISTANCIA	COSTO GENERALIZADO 2000	2005	2010	2015
CONTENEDORES						
Acajutla - San Salvador	vial	90.6	69.3	70.4	69.7	60.3
Quetzal - Acajutla (ahorro de costo)	maritima	230.0	104.7	104.7	104.7	104.7
Quetzal - San Salvador	vial	180.5	357.3	359.0	351.4	353.3
Desventaja comparativa			183.4	184.0	177.1	188.4

Nota: La diferencia importante entre los escenarios es que en el vial se considera la construcción de las vías de circunvalación de San Salvador. Los costos generalizados incluyen el valor del tiempo del usuario.
Fuente: Costos calculados por el Modelo TRANUS, Frederic R. Harris, Inc.

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ANNEX 5.2.1

Tender Documents for a Concession of a Port Service

ANEXO 5.2.1

LICITACION DE UNA CONCESION
DOCUMENTOS DE CONCURSO

Por lo general los documentos principales para la licitación de una concesión son: El Prospecto, las Condiciones Generales, los Términos de Referencia y la Proforma de Contrato. Todos ellos aportan información a varios niveles de detalle sobre la concesión que se licita y sus diversos requerimientos. En este Anexo se tratan algunos de los aspectos que deben ser incluidos en estos documentos.

El Prospecto

Tiene por objeto dar una idea general de las principales características y requisitos de la concesión para que personas o empresas interesadas decidan si desean participar en el concurso. El prospecto, además de describir la concesión, sus servicios y perspectivas, debe establecer claramente los requisitos de los participantes, las etapas que seguirá el proceso de licitación y las fechas en que se efectuarán sus principales eventos.

Las Condiciones Generales y los Términos de Referencia

Son documentos más detallados donde se especifican los aspectos de carácter legal, técnico y financiero de la concesión. Si bien en estos documentos deben quedar establecidos los requerimientos y condiciones de carácter obligatorio para los participantes, la Autoridad Portuaria debe dejar a la opción del proponente los aspectos empresariales y operacionales de la concesión, limitándose a definir parámetros indicativos de calidad de los servicios.

En los Términos de Referencia Generalmente se incluyen, entre otros los siguientes puntos:

La Concesión

Aquí se describen la ubicación del recinto portuario que será sujeto de la concesión , las mejoras que en el se encuentran y el equipo tal como grúas, montacargas y otros equipos de manejo de carga que deban ser incluidos en el convenio de operación. En esta sección debe haber lenguaje muy específico que describa la jurisdicción de la Autoridad Portuaria sobre los muelles y los accesos marítimos.

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Instrucciones Generales

Las instrucciones generales cubren los aspectos administrativos tales como etapas del Concurso y de las diferentes entregas, número de copias y requisitos de tipo administrativo.

Criterios de Evaluación y Plan de Selección del Concesionario

Los proponentes deben ser informados en cuanto a los criterios que se usarán para la selección y la forma en que las propuestas serán evaluadas. Un posible sistema de evaluación podría consistir en la asignación de valores numéricos para cada una de las diversas categorías de información que incluyen los proponentes en su propuesta.

debe describir en detalle en que forma mejorará y ampliará el comercio marítimo de El Salvador atrayendo tráfico de buques y de carga al puerto en caso de que obtenga la concesión del terminal.

Precios

Esta sección cubre la propuesta económica del oferente en la cual se definen las cantidades y la oportunidad en que el concesionario hará los pagos a la Autoridad Portuaria y los conceptos que estarán incluidos en estos pagos.

Los términos de referencia deben dar cierta flexibilidad en cuanto a la manera en que estos pagos deban ser estructurados de tal manera que los proponentes tengan diferentes opciones y usen su creatividad en la preparación de sus propuestas. Los proponentes deben proporcionar estimativos en cuanto al monto de los pagos que recibirá la autoridad portuaria y los límites máximos o mínimos a que estén sujetos estos pagos según la variación en las proyecciones de carga que hace el proponente. Es importante recordar que el proponente debe hacer un estudio de tráfico para determinar por su propia cuenta y con sus propios recursos la cantidad de tráfico que manejara el terminal durante el período de concesión. Es sobre esta base y sobre su plan de negocios que los pagos a la Autoridad Portuaria se calculan y se estiman sus posibles fluctuaciones.

Cargos Portuarios

Los proponentes deben saber que la Autoridad Portuaria continuará cobrando ciertos cargos por entrada a puerto y utilización de los muelles. También en esta sección debe describirse la reglamentación que las autoridades portuarias impondrán en cuanto a las tarifas portuarias que los concesionarios puedan cobrar por los servicios ofrecidos en su terminal y los limites superiores o inferiores de dichas tarifas.

Referencias La Autoridad Portuaria puede pedir que los proponentes den los nombres de organizaciones que puedan dar referencias sobre la experiencia del proponente en la operación de terminales y sus recursos financieros. Esta información obviamente es de gran importancia para examinar la credenciales de los proponentes.

Puntos a Incluir en el Contrato:

Un contrato para la operación de una concesión normalmente tiene un gran número de cláusulas legales que tienen que ver con la legislación del país y cuya discusión está

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fuera del alcance de este estudio. Los puntos que se indican a continuación son únicamente aquellos que tienen una significación especial en la operación de un terminal marítimo.

1. **Desarrollo Futuro del Puerto.** En esta cláusula debe aclararse que la Autoridad Portuaria se reserva el derecho para construir otros terminales marítimos y otras instalaciones en cualquier lugar del puerto y en la época que la Autoridad Portuaria lo considere conveniente. Normalmente el concesionario preferiría que no hubiera competencia en el futuro, sin embargo, como se ha explicado en varios puntos de este documento la bondad de una privatización de servicios públicos únicamente rinde beneficios cuando esta presente el más alto nivel de competencia.

2. **Informes.** La Autoridad Portuaria debe exigir informes del concesionario a intervalos regulares, especialmente en cuanto a volúmenes de carga. En algunos terminales también se incluye una cláusula en la cual el operador del terminal otorga a la Autoridad Portuaria el derecho de auditar e inspeccionar sus libros y documentos. Esta cláusula es conveniente particularmente cuando el concesionario está haciendo pagos a la Autoridad Portuaria basados en la cantidad de carga que maneja.

3. **Derecho para Entrar en la Concesión.** La Autoridad Portuaria debe reservarse este derecho y poder entrar en la concesión para cualquier propósito legítimo.

4. **Cambio de los Accesos al Terminal.** La Autoridad Portuaria puede desear incluir una cláusula en la cual se reserva el derecho para cambiar el acceso de entrada al terminal. Esto puede ser importante si la Autoridad Portuaria está desarrollando zonas contiguas al terminal y por lo tanto puede ser necesario cambiar la ubicación de la entrada al terminal.

5. **Mejoras Necesarias.** En esta cláusula deberán especificarse las mejoras que el proponente hará en las instalaciones que se concesionan. Esta cláusula debe especificar en el mayor detalle el tipo, alcance y especificacicnes de las mejoras que el proponente se compromete a realizar en la concesión.

6. **Servicios Públicos.** El contrato debe especificar a cargo de quien estará la provisión de servicios públicos y conexiones de agua y alcantarillado y otros servicios al terminal.

7. **Alteraciones en las Instalaciones del Terminal.** El concesionario debe tener la obligación de obtener la aprobación de la Autoridad Portuaria antes de hacer cualquier cambio en el terminal.

8. **Avisos.** La Autoridad Portuaria puede reservarse la autoridad de reglamentar los avisos que el concesionario desee colocar en la concesión.

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9. **Embargos**. Normalmente la Autoridad Portuaria prohibe que los concesionarios permitan que existan embargos sobre sus propiedades o sus activos en el terminal.

10. **Indemnizaciones.** Normalmente en el contrato se incluye el compromiso del concesionario de que indemnizará y sacará libre a la Autoridad Portuaria de cualquier reclamo que resulte de su operación del terminal.

11. **Traspaso.** Normalmente la Autoridad Portuaria prohibe que el concesionario pueda asignar el contrato a otra entidad sin el consentimiento expreso de la Autoridad Portuaria. Esta cláusula debe cubrir también otras transacciones tales como la venta de la empresa en la cual los derechos y obligaciones del contrato de concesionario pasan a nuevas manos.

12. **Arbitramiento**. En el contrato debe existir una formula para zanjar y resolver disputas que resulten de la interpretación del contrato. Para este efecto existen diversas vías de arbitramiento internacional que pueden adaptarse a este tipo de contratos.

13. **Impuestos**. El contrato debe especificar que impuestos debe pagar el concesionario.

14. **Restablecimiento de la Concesión.** La Autoridad Portuaria debe exigir que el concesionario devuelva la concesión y sus instalaciones en la condición original en que la recibió, una vez que el contrato termina.

15. **Terminación del Contrato.** En estas cláusulas la Autoridad Portuaria debe proteger su interés en caso de que el operador no cumpla las cláusulas y condiciones pactadas en el contrato. Normalmente en dicho contrato deben existir maneras de remediar fallas del concesionario o de terminar el contrato con todas las consecuencias que implica el rompimiento de contrato cuando el concesionario deja de cumplir cláusulas sustanciales o no acude a remediar fallas de operación cuando la Autoridad Portuaria lo exige, de acuerdo con el contrato.

16. **Atraque Preferencial.** En los documentos de contrato debe especificarse el sistema de atraque preferencial que seguirá la Autoridad Portuaria para los buques que traigan o manejen carga del concesionario. Normalmente la Autoridad Portuaria es la que adjudica el punto de atraque de todos los buques que entran al puerto, teniendo en cuenta reglas de atraque muy claras en las cuales se asigna preferencias al concesionario para el manejo de su carga.

17. **Uso y Operación de la Concesión**, En esta sección quedan incluidos varios aspectos relacionados con la operación de la concesión, entre otros:

La concesión es una instalación de servicio público, por lo tanto, el operador debe operar la concesión como un terminal marítimo público disponible a cualquier usuario en forma no discriminatoria y equitativa. El contrato deben contener garantías del operador que especifican que en ninguna forma el operador pretenderá crear ó imponer un monopolio o restringir la libertad del comercio o el uso del terminal.

Requisito de operación. El terminal es un recurso público importante y por lo tanto el concesionario debe obligarse a mantenerlo abierto y operando en forma continua para cualquier usuario. Hay ciertos ejemplos de líneas navieras que han obtenido una concesión para luego cerrarla y rehúsan devolverla a la Autoridad Portuaria antes del termino del contrato, para prevenir que ésta pueda asignarla a otro operador.

18. **Duración del Contrato.** El contrato debe definir el termino de la concesión y también la forma en que la duración del contrato puede extenderse. Estas cláusulas varían según la inversión que el concesionario deba hacer, pues el término del contrato debe ser suficiente para que el concesionario pueda recuperar su inversion.

19. **Pagos.** Esta sección debe cubrir los pagos que el operador deba efectuar a favor de la Autoridad Portuaria.

20. **Relaciones Laborales.** Esta sección especifica las responsabilidades que tiene el concesionario para conducir las relaciones con sus trabajadores. Debe hacerse hincapié en cuanto a que la Autoridad Portuaria no tiene responsabilidad por relaciones con los trabajadores y, si es el caso, que medidas puede tomar a la Autoridad Portuaria para impedir que se paralicen las actividades portuarias como resultado de una disputa laboral.

21. **Vigilancia.** En esta Sección se estipulan los sistemas de vigilancia con que cuenta el puerto y se especifica la responsabilidad en cuanto a este aspecto por parte del operador del terminal.

    Protección contra incendios, en esta sección se presenta el sistema y los procedimientos que el puerto utiliza para protección contra incendios y la responsabilidad del concesionario en este aspecto.

22. **Seguros.** El concesionario estará obligado a mantener diversos seguros tanto de accidentes como de responsabilidad ante terceros. En esta sección se deben especificar las pólizas de seguros que deba tener el concesionario.

23. **Reparaciones y Mantenimiento**. Aquí se describe quien será responsable por las reparaciones y mantenimiento de los equipos y el mantenimiento de la infraestructura concesionada. Si el operador es el responsable por estas actividades el contrato debe establecer un estándar razonable para definir el cumplimiento de las cláusulas de mantenimiento.

24. **Actividades Prohibidas.** En esta sección se describen las actividades no permitidas en la Concesión y las multas y sanciones a que está sujeto el concesionario al incurrir en ellas.

ANNEX 5.2.2

Estimates for an Improved Operation

ANEXO 5.2.2

OPERACION MEJORADA

En el diagnóstico de las operaciones del puerto de Acajutla se indicó el tamaño de las cuadrillas para cada tipo de carga y por maniobra, incluyendo en el caso de graneles secos el método de descarga, señalándose además la eficiencia por hora de cada cuadrilla. Para casi la totalidad de las maniobras se estimó que el número de miembros que formaban las cuadrillas era alto y que las eficiencias no guardaban relación con dichas cuadrillas, pues la experiencia de otros puertos indicaba que era factible obtener mejores rendimientos con cuadrillas más pequeñas.

Con base en lo anterior, se analizó el proceso de trabajo desde la descarga del buque hasta entregar la mercadería al usuario en las bodegas en tierra firme, utilizando indicadores de esfuerzo que reflejaban el tonelaje producido por hora hombre en la operación actual, lo que permitió rediseñar la composición de las cuadrillas para indicar que es posible enfrentar de forma más eficiente el trabajo futuro, bajo consideraciones de fortalecer la posición competitiva del puerto.

De esta manera y contando con la consulta oportuna del Departamento de Operaciones de Acajutla se diseñó una operación mejorada para el manejo de las distintas cargas, fundamentada en tres aspectos:

1- Composición razonable en el número de miembros de las distintas cuadrillas, pues la experiencia de Acajutla indica que hay demasiada gente por cuadrilla y que debido a esto, el trabajo efectivo de los trabajadores es por lo general el 50 ó 60 % del turno de 8 horas, ya que éstos se turnan para efectuar sus labores particularmente en la jornada de la noche.

2- Reducción del tiempo que en concepto de demoras es imputable a CEPA y su personal, al usuario y a la línea naviera, en un 50 % de las cifras indicativas de 1993. En efecto las demoras causadas por estos agentes de las operaciones portuarias alcanzaron en dicho año 4,522 horas pero considerando que muchos de estas demoras se deben a actitudes del personal obtenidas en negociaciones sindicales que no es posible eliminar, pero sí reducir, se estimó que un 50% del tiempo indicado era una cifra razonable para demoras.

3- Adquisición de equipo especializado y de mayor capacidad, en especial para el manejo de contenedores en muelle y patios y para graneles secos en muelle y transferencia. Debe comprenderse que son estos equipos los que dictan el ritmo de la eficiencia en la carga o descarga, a la cual deben adaptarse las subsiguientes maniobras.

De tal manera que disponiendo de mayor tiempo para realizar el trabajo efectivo de descargar o cargar y contando con el equipo adecuado, el efecto inmediato sería obtener mayor rendimiento, cuyo costo se abarataría no solo por producir mayor tonelaje por hora sino que además por lograrse con una cuadrilla más pequeña.

En el análisis realizado para definir la operación mejorada, se estudió la composición y eficiencia de las cuadrillas para cada una de las maniobras que requiere la movilización de las diferentes clases de carga en el puerto de Acajutla, habiéndose obtenido los siguientes resultados:

1 Carga General Suelta

El análisis se realizó de acuerdo con la ruta que sigue la carga, por lo que se definieron las siguientes maniobras:

1.1 Estiba - Desestiba

La composición actual de la cuadrilla para esta operación es de 20 hombres con una producción de 20 TM/ hora en promedio, considerando la manipulación de las diferentes formas de embalaje. Se encontró que por conveniencia económica de la cuadrilla muchas veces ésta se divide en 2, o sea se reduce a la mitad para trabajar simultáneamente 2 bodegas y obtener mayor rendimiento, pero en las ocasiones en que esto no es posible los trabajadores se turnan en 2 grupos para ejecutar sus labores en una misma bodega, sobre todo en la jornada nocturna, con lo cual el ritmo de trabajo de toda la cuadrilla es menor. Por consiguiente se estima que el tamaño adecuado de la cuadrilla debería ser de 14.5 hombres los cuáles realizando trabajo efectivo en mayor tiempo estarían en posición de obtener un promedio de 27 TM/ hora.

1.2 Muellaje

Bajo este concepto se realiza la transferencia de la carga desde el muelle hasta las bodegas en tierra firme, para lo cual el puerto utiliza actualmente 1 operador de montacargas, 2 operadores de tractor de tiro y dos ayudantes de operador; es decir, 5 personas que trabajan con la misma eficiencia de la desestiba, ó sea 20 TM/ hora. Se considera que 1 tractor de tiro con un operador y 2 ayudantes de operador actuales, no son necesarios ya que un solo operador con su tractor puede llevar vagonetas llenas y traer vacías, y la función de los ayudantes, que es enganchar y desenganchar las vagonetas del tractor, la puede hacer el mismo operador. Por consiguiente, para la transferencia sólo se requieren 2 personas las cuáles pueden atender la eficiencia de la desestiba mejorada o sean 27 TM/ hora.

1.3 Recepción y Despacho en Bodega

Esta es la maniobra que se realiza en las bodegas para recibir, clasificar, registrar, almacenar y despachar la carga al usuario en importación ó a los muelles en exportación. Actualmente esta actividad es realizada con 9 personas incluyendo al guardalmacén (que es parte del personal administrativo del puerto) y debido a los diferentes procedimientos se obtiene una eficiencia promedio de 10 TM/ hora. Se considera que a excepción del guardalmacén el resto del personal que forma la cuadrilla es necesario y que debido a la participación de aduanas y al uso obligado de peones en esta actividad no es posible promediar una eficiencia mayor. En consecuencia, la operación mejorada únicamente requiere 8 personas manteniendo la misma eficiencia de 10 TM./hora.

2. Carga a Granel

Esta clase de carga presenta una variedad de métodos de descarga con sus correspondientes maniobras, las cuáles se han examinado para establecer la operación mejorada, tal como se describe a continuación:

2.1 Descarga por Grúa y Bandas Transportadoras a Almacenes

Este es el método más eficiente para el manejo de graneles ya que utiliza ininterrumpidamente el sistema de alto rendimiento del puerto consistente en la unidad de carga (grúa de muelle) y las bandas transportadoras que llevan el producto hasta los lugares de almacenamiento. El análisis concluyó que había sobredimensionamiento de las cuadrillas de desestiba y transferencia en 32% y 40% respectivamente, con lo cual la estiba/desestiba se redujo de 13.25 a 10 hombres por cuadrilla y la transferencia de 7 a 5 hombres. Igualmente la reducción en las demoras actuales significó un incremento en la eficiencia de 170 TM/ hora actual a 250 TM/ hora en cada maniobra mejorada.

2.2 Descarga con Unidad de Carga y Bandas al Trompo

Aquí se incluyen las maniobras de estiba/desestiba y transferencia. En este método de descarga, el análisis produjo una situación similar a la anterior (descarga a almacenes), en lo relacionado en tamaño de las cuadrillas, pero, en lo que se refiere a la eficiencia, dadas las características de retiro por camiones desde el trompo, la eficiencia es más baja, pero siempre obtuvo un incremento de 150 TM en la operación mejorada.

2.3 Descarga con Unidad de Carga al Ducto

Este método se refiere únicamente a la estiba/desestiba, en relación a lo cual se encontró que el tamaño de la cuadrilla también era grande, pues había un 48% de personal en exceso; de manera que ésta se redujo de 19.25 a 13 personas. Por el lado de las

eficiencias, el resultado fue el mismo que la descarga al trompo, es decir que la reducción en las demoras produjo incremento de la eficiencia de 150 a 180 TM/hora.

2.4 Descarga por Medios Convencionales a Camiones

En este aspecto se analizó la única maniobra del puerto que es la estiba/desestiba, pero se consideró la utilización de cucharones de almeja de mayor capacidad, así como el uso de una tolva móvil a través de la cual se descarga el producto a camiones. Como consecuencia de esto se concluyó que la cuadrilla puede reducirse de 20.5 a 15.5 hombres y la eficiencia es factible de incrementarse de 25 a 80 TM/hora.

2.5 Descarga por Buhler a camiones

En esta actividad también solo hay una maniobra que es la estiba/desestiba, cuyo análisis de cuadrilla mostró un comportamiento similar al de la descarga por medios convencionales; es decir, una reducción de 20.5 a 15.5 personas. Por el lado de las eficiencias considerando la reducción en las demoras se estimó un incremento de 80 TM. en la operación actual a 100 TM. en la operación mejorada.

3. Carga Líquida

Este es un tipo de carga que tiene una operación eficiente, pues prácticamente se embarca o desembarca el producto por medio de tuberías privadas conectadas a los tanques también privados, lo cual solo requiere personal mínimo para el acople y desacople de las tuberías en los muelles y para supervisar que no haya derrames. Actualmente esta labor es realizada por la llamada cuadrilla de buques compuesta por 10 hombres, los cuales se dividen en 2 cuadrillas de 5 hombres para turnarse durante la operación de embarque ó desembarque, significando esto que la operación puede realizarse con 5 hombres únicamente. La eficiencia actual es de 130 TM/hora pero considerando el uso de un "BOOSTER" para aumentar la presión del líquido en las tuberías es factible incrementar esta eficiencia a 150 TM/hora.

4 Carga en Contenedores

En este tipo de carga se han considerado fundamentalmente las maniobras que se realizan para el manejo de un contenedor FCL, desde que es descargado hasta que es entregado al consignatario en el patio, ya que este tipo de contenedor es el que mejor representa el propósito de la contenerización que es servicio puerto a puerto, siendo además totalmente factible de comparar con otros puertos en términos de competitividad. Los resultados por maniobras son los siguientes:

4.1 De Barco a Muelle

Esta actividad presenta similitud con la estiba/desestiba de la carga general, especialmente si se trata de descargar barcos no especializados para transportar contenedores. En la actualidad se utiliza el mismo tamaño de la cuadrilla de estibadores para carga general que es de 20 hombres, los cuales producen una eficiencia de 8 contenedores por hora. Después de analizar la operación con equipo especializado como por ejemplo una grúa en el muelle C, se concluyó que solamente eran necesarias 12 personas por cuadrilla, pero se obtendría una mayor eficiencia equivalente a 18 contenedores por hora. Al utilizar el promedio de carga en contenedores de 1993 que es de 7.73 TM. por caja, se logra incrementar el rendimiento de 61.8 TM/hora a 139.14 TM/hora, lo que demuestra la importancia de la operación mejorada.

4.2 De Muelle a Patio

CUADRO 1
Composición de Cuadrillas y Cálculos de Operación

CARGA: General Suelta

MANIOBRA: Estiba/Desestiba

PRODUCTIVIDAD EN TM/Hora	RENDIMIENTO EN TM/Hora - Hombre.
27	1.86

CUADRILLAS	Nº	SALARIO INTEGRAL/HORA	EQUIPOS	MATERIAL
A BORDO				
Wincheros	2	¢31.02	1 Montacargas ¢13.28	Combustible 0 .70 Gls DSL hora ¢6.09
Operador de equipo	6	¢93.07		
Portaloinero	1	¢15.51		
Operador de Equipo	1	¢15.51		
Auxiliar Estiba	1	¢23.25		
EN MUELLE (Recepción)				
Muelleros	2	¢31.02		
Caporal	0.5	¢8.17		
Cheque	1	¢15.51		
Total de Trabajs	14.5	¢233.09	¢13.28	¢6.09

COSTO MANO DE OBRA	COSTO EQUIPO Y MATERIALES	COSTO DIRECTO
¢233.09 COLONES/HORA	¢19.37 COLONES/HORA	¢252.45 COLONES/HORA

46

CUADRO 2
Composición de Cuadrillas y Cálculos de Operación

CARGA: General Suelta

MANIOBRA: Transferencia

PRODUCTIVIDAD EN TM/Hora	RENDIMIENTO EN TM/Hora - Hombre.
27	13.50

CUADRILLAS	Nº	SALARIO INTEGRAL/HORA	EQUIPOS	MATERIAL
EN MUELLE				
Operador Montacargas	1	¢15.51	1 Tractor de Tiro ¢29.87	Combustible 2.0 Gls. DSL hora ¢17.40
Operador Tractor	1	¢15.74	6 Vagonetas ¢17.46	
			1 Montacargas ¢21.91	Combustible 0.70 Gls. DSL hora ¢6.09
	2	¢31.25	¢69.24	¢23.49

COSTO MANO DE OBRA	COSTO EQUIPO Y MATERIALES	COSTO DIRECTO
¢31.25 COLONES/HORA	¢92.73 COLONES/HORA	¢123.98 COLONES/HORA

CUADRO 3
Composición de Cuadrillas y Cálculos de Operación

CARGA : Carga General Suelta

MANIOBRA: Recepción / Despacho en Bodega

PRODUCTIVIDAD EN TM/Hora	RENDIMIENTO EN TM/Hora - Hombre.
10	1.25

CUADRILLAS EN BODEGA	Nº	SALARIO INTEGRAL/HORA	EQUIPOS	MATERIAL
Cheque Receptor / Expeditor	1	¢15.74	1 Montacargas	Combustibles
Operador de Equipos	1	¢15.74	¢14.24	0.70 Gls DSL Hora
Pesador	1	¢15.55		
Cheque Clasificador	1	¢16.44		¢6.09
Peones	4	¢61.90		
	8	¢125.36	¢14.24	¢6.09

COSTO MANO DE OBRA	COSTO EQUIPO Y MATERIALES	COSTO DIRECTO
¢125.36 COLONES/HORA	¢20.33 COLONES/HORA	¢145.69 COLONES/HORA

150

CUADRO 4
Composición de Cuadrillas y Cálculos de Operación

CARGA: Graneles Secos Descargados por Uca y Bandas a Almacén

MANIOBRA: Estiba / Desestiba

PRODUCTIVIDAD EN TM/Hora	RENDIMIENTO EN TM/Hora - Hombre.
250	25.00

CUADRILLAS	Nº	SALARIO INTEGRAL/HORA	EQUIPOS	MATERIAL
A BORDO				
Operador de U. de Carga	2	¢47.32	1 U. de Carga ¢2,001.93	Energía Eléctrica (303 Kw / hora) ¢250.00
Operador de Equipo	2	¢35.97		
Paleros	2	¢34.74	1 Cargador Frontal ó Tractor de oruga ¢38.88	Combustible (1.20 Gls. diesel/hora) ¢10.44
Auxiliar de Estiba	1	¢23.25	1 Clamshell ¢14.77	
EN MUELLE				
Mueleros	2	¢34.74		
Caporal	1	¢19.62		
	¢10.00	¢195.65	¢2,055.59	¢260.44

COSTO MANO DE OBRA	COSTO EQUIPO Y MATERIALES	COSTO DIRECTO
¢195.65 COLONES/HORA	¢2,316.03 COLONES/HORA	¢2,511.68 COLONES/HORA

CUADRO 5
Composición de Cuadrillas y Cálculos de Operación

CARGA: Graneles Secos Descargados por Unidad de Carga a Almacenes

MANIOBRA: Transferencia

PRODUCTIVIDAD EN TM/Hora	RENDIMIENTO EN T 1/Hora - Hombre.
250	50.00

CUADRILLAS	Nº	SALARIO INTEGRAL U.	EQUIPOS	MATERIAL
EN TIERRA				
Operador Control de Ba	2	¢35.71	Bandas Transportadoras Exp. ¢2,034.61	Energía Eléctrica (138 Kw/ hora) ¢113.85
Mecánicos	1	¢16.41		
Electricistas	1	¢16.41		
Supervisor	1	¢16.41		
	¢5.00	¢84.93	¢2,034.61	¢113.85

COSTO MANO DE OBRA	COSTO EQUIPO Y MATERIALES	COSTO DIRECTO
¢84.93 COLONES/HORA	¢2,148.46 COLONES/HORA	¢2,233.39 COLONES/TONS.

CUADRO 6
Composición de Cuadrillas y Cálculos de Operación

CARGA: Graneles Secos Descargados por Uca y Bandas al Trompo

MANIOBRA: Estiba / Desestiba

PRODUCTIVIDAD EN TM/Hora	RENDIMIENTO EN TM/Hora - Hombre
180	18.00

CUADRILLAS	Nº	SALARIO INTEGRAL/HORA	EQUIPOS	MATERIAL
A BORDO				
Operador de U. de Carga	2	¢47.32	1 U. de Carga ¢2,001.93	Energía Eléctrica (303 Kw / hora) ¢250.00
Operador de Equipo	2	¢35.97		
Paleros	2	¢34.74		
Auxiliar de Estiba	1	¢23.25	1 Cargador Frontal ó Tractor de oruga ¢38.88	Combustible (1.20 Gls. DSL Hora) ¢10.44
			1 Clamshell ¢5.63	
EN MUELLE				
Mueleros	2	¢34.74		
Caporal	1	¢19.62		
	¢10.00	¢195.65	¢2,046.45	¢260.44

COSTO MANO DE OBRA	COSTO EQUIPO Y MATERIALES	COSTO DIRECTO
¢195.65 COLONES/HORA	¢2,306.89 COLONES/HORA	¢2,502.54 COLONES/HORA

CUADRO 7
Composición de Cuadrillas y Cálculos de Operación

CARGA: Graneles Secos Descargados por UCA y Bandas al Trompo

MANIOBRA: Transferencia

PRODUCTIVIDAD EN TM/Hora	RENDIMIENTO EN TM/Hora - Hombre
180	36.00

CUADRILLAS	Nº	SALARIO INTEGRAL U.	EQUIPOS	MATERIAL
EN MUELLE				
Operador Control de Bandas	2	¢35.71	Bandas Transportadoras Imp	Energía Eléctrica (138 Kw/hora)
Mecánicos	1	¢16.41	¢2,034.61	¢113.85
Electricistas	1	¢16.41		
Supervisor	1	¢16.41		
	¢5.00	¢84.93	¢2,034.61	¢113.85

COSTO MANO DE OBRA	COSTO EQUIPO Y MATERIALES	COSTO DIRECTO
¢84.93 COLONES/TONS.	¢2,148.46 COLONES/TONS.	¢2,233.39 COLONES/TONS.

CUADRO 8
Composición de Cuadrillas y Cálculos de Operación

CARGA: Graneles Secos Descargados por Uca al Ducto

MANIOBRA: Desestiba	PRODUCTIVIDAD EN TM/Hora 180	RENDIMIENTO EN TM/Hora - Hombre 13.85

CUADRILLAS	Nº	SALARIO INTEGRAL/HORA	EQUIPOS	MATERIAL
A BORDO				
Operador de U. de Carga	2	¢47.32	1 U. de Carga ¢2,001.93	Energía Eléctrica (303 Kw / hora) ¢250.00
Operador de Equipo	2	¢35.97		
Paleros	2	¢34.74		
Auxiliar de Estiba	1	¢23.25	1 Cargador Frontal ó Tractor de oruga ¢38.88	Combustible (1.20 Gls. DSL Hora) ¢10.44
			1 Clamshell ¢14.77	
EN MUELLE				
Mueleros	2	¢34.74		
Caporal	1	¢19.62		
Mecánicos	1	¢16.41		
Electricistas	1	¢16.41		
Supervisor	1	¢16.41		
	¢13.00	¢244.87	¢2,055.59	¢260.44

COSTO MANO DE OBRA	COSTO EQUIPO Y MATERIALES	COSTO DIRECTO
¢244.87 COLONES/HORA	¢2,316.03 COLONES/HORA	¢2,560.90 COLONES/HORA

CUADRO 9
Composición de Cuadrillas y Cálculos de Operación

CARGA: A GRANEL SECOS POR MEDIOS CONVENCIONALES A CAMIONES

MANIOBRA: Estiba / Desestiba

PRODUCTIVIDAD EN TM/Hora	RENDIMIENTO EN TM/Hora - Hombre
80	5.16

CUADRILLAS	Nº	SALARIO INTEGRAL/HORA	EQUIPOS	MATERIAL
A BORDO				
Estibadores	6	¢104.23	1 Clampshell ¢7.00	Combustible (1.2 Gls. Dsl./ hora ¢10.44
Wincheros	2	¢36.01		
Portalonero	1	¢18.00		
Operador de Equipo	2	¢35.97	1 Cargador Frontal ó Tractor de Oruga ¢38.88	
Auxiliar de Estiba	1	¢23.25		
			Supone el uso de Tolvas para la carga e camiones	
EN MUELLE				
Muelleros	2	¢34.74		
Caporal	0.5	¢9.81		
Cheque	1	¢17.37		
	¢15.50	¢279.40	¢45.88	¢10.44

COSTO MANO DE OBRA	COSTO EQUIPO Y MATERIALES	COSTO DIRECTO
¢279.40 COLONES/HORA	¢56.32 COLONES/HORA	¢335.72 COLONES/HORA

95

CUADRO 10
Composición de Cuadrillas y Cálculos de Operación

CARGA: Graneles Secos Descargados por Elevadores de Cadena (Buhler)

MANIOBRA: Estiba / Desestiba	PRODUCTIVIDAD EN TM/Hora	RENDIMIENTO EN TM/Hora - Hombre
	100	8.00

CUADRILLAS	Nº	SALARIO INTEGRAL/HORA	EQUIPOS	MATERIAL
A BORDO				
Estibadores	4	¢69.49	Aparejos del buque	
Wincheros	2	¢36.01	1 Set de elevadores	Energía Eléctrica
Operador de Equipo	2	¢35.97	de cadena (Buhler)	(45Kw hora)
Auxiliar de Estiba	1	¢23.25	¢106.39	¢37.13
				Combustible
			1 Cargador frontal	(1.20 Gls. DSL Hora)
			a tractor de oruga	
			¢38.88	¢10.44
EN MUELLE				
Muelleros	2	¢34.74		
Caporal	0.5	¢9.81		
Cheque	1	¢17.37		
	¢12.50	¢226.65	¢145.27	¢47.57

COSTO MANO DE OBRA	COSTO EQUIPO Y MATERIALES	COSTO DIRECTO
¢226.65	¢192.84	¢419.49
COLONES/HORA	COLONES/HORA	COLONES/HORA

CUADRO 11
Composición de Cuadrillas y Cálculos de Operación

CARGA: Granel Liquido

MANIOBRA: Embarque / Desembarque

PRODUCTIVIDAD EN TM/Hora	RENDIMIENTO EN TM/Hora - Hombre
150	30.00

CUADRILLAS	Nº	SALARIO INTEGRAL/HORA	EQUIPOS	MATERIAL
EN MUELLE				
Caporal de Amarradores	1	¢16.35	PRIVADO:	
Amarradores (Acople / Desacople de mangueras)	4	¢54.91	Bombas del buque o del exportador ó Bombas del Almacenador en Exp.	
	¢5.00	¢71.26		

COSTO MANO DE OBRA	COSTO MATERIALES	COSTO DIRECTO
COLONES/HORA	COLONES/HORA	COLONES/HORA

151

CUADRO 12
Composición de Cuadrillas y Cálculos de Operación

CARGA: Contenedores

MANIOBRA: Barco a Muelle

PRODUCTIVIDAD EN TM/Hora	RENDIMIENTO EN TM/Hora - Hombre
139.14	11.60

CUADRILLAS	Nº	SALARIO INTEGRAL/HORA	COSTO DE USO DE EQUIPOS	COSTO DE MATERIAL
A BORDO				
Estibadores	4	¢93.82	1 Grúa de Muelles	Energía Eléctrica
Portalonero	1	¢23.45	¢3,212.54	(303 Kw /hora)
Auxiliar de Estiba	1	¢23.45		¢250.00
Operadores de Grúa	2	¢47.32		
EN MUELLE				
Muelleros	2	¢46.91		
Caporal	1	¢16.35		
Cheque	1	¢15.51		
	¢12.00	¢266.82	¢3,212.54	¢250.00

COSTO MANO DE OBRA	COSTO DE EQUIPO Y MATERIALES	COSTO DIRECTO
¢266.82	¢3,462.54	¢3,729.35
COLONES/HORA	COLONES/HORA	COLONES/HORA

CUADRO 13
Composición de Cuadrillas y Cálculos de Operación

CARGA: Contenedores

MANIOBRA: Muelle a Patio

PRODUCTIVIDAD EN TM/Hora	RENDIMIENTO EN TM/Hora - Hombre
139.14	23.19

CUADRILLAS	Nº	SALARIO INTEGRAL/HORA	EQUIPOS	MATERIAL
EN MUELLE				
Operadores de Equipo	6	¢107.92	6 Cabezales ¢1,120.79	Combustibles (120 Gls. Dsl hora x 6)
			6 Rastras ¢357.44	¢62.64
	¢6.00	¢107.92	¢1,478.23	¢62.64

COSTO MANO DE OBRA	COSTO EQUIPO Y MATERIALES	COSTO DIRECTO
¢107.92 COLONES/HORA	¢1,540.87 COLONES/HORA	¢1,648.79 COLONES/HORA

200

CUADRO 14
Compcsición de Cuadrillas y Cálculos de Operación

CARGA: Contenedores

MANIOBRA: Recibo/ Entrega en Patio (En Muelle y a Usuario)	PRODUCTIVIDAD EN TM/Hora 139.14	RENDIMIENTO EN TM/Hora - Hombre. 46.38

CUADRILLAS	Nº	SALARIO INTEGRAL/HORA	EQUIPOS	MATERIAL
EN PATIO				
Operador de Grúa Transtainer	2	¢47.32	1 Transtainer	Combustible
Cheque de Patio	1	¢16.35	¢762.67	(4.8 Gls. DSL. hora)
Supervisor				¢41.76
	¢3.00	¢63.67	¢762.67	¢41.76

COSTO MANO DE OBRA	COSTO EQUIPOS Y MATERIALES	COSTO DIRECTO
¢63.67 COLONES/HORA	¢804.43 COLONES/HORA	¢868.10 COLONES/HORA

CUADRO 15
Composición de Cuadrillas y Cálculos de Operación

CARGA: Todas las Cargas

MANIOBRA: Atraque / Desatraque	PRODUCTIVIDAD EN TM/Hora	RENDIMIENTO EN TM/H - Hombre. 0.00

CUADRILLAS	Nº	SALARIO INTEGRAL/HORA	EQUIPOS	MATERIAL
REMOLQUE		SUELDO MENSUAL	2 Remolcadores (1800 HP, 1200 HP)	Combustible (129.6 + 120)
Tripulación Remolcadores				
Patrón	1	¢4,190.58		
Maquinista	1	¢4,097.58	¢2,457.38	249.6 Gls.Diesel/h.
Marineros	2	¢7,395.36		
			¢1,606.75	¢2,171.52 Por hora
		¢15,683.52		
			¢4,064.13 Por hora	¢6,514.56 Por maniobra
Costo por Remolcador/ hora		¢82.89	¢12,192.40 Por maniobra	
Costo por 2 Remolcadores/hora		¢165.79		
La maniobra dura 3 horas				
Costo de Mano de Obras/ Maniobra		¢497.36		
AMARRE Y DESAMARRE				
Amarradores	8	¢109.81 Por hora		
		¢329.44 Por maniobra		
Costos por Maniobra				
Remolque - Mano de Obra		¢497.36		
Equipos		¢12,192.40		
Combustible		¢6,514.56		
Amarre y Desamarre - Mano de Obra		¢329.44		
Total por Maniobra	¢12.00	**¢19,533.77**		

COSTO MANO DE OBRA	COSTO EQUIPOS Y MATERIALES	COSTO DIRECTO
COLONES/HORA	COLONES/HORA	COLONES/HORA

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ANNEX 5.2.3

Estimates for Piers and Berths Occupancies

ANEXO 5.2.3

CALCULO DE OCUPACION DE MUELLES

En este anexo los Consultores describen los cálculos preparados para determinar la ocupación de muelles y la suficiencia de los atracaderos para acomodar las cargas previstas hasta el año 2015.

Tipos de Carga

Las cargas proyectadas han sido divididas en cuatro categorías, a saber:

- Carga General Suelta,
- Carga Contenerizada,
- Graneles Sólidos y
- Graneles Líquidos.

Proyecciones e Intervalos de Cálculo

Los Cálculos se han hecho para intervalos de cinco años: 2000, 2005, 2010 y 2015, utilizando las proyecciones preparadas por el Modelo de Asignación de Tráfico para Acajutla y Cutuco, según ESCENARIO 1 Y ESCENARIO 2.

Para cada Escenario y para cada puerto los Consultores prepararon 17 hojas de Cálculo así:

- Carga General Suelta	4 Hojas de Cálculo (2000, 2005, 2010 y 2015)
- Carga Contenerizada	4 Hojas de Cálculo
- Graneles Sólidos	4 Hojas de Cálculo
- Graneles Líquidos	4 Hojas de Cálculo
- Resumen	1 Hoja de Cálculo.

Es decir, en total 68 hojas de Cálculo de las cuales únicamente se incluyen en este Anexo las correspondientes a los más altos niveles de carga (ocho para cada puerto) y los Resúmenes (dos para cada puerto, una por Escenario).

Parámetros de Cálculo

En los Cálculos los Consultores han usado los parámetros reflejados en las estadísticas más recientes del puerto y supuesto su evolución futura así:

Embarque Promedio

Se estima que el embarque promedio evolucionará gradualmente en la siguiente forma:

	Año 2000	Año 2015
Carga General Suelta	2000 TM.	2600 TM.
Contenedores	1200 Cajas	1400 Cajas.
Graneles Sólidos, Acajutla	12000 TM.	12000 TM.
Graneles Sólidos, Cutuco	8000 TM.	8000 TM.
Graneles Líquidos	6000 TM.	6000 TM.

Rendimiento de Operación

Para todos los casos y para todas las cargas se ha supuesto que las maniobras se realizarán con productividad de la Operación Mejorada.

Atraque y Desatraque

Se ha tomado como de tres horas la duración promedio de esta maniobra.

Demoras

Se ha supuesto que el promedio de demoras en la operación de un barco no excederá el 20% del tiempo de trabajo efectivo empleado para manejar la carga.

Resultados

Los cálculos indican que los muelles y las facilidades previstas son suficientes para acomodar los volúmenes de carga proyectados, sin ocasionar demoras a los buques que exceden el 10% del tiempo de servicio, según teoría de colas y distribución de Poisson. Esta demora internacionalmente se considera aceptable.

Los Cuadros que aparecen a continuación, correspondientes a los más altos valores de ocupación de muelle, ilustran el proceso seguido por los Consultores.

CUADRO N º 1

ESCENARIO 1 - ACAJUTLA

CARGA GENERAL SUELTA - 2015

	TM
Total Proyectado en TM.	866297
Embarque Promedio	2600
Numero de Buques	333
Tonelaje de Registro Bruto	11000
Eslora	150
Atraque/Desatraque - Horas	5
Rendimiento en TM./hora	80
Demoras - % de T. de O.	0.2

Embarques	A/D- horas	ATRACADEROS A1	A2	B3
333	1666	295648.5	295648.5	275000
Toneladas/Atracadero		295648.5	295648.5	275000
Tiempo de Operación		3,696	3,696	3,438
Tiempo de A/D		780	780	106
Demoras		739	739	688
Tiempo Total en Atracaderos		5,215	5,215	4,231

CUADRO Nº 2

ESCENARIO 1 - ACAJUTLA

CONTENEDORES - 2015

Total Proyectado	1906651
Contenedor - TM/cont.	12
Número de Contenedores	158888
Embarque Promedio - Contenedores	1400
Número de Buques	113
Tonelaje de Registro Bruto	
Eslora	215
[illegible]que/ Desatraque - horas	3
Rendimiento Cont/ Hora - 1 Grúa	18
Rendimiento Cont/ Hora - 2 Grúas	30
Rendimiento Cont/ Hora - 1 Grúa en Ter	20
Rendimiento Cont/ Hora - 2 Grúas en Te	40
Demoras % T. de Operación	0.20

		ATRACADERO - TM.	
Embarques	A/D - horas	C7	Terminal
		500000	1406651
113	340		
		Toneladas/Atracadero	500000	1406651
		Tiempo de Operación	1389	2931
		Tiempo de A/D	89	251
		Demoras	278	586
		Tiempo Total en Atraca	1756	3768

CUADRO N° 3

ESCENARIO 1 - ACAJUTLA

GRANELES SOLIDOS - 2015

	TM.	Embarques	A/D -horas	Toneladas Manejadas por Atracadero Dir. a Cami B3	Unid de Ca B4	Buhler B5	Buhler B6	C8
Abonos	469188	39	117		422269.2			46918.8
Cereales	683637	57	171			341818.5	341818.5	
Azucar	125725	10	31		125725			
Otros	36587	3	9	36587				
Total	1315137	Total Toneladas por Atrac.		36587	547994.2	341818.5	341818.5	46918.8

Embarque Promedio	12000	Tiempo de Operación	457	2192	1139	1139	586
Numero de Buques	110						
Tonelaje de TRB	13000	Tiempo de A/D	9	137	85	85	12
Eslora	180						
Atraque/Desatraque - horas	3						
Manejo con Unidad de Carga - TM/h.	250	Tiempo de Demora	91	438	228	228	117
Manejo con Buhler - TM/h.	300	Tiempo Total en Atrac.	558	2767	1453	1453	716
Manejo Directo a Camión TM/h.	80						
Demoras % de T. de Operaciones	0.2						

GRANELES LIQUIDOS - 2015

Derivados de Petroleo	176424
Melazas	83564
Otros	282364
Total	542352
Embarque Promedio	6000
Numero de Buques	90
Tonelada de TRB	8000
Eslora	180
Atraque/ Desatraque	3
Rendimiento en TM/Hora	150
Demora % de Tiempo de Op.	0.2

CUADRO Nº 4

ESCENARIO 1 - ACAJUTLA

		ATRACADEROS			
		A1	A2	C7	C8
Nº de Emb.	Atraque/Desatraque				
29	88	58,808	58,808	58,808	
14	42	41,782	41,782		
47	141	70,591	70,591	70,591	70,591
Toneladas por Atracadero		171,181	171,181	129,399	70,591
Tiempo de Operación		1141	1141	863	471
Tiempo Atraque/Desatraque		86	86	65	35
Tiempo Total en Atracadero		1227	1227	927	506

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CUADRO N° 5

ESCENARIO 1 - ACAJUTLA

AÑO 2000 — HORAS DE OCUPACION DE ATRACADEROS

TIPO DE CARGA	Carga Anual	A1	A2	B3	B4	B5	B6	C7	C8	Terminal
Carga General Suelta	408655	3,421	3,421	310						
Graneles Secos	959616			396	2,100	1,030	1,030		506	
Graneles Liquidos	355492	832	832					574	309	
Contenedores	534332							2,523		0
Total	2258095									
Ocupación de Atracadero		4,253	4,253	708	2,100	1,030	1,030	3,097	816	0

AÑO 2005 — HORAS DE OCUPACION DE ATRACADEROS

TIPO DE CARGA	Carga Anual	A1	A2	B3	B4	B5	B6	C7	C8	Terminal
Carga General Suelta	449006	3,569	3,569	618						
Graneles Secos	1037631			415	2,338	1,081	1,081		592	
Graneles Liquidos	418055	964	964					692	376	0
Contenedores	774904							2,107		1,708
Total	2679596									
Ocupacion de Atracadero		4,532	4,532	1,033	2,338	1,081	1,081	2,800	968	1,708

AÑO 2010 — HORAS DE OCUPACION DE ATRACADEROS

TIPO DE CARGA	Carga Anual	A1	A2	B3	B4	B5	B6	C7	C8	Terminal
Carga General Suelta	621672	4,153	4,153	2,313						
Graneles Secos	1167508			481	2,543	1,253	1,253		651	
Graneles Liquidos	475855	1,086	1,086					801	436	
Contenedores	1205100							1,916		2,060
Total	3470033									
Ocupación de Atracadero		5,239	5,239	2,794	2,543	1,253	1,253	2,717	1,087	2,060

AÑO 2015 — HORAS DE OCUPACION DE ATRACADEROS

TIPO DE CARGA	Carga Anual	A1	A2	B3	B4	B5	B6	C7	C8	Terminal
Carga General Suelta	866297	5,215	5,215	4,231						
Graneles Secos	1315137			558	2,767	1,453	1,453		716	
Graneles Liquidos	542352	1,227	1,227					927	506	
Contenedores	1906651							1,756		3,768
Total	4630437									
Ocupación de Atracadero		6,442	6,442	4,789	2,767	1,453	1,453	2,683	1,221	3,768

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CUADRO Nº 6

ESCENARIO 2 - ACAJUTLA

CARGA GENERAL SUELTA - 2015

	TM
Total Proyectado en TM.	693706
Embarque Promedio	2600
Numero de Buques	267
Tonelaje de Registro Bruto	11000
Eslora	150
Atraque/Desatraque - Horas	5
Rendimiento en TM./hora	80
Demoras - % de T. de O.	0.2

		ATRACADEROS		
Embarques	A/D- horas	A1	A2	B3
267	1334	209353	209353	275000
Toneladas/Atracadero		209353	209353	275000
Tiempo de Operación		2,617	2,617	3,438
Tiempo de A/D		614	614	106
Demoras		523	523	688
Tiempo Total en Atracaderos		3,754	3,754	4,231

CUADRO Nº 7

ESCENARIO 2 - ACAJUTLA

CONTENEDORES - 2015

Total Proyectado	500000
Contenedor - TM/cont.	12
Número de Contenedores	41667
Embarque Promedio - Contenedores	1400
Número de Buques	30
Tonelaje de Registro Bruto	
Eslora	215
Atraque/ Desatraque - horas	3
Rendimiento Cont/ Hora - 1 Grúa	18
Rendimiento Cont/ Hora - 2 Grúas	30
Rendimiento Cont/ Hora - 1 Grúa en Ter	20
Rendimiento Cont/ Hora - 2 Grúas en Te	40
Demoras % T. de Operación	0.20

		ATRACADERO - TM.	
Embarques	A/D - horas	C7	Terminal
		500000	0
30	89		
Toneladas/Atracadero		500000	0
Tiempo de Operación		1389	0
Tiempo de A/D		89	0
Demoras		278	0
Tiempo Total en Atracaderos		1756	0

2/2

CUADRO Nº 8

ESCENARIO 2 - ACAJUTLA

GRANELES SOLIDOS - 2015

	TM.
Abonos	365539
Cereales	683637
Azucar	125725
Otros	36587
Total	1211488

Embarque Promedio	12000
Numero de Buques	101
Tonelaje de TRB	13000
Eslora	180
Atraque/Desatraque - horas	3
Manejo con Unidad de Carga - TM/h.	250
Manejo con Buhler - TM/h.	300
Manejo Directo a Camión TM/h.	80
Demoras % de T. de Operaciones	0.2

			Toneladas Manejadas por Atracadero				
			Dir. a Cami	Unid de Car	Buhler	Buhler	
	Embarques	A/D -horas	B3	B4	B5	B6	C8
Abonos	30	91		328985.1			36553.9
Cereales	57	171			341818.5	341818.5	
Azucar	10	31		125725			
Otros	3	9	36587				
Total Toneladas por Atrac.			36587	454710.1	341818.5	341818.5	36553.9
Tiempo de Operación			457	1819	1139	1139	457
Tiempo de A/D			9	114	85	85	9
Tiempo de Demora			91	364	228	228	91
Tiempo Total en Atrac.			558	2296	1453	1453	557

GRANELES LIQUIDOS - 2015

Derivados de Petroleo	137450
Melazas	83564
Otros	282364
Total	503378
Embarque Promedio	6000
Numero de Buques	84
Tonelada de TRB	8000
Eslora	180
Atraque/ Desatraque	3
Rendimiento en TM/Hora	150
Demora % de Tiempo de Op.	0.2

CUADRO Nº 9

ESCENARIO 2 - ACAJUTLA

		ATRACADEROS			
		A1	A2	C7	C8
Nº de Emb.	Atraque/Desatraque				
23	69	45,817	45,817	45,817	
14	42	41,782	41,782		
47	141	70,591	70,591	70,591	70,591
Toneladas por Atracadero		158,190	158,190	116,408	70,591
Tiempo de Operación		1055	1055	776	471
Tiempo Atraque/Desatraque		79	79	58	35
Tiempo Total en Atracadero		1134	1134	834	506

CUADRO Nº 10

ESCENARIO 2 - ACAJUTLA

AÑO 2000 — HORAS DE OCUPACION DE ATRACADEROS

TIPO DE CARGA	Carga Anual	A1	A2	B3	B4	B5	B6	C7	C8	Terminal
Carga General Suelta	415666	3,482	3,482	310						
Graneles Secos	922290			372	2,067	968	968		505	
Graneles Líquidos	365492	832	832					574	309	
Contenedores	572144							2,702		0
Total	2286582									
Ocupación de Atracadero		4,314	4,314	682	2,067	968	968	3,276	815	0

AÑO 2005 — HORAS DE OCUPACION DE ATRACADEROS

TIPO DE CARGA	Carga Anual	A1	A2	B3	B4	B5	B6	C7	C8	Terminal
Carga General Suelta	442451	3,512	3,512	618						
Graneles Secos	1034268			415	2,322	1,081	1,081		586	
Graneles Líquidos	416908	961	961					690	376	0
Contenedores	500000							2,107		0
Total	2393627									
Ocupación de Atracadero		4,473	4,473	1,033	2,322	1,081	1,081	2,797	963	0

AÑO 2010 — HORAS DE OCUPACION DE ATRACADEROS

TIPO DE CARGA	Carga Anual	A1	A2	B3	B4	B5	B6	C7	C8	Terminal
Carga General Suelta	566725	3,685	3,685	2,313						
Graneles Secos	1072942			481	2,113	1,253	1,253		506	
Graneles Líquidos	462409	1,054	1,054					769	436	
Contenedores	500000							1,916		0
Total	2602076									
Ocupación de Atracadero		4,739	4,739	2,794	2,113	1,253	1,253	2,685	943	0

AÑO 2015 — HORAS DE OCUPACION DE ATRACADEROS

TIPO DE CARGA	Carga Anual	A1	A2	B3	B4	B5	B6	C7	C8	Terminal
Carga General Suelta	693708	3,754	3,754	4,231						
Graneles Secos	1211488			658	2,296	1,453	1,453		557	
Graneles Líquidos	503378	1,134	1,134					834	506	
Contenedores	500000							1,756		0
Total	2908572									
Ocupación de Atracadero		4,888	4,888	4,789	2,296	1,453	1,453	2,590	1,063	0

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CUADRO Nº 11

ESCENARIO 1 - CUTUCO

CARGA GENERAL SUELTA - 2015

	TM	Embarques	A/D- horas	ATRACADEROS Sur	Norte
Total Proyectado en TM.	113395	44	218	56697.5	56697.5
Embarque Promedio	2600				
Numero de Buques	44	Toneladas/Atracadero		56697.5	56697.5
Tonelaje de Registro Bruto	11000				
Eslora	150				
Atraque/Desatraque - Horas	5				
Rendimiento en TM./hora	80	Tiempo de Operación		709	709
Demoras - % de T. de O.	0.2	Tiempo de A/D		109	109
		Demoras		142	142
		Tiempo Total en Atracaderos		959	959

CUADRO Nº 12

ESCENARIO 1 - CUTUCO

CARGA GENERAL SUELTA - 2015

	TM
Total Proyectado en TM.	113395
Embarque Promedio	2600
Numero de Buques	44
Tonelaje de Registro Bruto	11000
Eslora	150
Atraque/Desatraque - Horas	5
Rendimiento en TM./hora	80
Demoras - % de T. de O.	0.2

	Embarques	A/D- horas	ATRACADEROS Sur	Norte
	44	218	56697.5	56697.5
Toneladas/Atracadero			56697.5	56697.5
Tiempo de Operación			709	709
Tiempo de A/D			109	109
Demoras			142	142
Tiempo Total en Atracaderos			959	959

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CUADRO Nº 13

ESCENARIO 1 - CUTUCO

GRANELES SOLIDOS - 2015

	TM.
Abonos	61415
Cereales	0
Azucar	0
Otros	0
Total	61415

Embarque Promedio	8000
Numero de Buques	8
Tonelaje de TRB	13000
Eslora	150
Atraque/Desatraque - horas	3
Manejo con Unidad de Carga - TM/h.	0
Manejo con Buhler - TM/h.	100
Manejo Directo a Camión TM/h.	80
Demoras % de T. de Operaciones	0.2

		Toneladas Manejadas por Atracadero	
		Dir. a Cami	Dir. a Camión
Embarques	A/D -horas	Sur	Norte
8	23	30707.5	30707.5
Total Toneladas por Atrac.		30707.5	30707.5
Tiempo de Operación		384	384
Tiempo de A/D		12	12
Tiempo de Demora		77	77
Tiempo Total en Atrac.		472	472

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CUADRO Nº 14

ESCENARIO 1 - CUTUCO

GRANELES LIQUIDOS - 2015

Derivados de Petroleo	23093
Melazas	0
Otros	0
Total	23093
Embarque Promedio	6000
Numero de Buques	4
Tonelada de TRB	8000
Eslora	180
Atraque/ Desatraque	3
Rendimiento en TM/Hora	150
Demora % de Tiempo de Op.	0.2

		ATRACADEROS	
		Sur	Norte
Nº de Emb.	Atraque/Desatraque		
4	12	11,547	11,547
Toneladas por Atracadero		11,547	11,547
Tiempo de Operación		77	77
Tiempo Atraque/Desatraque		4	4
Tiempo Total en Atracadero		81	81

CUADRO Nº 15

ESCENARIO 1 - CUTUCO

AÑO 2000

TIPO DE CARGA	Carga Anual	HORAS DE OCUPACION DE LOS ATRACADEROS Sur	Norte
Carga General Suelta	28428	249	249
Graneles Secos	47108	362	362
Graneles Liquidos	11200	39	39
Contenedores	0		
Total	86736		
Ocupacion de Atracadero		650	650

AÑO 2005

TIPO DE CARGA	Carga Anual	Sur	Norte
Carga General Suelta	57003	492	492
Graneles Secos	47380	364	364
Graneles Liquidos	16160	57	57
Contenedores	0		
Total	120543		
Ocupacion de Atracadero		913	913

AÑO 2010

TIPO DE CARGA	Carga Anual	Sur	Norte
Carga General Suelta	79666	680	680
Graneles Secos	53943	415	415
Graneles Liquidos	19318	68	68
Contenedores	0		
Total	152927		
Ocupación de Atracadero		1,163	1,163

AÑO 2015

TIPO DE CARGA	Carga Anual	Sur	Norte
Carga General Suelta	113395	959	959
Graneles Secos	61415	472	472
Graneles Liquidos	23093	81	81
Contenedores	0		
Total	197903		
Ocupación de Atracadero		1,512	1,512

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CUADRO Nº 16

ESCENARIO 2 - CUTUCO

CARGA GENERAL SUELTA - 2015

	TM
Total Proyectado en TM.	313251
Embarque Promedio	2600
Numero de Buques	120
Tonelaje de Registro Bruto	11000
Eslora	150
Atraque/Desatraque - Horas	5
Rendimiento en TM./hora	80
Demoras - % de T. de O.	0.2

	Embarques	A/D- horas	ATRACADEROS Sur	Norte
	120	602	156626	156626
Toneladas/Atracadero			156626	156626
Tiempo de Operación			1,958	1,958
Tiempo de A/D			301	301
Demoras			392	392
Tiempo Total en Atracaderos			2,651	2,651

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CUADRO Nº 17

ESCENARIO 2 - CUTUCO

CONTENEDORES - 2015				ATRACADERO - TM.
		Embarques	A/D - horas	Terminal
Total Proyectado	761744			761744
Contenedor - TM/cont.	12			
Número de Contenedores	63479			
Embarque Promedio - Contenedores	1400	45	136	
Número de Buques	45			
Tonelaje de Registro Bruto				
Eslora	215			
Atraque/ Desatraque - horas	3			
Rendimiento Cont/ Hora - 1 Grúa	18			
Rendimiento Cont/ Hora - 2 Grúas	30			
Rendimiento Cont/ Hora - 1 Grúa en Terminal	20			
Rendimiento Cont/ Hora - 2 Grúas en Terminal	40			
Demoras % T. de Operación	0.20			

Toneladas/Atracadero	761744
Tiempo de Operación	3174
Tiempo de A/D	136
Demoras	635
Tiempo Total en Atracaderos	3945

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CUADRO Nº 18

ESCENARIO 2 - CUTUCO

GRANELES SOLIDOS - 2015

	TM.
Abonos	165064
Cereales	0
Azucar	0
Otros	0
Total	165064

Embarque Promedio	8000
Número de Buques	21
Tonelaje de TRB	13000
Eslora	150
Atraque/Desatraque - horas	3
Manejo con Unidad de Carga - TM/h.	0
Manejo con Buhler - TM/h.	100
Manejo Directo a Camión TM/h.	80
Demoras % de T. de Operaciones	0.2

Embarques	A/D -horas	Toneladas Manejadas p Dir. a Cami Sur	Dir. a Cami Norte
21	62	82532	82532
Total Toneladas por Atr		82532	82532
Tiempo de Operación		1032	1032
Tiempo de A/D		31	31
Tiempo de Demora		206	206
Tiempo Total en Atrac.		1269	1269

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GRANELES LIQUIDOS - 2005

Derivados de Petróleo	17306
Melazas	0
Otros	0
Total	17306
Embarque Promedio	6000
Número de Buques	3
Tonelada de TRB	8000
Eslora	180
Atraque/ Desatraque	3
Rendimiento en TM/Hora	150
Demora % de Tiempo de Op.	0.2

CUADRO Nº 19

ESCENARIO 2 - CUTUCO

		ATRACADEROS	
		Sur	Norte
Nº de Emb.	Atraque/Desatraque		
3	9	8,653	8,653
Toneladas por Atracadero		8,653	8,653
Tiempo de Operación		58	58
Tiempo Atraque/Desatraque		3	3
Tiempo Total en Atracadero		61	61

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CUADRO Nº 20

ESCENARIO 2 - CUTUCO

AÑO 2000

TIPO DE CARGA	Carga Anual	HORAS DE OCUPACION DE LOS ATRACADEROS Sur	Norte	Terminal
Carga General Suelta	45238	396	396	
Graneles Secos	47108	362	362	
Graneles Liquidos	11200	39	39	
Contenedores	0			0
Total	103546			
Ocupacion de Atracadero		797	797	0

AÑO 2005

TIPO DE CARGA	Carga Anual	Sur	Norte	Terminal
Carga General Suelta	62941	544	544	
Graneles Secos	50742	390	390	
Graneles Liquidos	17306	61	61	
Contenedores	0			0
Total	130989			
Ocupacion de Atracadero		994	994	0

AÑO 2010

TIPO DE CARGA	Carga Anual	Sur	Norte	Terminal
Carga General Suelta	146459	1,251	1,251	
Graneles Secos	148536	1,142	1,142	
Graneles Liquidos	32774	115	115	
Contenedores	344126			1,944
Total	671897			
Ocupación de Atracadero		2,508	2,508	1,944

ANNEX 5.2.4

Salvadorean Port Cargo Projections, 1995

ANEXO 5.2.4
PRONOSTICOS ESTIMADOS DE LA CARGA SALVADORENA
(SOLO ACAJUTLA Y CUTUCO)
AÑO 1995

Tipo de Carga y Producto	1992	Observado 1994			Obs. 1995 Primer Trim.	Pronóstico 1995		
	Total	Acajutla	Cutuco	Total	Acajutla	Acajutla	Cutuco	Total
Carga General Suelta								
Hierro y acero	73,909	82,461		82,461	26,701	80,964		80,964
Cereales	14,637	15,031		15,031	0	0		0
Abonos	839	16,919		16,919	0	0		0
Vehiculos	12,554	12,908		12,908	5,237	15,880		15,880
Otros	183,568	55,440	6,700	62,140	44,621	135,304	7,035	142,339
Cafe	43,619	43,301		43,301	14,398	43,658		43,658
Azucar	40,261	11,752		11,752	0	0		0
Total	366,757	237,812	6,700	244,512	90,957	275,806	7,035	282,841
Contenedores				0				0
Cafe	48,465	33,350		33,350	11,106	33,676		33,676
Otros	234,739	105,219		105,219	41,634	126,245		126,245
Total	283,205	138,569		138,569	52,740	159,921		159,921
Carga Granel				0				0
Abonos	296,404	267,671	44,296	311,967	66,099	266,558	46,511	313,069
Cereales/Harinas	305,506	496,730		496,730	156,833	632,462		632,462
Azucar	100,007	91,372		91,372	40,982	165,269		165,269
Otros	16,350	6,884		6,884	1,199	4,835		4,835
Total	718,267	862,657	44,296	906,953	265,113	1,069,124	46,511	1,115,635
Carga Liquida				0				0
Petroleo (RASA)	981,088	934,805		934,805	244,059	962,849		962,849
Derivados de Pet. (CEPA)	89,161	408,168	31,952	440,120	148,288	597,845	33,550	631,394
Melazas	66,470	57,700		57,700	12,100	48,783		48,783
Otros	126,184	171,097		171,097	64,208	258,864		258,864
Total	1,262,903	1,571,770	31,952	1,603,722	468,655	1,868,340	33,550	1,901,890
Total General	2,631,132	2,810,808	82,948	2,893,756	877,465	3,373,192	87,095	3,460,287

Indice estacional general 0.256866 0.260129

Análisis de sensibilidad (con indice estacional general para el primer trimestre de 0.3) 0.3 3,000,405

Aplicación a los flujos observados de Acajutla en el primer trimestre de 1994 de indices estacionales por tipo de carga.

Se suponen tasas de crecimiento anual de 5% de carga de Cutuco y 3% de RASA.

Fuente. Frederic R. Harris, Inc.

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