Appendix 6.3.12 Commercial Mixed-feeds Production by Region

(Unit: '000 MT)

(Year)	1977		1978		1979		1980		1981	
		%		%		%		%		%
Luzon	686	90.6	795	91.0	812	91.3	805	85.0	866	83.8
Metro Manila	476	62.9	533	61.0	541	60.9	517	54.6	555	53.7
Other Area	210	27.7	262	30.0	271	30.5	288	30.4	311	30.1
Visayas	41	5.4	56	6.4	54	6.1	103	10.9	116	11.2
Mindanao	30	4.0	23	2.6	23	2.6	39	4.1	51	4.9
Total	757		874		889		947		1,033	

Source: PAFMI

Appendix 6.3.13 Feed Importation in the Philippines

(thousand tons)

Year	Fish meal		Meat meal		Others	
	Actual	Avg. every 3 years	Actual	Avg. every 3 years	Actual	Avg. every 3 years
1974	9		33			
1975	29	19	55	44		
1976	19	20	44	52		
1977	12	16	57	55		
1978	18	18	63	51		
1979	23	22	33	50	21	
1980	24	21	55	40	11	13
1981	16	27	33	49	7	9
1982	41	24	59	45	8	9
1983	14	20	42	38	11	8
1984	5	14	13	27	4	7
1985	23		25		5	

Source: NCSO

Appendix 6.3.14 Fertilizer Supply and Demand in the Philippines

(thousands of metric tons)

Year	Total consumption	Imports	Local production
1965	307.8	207.6	100.2
1966	197.3	84.2	113.1
1967	406.8	190.2	216.6
1968	464.2	220.4	243.8
1969	540.6	258.6	282.0
1970	454.0	196.2	240.3
1971	491.4	242.0	261.2
1972	492.5	306.3	288.7
1973	696.9	347.1	309.5
1974	738.3	956.5	297.0
1975	593.1	233.6	291.7
1976	667.9	193.0	306.2
1977	686.6	448.1	228.0
1978	795..7	546.9	289.7
1979	848.7	734.5	233.7
1980	819.6	745.5	230.0
1981	785.4	426.9	264.3
1982	846.0	765.4	125.8
1983	878.3	613.4	164.2
1984	665.0	626.4	103.4

Source: 1965-1969: Production: Fertilizer Institute of the Philippines
1970-1984: FPA

Appendix 6.3.15 Consumption of Fertilizer in the Philippines

(thousand tons)

Year	Urea	Ammosul	NP & P	NPK	Potash	Total
1970	122	116	83	84	49	454
1971	159	130	74	83	46	491
1972	133	135	89	89	47	493
1973	153	210	129	116	68	677
1974	212	201	131	127	68	738
1975	144	168	106	102	74	593
1976	175	185	116	108	83	668
1977	229	178	106	124	49	687
1978	291	171	125	147	61	796
1979	320	175	124	160	70	849
1980	329	144	132	158	57	820
1981	307	126	124	164	64	785
1982	342	140	143	162	59	846
1983	372	138	145	151	73	878
1984	256	118	122	134	27	658

Source: FPA

Appendix 6.3.16 Harvest Area of Principal Fertilizer-Using Crops, Total Use, and Rate Per Hectare, Philippines, 1970-1984

Calendar Year	Rice	Sugar	Pineapple	Banana	Cabbage Pechay	Tomato	Total Crop Area	Total Fertilizer Use	Rate
	---------- thousand hectares ----------							thousand metric tons	kilograms per hectare
1970	3105.4	376.7	48.8	256.1	9.4	15.4	3811.8	454.0	119.1
1971	3246.6	408.0	48.0	265.4	10.2	14.2	3992.4	491.4	123.1
1972	3390.6	420.3	49.7	269.4	11.0	16.4	4157.4	492.5	118.5
1973	3376.0	434.7	48.3	273.3	11.1	16.6	4160.0	676.9	162.7
1974	3525.0	468.3	49.3	247.3	12.3	16.4	4318.6	738.3	171.0
1975	3630.9	513.2	54.1	264.0	13.3	17.9	4493.4	577.6	128.5
1976	3651.5	533.3	60.4	300.2	13.1	18.2	4596.7	643.9	140.1
1977	3703.1	548.2	64.8	302.3	13.8	18.6	4650.6	685.6	147.4
1978	3548.7	451.4	63.3	299.2	14.2	18.6	4395.4	791.6	180.1
1979	3542.7	419.1	62.5	317.8	12.4	16.4	4370.9	849.3	194.3
1980	3470.5	402.2	62.7	317.6	12.6	16.3	4281.9	819.6	191.4
1981	3409.0	404.0	67.0	311.8	11.8	15.4	4219.0	785.4	186.2
1982	3351.1	447.6	60.1	331.4	11.2	15.2	4216.6	845.9	200.6
1983	3054.3	417.0	62.0	326.0	10.3	13.9	388.5	879.5	226.5
1984	3151.4	405.0	63.0	329.5	9.6	16.1	3974.6	660.2	166.1

Source: PHILSUCOM and BAEcon.

Appendix 6.3.17 Historical Imports of Fertilizer through Manila

(Unit: '000 MT)

	1980	1981*	1982	1983	1984	1985
Ammonium Sulfate	51	25	66	62	59	7
Urea	154	208	116	120	121	196
NP	-	4	32	44	27	59
NPK	11	5	21	23	47	62
Others	23	21	12	10	0	-
Total	239	263	247	259	254	324

Source: Foreign Statistics, NCSO

Note: *Estimates by the Study Team based on the unit volume per import value.

Appendix 6.3.18 Fertilizer Demand by Crop, by Region, Philippines, 1984 (M.T.)

Region	Rice	Corn	Sugar	Fruit	Vegetables	Others*
I	21,334.81	2,745.85	-	700.98	29,681.58	3,343.65
II	31,050.01	1,706.56	2,243.59	13.60	118.11	1,822.31
III	49,983.62	14,656.35	-	1,822.26	9,724.71	9,152.77
IV	17,194.81	549.17	-	373.76	573.07	647.29
V	24,288.01	1,901.43	8,957.60	286.41	774.30	478.25
VI	57,159.62	10,026.79	136,858.72	1,223.67	109.36	12,657.20
VII	22,770.01	11,225.52	13,997.30	1,349.69	1,408.62	7,309.84
VIII	3,201.60	407.45	602.75	.72	4.38	32.98
IX	6,568.80	903.47	-	375.18	258.10	2,238.72
X	12,119.20	3,495.79	418.58	51.55	564.32	606.06
XI	12,530.40	4,121.73	1,825.01	934.40	468.08	2,692.23
XII	17,719.22	7,310.47	2,528.21	27.92	61.25	247.38
Total	276,000.11	59,050.58	167,431.76	7,160.14	43,745.88	41,288.68

* Includes fertilizer usage on fish ponds, garlic, legumes, etc.

Source: FPA

Appendix 6.3.19 Chemical Imports in the Philippines

(thousand tons)

Year	Actual	Moving Average every 3 years
1970	160	
1971	238	210
1972	232	254
1973	293	276
1974	302	287
1975	266	300
1976	332	
1977	*N.A.	
1978	*N.A.	
1979	*N.A.	
1980	747	
1981	822	779
1982	767	830
1983	900	796
1984	722	

Source: NCSO

Note : N.A. means data not available.

Appendix 6.3.20 Estimated GDP of the Construction Sector

Construction Sector GDP is estimated as follows:

(Unit: Million Pesos at constant 1972 prices)

		GDP	Construction Sector GDP	Elasticity
Actual	1967	44,093	1,978	
	1968	46,544	1,797	
	1969	48,779	1,942	0.84
	1970	51,014	1,738	0.35
	1971	53,526	1,889	1.13
	1972	56,075	2,240	2.08
	1973	60,931	2,433	2.10
	1974	64,139	2,745	3.69
	1975	68,361	4,101	4.90
	1976	72,962	5,254	3.48
	1977	77,990	5,568	1.83
	1978	82,797	5,913	1.70
	1979	88,346	7,121	1.42
	1980	92,706	7,139	1.86
	1981	96,207	7,830	1.13
	1982	98,999	8,079	0.96
	1983	99,920	7,689	11.86
	1984	94,214	5,866	6.10
	1985	90,469	4,248	
Forecast	1990	110,643	7,248	
	1995	141,212	10,899	
	2000	180,226	15,647	
	2005	230,019	21,438	

	Elasticity	GDP Annual Growth Rate (%)
1969-1975	2.26	-
1976-1982	1.77	-
1990-1995	1.70	5.0
1995-1900	1.50	5.0
1900-1905	1.30	5.0

Elasticity (Actual) : Calculation from ratio to previous year by 3 year moving averages.

GDP (Forecast) : Same as Future Socio-Economic Framework (Medium assumption)

Construction Sector GDP (Forecast): Based on the above elasticities

Appendix 6.3.21 Imports of Machinery and Transport Equipment though Manila

(Year)	1980	1981	1982	1983	1984	1985
Import Volume (thousand tons)						
Power generating machinery and equipment	54	36	31	28	7	12
Specialized industrial machinery	57	49	56	47	14	17
Metalworking Machinery	18	13	16	11	4	4
General Industrial Machinery and Machine Parts	58	48	51	48	17	16
Electric Machinery and Parts	44	44	39	49	28	21
Road vehicles	118	101	103	96	23	25
Others	11	6	24	41	8	8
Total	360	297	320	320	101	103
Import Value (Million dollars)	1,144	1,082	986	923	401	291
Share of Manila to national total (%)	71	67	61	61	42	41

Source: NCSO Foreign statistics.
Figures in the Table exclude the volume and value of imported ships

Appendix 6.3.22 Quantity Indicator of Foreign Trade in Philippines

Year	Import		Export	
	Actual	Avg. 3 years	Actual	Avg. 3 years
1972	86		98	
1973	81	87	106	99
1974	95	92	94	100
1975	100	100	100	107
1976	106	103	128	127
1977	103	110	154	144
1978	122	119	150	156
1979	133	130	164	171
1980	135	130	198	187
1981	121	130	200	203
1982	134		210	

Source: Monthly statistics report; U.N.

Appendix 6.3.23 Export of Feed at the Port of Manila

(Unit: 1,000MT)

	1980	1981	1982	1983	1984	1985
Oil Cake and Other Residues of Coconut (copra)	73	43	47	54	53	45
Others	6	7	3	4	6	2
Share of Manila for Copra Meal/Cake	13.4	6.9	8.0	9.8	14.6	10.1

Appendix 6.3.24 Trend of Coffee Exports in Philippines

(thousand tons)

	Actual Volume	Avg. every 3 years
1975	2	
1976	13	8.7
1977	11	12.3
1978	13	13.3
1979	16	15.0
1980	16	17.3
1981	20	20.3
1982	25	22.3
1983	22	26.7
1984	33	28.7
1985	31	

Source: NCSO

Growth rate

1976 - 80 18.7 %

80 - 84 13.5 %

76 - 84 16.1 %

Appendix 6.3.25 Exports of Vegetables and Fruits

('000 MT)

Year	Canned Pineapple	Pineapple Juice	Pineapple Concentrates	Mangoes	Coffee	Total	Moving Avg. Every 3 years
1970	100	14	10	6		130	
1971	100	9	7	5		121	128
1972	108	10	8	6		132	124
1973	91	11	10	8		120	136
1974	125	13	10	8		156	143
1975	116	18	11	6	2	153	163
1976	138	8	14	7	13	180	180
1977	154	23	15	5	11	208	199
1978	162	11	13	9	13	208	222
1979	189	15	22	7	16	249	237
1980	187	25	18	9	16	255	246
1981	174	20	12	7	20	233	251
1982	171	40	19	10	25	265	238
1983	146	23	17	8	22	216	247
1984	171	23	24	8	33	259	244
1985	165	30	24	8	31	258	

Source: NCSO

Appendix 6.3.26 Exported Volume of Forest Products (Three Year Moving Averages) in the Philippines

(Unit: '000 m^3)

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Logs	3876	2991	2196	1834	1391	889	724	748	795	695
Timber	344	401	508	648	743	735	627	622	620	593
Plywood	210	226	291	327	368	369	319	302	260	259
Veneer Sheet and Corestocks	144	140	158	165	168	163	133	119	97	87
Others	4	7	15	19	23	26	23	23	22	26
Total Forest Prod. except Logs	702	774	972	1159	1302	1293	1102	1066	999	965

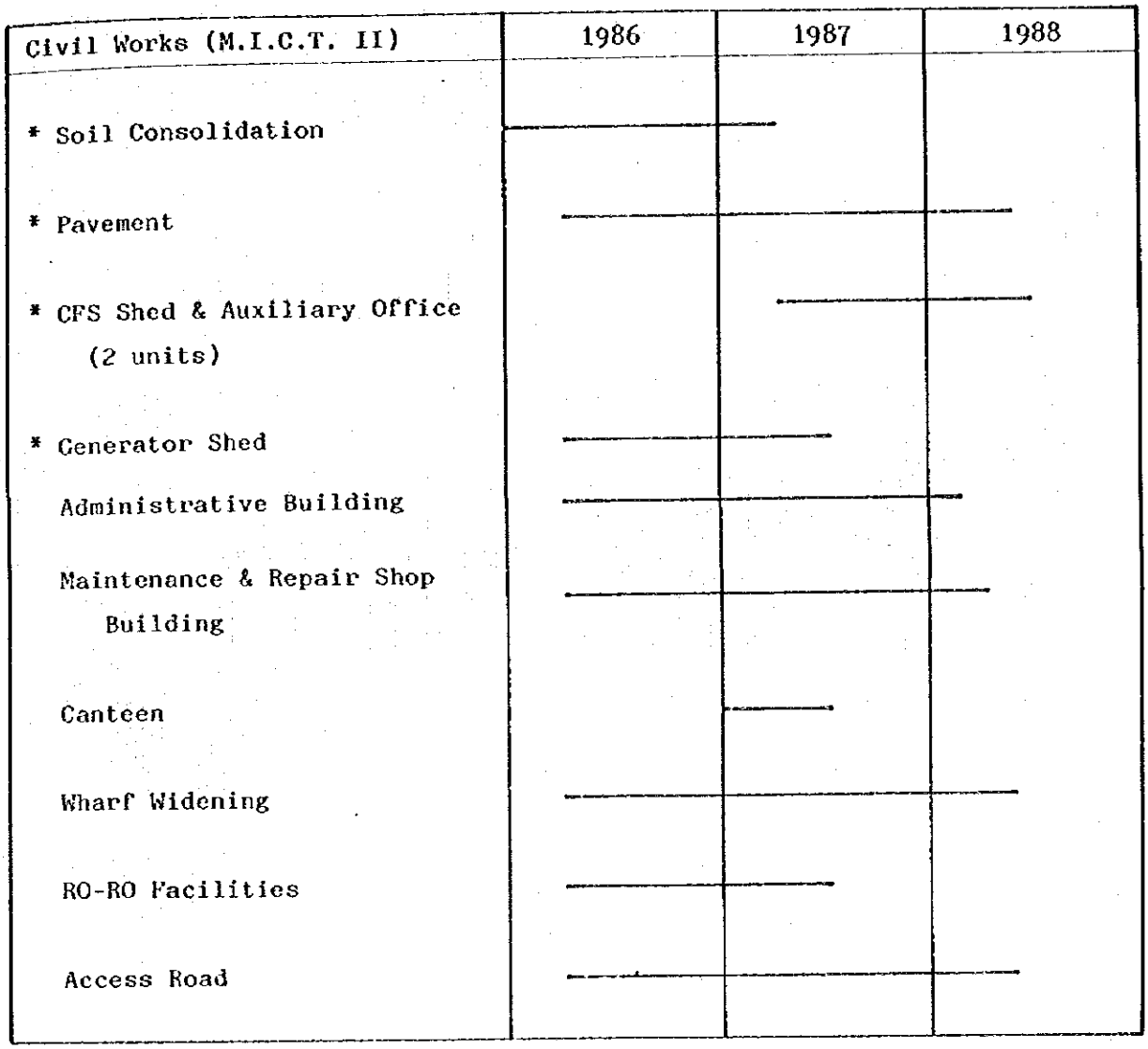
Source:NCSO

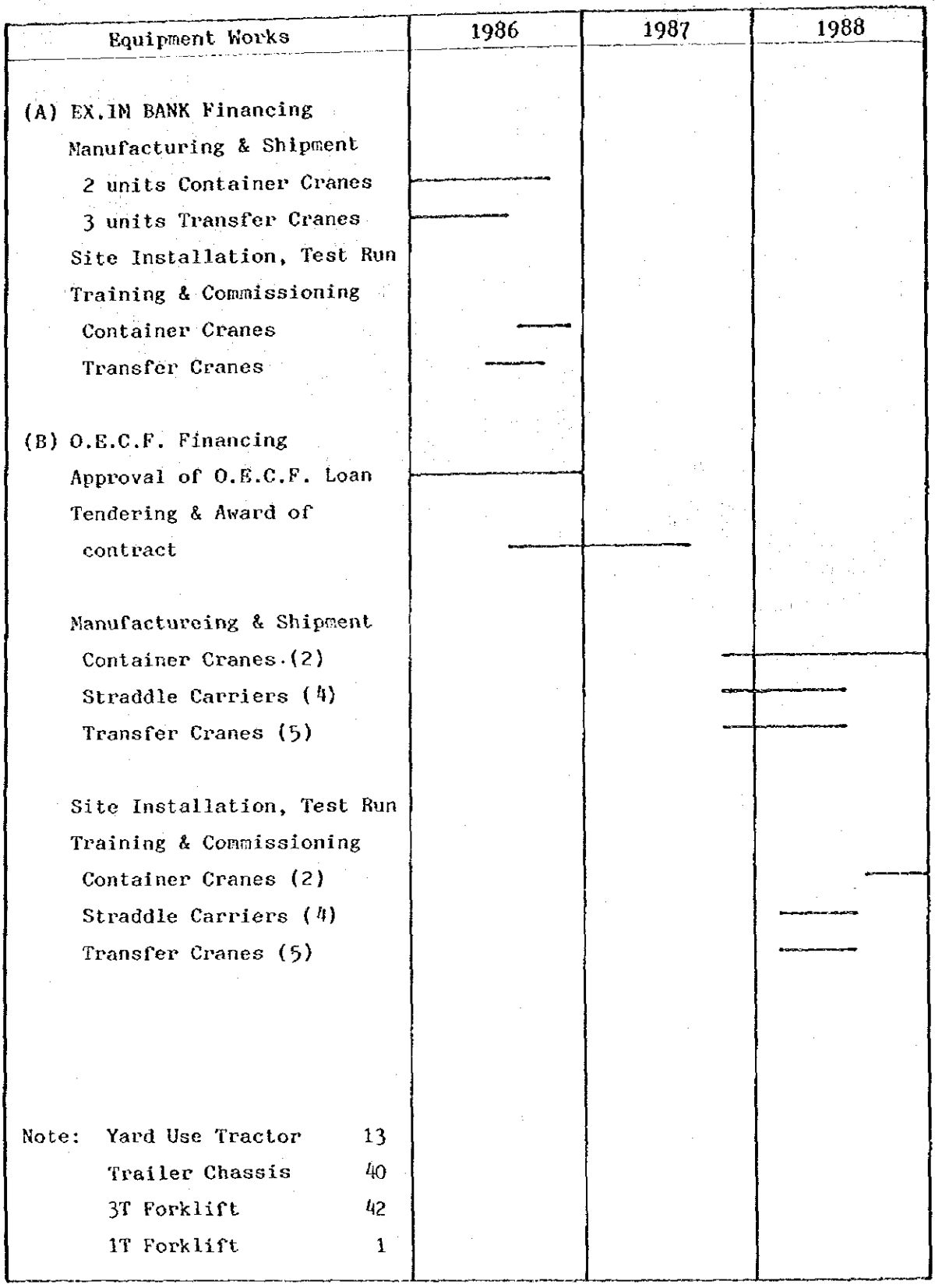
Forest Production in the Philippines (Moving Averages)

(Unit: '000 m^3)

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Logs	8299	7985	7896	7213	6711	6128	5459	4826	4310	4170
Timber	1480	1564	1652	1658	1644	1458	1315	1214	1219	1228
Plywood	412	405	465	494	515	504	477	446	440	449
Veneer	232	346	482	559	613	553	394	223	130	115
Total Forest Prod. except Logs	2124	2315	2599	2711	2772	2515	2186	1883	1789	1792

Appendix 7.1.1 Construction Schedule of M.I.C.T.




Equipment Works
1986
1987
1988
(A) EX.IM BANK Financing
Manufacturing & Shipment
2 units Container Cranes
3 units Transfer Cranes
Site Installation, Test Run
Training & Commissioning
Container Cranes
Transfer Cranes
(B) O.E.C.F. Financing
Approval of O.E.C.F. Loan
Tendering & Award of
contract
Manufactureing & Shipment
Container Cranes.(2)
Straddle Carriers (4)
Transfer Cranes (5)
Site Installation, Test Run
Training & Commissioning
Container Cranes (2)
Straddle Carriers (4)
Transfer Cranes (5)
Note: Yard Use Tractor 13
Trailer Chassis 40
3T Forklift 42
1T Forklift 1

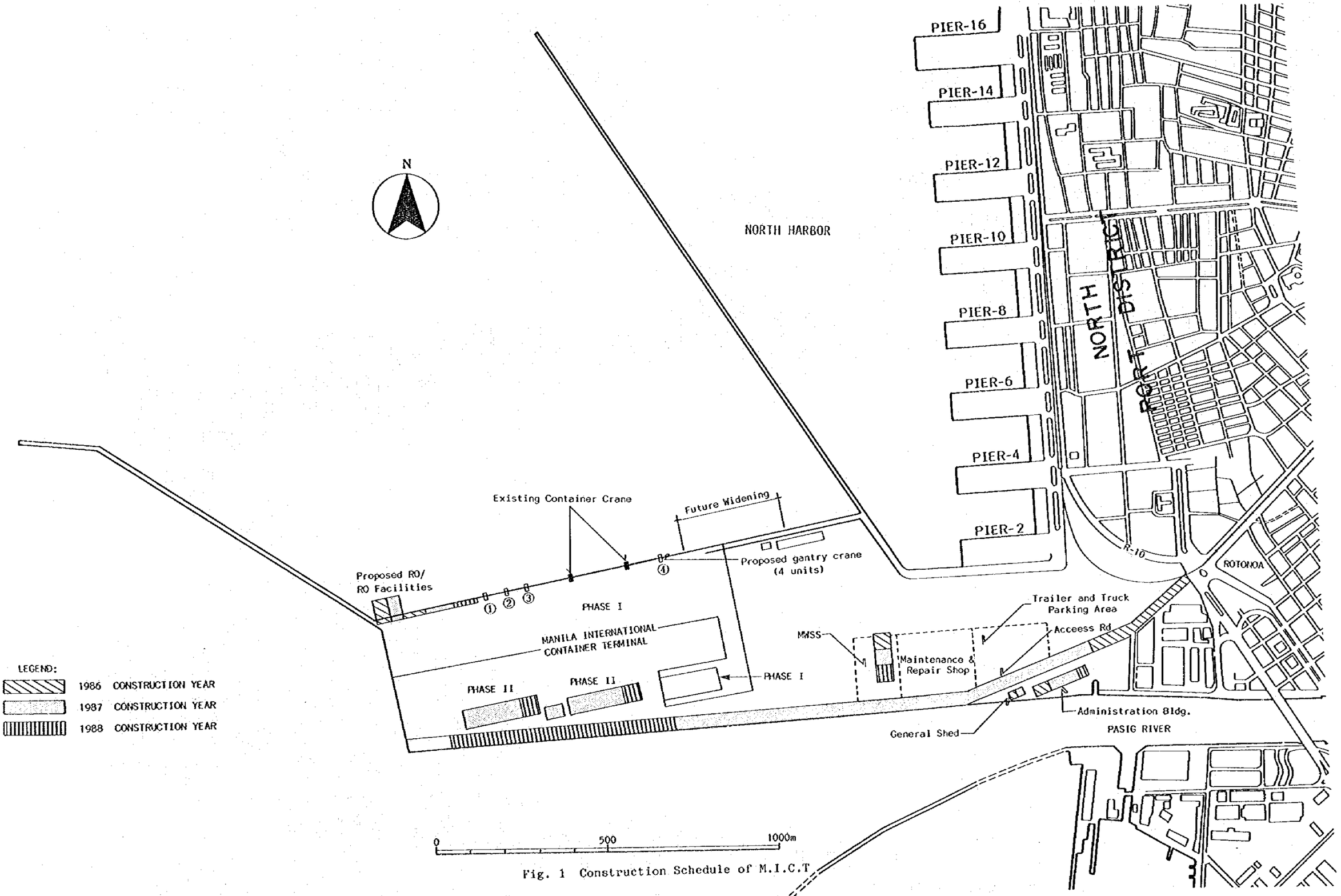


Fig. 1 Construction Schedule of M.I.C.T

Appendix 7.1.2 Survey of the Pasig River

1) Objectives

The main purpose of the survey is to determine the cargo volume handled by barges on the Pasig River from South Harbor's Anchorage. Related to this is the identification of the present transport patterns of various companies.

2) Companies

There are five (5) industries covered in the survey and thirteen (13) companies were interviewed.

The companies are listed in Table 3. These companies were chosen based on Foreign Trade Statistics, the site survey and the cargo reports from PMU Manila.

3) Wheat Cargo on the Pasig River

The total yearly volume of wheat imports which are transported via the Pasig River to the milling companies was estimated based on data from the Philippine Flour Millers Association. Since all these companies use barges as their sole transport mode, it can be assumed that the average yearly volume of wheat carried by barges on the Pasig River is 369,638 tons.

The total wheat storage capacity of the mills is approximately 97,018 L.T.

Table 1 Wheat Cargo Volume

Year	Republic Flour Mills	Wellington Flour Mills	Liberty Flour Mills	Universal Robina Corp.	Total
1974	102,256	69,319	69,303	31,580	272,458
1975	99,801	65,463	70,406	43,637	279,307
1976	114,003	75,854	78,643	56,852	325,352
1977	150,413	99,089	101,135	66,767	417,404
1978	129,511	80,246	78,509	59,768	348,034
1979	171,703	106,204	100,166	83,651	461,724
1980	142,259	94,849	96,726	65,497	399,331
1981	182,700	106,092	79,570	85,138	453,500

Table 2 Storage Capacity of Flour Mills

Company	No. of Silos	No. of Bins	Total Capacity (LT)
Liberty Flour Mills	7	2	12,500
Republic Flour Mills	15	0	37,400
Wellington Flour Mills	8	3	13,655
Universal Robina Corp.	27	15	33,463
Total	77	20	97,018

Table 3 Companies Interviewed for the Pasig River Survey

Flour Related Companies

1. Liberty Flour Mills
2. Republic Flour Mills
3. Wellington Flour Mills
4. Universal Robina Corporation

Fertilizer Related Companies

1. Planters Product, Inc.

Petroleum Related Companies

1. Shell (Filipinas Shell Co.)
2. Caltex
3. Petrophil Inc.

Iron and Steel Related Companies

1. National Steel Corporation

Chemical Related Companies

1. Exxon Chemical, Phils.
2. Pacific Enamels Manufacturing
3. Republic Class Corporation
4. Resins

4) Preliminary Results of the Cargo Survey

The survey took approximately 11 weeks (July 15 to September 27, 1986) and the number of respondents to date is 5 samples from a total of 13

companies. This represents a 38.5% survey response rate. Five (5) other firms have expressed their willingness to submit the completed questionnaire form at a much later date as their work activities permit. The rest of the surveyed companies have refrained from taking part in the survey.

The response status of the companies is shown in the Table 4 below.

Table 4 Response Status

Name of Company	Survey Status		
	Submitted	Pending*	Refused
1. Liberty Flour Mills, Inc.			●
2. Republic Flour Mills, Inc.		●	
3. Wellington Flour Mills, Inc.			●
4. Universal Robina Corporation	●		
5. Planters Product In.	●		
6. Shell Chemical Company		●	
7. Petrophil Inc.			●
8. Caltex (Phils.) Inc.		●	
9. National Steel Corporation	●		
10. Exxon Chemicals, Inc.		●	
11. Republic Glass Corporation		●	
12. Resins, Inc.	●		
13. Colgate-Palmolive, Inc.	●		
Total	5	5	3
(%)	38.5	38.5	23.0

*Classified as pending since the sample companies have expressed their willingness to submit responses at a much later date.

5) Port Management Unit Data

a. The data recorded by PMU Manila included the monthly cargo movement transported by barges to both public and private berths located along the Pasig River. The limitation of the available data is that it is only for the period from March to December of 1985.

b. A study of the total volume of cargo by month based on the given data reveals that September is the peak month of deliveries (refer to Fig. 1). Moreover, the general pattern for cargo movement realizes a gradual buildup in volume from May to September and abruptly declines in October.

c. An investigation of cargo origin/destination by berth reveals that the majority of the cargo is handled at the public wharves (17.4%) and the berths of flour millers (17.9%). The jump in the volume of cargo handled at public wharves in the month of September is attributed to the marked increase in the import of fertilizer.

6) NCSO Foreign Trade Statistics

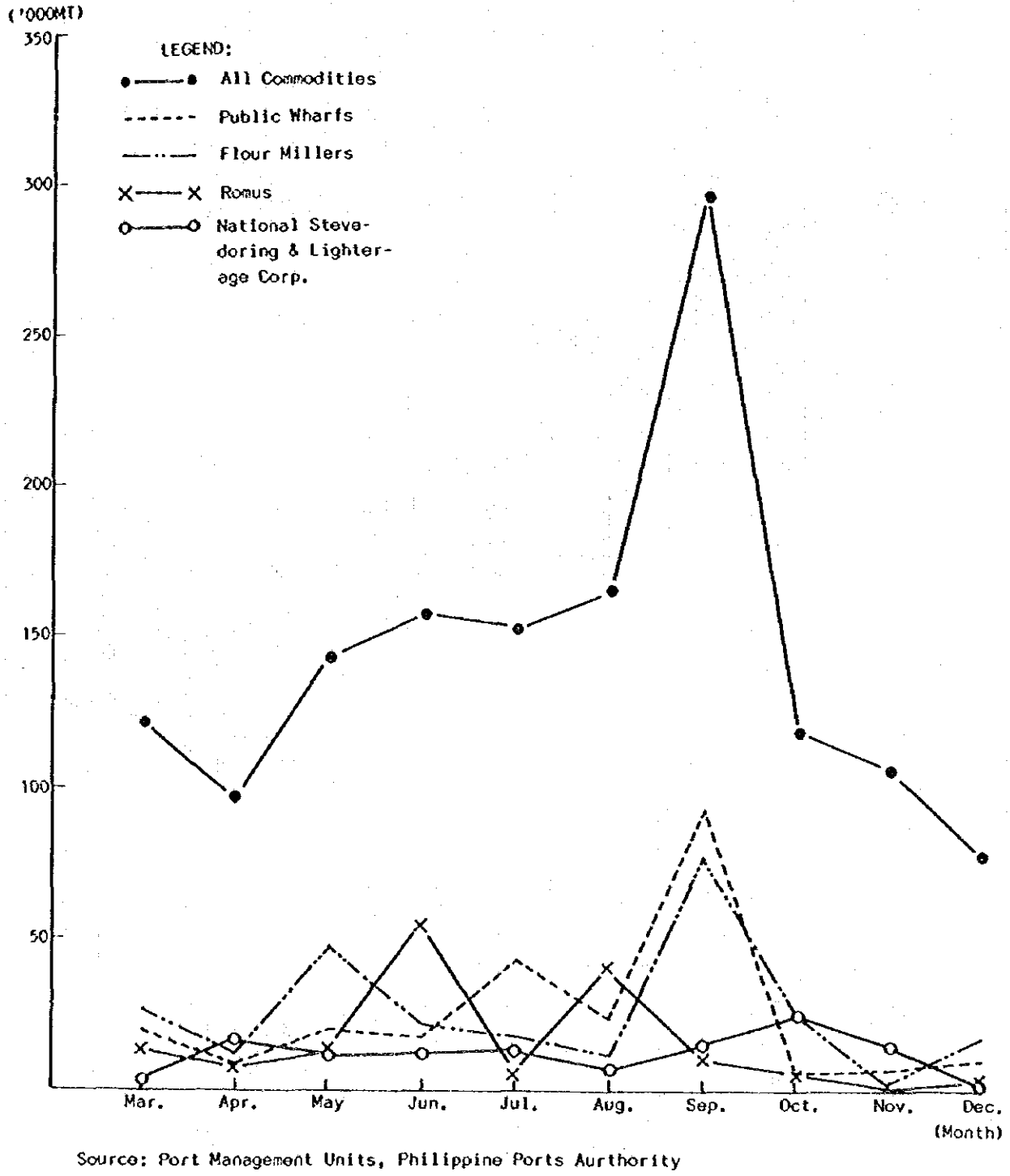
Based on NCSO foreign trade statistics (1981 to 1985), the following commodities registered the highest volume of import/export at Manila South Harbor (see Table 5).

Most of the import commodities are minly bulk imports.

Hence, they are usually handled at the Anchorage.

Table 5 Import/Export Volume for Port of Manila (NCSO)

Commodities	Volume ('000 metric tons)					Average
	1981	1982	1983	1984	1985	Volume
IMPORTS						
1) Cereals & Cereal Preparations	789	966	1064	835	976	926
2) Fertilizers	454	247	258	254	324	308
3) Feeding Stuff for Animals	256	454	316	361	272	332
4) Inorganic Chemicals	209	201	227	207	161	201
5) Iron & Steel	630	778	764	203	132	501
EXPORTS						
1) Cork & Wood	151	152	190	152	130	155
2) Vegetables & Fruits	128	122	115	125	102	118
3) Fixed Vegetable Oils & Fats	54	57	136	74	77	80



Source: Port Management Units, Philippine Ports Aurthority

Fig. 1 Monthly Cargo Flow on the Pasig River (1985)

Appendix 7.2.1 List of Large Size Conventional Ships which called at Manila in 1985

(Jan.-June. 1985)

No.	Facility	DWT	LOA (m)	Commodity loaded/unloaded	Handling volume (tons)
1	Anch.	62,503		Other Coconut (Bulk)	13,750
2	P-9	32,690	184	Wood	2,027
3	"	27,995	197	"	1,656
4	Anch	36,251	182	Feed (bulk)	27,499
5	"	27,995	197		0
6	P-3	26,560	161	Wood	1,015
7	P-9	40,110	134	Wood	802
				Iron & Steel	161
8	Anch	30,184	190	Wheat (bulk)	13,432
9	"	36,251	182		0
10	"	28,000	165		0
11	P-3	34,171	198	Wood	2,707
12	"	35,414	183	"	2,645
13	P-9	30,332	178	"	2,000
14	Anch	35,414	184	Feed (bulk)	25,633
15	P-5	27,311	191	Wood	6,106
16	Anch	28,767	180		0
17	"	26,856	163		0
18	P-9	38,678	182	Wood	360
				Miscellaneous	1,900
				Others	176
19	Anch	31,825	188	Wheat (bulk)	16,764
20	"	36,257	182		0
21	"	61,315			0

Source: "Worksheet per vessel activity" PPA

Appendix 7.2.2 Characteristics of Conventional Ships other than Particular Commodity Carriers

Ship class	Average DWT	Average Handling Volume (tons)	Loaded rate (%)
- 10,000 DWT	5,760	1,006	19
10,000 -	16,720	4,848	32

Source: Processed data from PPA statistics in 1985.

Appendix 7.2.3 Ship Size and Loaded Volume of Timber Ships

Loaded volume (t)	Ship size (DWT)	Loaded volume (t)	Ship size (DWT)	Loaded volume (t)	Ship size (DWT)
139	1,456	977	32,674	2,027	32,690
166	2,014	1,015	26,560	2,056	27,562
169	4,436	1,026	2,271	2,096	12,713
174	837	1,082	26,536	2,100	36,405
403	27,482	1,152	38,695	2,134	40,444
458	26,499	1,168	35,928	2,224	13,738
492	34,186	1,192	22,272	2,287	20,205
520	32,595	1,314	34,574	2,310	36,250
572	42,431	1,428	33,133	2,645	35,414
612	4,936	1,444	26,080	2,707	34,171
639	32,628	1,464	17,298	2,753	22,174
700	28,323	1,500	32,770	3,034	26,800
708	42,431	1,618	41,698	3,091	34,700
737	37,648	1,656	27,995	3,158	26,814
794	32,674	1,658	28,317	3,871	31,427
854	32,770	1,676	30,450	3,970	20,335
883	29,081	1,797	33,796	4,376	22,272
888	28,562	1,936	22,272	5,670	26,814
903	22,272	1,996	25,907	6,106	27,311
949	24,130	2,000	30,332		

Source: PPA

Appendix 7.2.4 Characteristics of Iron and Steel Ships which called at Manila in 1985

Exclusive iron and steel carriers

No.	Avg. handling volume (tons)	Ship size (DWT)
1	539	6,498
2	1,161	6,023
3	1,173	4,014
4	1,367	6,328
5	1,371	6,035
6	2,977	4,950
7	3,256	6,498
8	4,189	5,807
9	5,057	20,143
10	5,711	12,016
11	8,180	23,911

Vessels which transported over 1,000 tons of iron and steel

No.	Avg. handling volume (tons)	Ship size (DWT)
1	1,009	7,737
2	1,011	7,707
3	1,093	7,737
4	1,132	7,910
5	2,828	8,015
6	1,246	19,493
7	1,341	7,737
8	1,664	5,791
9	1,850	22,274

Appendix 7.2.5 Characteristics of Semi-container and Self-sustaining Container Ships which called at South Harbor in 1985

	Class	No. of Calls	Avg. DWT	Avg. handling volume	Loaded rate (%)
Semi-container ships	- 10,000DWT	60	7,753	1,593	23
	10,001 -	15	21,331	2,118	11
Self-sustaining Container ships	- 10,000	128	5,253	2,133	45
	10,001 -	72	15,338	1,908	14

Source: Processed data based on PPA statistics.

Note: Figures include only available data.

Appendix 7.2.6 Number of Bulk Carriers by Ship Class in the World

Ship class 1000 DWT	1973	1977	1981	1985	Growth rate 1985/1977
10 - 11.5	77	71	60	58	0.817
11.5 - 13	116	123	82	74	0.602
13 - 16	289	353	324	287	0.813
16 - 25	945	1,104	1,180	1.157	1.048
25 - 33	781	1,088	1,258	1,386	1.274
33 - 48	476	624	750	1,114	1.785
48 - 67	246	420	510	672	1.600
67 - 85	123	151	148	173	1.146
85 - 100	81	97	107	107	1.103
100 - 120	52	106	123	128	1.208
120 - 140	39	67	89	110	1.642
140 - 160	40	53	51	63	1.189
160 - 180	15	21	20	26	1.348
180 - 220	-	2	3	5	
220 - 225	12	13	11	13	
225 - 245	5	10	10	9	0.939
245 - 270	1	4	8	7	
270 - 300	5	6	2	2	
Total	3,303	4,313	4,736	5,391	

Source: Lloyd's Register of Shipping.

Appendix 7.2.7 Ship Size of Grain Carriers at Manila

Ship class DWT	1978		1979		1980		1983		1984	
	Wheat	Soybean meal	Wheat	Soybean meal	Wheat	Soybean meal	Wheat	Soybean meal	Wheat	Soybean meal
- 10,000	0	0	0	1	0	1	0		0	1
10,001 - 15,000	0	1	1	2	0	1	1		0	0
15,001 - 20,000	1	1	1	3	0	5	0		0	1
20,001 - 30,000	17	0	20	2	18	4	18		9	2
30,001 -	2	1	1	0	2	1	2		7	6
Total	20	3	23	8	20	12	21		16	10

Source: NFA Port Operations Office

Appendix 7.2.8 Characteristics of Bulk Carriers other than Grain Carriers

No.	DWT	Handling Volume (tons)	Commodity
1	5,966	3,800	fertilizer
2	6,522	5,835	"
3	6,066	2,000	"
4	5,890	2,100	"
5	6,276	1,550	"
6	5,953	4,945	"
7	6,594	3,500	"
8	6,641	5,450	"
9	5,000	4,771	"
10	22,354	10,733	"
11	5,186	4,650	chemicals
12	18,812	17,197	"
13	15,167	3,330	"
14	13,965	10,000	"
15	18,886	9,621	coal
16	18,881	16,933	"
17	8,658	3,300	crude minerals
18	8,685	3,300	"

Source: PPA "worksheet per vessel activity" in the first half of 1985.

Note: Figures shown in the table include only available data.

Ship class	Average DWT	Avg. handling Volume (tons)	Loaded rate (%)
- 10,000 DWT	6,080	3,592	66
10,000 -	18,010	9,144	56

Appendix 7.2.9 Cargo Volume by Ship Type by Packing Type Handled at the Piers of South Harbor in 1985

(thousand tons, %)

Cargo Volume Row % Col. %	Loose (Break bulk) Cargo	Containerized Cargo	Bulk (dry) Cargo	Liquid Cargo	Row Total
Conventional	464	39	96	0	599
Gen. Cargo	77.5	6.5	16.0	0	100
Ships	69.5	3.5	43.4	0	29.5
Semi Container	43	87	10	0	140
Ships	30.7	62.1	7.2	0	100
	6.4	7.8	4.5	0	6.9
Container Ships	10	968	0	0	978
	1.0	99.0	0	0	100
	1.5	86.7	0	0	48.1
Ro-Ro ships	1	22	0	0	23
	4.3	95.7	0	0	100
	0.1	2.0	0	0	1.1
Bulk Carriers	149	0	109	19	277
	53.8	0	39.4	6.8	100
	22.3	0	49.3	70.4	13.6
Tankers	0	0	3	8	11
	0	0	27.3	72.7	100
	0	0	1.4	29.6	0.5
Others	1	0	3	0	4
	25.0	0	75.0	0	100
	0.1	0	1.4	0	0.2
Column Total	668	1,116	221	27	2,032
	32.9	54.9	10.9	1.3	100
	100	100	100	100	100

Source: Computer processed data

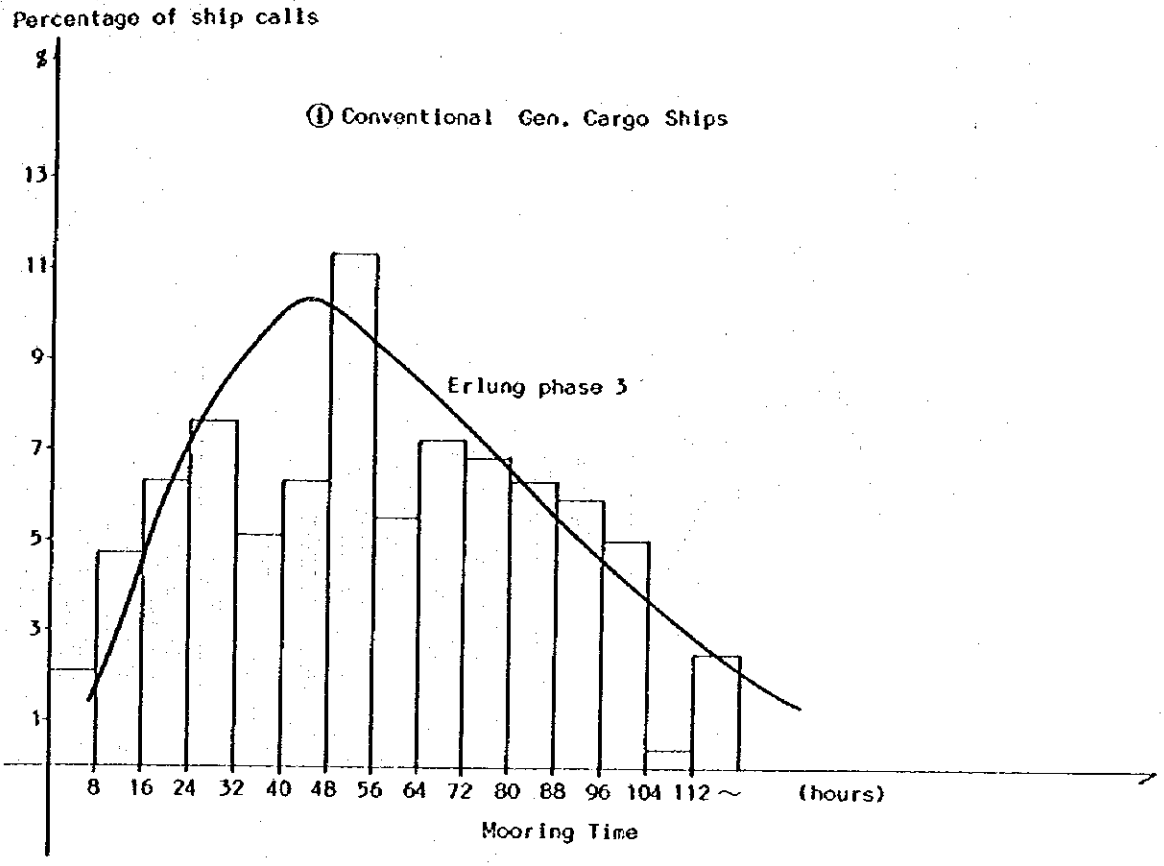
Appendix 7.2.10 Cargo Volume by Ship Type by Packing Type Handled at Anchorage in 1985

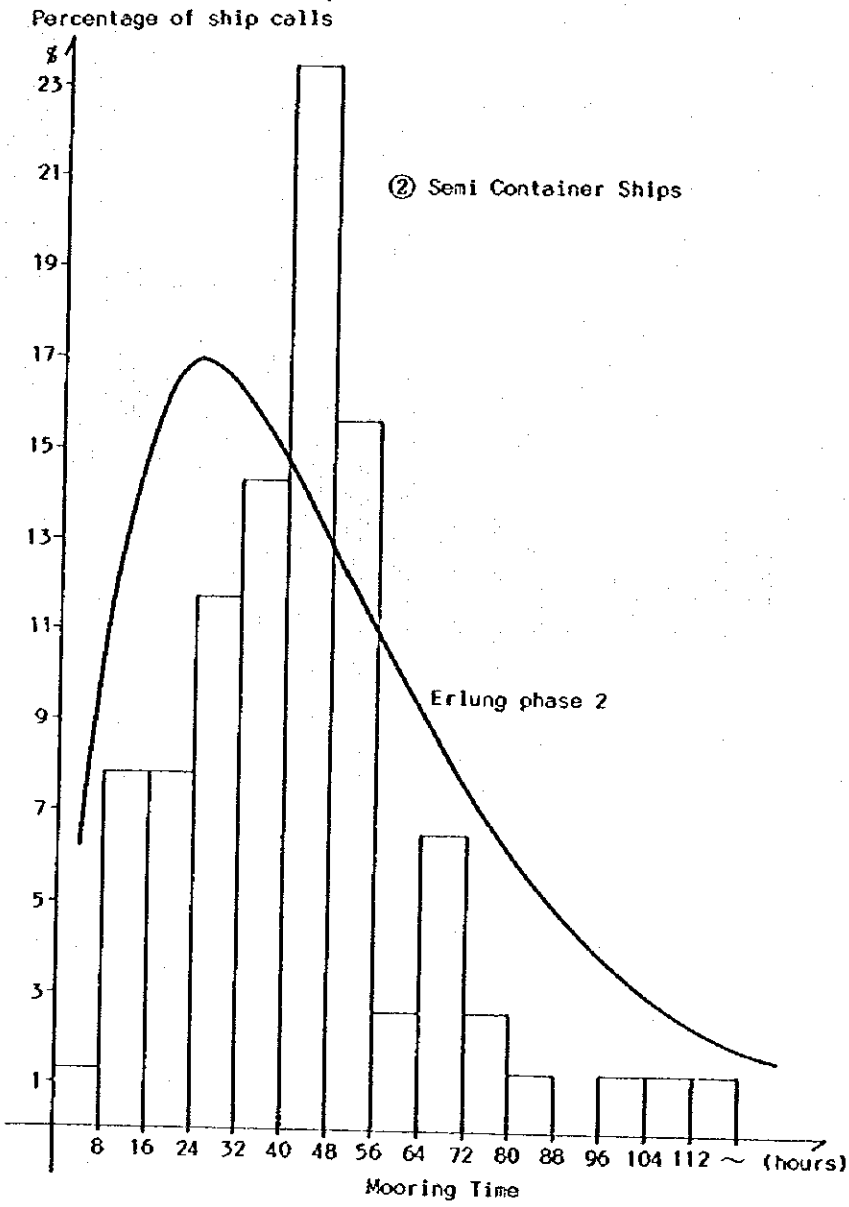
(thousand tons)

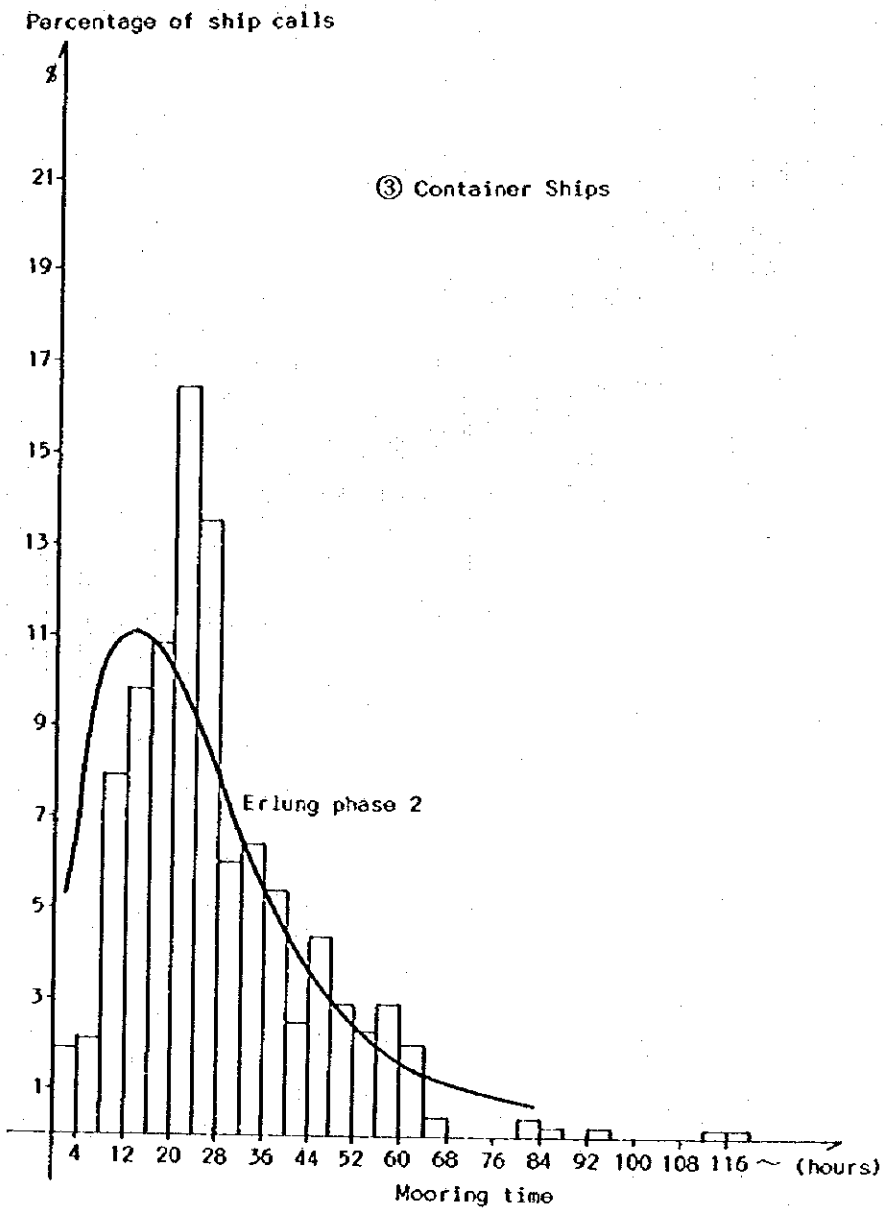
Ship Type	Loose Break bulk Cargo	Containerized Cargo	Bulk (dry) Cargo	Liquid Cargo	Total
Conventional Gen. Cargo Ships	231	0	262	0	493
Semi Container Ships	4	0	2	0	6
Container Ships	0	2	5	2	9
Ro-Ro Ships	0	0	0	0	0
Bulk Carriers	172	0	608	9	789
Tankers	1	2	59	162	224
Others	1	0	0	0	1
Total	409	4	936	173	1,522

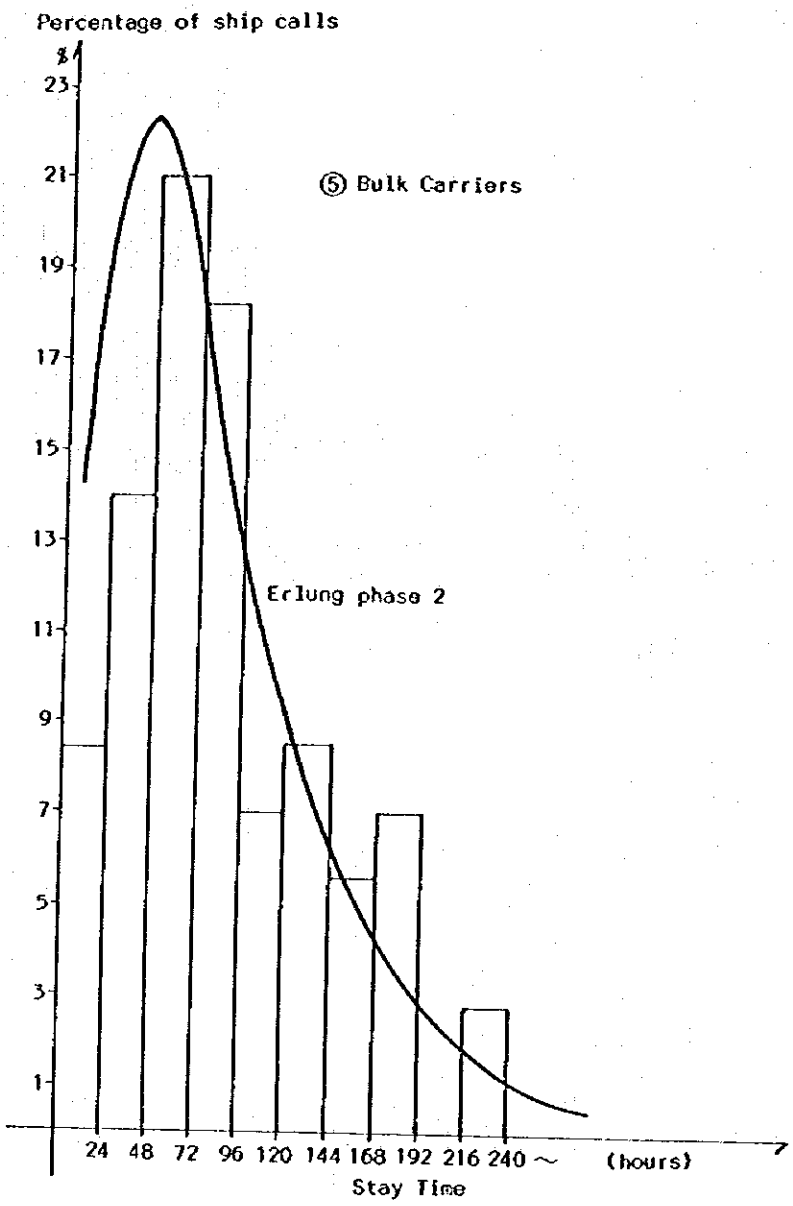
Source: Computer processed data

Appendix 7.3.1 Distribution of Mooring Time at the Piers of South Harbor (1985)




Percentage of ship calls
%
23
21
19
17
15
13
11
9
7
5
3
1
② Semi Container Ships
Erlung phase 2
8 16 24 32 40 48 56 64 72 80 88 96 104 112 ~ (hours)
Mooring Time


Percentage of ship calls
%
21
19
17
15
13
11
9
7
5
3
1
③ Container Ships
Erlung phase 2
4 12 20 28 36 44 52 60 68 76 84 92 100 108 116～ (hours)
Mooring time


Percentage of ship calls
%
23
21
19
17
15
13
11
9
7
5
3
1
⑤ Bulk Carriers
Erlung phase 2
24 48 72 96 120 144 168 192 216 240 ~
(hours)
Stay Time

Appendix 7.4.1 NFA Grain Vessel Movement at Manila Port

(All Grain Vessels)

DWT Class		No. of Calls	Average DWT	Average LOA	Average Volume	Avg. No. of Days of Stay
- 5,000	1983	0				
	1985	1 (2%)	3,903	105.6	1,500	2
5,001-10,000	1983	3 (15%)	7,435.93	122.7	6,627	14.1
	1985	4 (6%)	7,384.97	110.07	5,982	7.52
10,001-15,000	1983	9 (17%)	12,530	145.3	10,280	16.4
	1985	17 (27%)	12,961.71	146.57	10,161.98	13.18
15,001-20,000	1983	2 (4%)	17,014	137.70	13,250	19
	1985	12 (19%)	16,991.22	150.47	14,253.20	18.83
20,001-30,000	1983	25 (48%)	28,022	179.6	22,008	31.2
	1985	15 (23%)	26,112	180.0	16,543	23.9
20,001-30,000	1983	25 (48%)	28,022	179.6	22,008	31.2
	1985	15 (23%)	26,112	180.0	16,543	23.9
30,001-	1983	8 (15%)	37,874.25	185.9	25,945.21	37.25
	1985	15 (23%)	33,702.31	186.3	24,160	31.1
Total	1983	52	23,266	164.3	17,881	26.47
	1985	64	21,170	161.5	15,309	20.4

Average Handling Volume Per Day

(1983) 675 tons/day

(1985) 750 tons/day

Appendix 7.4.2 Historical Number and Size of Grain Carriers

Year, Month	Number of ships	Maximum			Average		
		DWT	LOA m	Draft m	DWT	LOA m	Draft m
1980 Oct	7	27,581	166	-	10,575	125	-
1981 Oct	3	29,680	181	9.14	15,329	172	8.23
1982 Oct	2	26,325	177	7.80	21,152	176	7.75
1983 Oct	32	35,674	186	9.10	13,236	118	7.0
Nov	18	35,792	197	9.70	18,459	152	7.0
Dec	23	54,250	180	9.40	18,419	134	7.0
1984 Oct	15	63,408	236	9.80	17,959	144	7.07
Nov	21	38,500	183	10.20	20,258	150	8.00
Dec	22	44,923	217	9.50	16,608	159	7.00

Source: PPA

Appendix 7.4.3 Share of Grain Shipments (IMPORTS) by Larger Vessels in Asian Countries

	Vessel size (DWT)	
	40,000 - 60,000	60,000 - 70,000
1981	16 %	12 %
1982	16	18
1983	18	24
1984	22	25

Source: World Bulk Trades 1983, 1984

Appendix 7.4.4 Barges and Tugboats Plying the Pasig River

Information pertaining to the barges and tugboats plying the South Harbor - Pasig River route was derived from the 1985 Port Operations Log Book of the Port Management Unit, PPA. Generally, only those vessels with South Harbor as their last port of call were picked out and summarized in the tables below.

The Pasig River is characterized by shallow draft due to siltation and the low clearances of bridges. Hence, the barges and tugboats using the Pasig River are small. On the whole, the average length-overall (LOA) of the barges is 37.8 meters, the average deadweight tonnage (DWT) is 703.5 tons and the average gross registered tonnage (GRT) is pegged at 390.6 tons. Likewise, the tugboats have an average LOA of 21.75 meters, average DWT of 975 tons and average GRT of 90.28 tons.

The total number of barges recorded on the South harbor - Pasig River route in 1985 is 231 while the number of tugboats is only 23.

Table 1 Characteristics of Barges Plying the Pasig River

	Range	No. of Barges
GRT (tons)	- 300	79
	301 - 500	108
	501 - 1000	42
	1001 - 1500	2
	1501 -	0
	Total	231
LOA (meters)	- 10	0
	11 - 20	2
	21 - 30	32
	31 - 40	147
	41 - 50	37
	51 -	13
	Total	231

AVERAGE	LOA (meters)	37.80
	DWT (tons)	703.54
	GRT (tons)	390.62

Table 2 Characteristics of Tugboats Plying the Pasig River

	Range	No. of Tugboats
GRT (tons)	- 300	21
	301 - 500	1
	501 - 1000	1
	Total	23
LOA (meters)	- 10	1
	11 - 20	17
	21 - 30	3
	31 - 40	0
	41 - 50	2
	Total	23

AVERAGE	LOA (meters)	21.75
	DWT (tons)	NA*
	GRT (tons)	90.28
	H.P.	430.29

*NA - not available

The source data of the above tables are attached as Table 3 and Table 4 for the barges and tugboats, respectively.

Table 3 Data on Barges Plying the South Harbor - Pasig River Route

Name of Vessel	DWT (tons)	GRT (tons)	LOA (meters)
1. BSC V	500	356.18	38.10
2. AYNA	450	345.20	37.20
3. COP-16	750	372.50	39.00
4. Blescon 102	750	373.90	39.00
5. Judy I	750	373.90	39.00
6. Blescon 101	750	373.90	39.00
7. Fencer	600	313.58	36.59
8. Dna. Marciana III	650	371.87	35.98
9. LLL - I	650	354.24	36.00
10. LC-713	700	486.68	36.58
11. LC-706	700	486.68	36.58
12. LC-502	500	399.56	36.58
13. Renato	950	585.95	45.12
14. J. Ronaldo	850	585.95	45.12
15. MSCI-111	1000	678.08	45.56
16. MSCI-999	400	269.08	35.50
17. MSCI-555	400	269.08	35.56
18. MSCI-444	400	269.08	35.56
19. MSCI-222	400	269.08	35.56
20. CLC-1004	NA	173.30	27.44
21. L-18	NA	325.98	54.15
22. Isloff 1414	750	344.76	38.10
23. Isloff 1004	1200	593.85	45.75
24. Isloff 202	700	431.36	36.58
25. Isloff 404	700	434.71	39.00
26. LC-709	700	486.68	36.58
27. LC-710	700	486.68	36.58
28. LC-716	700	486.68	36.58
29. RLC-1	600	358.65	42.38
30. RLC-2	600	386.85	41.16
31. RLC-3	600	358.65	42.38
32. RLC-4	600	386.85	41.16
33. RLC-5	600	386.65	41.16
34. RLC-7	300	233.13	32.01

Name of Vessel	DWT (tons)	GRT (tons)	LOA (meters)
35. RLC-8	300	233.13	32.01
36. RLC-9	300	233.13	32.01
37. Tausug	1250	528.17	45.73
38. Leamer	400	285.26	30.45
39. Kalinga	1250	528.17	45.73
40. Badjaw	1250	528.17	45.73
41. Luna Vill	400	179.38	27.30
42. Bobby Vill	400	179.38	27.30
43. Tagbanua	750	391.50	36.58
44. Isloff 101	700	431.38	36.58
45. Isloff 1001	1000	545.26	42.68
46. Isloff 303	700	370.80	26.40
47. LC 503	500	399.56	36.58
48. LC-501	500	399.56	36.58
49. LC-711	700	486.68	36.58
50. Isloff 1003	1200	593.85	45.70
51. Offshore 10001	1000	506.02	45.73
52. Offshore 7503	750	391.52	29.00
53. AG&P Lighter 1	220	135.12	24.41
54. AG&P Lighter 2	220	135.12	24.41
55. AG&P Lighter 5	NA	104.65	21.34
56. AG&P Lighter 6	230	128.40	24.39
57. Barge Pump 1	NA	160.65	24.39
58. AG&P Lighter 21	800	325.98	36.58
59. AG&P Lighter 11	210	131.58	77.08
60. AG&P Lighter 13	NA	45.00	14.04
61. Barge Pump 2	NA	33.00	15.24
62. Barge Kenram 40	300	233.50	35.52
63. AG&P Lighter 20	800	383.74	34.75
64. AG&P Lighter 19	350	176.61	30.49
65. AG&P Lighter 18	350	176.29	30.49
66. AG&P Lighter 17	440	202.61	31.70
67. AG&P Lighter 16	400	205.05	31.70
68. LC-700	700	486.60	36.58
69. LC-401	400	231.39	33.54
70. MSCI-666	400	269.08	35.56
71. MSCI-1010	400	269.08	35.56

Name of Vessel	DWT (tons)	GRT (tons)	LOA (meters
72. MSCI-777	400	269.08	35.56
73. MSCI-333	400	269.08	35.56
74. COP-12	750	446.33	38.11
75. Lanao	400	175.96	35.05
76. LC-712	700	486.68	36.58
77. Isloff 1515	750	344.76	37.58
78 LC-708	700	486.68	36.58
79. TM-622	2500	525.70	60.97
80 AVRLSTC 10	673.94	392.38	36.58
81 AVRLSTC 6	475.94	281.51	30.49
82. AVRLSTC 9	508.88	299.71	36.58
83 AVRLSTC 8	490.22	319.95	36.58
84. LC-707	NA	298.59	36.58
85. Jimmon	550	315.95	36.57
86. Helen 1	NA	237.84	31.71
87. Wayne 4	NA	304.15	33.63
88. MSCI-2121	NA	678.09	45.56
89. Lory 1	500	237.84	31.70
90. Offshore 7504	750	391.52	39.61
91. Offshore 7502	750	391.52	39.61
92. Don Pascual	NA	391.52	38.50
93. Isloff 1818	750	373.90	36.58
94. Paul	1200	670.14	45.75
95. Annaliza	1250	648.22	45.73
96. Elvina	1250	648.22	45.73
97. Barge Abra	400	181.16	30.19
98. Barge Fate	400	203.27	36.02
99. Judy II	600	285.86	36.58
100. Crisanta I	600	285.86	36.58
101. LC-703	750	564.05	36.58
102. Grace	750	368.30	36.58
103. Commodity	1200	652.42	46.72
104. AJ-101	350	237.71	31.40
105. AJ-103	350	237.71	31.40
106. BSC I	500	300.19	36.58
107. Isloff 1717	750	373.70	36.58

Name of Vessel	DWT (tons)	GRT (tons)	LOA (meters)
108. Balogo 3	750	363.81	40.24
109. AVRLSTC 3	325.70	206.89	26.82
110. AVRLSTC 5	475.94	206.01	26.82
111. AVRLSTC 4	NA	186.54	26.82
112. L-21	NA	288.60	33.54
113. FEUG N	NA	288.60	33.54
114. Isloff 1005	1200	670.14	45.73
115. LC-3000	3000	1487.25	75.00
116. LC-1019	1000	593.85	38.46
117. COP-8	750	372.50	38.00
118. Barge Burro	750	283.02	36.48
119. Resins Barge I	1250	632.28	46.04
120. Pacific Tow 2000	1500	710.77	48.80
121. Isloff 505	750	434.79	39.00
122. LC-550	550	292.57	34.47
123. LC-714	700	486.08	36.56
124. LC-1705	1700	944.56	53.69
125. CCI-777	NA	497.22	41.15
126. LC-715	700	486.68	36.58
127. Felia M	NA	288.66	23.54
128. Mely	900	525.25	43.90
129. Isloff 707	700	431.38	36.58
130. AJ-105	400	280.52	31.70
131. Barge Nasugbu	650	234.68	33.53
132. Isloff 808	750	431.30	36.58
133. Isloff 606	700	434.71	39.00
134. Carbide	NA	350.66	36.28
135. DLI-650	650	328.01	33.54
136. LC-1706	1700	944.56	53.69
137. CCI-888	750	272.36	40.24
138. Barge Alma	400	296.63	30.49
139. Barge Bataan	400	259.29	30.48
140. Barge Lilih	800	364.39	37.80
141. LC-704	700	486.68	36.58
142. BSC 9	1200	533.95	45.72

Name of Vessel	DWT (tons)	GRT (tons)	LOA (meters)
143. Ma. Rosa	NA	249.92	34.31
144. MSCI-888	400	269.08	35.56
145. Susie	700	486.68	36.58
146. BSC II	500	399.56	32.53
147. Nasugbu 101	750	391.52	39.61
148. Barge Leamer 7901	350	206.85	29.36
149. Barge Baby Vill 843	400	185.69	30.64
150. Barge Kenram II	NA	163.12	30.40
151. MCP IV	500	265.94	30.49
152. MCP I	500	322.69	33.54
153. LCL-705	700	558.65	33.53
154. LC-21	700	486.68	36.58
155. LCC-703	700	434.71	39.00
156. Nikki	1200	463.36	38.00
157. Isloff 111	700	434.71	39.00
158. Isloff 1212	700	434.71	39.00
159. BSC 4	500	334.35	39.00
160. Barge Charlest	NA	397.35	36.13
161. Balogo II	NA	486.08	36.56
162. RLC-6	600	386.65	40.54
163. Eduardo	350	170.21	34.75
164. S 852	850	386.50	39.00
165. UNL 107	400	251.87	34.85
166. S851	850	386.50	39.00
167. Arlene	NA	173.30	23.54
168. L-16	NA	205.05	23.54
169. LF-2601	NA	1181.91	65.54
170. Raymond Glenn	1200	528.61	38.00
171. Lilia	800	520.05	36.58
172. Dona Pacita	NA	363.24	36.58
173. Barge Ria	750	363.81	36.58
174. Barge Masuda	750	359.26	36.58
175. Barge Guillermo	600	300.88	36.58
176. CBCI-707	750	362.83	36.58
177. Ketransco 7504	800	364.39	37.80
178. Ketransco 7503	800	364.39	37.80

Name of Vessel	DWT (tons)	GRT (tons)	LOA (meters)
179. Ketransco 7501	800	364.39	37.80
180. Sheri Ann	800	364.39	37.80
181. MTKK - Meg	NA	249.19	39.63
182. Norrea	NA	299.14	30.49
183. Barge HL	NA	597.77	36.58
184. Jemma	NA	406.30	40.24
185. Nassa	500	320.50	36.58
186. Isloff 304	700	434.71	39.00
187. Dona Salud	600	328.70	36.58
188. Balogo VI	NA	310.66	36.58
189. Isloff 705	NA	558.65	33.53
190. LB-503	500	328.75	36.58
191. Eduardo Jr.	250	192.34	24.39
192. Malolita	300	233.14	32.01
193. LCT Tristar	700	373.90	39.00
194. DLI 1100	450	285.26	30.45
195. Magdalene	700	486.68	36.58
196. F10	400	228.78	31.24
197. COP 10	750	446.33	38.11
198. COP 4	750	446.33	38.11
199. COP 14	750	446.33	38.11
200. COP 2	750	372.50	36.00
201. Maranaw	750	593.85	45.73
202. Marwin	650	272.36	40.24
203. Joni	1000	612.19	44.21
204. Jenny III	700	373.50	36.59
205. H-2	1200	597.77	36.59
206. CBCI 404	650	272.36	40.24
207. JCS I	750	364.39	37.80
208. Charlie	500	288.66	33.54
209. Barge Lunavill	170.28	185.69	30.64
210. Barge Common 2000	1500	652.47	48.86
211. CBCI 606	600	272.36	40.24
212. RLC 6	600	386.15	41.15
213. CBCI 1001	NA	362.83	36.58
214. LCC 700	700	564.05	33.53

Name of Vessel	DWT (tons)	GRT (tons)	LOA (meters)
215. Commodity 100	700	376.54	38.41
216. Lorna	400	194.15	32.93
217. Antique	400	224.00	31.30
218. Nasugbu 102	600	386.65	40.55
219. LVM 104	400	263.15	35.55
220. CBCI 10001	NA	833.61	56.40
221. AG&P Lighter 3	200	138.34	24.39
222. AG&P Lighter 14	NA	509.52	45.12
223. Barge FIA	NA	363.81	40.24
224. S 2006	2000	978.63	60.98
225. S 2010	2000	978.63	60.98
226. S 2008	2000	978.63	60.98
227. Luzinco 122	500	378.00	46.00
228. Noah's Ark 7	400	352.28	40.13
229. B R 1978	500	650.64	46.00
230. Noah's Ark 10	500	660.00	40.00
231. Nancy	1200	549.36	59.50

Source: Port Operations Log, 1985 (PMU-PPA)

Table 4 Data on Tugboats Plying the South Harbor - Pasig River Route

	Name of Vessel	GRT (tons)	LOA (meters)	H.P.
1.	Alto	42.74	21.45	500
2.	Duro	29.63	12.45	250
3.	Macho	32.78	15.01	250
4.	Ayalit	48.47	17.99	NA
5.	Malolita	13.89	15.22	NA
6.	Bruto	49.26	18.22	500
7.	Jasaan	27.31	14.93	NA
8.	Napvill	48.47	17.51	NA
9.	Isloff Gusto	49.26	18.22	500
10.	Isloff Bueno	43.00	21.22	900
11.	Isloff Bravo	32.78	15.01	250
12.	Isloff Listo	30.63	12.70	180
13.	Isloff Vivo	27.00	14.79	250
14.	Poro III	201.26	28.66	1200
15.	Hauler	31.56	16.00	480
16.	Erector	28.27	13.72	180
17.	Builder	10.28	10.57	450
18.	Helper	18.14	14.20	225
19.	Poro II	16.65	10.11	450
20.	Messenger	4.30	7.52	225
21.	Batangas	30.06	13.79	525
22.	Barge 15	469.46	34.75	NA
23.	Barge 136	659.56	82.93	NA

Source: Port Operations Log, 1985 (PMU-PPA)
Island Integrated Offshore Service Inc.
Atlantic Gulf & Pacific Corp.

Appendix 7.5.1 Estimation of the number of container units handled at the Port of Manila

1) Average cargo volume per TEU

The future average cargo volume per TEU for the import cargo which is handled at Manila is estimated based on the historical trend as shown in Table 1.

For export cargo, the future average cargo volume per TEU is estimated based on the correlation between the ratio of per TEU export volume for imports and the container volume balance rate.

The estimated average cargo volume per TEU is as follows:

(tons/TEU)

(Year)	Import	Export
1985	11.1	8.2
1990	12.0	8.5
1995	13.0	8.5
2000	13.5	9.0
2005	14.0	9.0

Table 1 Average Volume per TEU and Empty Container Rate at Manila

Year	Avg. volume per TEU		Empty container ratio			Container volume balance rate (%)
	Imp. (ton)	Exp (ton)	Imp. (%)	Exp. (%)	Total (%)	
1978	11.2	7.1	5.4	32.1	21.6	38.1
1979	11.9	7.6	5.6	38.3	25.7	48.3
1980	10.4	6.9	8.4	32.1	23.8	41.5
1981	10.9	6.2	9.4	24.6	19.6	42.4
1982	11.1	6.6	7.7	35.4	25.8	47.3
1983	11.8	6.4	5.4	35.7	24.9	49.6
1984	11.1	7.1	17.4	17.7	21.3	31.0
1985	11.1	8.2	17.3	15.9	20.0	21.6

Source: PPA

Note:(1) The container volume balance rate is computed as:
(import containerized cargo volume - export containerized cargo volume)/total containerized cargo volume.

(2) Avg. volume per TEU is computed only considering loaded containers

Table 2 Container volume balance rate and per TEU export/import volume rate

Year	Container volume balance rate (%)	Per TEU exp. volume/ per TEU imp. volume rate (%)
(Actual)		
1978	38.1	63.4
1979	48.3	63.9
1980	41.5	66.3
1981	42.4	56.9
1982	47.3	59.5
1983	49.6	54.2
1984	31.0	60.2
1985	21.6	73.9
(Estimation)		
1990	22	67
1995	27	64
2000	27	64
2005	29	63

Note: Estimated rates are computed based on the future volume of containerized cargo forecast in Chapter 6.

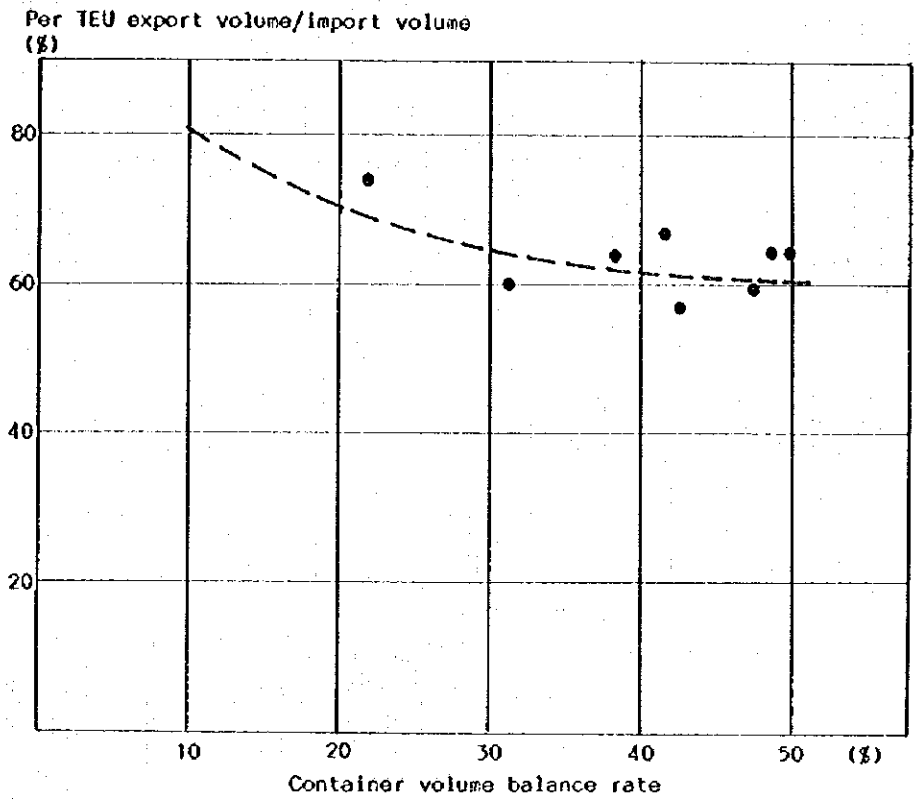


Fig. 1 Relation between the Ratio of Per TEU Export Volume to Import Volume and the Container Volume Balance Rate

2) Estimated number of loaded containers

The number of loaded containers is estimated using the above average cargo volume per TEU.

	Container cargo volume ('000 tons)		Estimated number of TEUs ('000 TEUs)		
	Imp.	Exp.	Imp.	Exp.	Total
1990					
S.H.	329	199	27.4	23.4	50.8
M.I.C.T.	1,315	798	109.6	93.9	203.5
1995					
S.H.	343	189	26.4	22.2	48.6
M.I.C.T.	1,942	1,074	149.4	126.4	275.8
2000					
S.H.	382	210	28.3	23.3	51.6
M.I.C.T.	2,254	1,404	167.0	156.0	323.0
2005					
S.H.	510	268	36.4	29.8	66.2
M.I.C.T.	3,410	1,796	243.6	199.6	443.2

3) Empty container rate

The empty container rate is estimated based on the container volume balance rate. The historical trend is shown in Table 1. The relation between the empty container rate and the container volume balance rate is presented in Fig. 2.

The estimated empty container rate is as follows:

	1990	1995	2000	2005
Empty container rate (%)	20	21	21	22

Empty container rate = No. of empty containers/No. of loaded containers

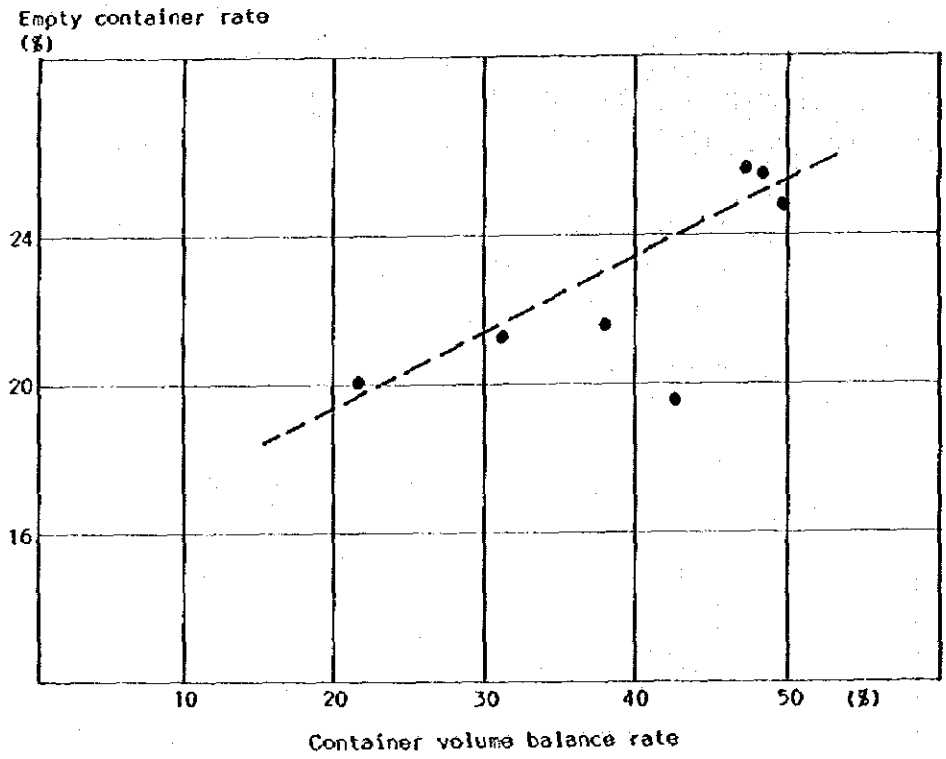


Fig. 2 Relation between the Empty Container Rate and the Container Volume Balance Rate

4) Container share by size

The container share by size varies by route as shown as Table 3, the share of 20 foot containers at the Port of Kobe.

However, the share of 20 foot containers handled at Manila has been decreasing since 1983, as shown in Table 4.

The future container share by size is estimated based on this trend.

Estimated container share by size

Year	20'	40'	Conversion factor (TEU/unit)
1985	62.4%	37.6%	
1990	60	40	1.4
1995	55	45	1.45
2000	50	50	1.5
2005	45	55	1.55

Conversion rate (TEU/unit)

20 foot containers	1 TEU
40 foot containers	2 TEUs

Table 3 Share of 20 foot containers handled at the Port of Kobe

	1978	1982	1984
Total World	53.3%	57.5%	54.3%
Pacific Southeast	33.1	29.0	27.7
U.S. East Coast	43.6	51.5	45.0
Europe	73.0	68.7	65.0
Au/Nz	98.0	93.5	94.5
Singapore/Malaysia		82.2	76.3
Philippines		76.3	77.0
Korea	47.1	47.4	44.0

Table 4 Container share by size at Manila

(%)

Year	20'	35'	40'
1979	55.5	9.1	35.4
1980	54.9	8.2	36.9
1981	59.8	5.9	34.3
1982	63.4	6.4	30.2
1983	66.1	5.0	28.7
1984	63.2	2.0	34.6
1985	62.4	0.8	36.7

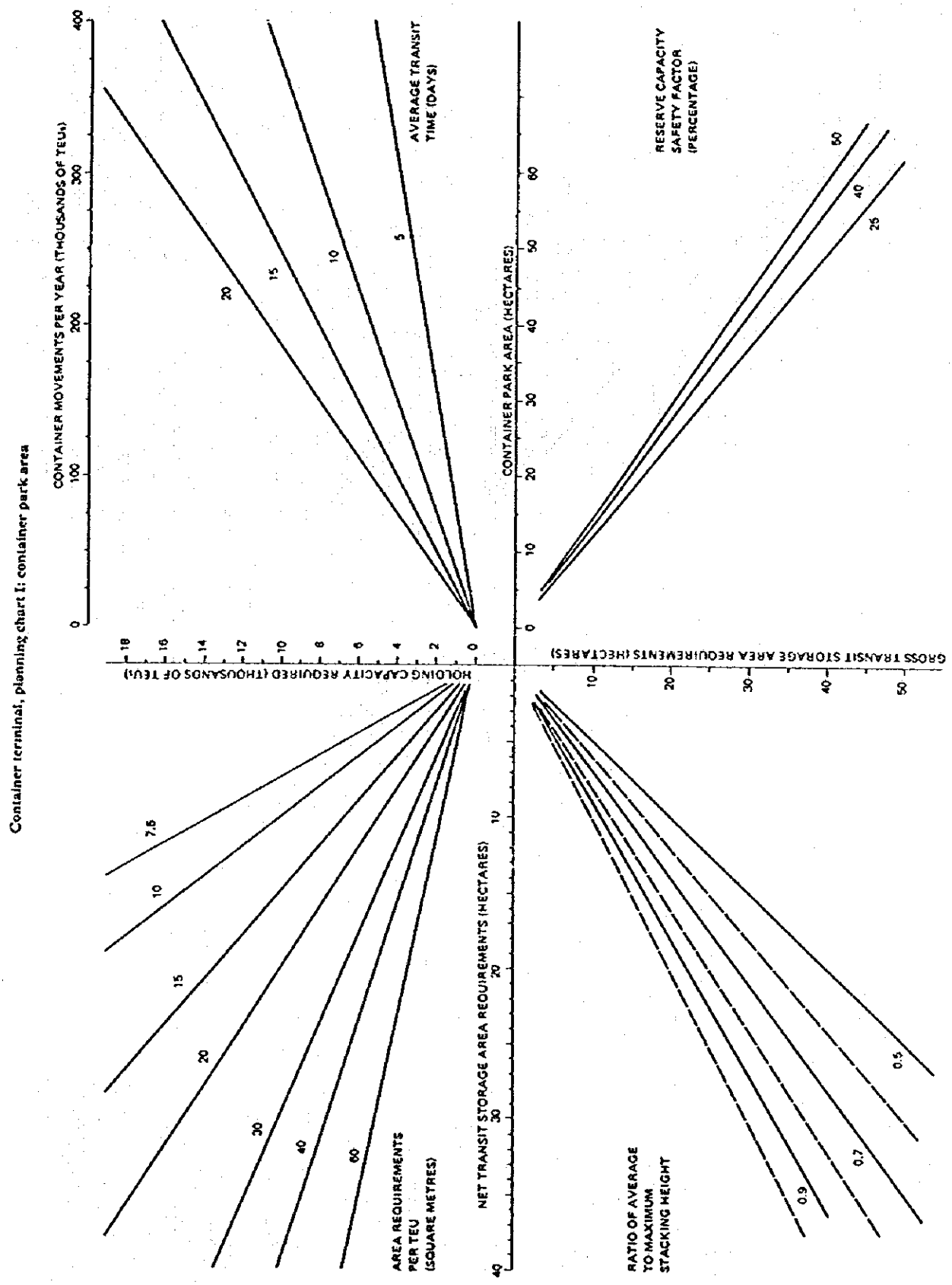
5) Estimation of the total number of container units

Based on the estimation of the number of loaded containers, the empty container rate and the conversion factor of total containers, the total number of container units which will be handled at the Port of Manila is estimated as follows:

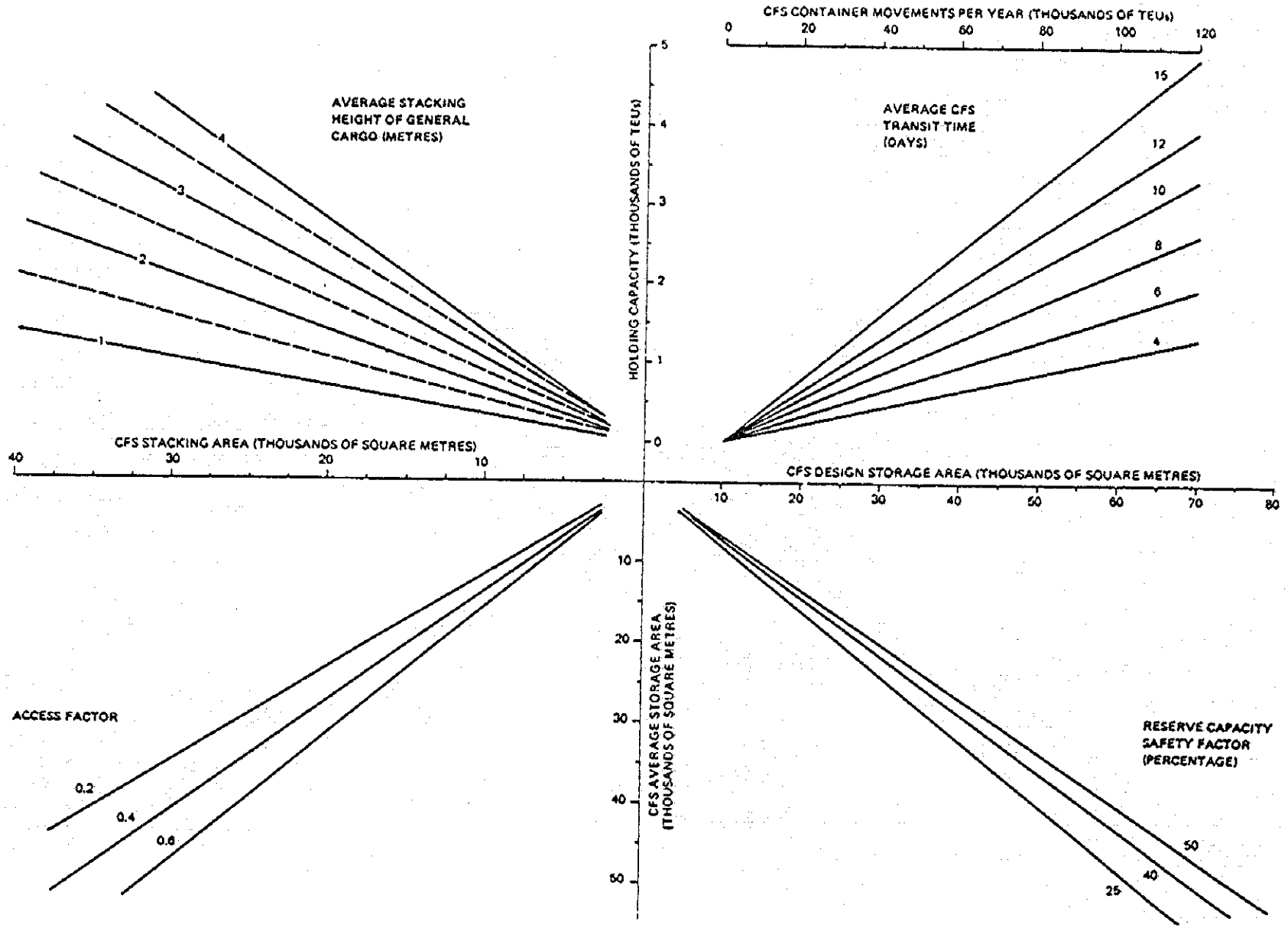
Estimated number of container units

Year	No. of loaded containers ('000 TEU)	No. of empty containers ('000 TEU)	No. of total containers ('000 TEU)	No. of total container units ('000 units)
1990				
S.H.	50.8	10.2	61.0	43.6
M.I.C.T.	203.5	40.7	244.2	174.4
1995				
S.H.	48.6	10.2	58.8	40.6
M.I.C.T.	275.8	57.9	333.7	230.5
2000				
S.H.	51.6	10.8	62.4	41.6
M.I.C.T.	323.0	67.8	390.8	230.1
2005				
S.H.	66.2	14.6	80.8	52.1
M.I.C.T.	443.2	97.5	540.7	348.8

Appendix 7.5.2 UNCTAD Container terminal Planning Chart



Container terminal, planning chart II: container freight station (CFS) area



Appendix 7.6.1 Estimation of the Average Mooring Time by Ship Type

1) The average mooring time per ship (Tm) is estimated using the following formula:

$$Tm = \frac{Vs}{Qs \times Ro} + Tc$$

where Vs: average handling volume per ship
Qs: average handling performance per ship
Ro: real operating time rate
Tc: time necessary for purposes other than cargo handling

2) Time necessary for purposes other than cargo handling is presumed to be 5 hours/ship for semi-container and self-sustaining container ships and 6 hours/ship for other ships.
This time is used for preparation for berthing/deberthing, obtaining clearance for loading/discharging, etc.

3) The real operating time rate is estimated as shown in Table 10.3.1 of Section 10.3.2 in Chapter 7 considering improved operation and communication systems, improved physical conditions, etc.

4) The average handling volume per ship hour for loose cargo is used to estimate the average mooring time of conventional ships. The conventional ships actually handle a small quantity of containers, around 10% of the total handling volume. However, this volume is negligible.

5) The average mooring time of semi-container ships is estimated based on the following assumptions:

a) The composition of cargos by packing type which is handled by semi-container ships is estimated as follows:

Packing type	Share (%)	Average handling volume (tons)	
		10,000 DWT or less	over 10,000 DWT
Loose cargo	30	540	720
Containerized cargo	70	1,260	1,680

b) The required time for cargo handling is estimated as the total of the required loose cargo handling time plus the required container handling time.

c) The required time for each type of cargo handling is estimated using respective handling performance rates.

6) The average volume of containerized cargo per container unit is estimated as follows:

Year	Unit weight (t/unit)
1990	12.1
1995	13.2
2000	14.2
2005	15.0

The estimation of the number of container units handled at the Port of Manila is shown in Appendix 7.5.1.

7) The estimated average mooring time by ship type is presented in Table 1.

Table 1 Estimated Average Mooring Time by ship type

Ship Type Ship Class	Avg. handling volume/ship (tons)	Handling capacity (t/ship gross hr)	Average mooring time/ship (hours)	Remarks
(At Piers)				
Conventional				
- 10,000	1,100	43 (41)	32 (33)	
10,000 -	4,600	43 (41)	113 (118)	
Semi Container *2)				
- 10,000	1,800	loose 43	23 (24)	
(				
10,001 -	2,400	container 15 unit	29 (30)	
Container (self-sus.)				
- 10,000	2,400	15 unit	15 (16)	
10,000 -	2,200	15 unit	14 (15)	
Bulk (except grain) - 10,000	4,400	70	69	
10,000 -	12,600	70	186	
Iron & steel				
- 10,000	1,800	70	32	
10,001 -	5,500	70	85	
Lumber				
10,001 -	3,000	50	66	
Fertilizer (bagged)				
- 10,000	4,400	70 (67)	69 (72)	
10,001 -	8,800	70 (67)	132 (137)	
Grain				
10,001 -	50,000	600	106	Master Plan Case 1
	20,000	800	46	Master Plan Case 2
(At Anchorage)			(days)	
Conventional *3)				
- 10,000	2,000	loose 21	2.8	
10,001 -	10,800	bulk 39	13.8	
Bulk (except grain) - 10,000	4,400	39	5.0	
10,001 -	12,600	39	13.8	
Grain				
Wheat	25,500	480	2.5	
Soybean meal	22,500	480	2.2	
Tanker				
- 10,000	1,300	700 t/day	2.0	
10,001 -	2,000	700 t/day	3.0	

Note: 1) Figures without parentheses show the mooring time in the year 2005 Figures in parentheses show the mooring time in the year 1995 estimated with considering the difference of physical conditions of Pier-9 and the difference of loaded cargo volume per TEU.

*2) The average mooring time is computed as the required handling time for loose cargo plus the required handling time for containers.

*3) The average mooring time is computed as the required handling time for loose cargo plus the required handling time for bulk cargo.

Appendix 7.8.1 Comparison of Land Use

Facilities	Manila S.H.	Yokohama Honmoku	Yokohama Yamashita	Kobe Shinko	Kobe Maya	Kobe Hyogo	China Qing Dao	Remarks
	%	%	%	%	%	%	%	
Warehouses	12.7	14.1	14.9	17.2	11.8	24.9	6.5	
Freight handling areas	35.0	22.2	18.1	16.5	38.5	16.7	27.6	Sheds and open storage yards
Aprons	1.3	10.6	17.4	11.2	12.9	10.1		
Roads	22.0	35.2	20.6	19.7	30.7	30.7		
Others	29.0	17.9	15.4	25.4	6.1	18.0		
Total	100.0	100.0	100.0	100.0	100.0	100.0		
All Areas (ha)	111	160	46	84.9	73.8	30.6		

Appendix 7.9.1 Survey Results

1.0 SURVEY RESULTS

The results of the two (2) surveys are consolidated and summarized in the following sections.

1.1 Traffic Count Survey

1.1.1 Traffic Flow at Intersections

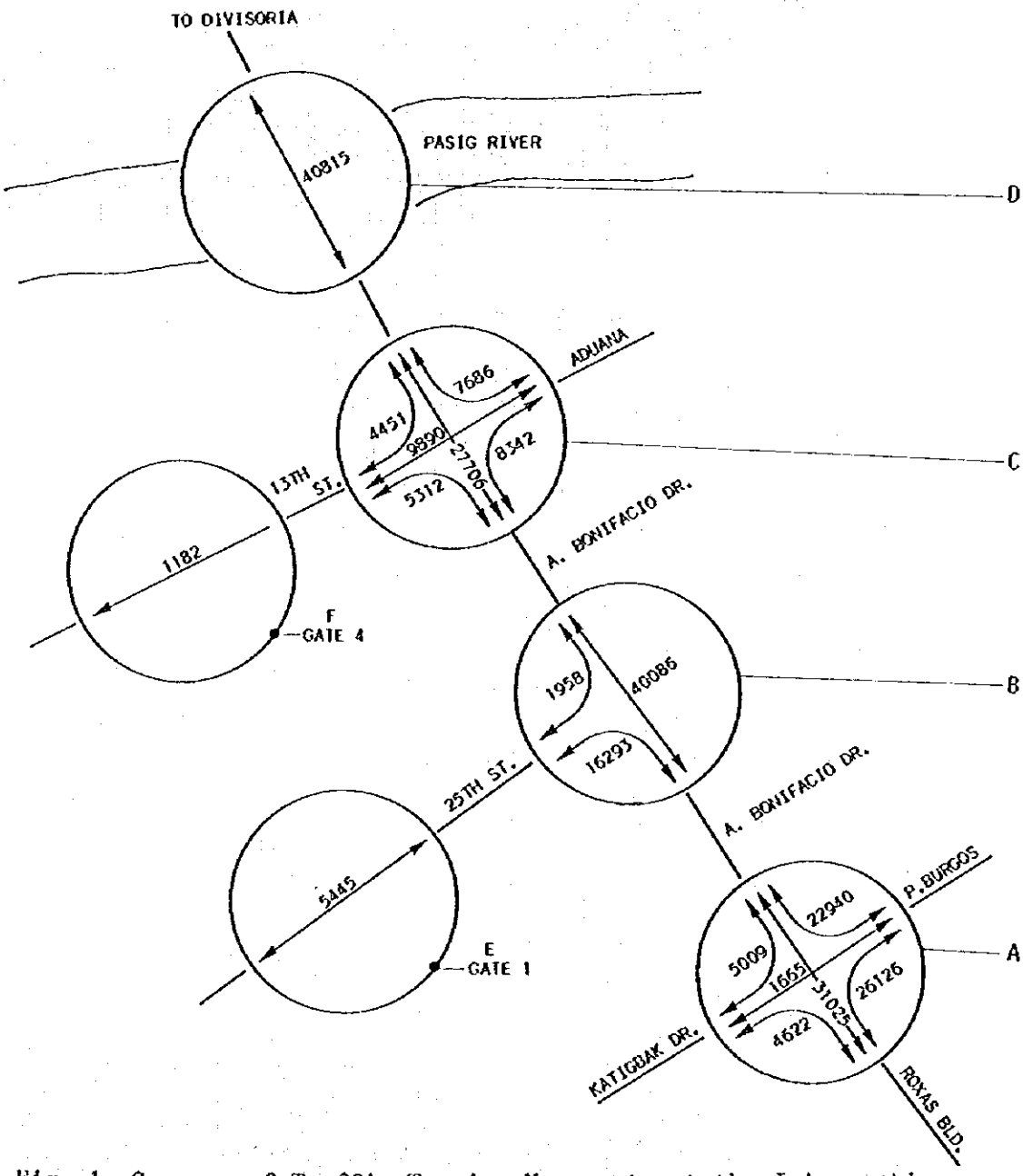


Fig. 1 Summary of Traffic Turning Movements at the Intersections (24 hour)

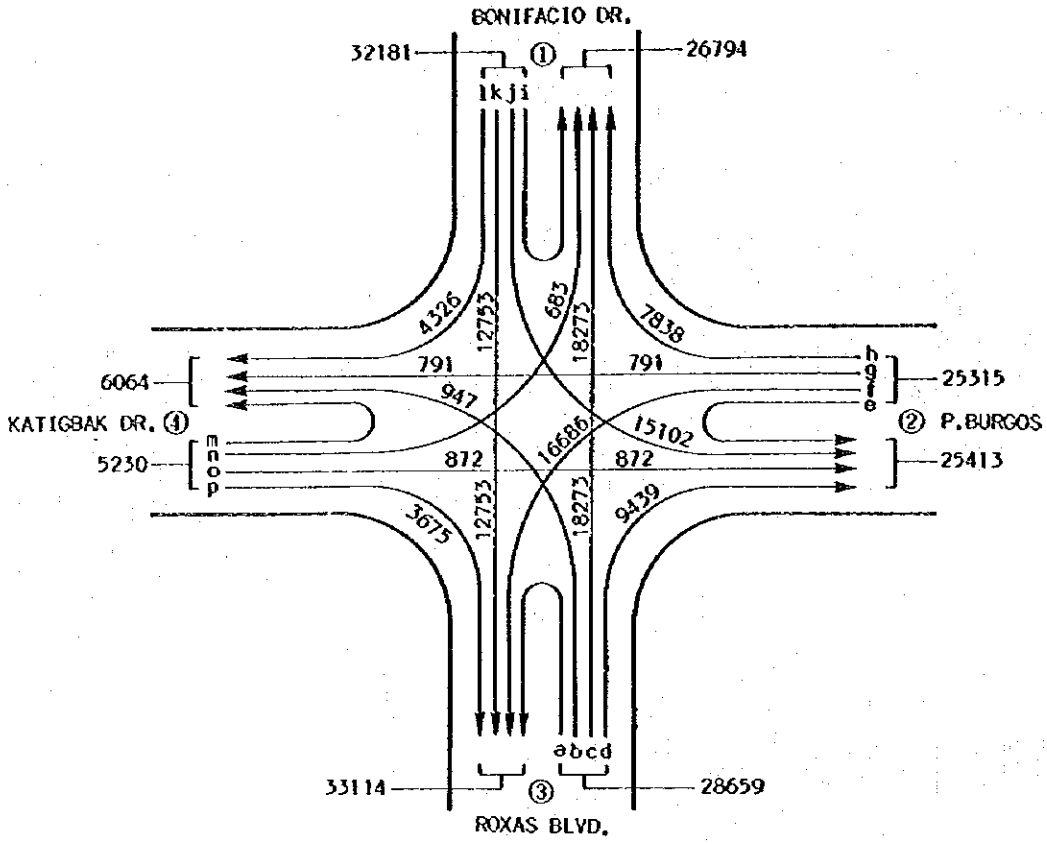


Figure a TRAFFIC FLOW AT INTERSECTION A

Table a

Directional Counts at:

Station (A): Katigbak/Roxas

Direction		Small	Large	24-HR Total
a	(3→3)U	0	0	0
b	(3→4)L	915	33	947
c	(3→1)T	17735	537	18273
d	(3→2)R	9176	264	9439
e	(2→2)U	0	0	0
f	(2→3)L	16359	327	16686
g	(2→4)T	764	27	791
h	(2→1)R	5587	2251	7838
i	(1→1)U	0	0	0
j	(1→2)L	12952	2149	15102
k	(1→3)T	12301	452	12753
l	(1→4)R	4207	119	4326
m	(4→4)U	0	0	0
n	(4→1)L	668	15	683
o	(4→2)T	852	20	872
p	(4→3)R	3594	82	3675

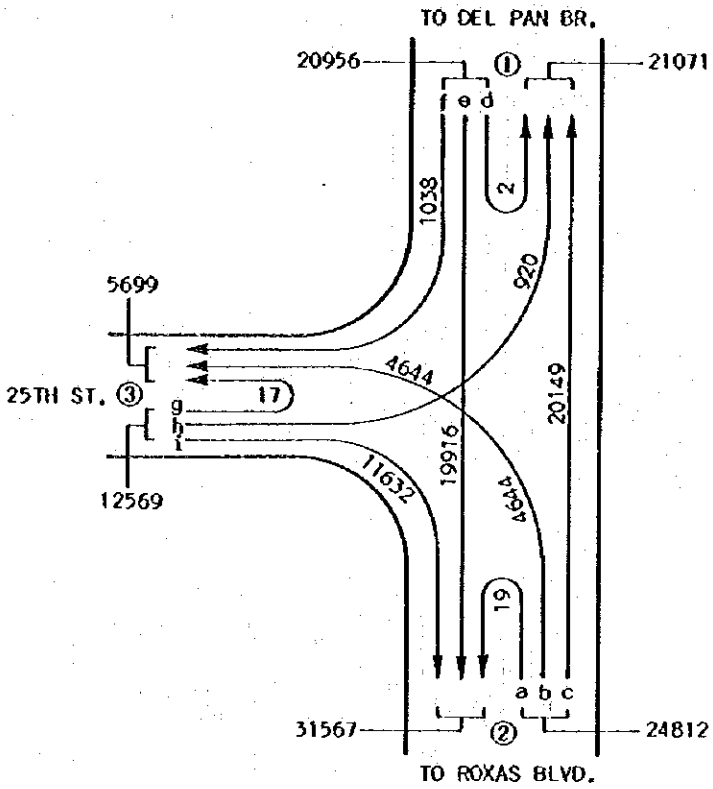


Figure b TRAFFIC FLOW AT INTERSECTION B

Table 6

Directional Counts at:

Station (B): 25th St/A. Bonifatio

Direction	Small	Large	24-HR Total
a (2→2)U	17	0	19
b (2→3)L	4178	446	4644
c (2→1)T	17598	2551	20149
d (1→1)U	2	0	2
e (1→2)T	17198	2718	19916
f (1→3)R	938	100	1038
g (3→3)U	17	0	17
h (3→1)L	580	340	920
i (3→2)R	11090	542	11632

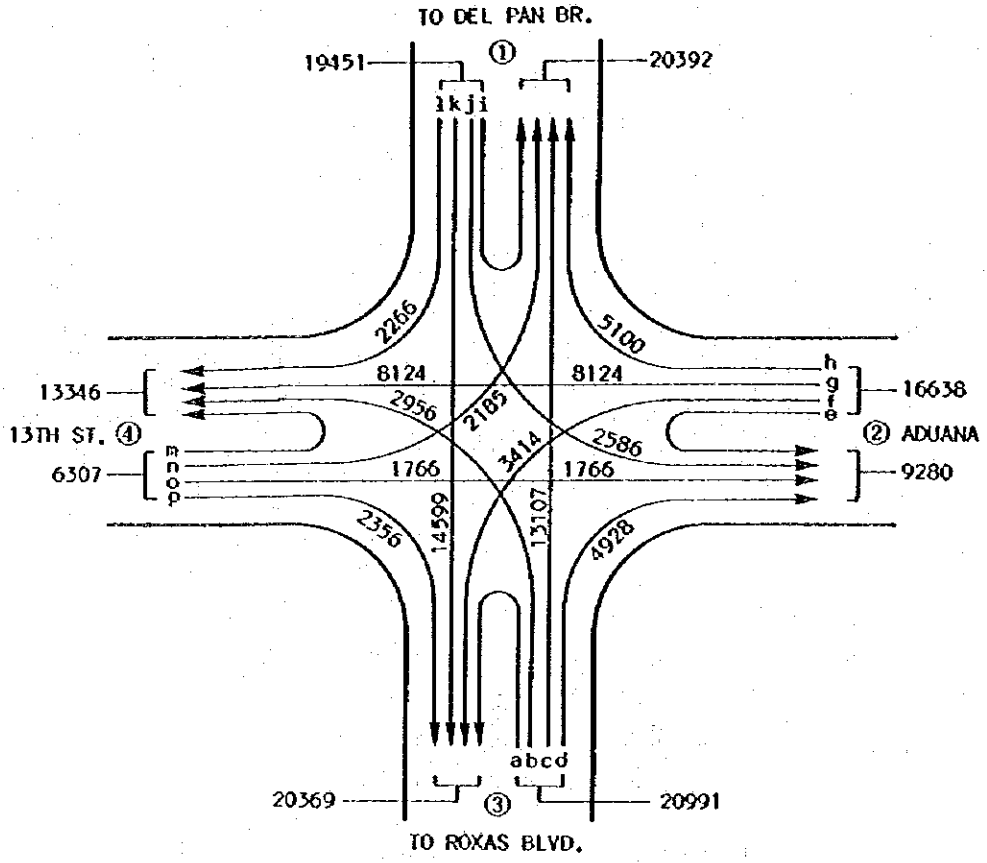


Figure c TRAFFIC FLOW AT INTERSECTION C

Table c

Directional Counts at:

Station (C): Bonifacio Rotonda

Direction	Small	Large	24-HR Total
a (3→3)U	0	0	0
b (3→4)L	2629	327	2956
c (3→1)T	10878	2229	13107
d (3→2)R	4691	238	4928
e (2→2)U	0	0	0
f (2→3)L	3275	139	3414
g (2→4)T	7999	124	8124
h (2→1)R	4851	249	5100
i (1→1)U	0	0	0
j (1→2)L	2274	312	2586
k (1→3)T	13252	1347	14599
l (1→4)R	1225	1040	2266
m (4→4)U	0	0	0
n (4→1)L	2137	47	2185
o (4→2)T	1604	162	1766
p (4→3)R	2286	70	2356

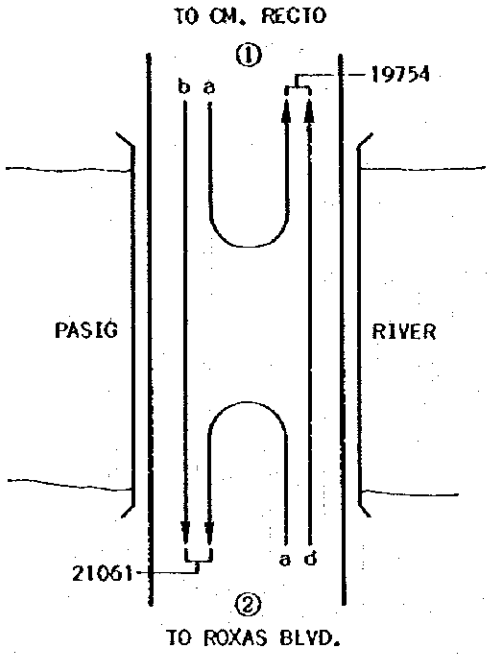


Figure d TRAFFIC FLOW AT INTERSECTION D

Table d

Directional Counts at:

Station (D): Roxas Bridge

Direction	Small	Large	24-HR Total
a (1→1)U	0	0	0
b (1→2)T	17416	3645	21061
c (2→2)U	0	0	0
d (2→1)T	16359	3395	19754

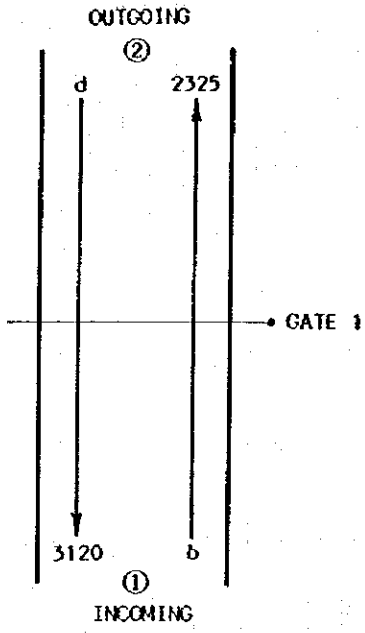


Figure e TRAFFIC FLOW AT INTERSECTION E

Table e

Directional Counts at:

Station (E): Gate 1 (25th Street)

Direction	Small	Large	24-HR Total
a (1→1)U	0	0	0
b (1→2)T	2113	212	2325
c (2→2)U	0	0	0
d (2→1)T	2120	1000	3120

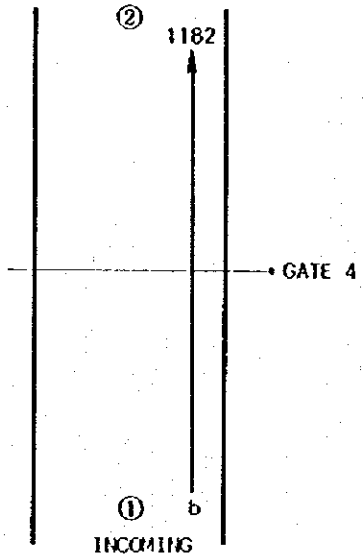


Figure f TRAFFIC COUNT AT INTERSECTION F

Table f

Directional Counts at:

Station (F): Gate 4 (13th Street)

Direction	Small	Large	24-HR Total
a (1→1)U	0	0	0
b (1→2)T	354	828	1182

2.0 Traffic Volume at Major Road Sections

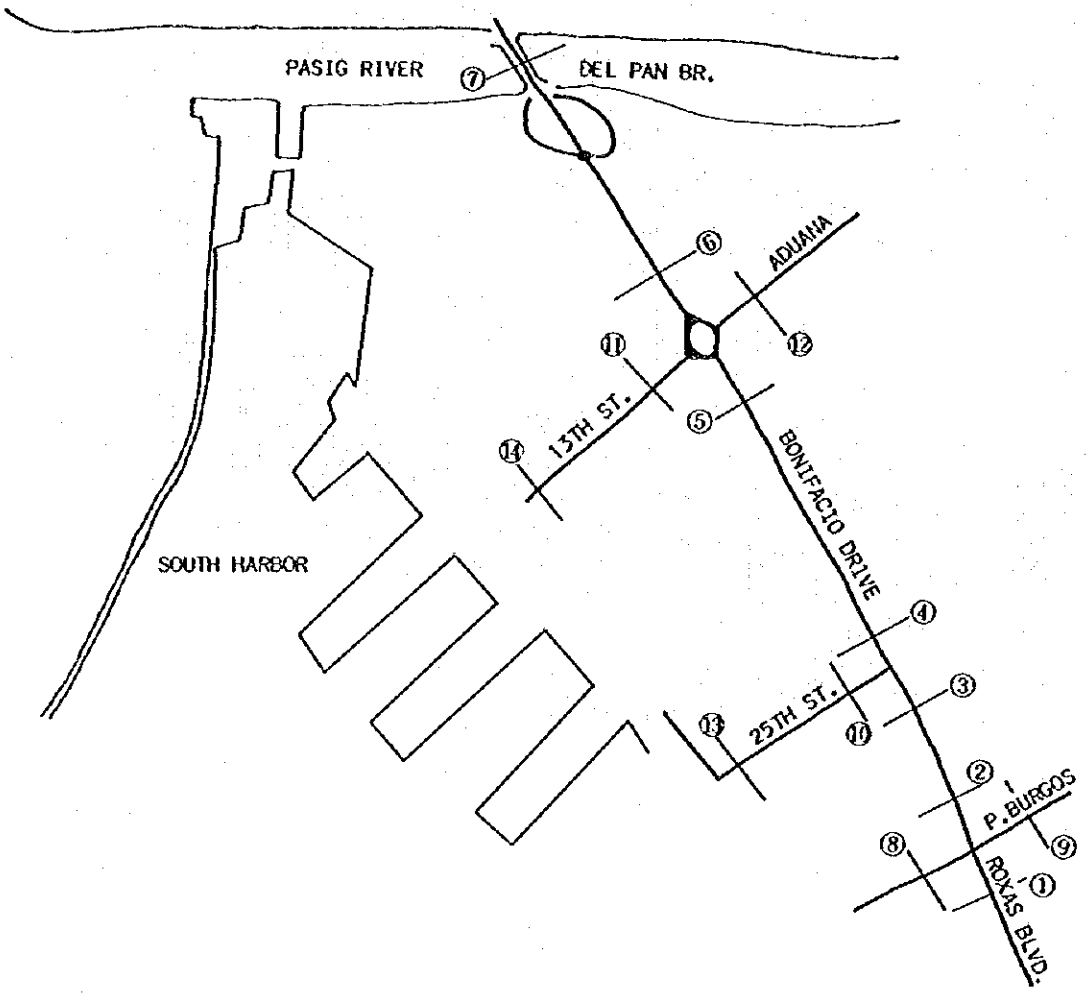


Fig. 2 Location of Major Road Sections

Table 1
Manila South Port Rehabilitation Project
Traffic Count Survey
Current Traffic Volume and Characteristics at Major Road Sections

Sec No	Section Name	-- Traf Vol (16/10Hrs) --			24 HRS[1] Total	Peak Hour		
		Small Vehicles	Large Vehicles	Total Vehicles		Volume	Time	Traffic Ratio
1	Roxas Blvd	55118	1555	56673	61774	5152	14-15	8.34
2	A. Bonifacio Drive	49038	5068	54106	58976	4956	14-15	8.40
3	A. Bonifacio Drive	44934	5630	50564	56379	4125	9-10	7.32
4	A. Bonifacio Drive	32572	5121	37693	42028	3092	14-15	7.36
5	A. Bonifacio Drive	27395	3220	30615	41361	3404	17-18	8.23
6	A. Bonifacio Drive	25624	3867	29491	39842	3200	15-16	8.03
7	Roxas Bridge (Del Pan)	30157	6286	36442	40815	3115	10-11	7.63
8	Katigbak Drive	10092	271	10363	11296	1109	17-18	9.82
9	P. Burgos Street	41918	4622	46540	50729	3983	14-15	7.85
10	25th Street	15084	1299	16383	18267	1432	9-10	7.84
11	13th Street	13235	1311	14546	19652	1623	10-11	8.26
12	Aduana	18278	906	19184	25918	2161	8- 9	8.34
13	Gate 1 (25th St.)	3133	898	4031	5445	517	15-16	9.49
14	Gate 4 (13th St.)	262	613	875	1182	146	14-15	12.35

1/ Expansion factors (EF) utilized in converting traffic counts from 16 hours or 10 hours to 24 hours were obtained from MPWH TEAM They are as follows:

Section No.	Survey Date	Survey Duration	EF
1	Jul 15	16 hours	1.090
2	Jul 15	16 hours	1.090
3	Jul 16	16 hours	1.115
4	Jul 16	16 hours	1.115
5	Jul 25	10 hours	1.351
6	Jul 25	10 hours	1.351
7	Jul 17 & 18	16 hours	1.120
8	Jul 15	16 hours	1.090
9	Jul 15	16 hours	1.090
10	Jul 16	16 hours	1.115
11	Jul 25	10 hours	1.351
12	Jul 25	10 hours	1.351
13	Jul 16 & 17	10 hours	1.351
14	Jul 16 & 17	10 hours	1.351

Table 2

Manila South Port Rehabilitation Project

Traffic Count Survey

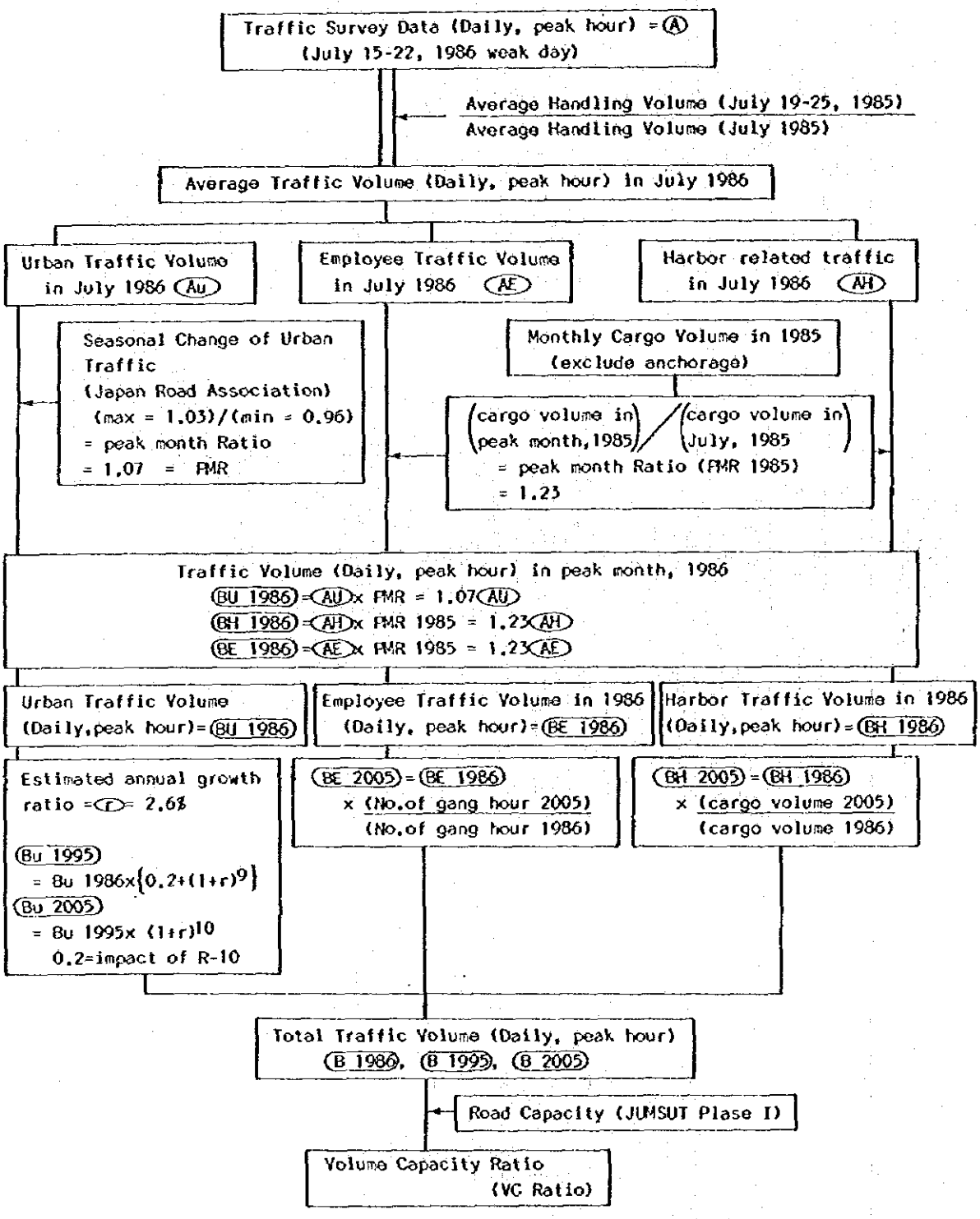
Hourly Traffic Distribution at Major Road Sections

Sec No.	Section Name	6:00 6:59	7:00 7:59	8:00 8:59	9:00 9:59	10:00 10:59	11:00 11:59	12:00 12:59	13:00 13:59	14:00 14:59	15:00 15:59	16:00 16:59	17:00 17:59	18:00 18:59	19:00 19:59	20:00 20:59	21:00 21:59	Total
1	Roxas Blvd	1563	3303	3848	4083	4292	4196	3641	4039	5152	4415	3975	4543	3273	2744	1944	1662	56673
2	A. Bonifacio Drive	1465	3338	4096	4347	4572	4074	3397	3907	4956	4206	3963	4338	2792	2046	1520	1089	54106
3	A. Bonifacio Drive	1212	2956	3855	4125	4094	3848	3079	3708	4028	3941	3966	3965	3019	2215	1474	1079	50564
4	A. Bonifacio Drive	812	2125	2740	3019	3050	2857	2323	2697	3092	3044	3030	3030	2165	1721	1123	865	37693
5	A. Bonifatio Drive	0	0	2647	2977	3299	3200	2494	2836	3278	3332	3248	3404	0	0	0	0	30615
6	A. Bonifacio Drive	0	0	2833	3100	3168	3109	2330	2792	2916	3200	3040	3003	0	0	0	0	29491
7	Roxas Bridge (Del Pan)	1156	1808	2538	2884	3115	2787	2442	2710	2741	2837	2762	2651	2442	1544	1146	881	36442
8	Katigbak Drive	332	642	636	777	836	709	664	717	845	810	774	1109	567	413	302	228	10363
9	P. Burgos Street	1740	2953	3338	3275	3550	3347	2852	3361	3983	3517	3156	3512	2662	2331	1594	1369	46540
10	25th Street	470	985	1311	1432	1356	1325	932	1269	1296	1295	1288	1187	1028	552	383	274	16383
11	13th Street	0	0	1525	1553	1623	1478	1327	1476	1406	1371	1349	1438	0	0	0	0	14546
12	Aduana	0	0	2161	2060	2026	2025	1503	1764	1962	1991	1895	1797	0	0	0	0	19184
13	Gate 1 (25th St.)	0	168	296	434	485	486	232	445	473	519	497	0	0	0	0	0	4031
14	Gate 4 (13th St.)	0	5	86	106	124	90	0	138	146	120	64	0	0	0	0	0	875

Table 3
Manila South Port Rehabilitation Project
Traffic Count Survey
Projected Traffic

Sec No.	Section Name	No. of Lanes	Est. Road Capacity		1986					
					ADT		Peak hour		VC Ratio	
			ADT pcu/day	Peak hr pcu/hr	Veh/day 24-hr	pcu/day	Veh/hr	pcu/hr	Daily	Peak hr
1	Roxas Blvd	6	54000	5400	61774	65721	5152	5463	1.22	1.01
2	A. Bonifacio Drive	6	54000	5400	58976	70032	4956	5944	1.30	1.10
3	A. Bonifacio Drive	6	54000	5400	56379	67842	4125	5102	1.26	.94
4	A. Bonifacio Drive	6	54000	5400	42028	48664	3092	3599	.90	.67
5	A. Bonifacio Drive	6	54000	5400	41361	46655	3404	3812	.86	.71
6	A. Bonifacio Drive	6	54000	5400	39842	46365	3200	3734	.86	.69
7	Roxas Bridge (Del Pan)	6	54000	5400	40815	49645	3115	3811	.92	.71
8	Katigbak Drive	4	36000	2880	11296	11872	1109	1153	.33	.40
9	P. Burgos Street	6	54000	5400	50729	60496	3983	4828	1.12	.89
10	25th Street	4	36000	2880	18267	23903	1432	1900	.66	.66
11	13th Street	4	36000	2890	19652	25875	1623	2157	.72	.75
12	Aduana	4	36000	2880	25918	29697	2161	2484	.82	.86
13	Gate 1 (25th St.)	4	36000	2880	5445	6658	517	666	.18	.23
14	Gate 4 (13th St.)	4	36000	2880	1182	2010	146	253	.06	.09

Appendix 7.9.2 Flow of the Traffic Volume Forecast



Appendix 7.9.3 Separate Traffic Estimates
(in 1986)

Sec No.	Section Name	No.of lanes	Est Road Capacity		Urban Traffic				Employee Traffic				Harbor-related Traffic			
					ADT		Peak hour		ADT		Peak hour		ADT		Peak hour	
			ADT Pcu/day	Peak hr Pcu/hr	Veh/day 24-hr	Pcu/day	Veh/hr	Pcu/hr	Veh/day 24-hr	Pcu/day	Veh/hr	Pcu/hr	Veh/day	Pcu/day	Veh/hr	Pcu/hr
1	Roxas Blvd	6	54.000	5.400	54.077	54.557	4.557	4.576	10.477	13.941	775	1.031	3.324	4.181	324	428
2	A. Bonifacio Drive	6	54.000	5.400	40.256	44.974	3.488	3.952	19.914	26.497	1.472	1.958	6.352	7.943	614	811
3	A. Bonifacio Drive	6	54.000	5.400	37.475	42.626	2.599	3.151	19.914	26.499	1.472	1.958	6.353	7.947	614	811
4	A. Bonifacio Drive	6	54.000	5.400	37.193	41.846	2.676	3.012	7.829	10.208	611	795	1.110	1.546	116	170
5	A. Bonifacio Drive	6	54.000	5.400	36.481	39.698	3.009	3.237	7.829	10.208	613	797	1.110	1.544	116	170
6	A. Bonifacio Drive	6	54.000	5.400	36.466	41.502	2.920	3.326	6.277	8.172	493	641	811	1.149	86	129
7	Roxas Bridge (Del Pan)	6	54.000	5.400	37.507	45.012	2.829	3.408	6.277	8.172	493	641	811	1.149	86	129
8	Katigbak Drive	4	36.000	2.880	10.146	10.162	1.034	1.034	1.690	2.248	124	164	539	673	52	68
9	P. Burgos Street	6	54.000	5.400	45.392	53.077	3.556	4.229	7.747	10.307	573	763	2.471	3.090	239	315
10	25th Street	4	36.000	2.880	0	0	0	0	16.037	21.581	1.149	1.547	6.716	8.221	639	823
11	13th Street	4	36.000	2.880	0	0	0	0	22.935	29.614	1.833	2.364	1.546	2.586	188	322
12	Aduana	4	36.000	2.880	16.728	17.291	1.405	1.452	11.774	15.230	938	1.212	876	1.421	105	175
13	Gate 1 (25th St.)	4	36.000	2.880	0	0	0	0	0	0	0	0	6.697	8.189	636	819
14	Gate 4 (13th St.)	4	36.000	2.880	0	0	0	0	0	0	0	0	1.454	2.472	180	311

Separate Traffic Estimates
(in 1995)

Sec No.	Section Name	No.of lanes	Est Road Capacity		Urban Traffic				Employee Traffic				Harbor-related Traffic			
					ADT		Peak hour		ADT		Peak hour		ADT		Peak hour	
			ADT Pcu/day	Peak hr Pcu/hr	Veh/day 24-hr	Pcu/day	Veh/hr	Pcu/hr	Veh/day 24-hr	Pcu/day	Veh/hr	Pcu/hr	Veh/day	Pcu/day	Veh/hr	Pcu/hr
1	Roxas Blvd	6	54,000	5,400	78,952	79,653	6,653	6,681	7,334	9,759	543	772	3,008	3,763	292	385
2	A. Bonifacio Drive	6	54,000	5,400	58,774	65,662	5,092	5,770	13,940	18,548	1,030	1,371	5,717	7,149	553	730
3	A. Bonifacio Drive	6	54,000	5,400	54,714	62,234	3,795	4,454	13,940	18,550	1,030	1,371	5,717	7,152	553	730
4	A. Bonifacio Drive	6	54,000	5,400	54,032	61,095	3,907	4,398	5,480	7,146	428	557	999	1,391	104	153
5	A. Bonifacio Drive	6	54,000	5,400	53,262	57,959	4,393	4,721	5,480	7,146	429	558	999	1,390	104	153
6	A. Bonifacio Drive	6	54,000	5,400	53,240	60,593	4,263	4,856	4,394	5,720	345	449	730	1,034	77	116
7	Roxas Bridge (Del Pan)	6	54,000	5,400	54,760	65,718	4,130	4,976	4,394	5,720	345	449	730	1,034	77	116
8	Katigbak Drive	4	36,000	2,880	14,816	14,837	1,509	1,510	1,183	1,574	87	115	485	606	47	61
9	P. Burgos Street	6	54,000	5,400	66,272	77,492	5,192	6,174	5,423	7,215	401	534	2,224	2,781	215	284
10	25th Street	4	36,000	2,880	0	0	0	0	11,226	15,107	804	1,083	6,044	7,399	575	741
11	13th Street	4	36,000	2,880	0	0	0	0	16,055	20,751	1,283	1,655	1,391	2,327	169	290
12	Aduana	4	36,000	2,880	24,423	25,245	2,051	2,120	8,242	10,661	657	848	788	1,279	95	158
13	Gate 1 (25th St.)	4	36,000	2,880	0	0	0	0	0	0	0		6,027	7,370	572	737
14	Gate 4 (13th St.)	4	36,000	2,880	0	0	0	0	0	0	0		1,309	2,225	162	280

Separate Traffic Estimates
(in 2005)

Sec No.	Section Name	No.of lanes	Est Road Capacity		Urban Traffic				Employee Traffic				Harbor-related Traffic			
					ADT		Peak hour		ADT		Peak hour		ADT		Peak hour	
			ADT Pcu/day	Peak hr Pcu/hr	Veh/day 24-hr	Pcu/day	Veh/hr	Pcu/hr	Veh/day 24-hr	Pcu/day	Veh/hr	Pcu/hr	Veh/day	Pcu/day	Veh/hr	Pcu/hr
1	Roxas Blvd	6	54,000	5,400	101,848	102,752	8,582	8,618	8,382	11,153	620	825	6,684	8,362	648	856
2	A. Bonifacio Drive	6	54,000	5,400	75,818	84,704	6,569	7,443	15,931	21,198	1,178	1,566	12,704	15,886	1,228	1,622
3	A. Bonifacio Drive	6	54,000	5,400	70,581	80,282	4,896	5,746	15,931	21,200	1,178	1,566	12,704	15,894	1,228	1,622
4	A. Bonifacio Drive	6	54,000	5,400	70,049	78,813	5,040	5,673	6,263	8,166	489	636	2,220	3,092	232	340
5	A. Bonifacio Drive	6	54,000	5,400	68,708	74,767	5,667	6,097	6,263	8,166	490	637	2,220	3,088	232	340
6	A. Bonifacio Drive	6	54,000	5,400	68,670	78,165	5,499	6,264	5,022	6,538	394	513	1,622	2,298	172	258
7	Roxas Bridge (Del Pan)	6	54,000	5,400	70,640	84,776	5,328	6,419	5,022	6,538	394	513	1,622	2,298	172	258
8	Katigbak Drive	4	36,000	2,880	19,113	19,140	1,947	1,948	1,352	1,798	155	131	1,078	1,346	104	136
9	P. Burgos Street	6	54,000	5,400	85,491	99,965	6,698	7,964	6,198	8,246	458	610	4,942	6,180	478	630
10	25th Street	4	36,000	2,880	0	0	0	0	12,830	17,265	919	1,238	13,432	16,442	1,278	1,646
11	13th Street	4	36,000	2,880	0	0	0	0	18,348	23,715	1,466	1,891	3,092	5,172	376	644
12	Aduana	4	36,000	2,880	31,506	32,566	2,646	2,735	9,419	12,184	750	970	1,752	2,842	210	350
13	Gate 1 (25th St.)	4	36,000	2,880	0	0	0	0	0	0	0	0	13,394	16,378	1,272	1,638
14	Gate 4 (13th St.)	4	36,000	2,880	0	0	0	0	0	0	0	0	2,903	4,944	360	622

Appendix 7.9.4 Saturation Ratios at Intersections

Capacity of Intersection (A) - 2005

UNIT (PCU)

Section Name	(1)			(2)			(8)			(9)		
Direction of lanes	LEFT	THRU	RGHT	LEFT	THRU	RGHT THRU	LEFT	THRU	RGHT	LEFT	LEFT THRU	RGHT
No. of lanes	1	4	1	3	3	1		5		3	1	1
Basic Saturation Flow (PCU/hr)	1,400	1,550	1,400	1,400	1,550	1,400		1,550		1.400	1,400	1,400
Lane Width (m)	2.9	2.8	3.4	3.2	2.8	3.4		14.65		2.8	2.75	3.0
Reduction Ratio	0.95	0.95	1.0	1.0	0.95	1.0		0.95		0.95	0.95	1.0
Longitudinal Slope (%)												
Reduction Ratio												
Right Car Mixing Ratio (%)						50%		33%				
Reduction Ratio						0.87		0.92				
Left Car Mixing Ratio (%)								3%			75%	
Reduction Ratio								0.99			0.80	
Saturation Flow (PCU/hr)	1,330	5,890	1,400	4,200	4,400	1,220		6,706		3,990	1,064	1,400
Total Saturation Flow (PCU/hr)	1,330	5,890	1,400	4,200	5,620			6,706		5,054		1,400
Green Light Ratio	0.24	0.20	0.46	0.24	0.26			0.24		0.26		0.50
Traffic Volume (PCU/hr)	158	3,049	1,572	2,728	3,077			1,026		3,169		1,424
Nominal Traffic Volume	0.119	0.518	1.123	0.650	0.548			0.153		0.627		1.02
Phase A Saturation Ratio		0.518	0.488		0.548							
Phase B Saturation Ratio	0.119			0.630								0.488
Phase C Saturation Ratio			0.635							0.627		0.529
Phase D Saturation Ratio								0.153				

Saturation Ratio Total = 1.966

Capacity of Intersection (B) 2005

(Unit: PCU)

Section Name	(3)			(4)			(10)	
Direction of lanes	LEFT	THRU	THRU	THRU	THRU	THRU RGHT	LEFT	RGHT
No. of lanes	2	2	2	2	1	1	1	3
Basic Saturation Flow (PCU/hr)	1,400	1,550	1,550	1,550	1,550	1,400	1,400	1,400
Lane Width (m)	3.50	2.80	3.2,3.4	2.8	3.2	4.5	3.40	3.40
Reduction Ratio	1.0	0.95	1.0	0.95	1.0	1.0	1.0	1.0
Longitudinal Slope (%)	-	-	-	-	-	-	-	-
Reduction Ratio								
Right Car Mixing Ratio (%)						20%		
Reduction Ratio						0.94		
Left Car Mixing Ratio (%)								
Reduction Ratio								
Saturation Flow (PCU/hr)	2,800	2,945	3,100	2,945	1,550	1,316	1,400	4,200
Total Saturation Flow (PCU/hr)	2,800	6,045		5,811			1,400	4,200
Green Light Ratio	0.4	0.45		0.45			0.10	0.50
Traffic Volume (PCU/hr)	735	3,196		3,318			142	1,839
Nominal Traffic Volume	0.263	0.529		0.571			0.101	0.438
Phase A Saturation Ratio		0.529		0.571				
Phase B Saturation Ratio	0.230							0.350
Phase C Saturation Ratio							0.037	0.086

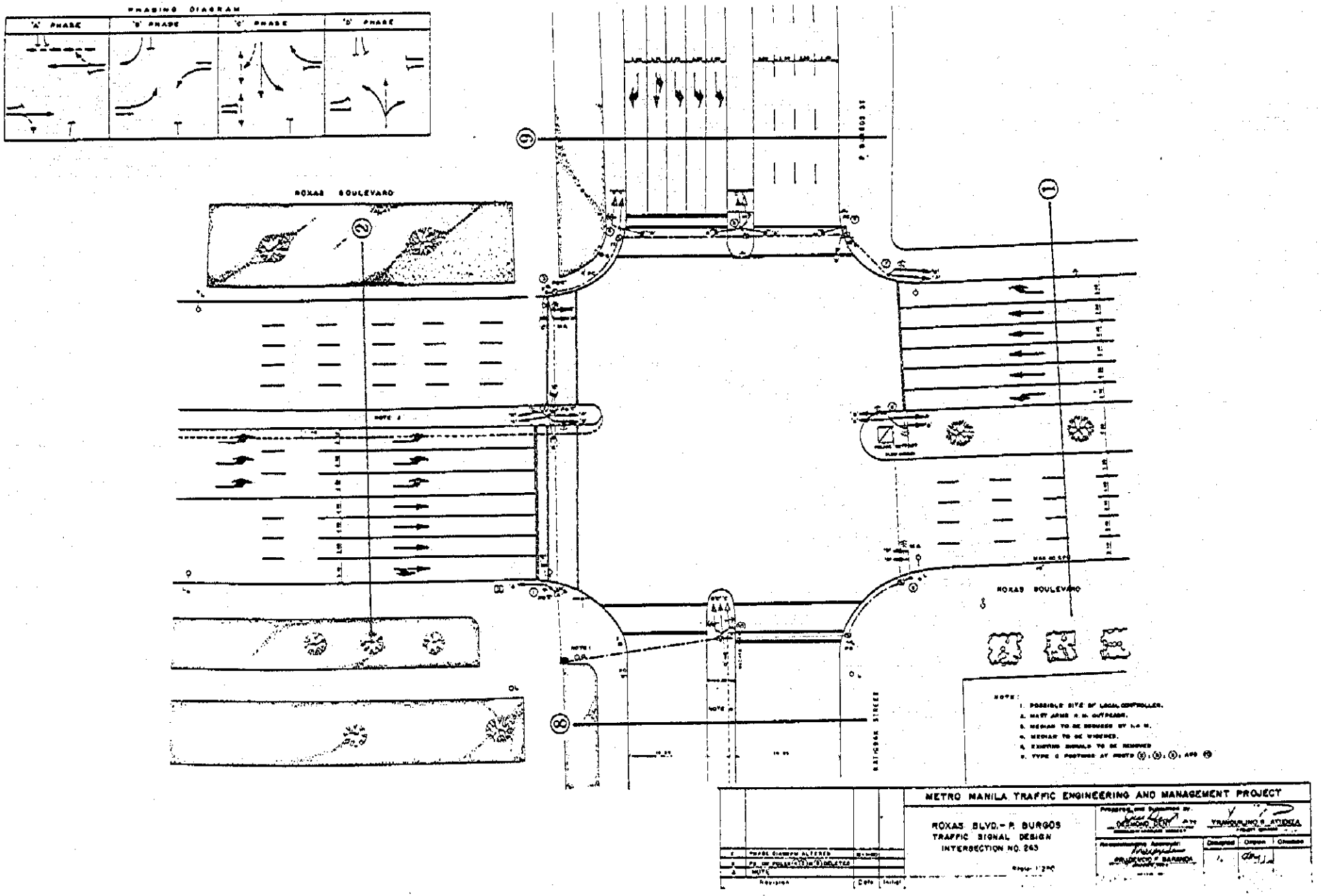
Saturation Ratio Total = 1.009

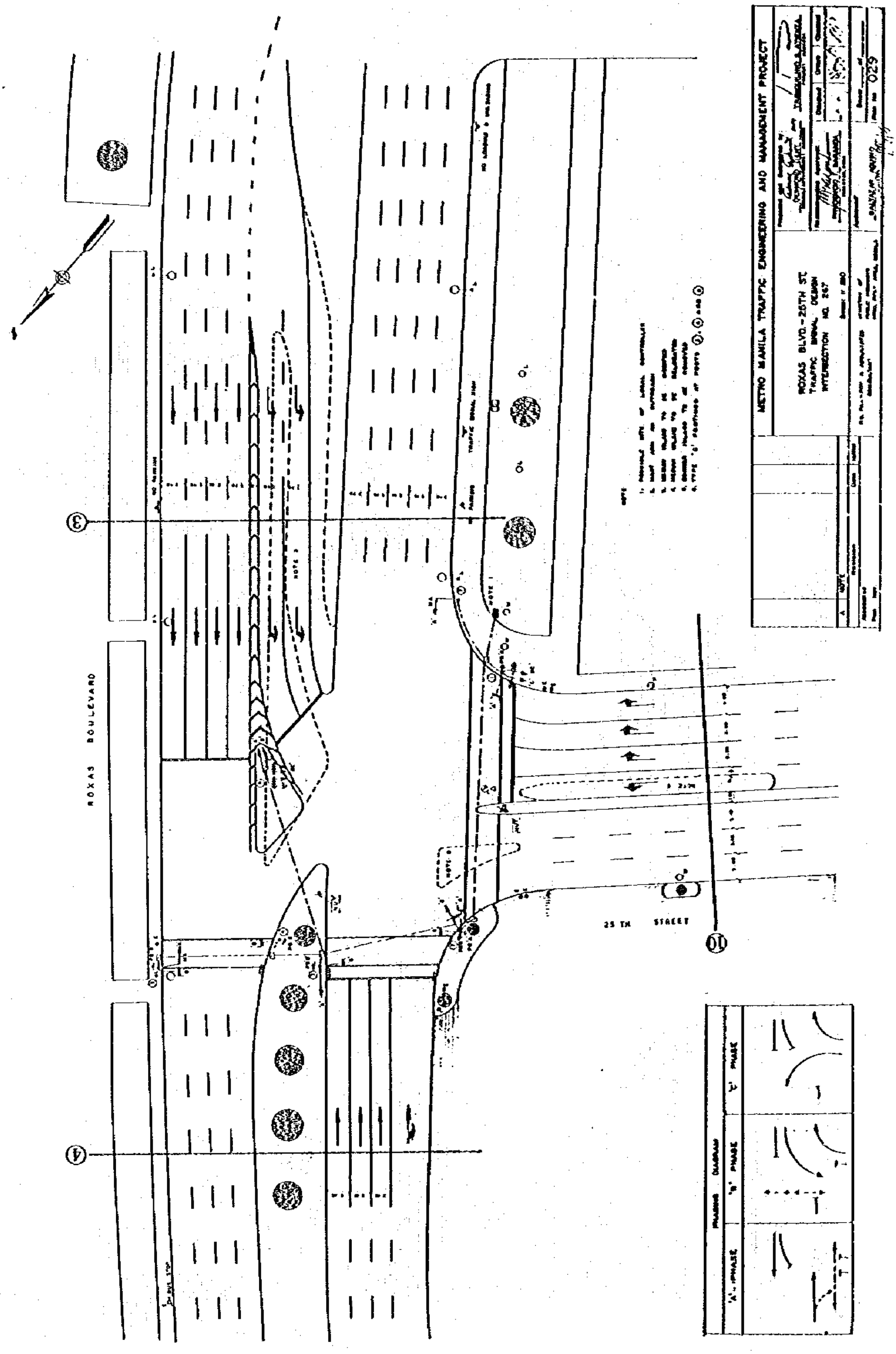
Capacity of Intersection (C) 2005

UNIT (PCU)

Section Name	(5)			(6)			(11)			(12)		
Direction of lanes	LEFT	THRU	RGHT	LEFT	THRU	RGHT	LEFT	THRU	RGHT	LEFT	THRU	RGHT
No. of lanes	1	6	1	2	5	1	1	2	2	1	4	2
Basic Saturation Flow (PCU/hr)	1,400	1,550	1,400	1,400	1,550	1,400	1,400	1,550	1,400	1,400	1,550	1,400
Lane Width (m)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Reduction Ratio	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Longitudinal Slope (%)												
Reduction Ratio												
Right Car Mixing Ratio (%)												
Reduction Ratio												
Left Car Mixing Ratio (%)												
Reduction Ratio												
Saturation Flow (PCU/hr)	1,400	9,300	1,400	2,800	7,750	1,400	1,400	3,100	2,800	1,400	6,200	2,800
Total Saturation Flow (PCU/hr)	1,400	10,700		2,800	9,150		7,300			1,400	9,000	
Green Light Ratio	0.30	0.32		0.30	0.32		0.38			0.38	0.38	
Traffic Volume (PCU/hr)	507	3,087		457	2,976		814			534	2,069	
Nominal Traffic Volume	0.362	0.289		0.163	0.326		0.111			0.381	0.230	
Phase A Saturation Ratio		0.289			0.326							
Phase B Saturation Ratio							0.111			0.381	0.230	
Phase C Saturation Ratio	0.362			0.163								
Phase D Saturation Ratio												

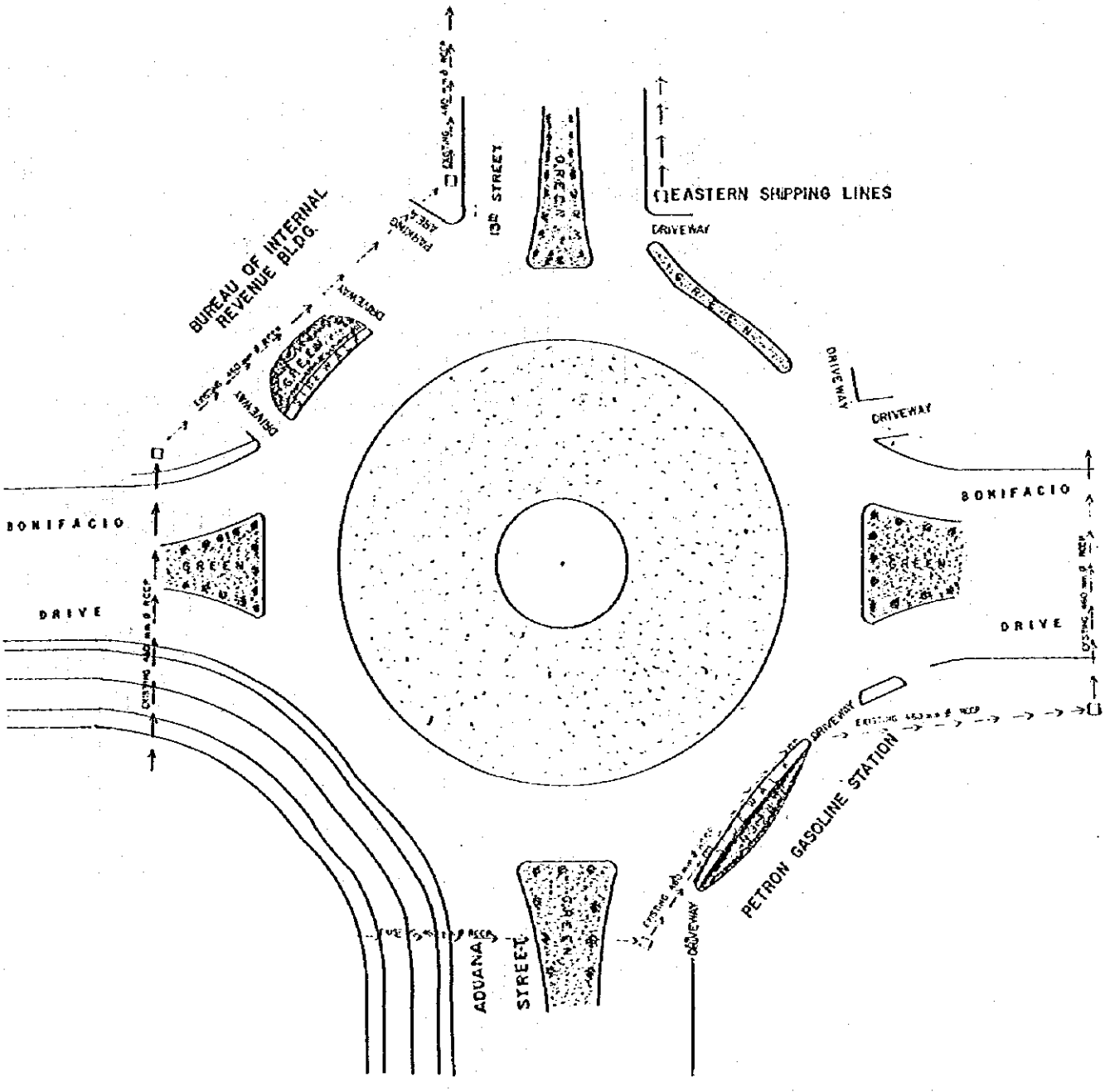
Saturation Ratio Total = 1.069

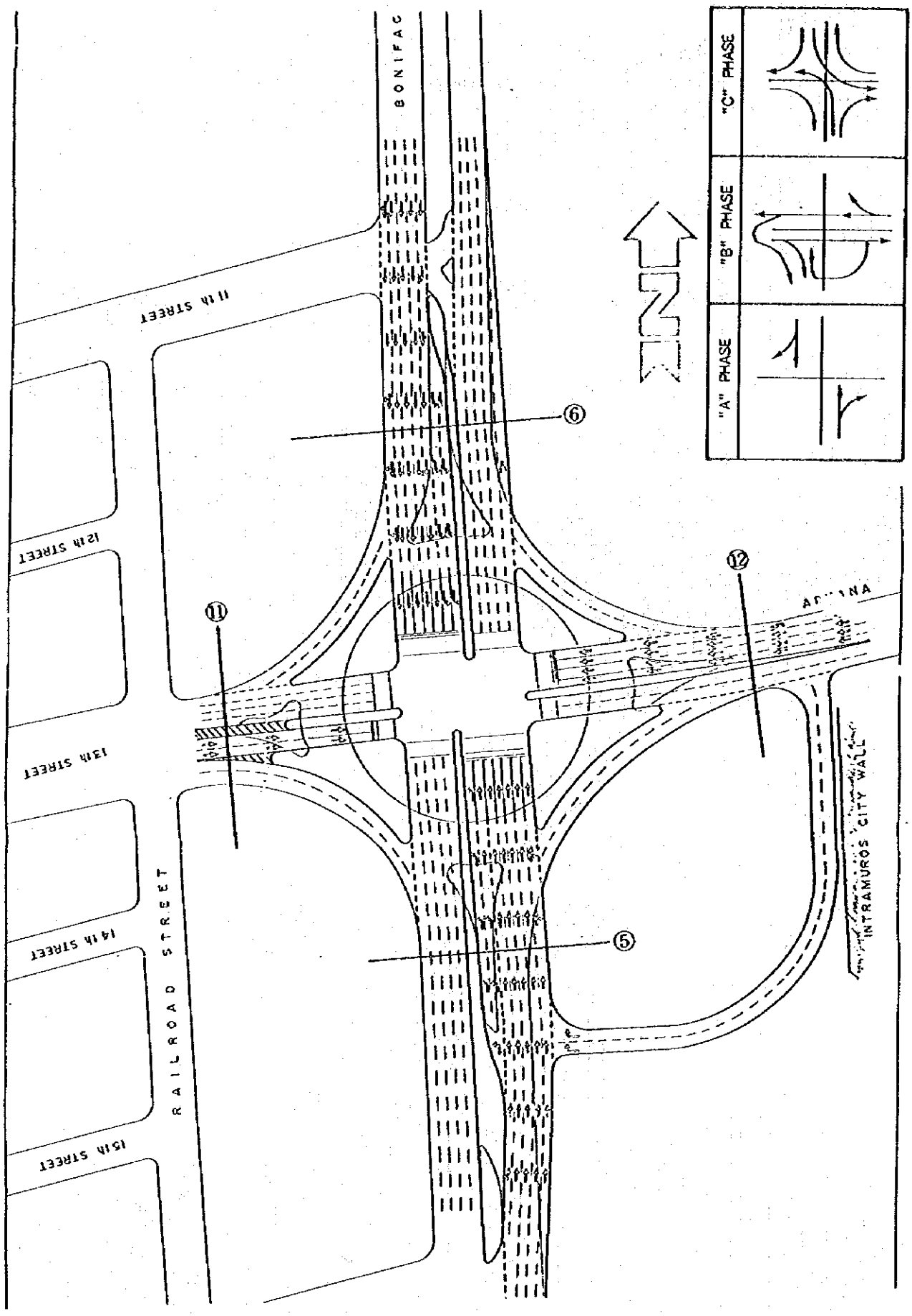

PHASING DIAGRAM
'A' PHASE
'B' PHASE
'C' PHASE
'D' PHASE
ROXAS BOULEVARD
P. BURGOS ST
ROXAS BOULEVARD
NOTE :
1. POSSIBLE SITE OF LOCAL CONTROLLER.
METRO MANILA TRAFFIC ENGINEERING AND MANAGEMENT PROJECT
ROXAS BLVD. - P. BURGOS
TRAFFIC SIGNAL DESIGN
INTERSECTION NO. 263


ROXAS BOULEVARD
25 TH STREET
METRO MANILA TRAFFIC ENGINEERING AND MANAGEMENT PROJECT
ROXAS BLVD.-25TH ST.
TRAFFIC SIGNAL DESIGN
INTERSECTION NO. 267
029
PHASING DIAGRAM
'A' PHASE
'B' PHASE

INTERSECTION MAP (C)

INTERSECTION: BONIFACIO DRIVE - ROTONDA




"A" PHASE
"B" PHASE
"C" PHASE
N
BONIFACIO
11th STREET
12th STREET
13th STREET
14th STREET
15th STREET
RAILROAD STREET
ANDA
INTRAMUROS CITY WALL
⑤
⑥
⑪
⑫

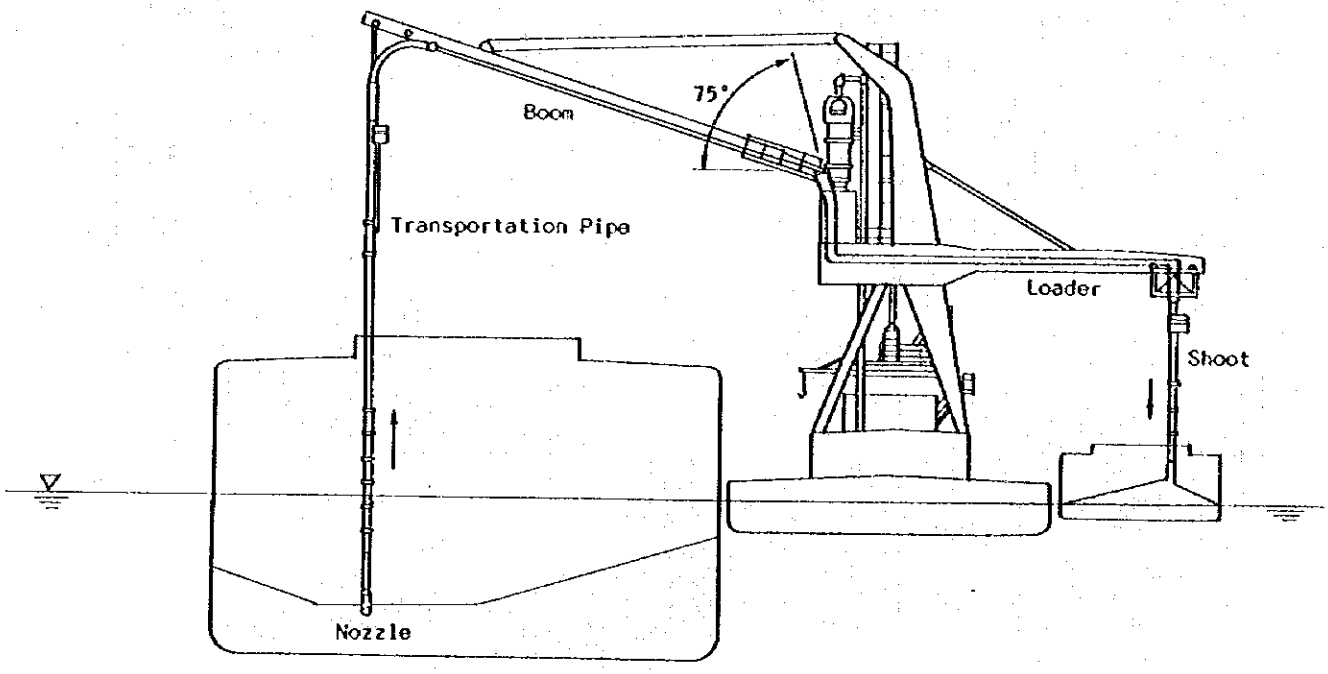
Appendix 7.9.5 Gate Capacity (Peak Hour Traffic Volume)

Unit: (No. of cars)

Peak Veh No/Hour (Avg. Veh No./Hour)

		Type of Vehicle	1986	1995	2005
Gate 1	IN	Large	25 (20)	22 (17)	50 (39)
		Small	247 (192)	222 (173)	493 (384)
		Total	272 (212)	244 (190)	543 (423)
	OUT	Large	117 (91)	105 (82)	234 (182)
		Small	247 (193)	223 (174)	495 (387)
		Total	364 (284)	328 (256)	729 (569)
Gate 4	IN	Large	126 (84)	113 (76)	252 (168)
		Small	54 (36)	49 (32)	108 (72)
		Total	180 (120)	162 (108)	360 (240)
	OUT	Large			
		Small	-	-	-
		Total			
Total	IN	Large	151 (104)	135 (93)	302 (207)
		Small	301 (228)	271 (205)	601 (456)
		Total	452 (332)	406 (298)	903 (663)
	OUT	Large	117 (91)	105 (82)	234 (182)
		Small	247 (193)	223 (174)	495 (387)
		Total	364 (284)	328 (256)	729 (569)

Appendix 8.3.1 Conceptual Drawing of Floating Pneumatic Unloader



Appendix 8.3.2 Simulation Tests for Floating Unloader

1) Prerequisites of the simulation tests

In order to determine the required capacity of the floating unloader, number of barges, service time, waiting time and staying time for calling vessels, simulation tests have been carried out under the following conditions.

1	Grain handling volume in the year 2000	1,227,000 T/year
2	Average cargo load per grain vessel	25,000 T
3	Available working days o official holidays : 3 days o rain, wind, waves : 60 days o swell of river : 14 days o dredging : 3 days o trouble of barge and unloading stations : 11 days Total : 91 days Then available working days are 365 - 91 = 274 days/year	274 days
4	Working time per day 8 hours/shift x 2 shift/day = 16 hours/day	16 hours/day
5	Nominal capacity of floating unloader	400 T/hour·set
6	Average efficiency of floating unloader	0.6
7	Barge unloading capacity	4,500 T/day
8	Average barge capacity	750 T

2) Simulation test results

Simulation tests have been carried out using the "queuing theory" with the aid of computer. The results of the simulation tests are shown in the following table.

1	Required capacity of the floating unloader o Two sets of floating unloader would be required. 400T/hour·set x 2 sets = 800 T/hour	800 T/hour
2	Average service time for cargo handling per vessel	5.7 days
3	Average waiting time per vessel	10.5 days
4	Total staying time for all calling vessels	852 days
5	Required number of barges	32 barges
6	Total waiting time of barge per year	686 barge·days

Appendix 8.3.3 Economic Analysis of Floating Unloader

1) Forecast of grain handling volume (Unit: 1000 tons)

Year	1990	1995	2000	2005
Wheat	411	518	660	832
Soybeans	262	411	567	765
Total	673	929	1,227	1,597

2) Prerequisites of the Economic Analysis

o 1US$ = ₱ 20.5 = ¥ 154. (August 1986)

o Consumer price index

1980	138.9
1982	173.2
1983	190.5
1986	358.9

o Wages (Economic Prices)

a) Skilled Labor

(Local Market Wage Rate) x (CFC)

= ₱ 100/day x 0.833

= ₱ 83/day

= ₱ 83/day x 25 days x 13 months = ₱ 27,000/year

b) Unskilled Labor

(Nominal Wage) x (Shadow Wage Rate) x (CFC)

= ₱ 57.08/day x 0.8 x 0.833

= ₱ 38/day

= ₱ 38/day x 25 days x 13 months = ₱ 12,500/year

o Project Life = 20 years

The economic service life of floating crafts is 20 years.

3) Schedule

1993	Manufacturing of floating unloader
1994	Investment
1995	Target year (operation will start)
⎫	⎪
2013	⎭ Project life (20 years)

4) Investment

a) Two sets of Floating Unloader

CIF Price in 1986 = ₱ 220 million

b) Engineering Fee

₱ 18 million

5) Annual Operation Costs

a) Utility (Fuel Oil) Cost

The only utility required for this project is the fuel oil for the two generators in the pontoons. The fuel cost calculations are based on the following factors.

Total installed power consumption is 950 KW.

Based on the forecast quantity of import grain in the year 2000, it is estimated as follows.

1,227,000 tons (800 tons/hour x 0.6) = 2,556 hours

The generators consume 150 l of fuel oil per hour. Thus, the total annual energy cost is calculated as follows.

2,556 hours x 150 l/hour x ₱ 6.88/l = ₱ 2.638 million

b) Maintenance Costs

Maintenance costs, including spare parts, are assumed as 3% of the total investment cost.

₱ 220 million x 0.03 = ₱ 6.6 million

c) Labor Costs

Skilled labor	: 4 persons x ₱ 27,000 =	₱ 108,000
Unskilled labor	: 46 persons x ₱ 12,500 =	₱ 575,000
	Total	₱ 683,000

d) Tug Boat Fees

In order to bring the Floating Unloaders alongside a vessel or to return them to their mooring place in the port, two tug boats are used at one time.

o Number of vessels which will call at the port in the year 2000.

660,000 tons 25,000 tons/vessel + 567,000 tons 22,500 tons/vessel = 26.4 + 25.2 = 52 vessels

o Number of required tug boats

52 vessels x 2 = 104 vessels (600HP)

o Estimated daily cost of tug boats in 1986.

$$₱\ 6{,}942/\text{day (in 1980)} \times \frac{358.9}{138.9} = ₱\ 18{,}000/\text{day}$$

o Annual tug boat fees

104 tug boats x ₱ 18,000/day x $\frac{1}{2}$ day = ₱ 936,000

e) Demurrage of barges

Because of the difference of the unloading capacities at the port and at the millers, a total of 686 barge-days per year are used as temporary storages.

o Estimated barge costs in 1986

₱ 1,210/day (in 1980) x $\frac{358.9}{138.9}$ = ₱ 3,200/day

o Annual cost for demurrage of barges

₱ 3,200/day x 686 days = ₱ 2,195,200/year

= ₱ 2.195 million/year

f) Total Annual Operation Costs

	Annual Operation Costs (₱ 1,000)		
	1995	2000	2005
a) Utilities Costs	1,998	2,638	3,434
b) Maintenance Costs	6,600	6,600	6,600
c) Labor Costs	683	683	683
d) Tug Boat Fees	702	936	1,224
e) Demurrage of Barges	2,195	2,195	2,195
Total	12,178	13,052	14,136

6) Benefits

a) Savings in Ships' Staying Time

① Savings of Staying Time

According to the simulation of vessels' staying time in port in the year 2000 (Table 1), a total of 800 vessel-days of staying time per year will be saved.

② Share of Benefits Belonging to the Philippines

In this study, we assume that 37% of the benefits for imports will be transferred to the Philippine economy (Refer to Appendix 11.3.2).

③ Ship Cost

The ship cost for 30,000 DWT vessels is estimated as $ 10,300/ship-day (₱ 211,000/ship day).

④ Calculation Result

₱ 211,000/ship day x 800 days x 0.37 = ₱ 62,456,000

= ₱ 62.456 million

Table 1 Simulation test results in the year 2000

grain handling volume	1,227,000 T
number of vessels	52
average cargo load	25,000 T
available working days	274 days

	Floating Unloader (With Case)	Present System (Without Case)
1. Ship Unloading Capacity	6,200 tpd	1,000 tpd x 4
2. Barge Unloading Capacity	4,500 tpd	4,000 tpd
3. Averge Service Time for Cargo Handling per Vessel	5.7 days	24.4 days
4. Average Waiting Time per Vessel	10.5 days	7.6 days
5. Total Staying Time for All Calling Vessels (Service Time + Waiting Time)	852 days	1,652 days
6. Savings of Staying Time	800 days	0

b) Savings of Losses

The actual quantity of import grains received is different from the volume stated on the bill of lading. The reduction of this difference for both corn and soybean meal is accounted as a benefit accruing to the Philippines.

Presently, 1.7% of the grains are lost in handling, and those losses are expected to be reduced by 25% under the new (floating unloader) system. The value of this savings is calculated below.

① Price of grain (CIF)

o Wheat : $ 181.19 /MT = ₱ 3715/MT

o Soybeans : $ 183.363/MT = ₱ 3759/MT

(Source: Foreign Trade Statistic 1985)

② Calculation Result

(660,000 MT x ₱ 3,715/MT + 567,000 MT x ₱ 3,759/MT) x 0.017 x 0.25

= ₱ 19,478,000

= ₱ 19.478 million

c) Saving in Stevedorage

According to the handling costs estimated by OTSI in 1986, grain stevedorage costs at anchorage is average ₱ 17.50/MT (Refer to Table 2).

Stevedorage costs will be reduced by the project as calculated below.

1,227,000 MT x ₱ 17.50/MT = ₱ 21,472,000

= ₱ 21.472 million

d) Total Benefits

	Total Benefits (₱ 1,000)		
	1995	2000	2005
a) Ships' Staying Costs	47,287	62,456	81,289
b) Savings of Losses	14,745	19,478	25,358
c) Savings in Stevedorage	16,257	21,472	27,947
Total	78,289	103,406	134,594

7) Costs and Benefits at Market Prices

Table 3 shows the costs and benefits at market prices.

Table 2 Handling Costs (Pesos)

Commodity	Basic Stevedoring	Handling Costs at		
		Anchorage	Berth	Shipside
1) Bagged Cargo (General)	15.03/RT	18.50/RT	17.75/RT	18.03/RT
2) Lumber	41.36/Bdft		45.50/Bdft	45.50/Bdft
3) Palletized Cargo	13.07/RT		13.72/RT	13.72/RT
4) Containerized Cargo	133.91/Unit		147.30/Unit	147.50/Unit
5) Bulk Cargo	14.40/MT	17.50/MT	16.00/MT	17.50/MT
6) Steel Cargo (Imported)	14.77/MT	16.50/MT	16.00/MT	16.50/MT
7) Steel Cargo (Local)	10.35/MT		11.39/MT	11.50/MT
8) Heavy Lift 5-20	72.48/MT		76.10/MT	81.18/MT
9) Heavy Lift Over 20	88.01/MT		92.41/MT	98.57/MT

*Note: Handling costs include Basic Stevedoring, Standby, Extra Labor and Other Charges

Source: OTSI (1986)

Table 3 Costs and Benefits at Market Prices

Year	Costs (₱ 1,000)								Benfits (₱ 1,000)			
	Investment	Annual Operation Costs						Total Costs	Savings in Ships' Staying Costs	Savings of Losses	Savings in Steve-dorage	Total Benefits
		Utilities Costs	Maintenance Costs	Labor Costs*1	Tug Boat Fees	Demurrage of Barges	Total					
1988												
89												
1990												
91												
92												
93												
94	238,000							238,000				
1995		1,998	6,600	683	702	2,195	12,178	12,178	47,287	14,745	16,257	78,289
96		2,126	↓	↓	749	↓	12,353	12,353	50,321	15,692	17,300	83,313
97		2,254	↓	↓	796	↓	12,528	12,528	53,355	16,638	18,343	88,336
98		2,382	↓	↓	842	↓	12,702	12,702	56,388	17,585	19,386	93,359
99		2,510	↓	↓	889	↓	12,877	12,877	59,422	18,531	20,429	98,382
2000		2,638	6,600	683	936	2,195	13,052	13,052	62,456	19,478	21,472	103,406
01		2,797	↓	↓	994	↓	13,269	13,269	66,223	20,654	22,767	109,644
02		2,956	↓	↓	1,051	↓	13,485	13,485	69,989	21,830	24,062	115,881
03		3,116	↓	↓	1,109	↓	13,703	13,703	73,756	23,006	25,357	122,119
04		3,275	↓	↓	1,166	↓	13,919	13,919	77,522	24,182	26,652	128,356
2005		3,434	6,600	683	1,224	2,195	14,136	14,136	81,289	25,358	27,947	134,594
06		↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
07		↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
08		↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
09		↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
2010		↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
11		↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
12		↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
13		↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓

Note *1 : At Econmic Prices

8) Economic Pricing

a) Conversion Factors for Costs and Benefits

o Costs

① Investment	: 1.0
② Utilities	: 0.695
③ Maintenance Costs	: 0.833
④ Labor Costs	: 0.666
⑤ Tug Boat Fees	: 0.904
⑥ Demurage of Berges	: 0.904

o Benefits

① Savings in Ships' Staying Costs	: 1.0
② Savings of Losses	: 1.0
③ Savings in Stevedorage	: 0.666

b) Costs and Benefits at Economic Prices

Table 4 shows the costs and benefits at economic prices.

9) Evaluation

a) Calculation of the EIRR

Base Case

Case A: The costs are increased by 10%.

Case B: The benefits are decreased by 10%.

Case C: The costs are increased by 10% and the benefits are decreased by 10%.

(%)

Case	EIRR
Base Case	31.96
Case A	28.98
Case B	28.70
Case C	25.97

Table 4 Costs and Benefits at Economic Prices

Year	Costs (₱ 1,000)								Benfits (₱ 1,000)			
	Investment	Annual Operation Costs						Total Costs	Savings in Ships' Staying Costs	Savings of Losses	Savings in Steve-dorage	Total Benefits
		Utilities Costs	Maintenance Costs	Labor Costs	Tug Boat Fees	Demurrage of Barges	Total					
1988												
89												
1990												
91												
92												
93												
94	238,000							238,000				
1995		1,389	5,498	683	635	1,984	10,189	10,189	47,287	14,745	10,827	72,859
96		1,478			677		10,320	10,320	50,321	15,692	11,522	77,535
97		1,567			719		10,451	10,451	53,355	16,638	12,216	82,209
98		1,655			762		10,582	10,582	56,388	17,585	12,911	86,884
99		1,744			804		10,713	10,713	59,422	18,531	13,605	91,558
2000		1,833	5,498	683	846	1,984	10,844	10,844	62,456	19,478	14,300	96,234
01		1,944			898		11,007	11,007	66,223	20,654	15,163	102,040
02		2,055			950		11,170	11,170	69,989	21,830	16,025	107,844
03		2,165			1,003		11,333	11,333	73,756	23,006	16,888	113,650
04		2,276			1,055		11,496	11,496	77,522	24,182	17,750	119,454
2005		2,387	5,498	683	1,107	1,984	11,659	11,659	81,289	25,358	18,613	125,260
06												
07												
08												
09												
2010												
11												
12												
13												

Project Name : FLOATING UNLOADER (BASE CASE)
I.R.R. (%) : 31.96

NO.	YEAR	COST	BENEFIT	BNFT.-COST	P. COST	P. BNFT	P.VALUE
1	1994	238000.00	0.00	-238000.00	238000.00	0.00	-238000.00
2	1995	10189.00	72859.00	62670.00	7721.40	55213.80	47492.40
3	1996	10320.00	77535.00	67215.00	5926.64	44527.30	38600.70
4	1997	10451.00	82209.00	71758.00	4548.32	35777.70	31229.40
5	1998	10582.00	86884.00	76302.00	3490.00	28654.80	25164.80
6	1999	10713.00	91558.00	80845.00	2677.52	22883.30	20205.80
7	2000	10844.00	96234.00	85390.00	2053.89	18227.00	16173.10
8	2001	11007.00	102040.00	91033.00	1579.87	14646.10	13066.20
9	2002	11170.00	107844.00	96674.00	1214.98	11730.40	10515.40
10	2003	11333.00	113650.00	102317.00	934.17	9368.06	8433.89
11	2004	11496.00	119454.00	107958.00	718.11	7461.83	6743.72
12	2005	11659.00	125260.00	113601.00	551.91	5929.55	5377.63
13	2006	11659.00	125260.00	113601.00	418.25	4493.51	4075.26
14	2007	11659.00	125260.00	113601.00	316.96	3405.26	3088.31
15	2008	11659.00	125260.00	113601.00	240.20	2580.57	2340.37
16	2009	11659.00	125260.00	113601.00	182.02	1955.60	1773.57
17	2010	11659.00	125260.00	113601.00	137.94	1481.99	1344.04
18	2011	11659.00	125260.00	113601.00	104.53	1123.07	1018.54
19	2012	11659.00	125260.00	113601.00	79.22	851.09	771.87
20	2013	11659.00	125260.00	113601.00	60.03	644.97	584.93
	TOTAL	451036.00	2077610.00	1626570.00	270956.00	270956.00	-0.02

UNIT = 1000 P

Note : P.COST --- Present Value of Cost
: P.BNFT --- Present Value of Benefit

Appendix 8.3.4 Financial Analysis of Floating Unloaders

1. Prerequisites of the FIRR calculation

(1) Organization

In this study we assume the following allotment of work.

Construction of Floating Unloaders : PPA

Operation Company : Stevedoring Company

User : NFA/Other users

(2) Costs and benefits

(Unit: Million Pesos)

	PPA	Stevedoring Co.	NFA/Other users
Costs	(1)Construction costs:238.00 (2)Maintenance costs:6.6/year (3)Tax: 3% of rental incom 1.1/year	(1)Rental fee :37.00/year (2)Operation cost 1995 - 1999 :5.6/year 2000 - 2004 :6.5/year 2005 - 2013 :7.5/year (3)Tax: 3% of revenue from users, 1.89 year	Users' fee :62.00/year
Benefits	Rental income from Stevedoring Co. :37.00/year	Revenue from NFA/Other users 62.00/year	(1)Saving on ocean freight 1995 - 1999 :47.3/year 2000 - 2004 :62.5/year 2005 - 2013 :81.3/year (2)Saving of losses 1995 - 1999 :14.7/year 2000 - 2004 :19.5/year 2005 - 2013 :25.4/year (2)Saving of stevedorage 1995 - 1999 :16.3/year 2000 - 2004 :21.5/year 2005 - 2013 :27.9/year
Others	35% decrease in stevedoring income by saving in stevedorage of NFA/Other users	65% decrease in stevedoring income by saving in stevedorage of NFA/Other users	

2. Results

The necessary minimum rental charge at which PPA may introduce the floating unloaders is 37 million pesos per year. At this charge the FIRR of PPA (5.91%) is over 5.5%, the average interest rate of OECF funds and funds from other international banks. (It is assumed that the overall construction cost is raised using foreign loans.) The stevedoring company can not operate the floating unloaders without charging a users' fee of at least 62 million pesos per year to NFA/Other users to cover the rental fee of 37 million pesos per year to PPA, the operation cost and other costs. At this users' fee NFA/Other users can gain substantial benefits with a very large FIRR.

On the other hand the maximum users' fee which the stevedoring company can charge to NFA/Other users is 109 million pesos per year. Under this fee NFA/Other users gain no merit from using the floating unloaders which means the FIRR of NFA/Other users is nearly zero. At this fee the stevedoring company can afford a rental fee of up to 82 million pesos per year to PPA.

Thus PPA, the stevedoring company and NFA/Other users can all enjoy some merit from the floating unloaders if PPA sets the rental charge between 37 and 82 million pesos per year and the stevedoring company sets the users' fee between 62 and 109 million pesos per year.

Rental Charge and FIRR (Base Case)

(Unit: Million Pesos, %)

	PPA	Stevedoring Co.	NFA/Other users
Rental charge	37/year *1	62/year *2	
	5.91	1.98	Very large
Rental charge	82/year *4	109/year *3	
	Very large	5.66	0.37

*1 The necessary minimum rental charge at which PPA may introduce the floating unloaders.

*2 The necessary minimum rental charge at which the stevedoring company may operate the floating unloaders.

*3 The maximum rental charge at which NFA/Other users gain no merit from usingthe floating unloaders.

*4 The maximu rental charge at which the stevedoring company may operate the floating unloaders with a rental charge of 109 million pesos per year to NFA/Other users.

3. Sensitivity Analysis

(1) Identification of cases

Sensitivity analyses are made for the following cases:

Case A construction costs increase by 10%

Case B benefits decrease by 10%

Case C construction costs increase by 10% and benefits decrease by 10%

(2) Results

A sensitivity test was conducted for each of the cases mentioned above. Judging from the sensitivity test, it is feasible to introduce the floating unloaders if the rental charge of PPA is set between 40 and 72 million pesos per year and the rental fee of the stevedoring company is set between 66 and 98 million pesos per year.

Results of Sensitivity Analysis

(Unit: Million Pesos, %)

		PPA	Stevedoring Co.	NFA/Other users
Base case	Rental charge	37/year *1	62/year *2	-
	FIRR	5.91	1.98	Very large
	Rental charge	82/year *4	109/year *3	-
	FIRR	Very large	5.66	0.37
Case A	Rental charge	40/year *1	66/year *3	-
	FIRR	5.99	3.05	Very large
	Rental charge	82/year *4	109/year *3	-
	FIRR	Very large	5.66	0.37
Case B	Rental charge	37/year *1	62/year *2	-
	FIRR	5.91	1.98	Very large
	Rental charge	72/year *4	98/year *3	-
	FIRR	Very large	1.51	0.49
Case C	Rental charge	40/year *1	62/year *2	-
	FIRR	5.99	1.98	Very large
	Rental charge	72/year *4	98/year *3	-
	FIRR	Very large	1.51	0.49

*1-*4 : same with the notes to "Rental charge and FIRR (Base case)"

Appendix 8.3.5 Conclusion of Enomic and Financial Analysis of Floating Unloaders

The introduction of floating unloaders is evaluated using the Internal Rate of Return (IRR) which is calculated based on cost-benefit analysis.

Judging from the above Appendices 8.3.3 and 8.3.4, it is concluded that the introduction of floating unloaders is feasible both economically and financially.

It is possible, if necessary, to advance the time to introduce the floating unloaders though it was assumed that the time of introduction in our study would be 1994, just after the completion of the short-term rehabilitation. The time of introduction depends upon when PPA determines the operation company of the floating unloaders.

Since the results of the EIRR and FIRR calculated above are independent from those of the short-term rehabilitation, a charge in the time of introduction has no influence on the EIRR and FIRR of either the floating unloader or the short-term rehabilitaion.

Appendix 9.2.1 Seismic Coefficient

Calculation of the seismic coefficient is conducted in accordance with the National Structural Code of the Philippines, Volume 1 (Third Edition 1986, hereafter the code is reffered to as NSCP).

The seismic coefficient (Ke) is calculated by the following formula:

Ke = ZIKCS

"Z" is the numerical coefficient related to seismicity of the region. The Philippines falls under seismic zone 4 and "Z" is taken as 1.0.

"I" is the occupancy importance factor as specified in NSCP's Table 2.1-c. The range of "I" is specified from 1.0 to 1.5 in response to the type of occupancy. The occupancy ratio of the Piers is not so high and "I" is taken as 1.0.

"K" is the numerical coefficient as set forth in NSCP's Table 2.1-A. The range of "K" is specified from 1.0 to 2.5 in response to the type or arrangement of resisting elements. The Piers have the same flaming system as the general buildings and "K" is taken as 1.0.

"C" is the numerical coefficient as specified in NSCP's Sec. 2.1(d) and "S" is the numerical coefficient for site-structure resonance. The product of "CS" need not exceed 0.14.
"C" is related to the period of the structure and the value of "C" need not exceed 0.12.
"S" related to both of the period of the structure and the characteristic site period. When the characteristic site period is not properly established, the value is 1.5.

Actually, both the period of the structure and the characteristic site period are not properly established. If "C" is taken as 0.12 and "S" is taken as 1.5, the product "CS" is 0.18 and exceeds 0.14. Then, the value of the product "CS" in this report is taken as 0.14.

Therefore, the seismic coefficient (Ke) is calculated as follows:

$$Ke = 1.0 \times 1.0 \times 1.0 \times 0.14$$
$$= 0.14$$

Then, the design seismic coefficient in this report is set at 0.15.

Appendix 9.2.2 Projected Water Depth

Figs. A and B show the relationship between dead weight tonnage (DWT) and draft of container vessels and general cargo ships respectively which entered South Harbor from 1980 through 1985.

According to Figs. A and B, it is clear that the most of the drafts of container vessels and general cargo ships which entered South Harbor are less than 10.0m. There are a few vessels of over 20,000 DWT the draft of which are over 10.0m. These vessels, however, were moored at the Anchorage area for discharge and did not berth at the piers, according the port record.

The standard full draft (SFD) line (solid line) is shown in Figs. A and B respectively. According to Fig. A, the SFD of the container vessels over 20,000 DWT is over 10.0m. According to Fig. B, the SFD of the general cargo ships over 21,500 DWT is over 10.0m. However, Figs. A and B show that the drafts of the container vessels over 20,000 DWT and the general cargo ships over 21,500 DWT which entered South Harbor are less than SFD. This means that these vessels/ships did not enter South Harbor with a full load. Moreover, it is also estimated that the draft of vessels/ships which entered South Harbor was not especially adjusted in advance because points showing the draft depth scatter between 5.0 and 10.0 m.

Judging from the above mentioned date, there is no problem with ships entering and leaving the port under the present water depth of South Harbor (MLLW-10.0m). Therefore the projected water depth (MLLW-10.0m) was adopted for the study.

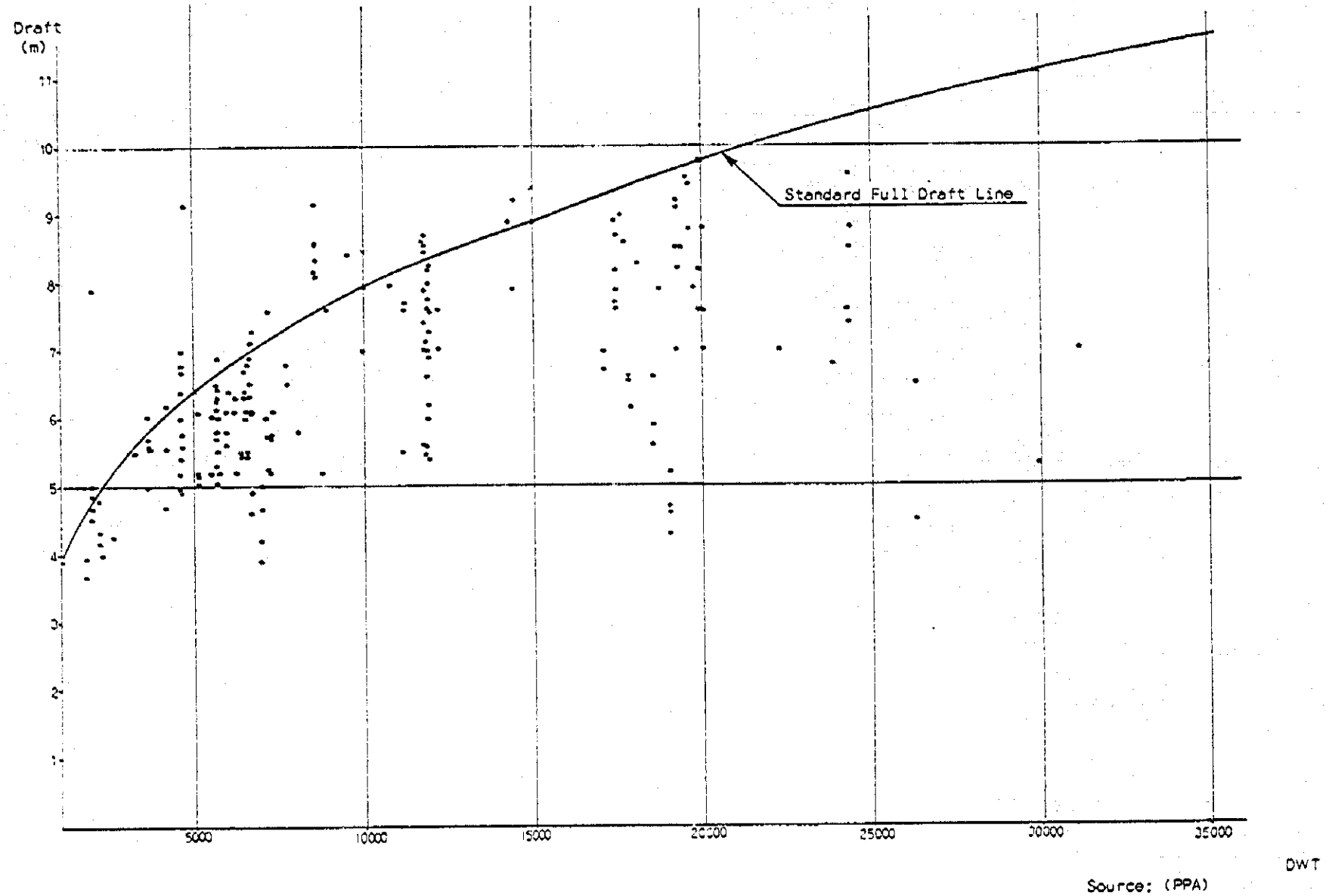


Fig. A Relationship between DWT and Draft of Container Vessels (1980 - 1985, South Harbor)

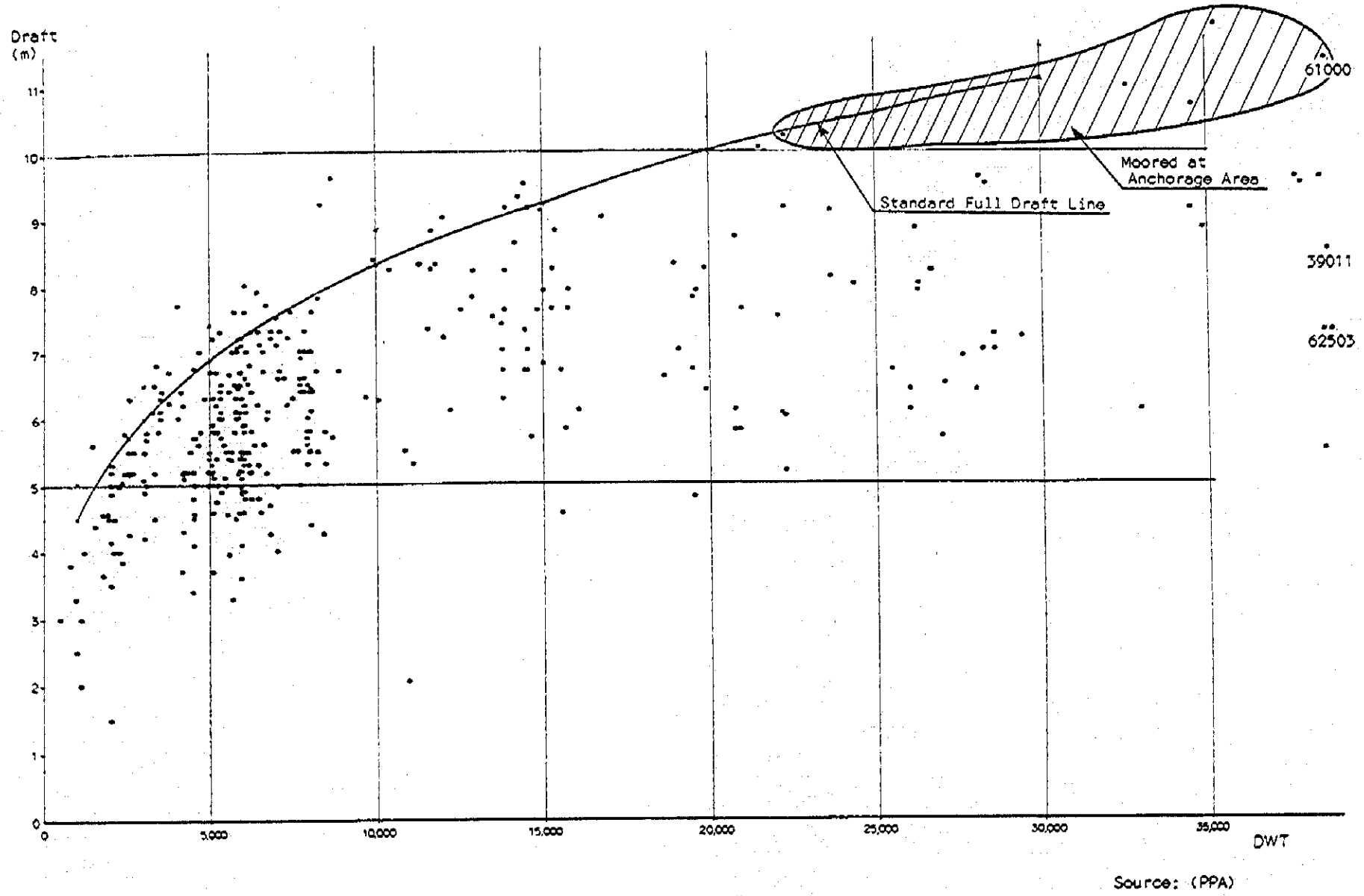
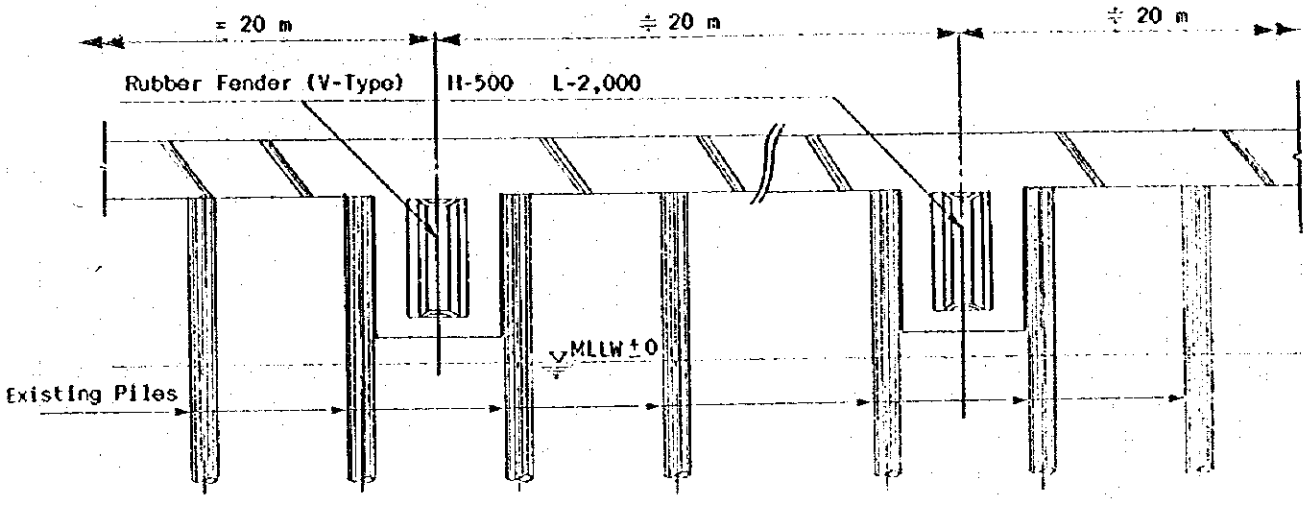
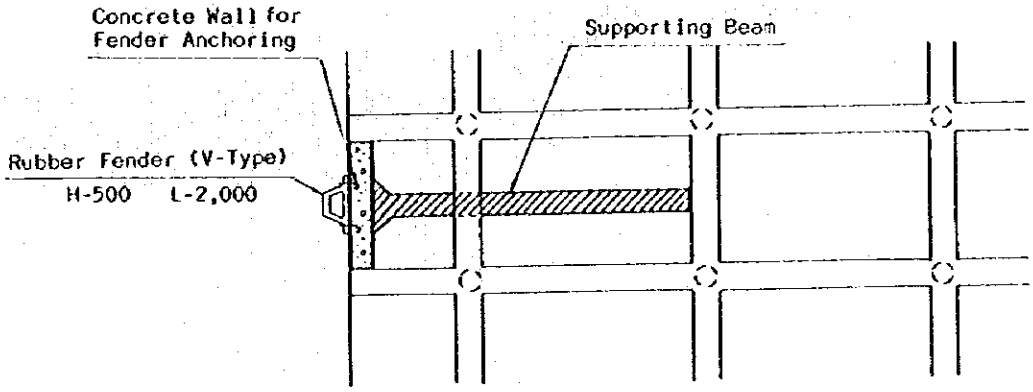


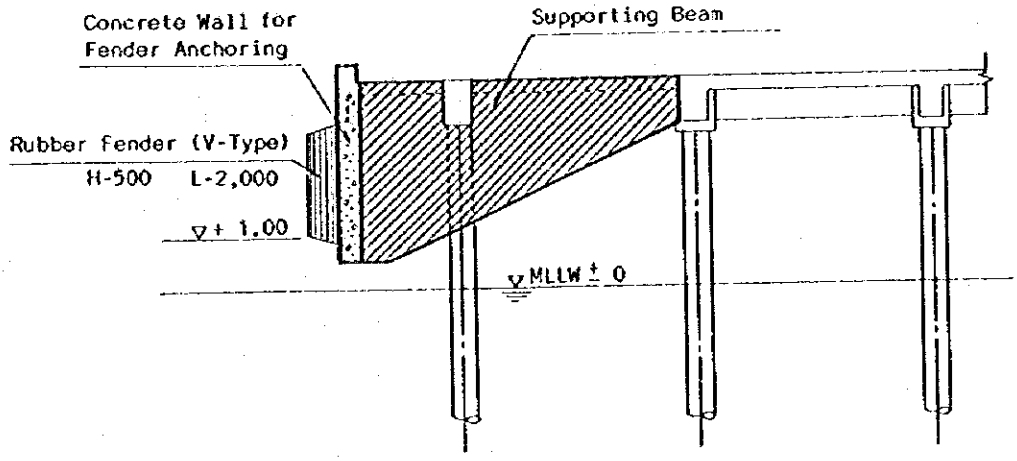
Fig. B Relationship between DWT and Draft of General Cargo Ships (1980 - 1985, South Harbor)



Front View



Plan of Supporting Beam



Section of Supporting Beam

Appendix 9.3.1 Installation of Additional Rubber Fender
(For Reference Only)

Appendix 9.6.1 Rough Construction Cost Estimate (Master Plan)

(in 1,000 pesos, 1$=20.5P=¥154)

Repair/Improvement Work Item	Master Plan				Remarks
	Alternative 1	Alternative 2	Alternative 3	Alternative 4	
1. Pier 3					
Slab and Beam	8,570	8,570	no improvement	same as Alternative 1	
Fender	12,330	12,330			
Leveling-up of Lowered Passage	24,640				
Sub-total	45,540	20,900		45,540	
2. Pier 5					
Fender	16,060		16,060*2		
Demolition of Transit Shed	8,000	same as Alternative 1		same as Alternative 1	*1) including repair works of slab and beam
Leveling-up of Lowered Passage	47,910*1				*2) no improvement except fender
Sub-total	71,970	71,970	16,060	71,970	
3. Pier 9					
Fender	8,830				
Leveling-up of lowered passage	35,130*3	same as Alternative 1	same as Alternative 1	same as Alternative 1	*3) including repair works of slab and beam
Extension Works	134,340				
Sub-total	178,300	178,300	178,300	178,300	
4. Pier 13					
Slab and Beam	3,630				
Fender	16,590				*4) gravity type including soil improvement
Demolition of the Pier		same as Alternative 1	20,910	20,910	*5) including soil improvement
Quaywall			867,360*4		
Reclamation			218,180*5		
New CFS (Transit Shed)			28,090	16,190	
New Pier				723,640*6	*6) steel pile type
Sub-total	20,220	20,220	1,134,540	761,460	
5. Pier 15					
Slab and Beam	6,520	8,670	6,520		*7) including repair works of Slab and Beam
Fender	16,060	16,060	16,060		*8) including improvement works for straddle carriers
Leveling-up of Lowered Passage	41,340*7	58,980*8	41,340*7		*9) steel pile type
Demolition of Transit Shed	4,010	4,010		same as Alternative 1	
Extension Works			101,360*9		
Sub-total	67,930	83,720	165,280	67,930	
6. Back-up Area					
Pavement (CY-01)	37,820				
- do - (CY-02)		4,130			
Demolition and Reconstruction (Block 141)	28,880	28,080		same as Alternative 1	
Demolition (Block 147, 150 and 155)	13,190	13,190	13,190		
Demolition and Pavement (Block 171)		11,400	11,400		
Improvement (Block 181)		1,250			
Sub-total	79,890	59,570	24,590	79,890	
7. Dredging					
Slips/Piers	20,000	same as Alternative 1	same as Alternative 1	same as Alternative 1	
Anchorage	31,000				
Sub-total	51,000	51,000	51,000	51,000	
8. Grain Terminal					
Floating Unloader	233,400*10	233,400			*10) including renovation cost (6.7 MP/set)
Site Preparation	130,920*10	19,130*11	same as Alternative 1	same as Alternative 1	*11) conversion of P-3 into Grain Terminal
Civil Work and Equipment/Mechanical	299,000	224,250			
Sub-total	663,320	476,780	663,320	663,320	
9. Engineering Fee	94,230	77,040	178,610	153,599	
10. Total (in 1,000 pesos)	1,272,400	1,039,500	2,411,700	2,073,000	
11. Contingency	127,600	103,500	241,300	207,000	
12. Grand Total	1,400,000	1,143,000	2,653,000	2,280,000	
13. Relative Comparison	1.00	0.82	1.90	1.63	

Note: 1. Above cost estimate is based on the survey as of Aug. '86
2. The following cost/fees are not included:
1) repair/improvement cost for West and South Breakwaters
2) maintenance dredging cost (400,000m³/year)
3) price escalation from Aug. '86 through June '87
4) withholding and contractor's taxes
5) supervising fee
6) repair/improvement of navigation aids
3. Dredging areas are shown in AFP. 9.6.3.

Appendix 9.6.2 Additional Rough Construction Costs and Fees

1. Repair/Improvement Cost for West and South Breakwaters
   Rubble-mound: $12,000m^3$ x $350P/m^3$ = 4,200,000 P

2. Maintenance Dredging: $400,000m^3$/year x 55 P/m^3 = 22,000,000 P/year

3. Price Escalation (Source: Asian Development Bank)

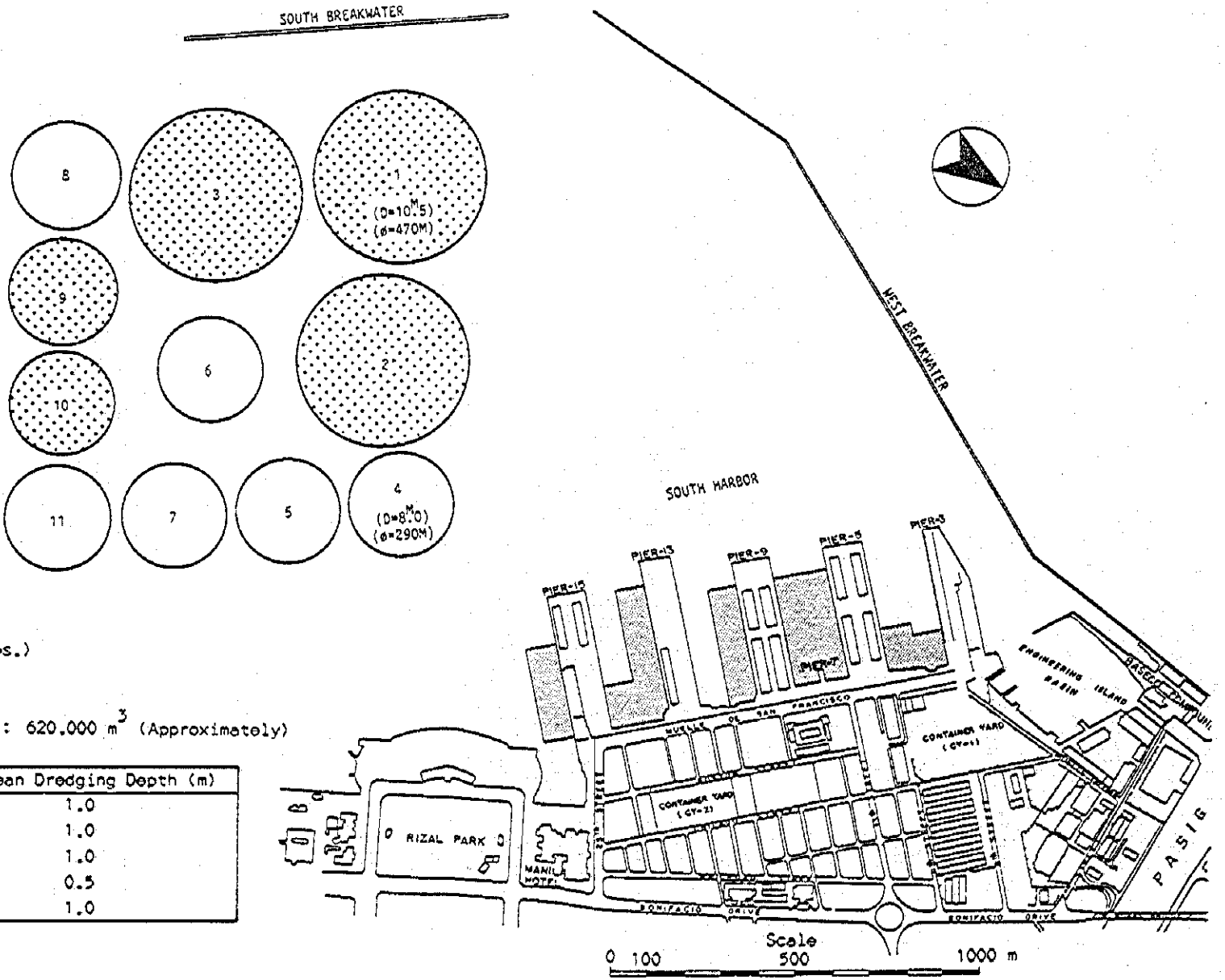
	1986 (Sep-Dec)	1987	1988	1989	1990	1990	1992
Local Currency Portion	6.7%	6%	4%	4%	4%	4%	4%
Foreign Currency Portion	4.0%	3%	1%	1%	1%	3.5%	3.5%

4. Withholding Tax
   Five (5) percent of the total contract price is usually deducted by the purchaser at each disbursement.
   One (1) percent: expanded with holding tax
   four(4) percent: Contractor's tax

5. Supervising Fee
   8,000,000 P/year

6. Repair/Improvement of Navigation Aids
   12,000,000 P

Note: All costs include indirect construction costs and contingencies (10%)



Legend

1. Anchorage Area

○ : Anchorage (11 Nos.)

▨ : Dredging Area

Total Dredging Volume : 620.000 m^3 (Approximately)

Anchorage No.	Mean Dredging Depth (m)
No. 1	1.0
No. 2	1.0
No. 3	1.0
No. 9	0.5
No. 10	1.0

2. Piers and Slips Area

▨ : Dredging Area

Total Dredging Volume : 400.000 m^3 (Approximately)

Proposed Water Depth : MLLW - 10.5 m

Appendix 9.6.3 Proposed Derdging Area

Appendix 10.2.1 Sample of Data Input Sheet for Port Statistics

Coding Sheet For Cargo Movement at The Port of Manila
(Foreign Trade, 1985)

ZONE	MONTH	ENTRY NO	SH. T.	FLAG	G.R.T.	D.W.T	L.O.A.	SER. T.	LAST PORT	NEXT PORT	DAYS OF STAY	MOORING HOURS	IMP/EXP.	CMDTY	PACK T	WEIGHT	REMARKS

SH. T. - SHIP TYPE
SER. T. - SER. TYPE
IMP. - IMPORT
EXP. - EXPORT
CMDTY. - COMMODITY
PACK T. - PACK TYPE

PORT OF MANILA
MASTER SHEET PER VESSEL ACTIVITY (FOREIGN TRADE, 1985

A	IDENTIFICATION							
1. MOORING FACILITY/ZONE		2. NAME OF SHIP		3. NO. OF DPR.		4. ENTRY NO.		
5. TYPE OF SHIP		6. TYPE OF REGISTRY		7. G.R.T.		8. D.W.T		
9. L.O.A								
10. TYPE OF SERVICE		11. LAST PORT OF CALL		12. NEXT PORT OF CALL				
B.	SHIP MOVEMENT							
13. ARV AT PORT	Mo. Day Hr. Min	14. DPR. FR. PORT	Mo. Day Hr. Min.	15. DAYS of STAY at port				
16. ARV AT BERTH	Mo. Day Hr. Min	17. DPR FR. BERTH	Mo. Day Hr. Min.	18. MOORING HOURS AT BERTH				
C	CARGO MOVEMENT							
	IMPORT CARGO							
19. COMMO-DITY			20. PACKING TYPE		21. WT.			
22. TOTAL								
	EXPORT CARGO							
23. COMMO-DITY			24. PACKING TYPE		25. WT.			
26. TOTAL								

CODE OF TYPE OF SERVICE

CODE NO.	TYPE OF SERVICE
1	Liner
2	Tramper

COMMODITY CLASSIFICATION

CODE NO.	NAME OF COMMODITY	CODE NO. OF PSCC
01	Dairy Products	Division 02
02	Fish & Fish Preparation	Division 03
03	Wheat & Wheat Preparation	041,046
04	Other Cereals	Division 04 exclusing 041,046
05	Feeding Stuff	Division 08
06	Other Food	Section 0 exclusing above
11	Tobacco	Division 12
21	Wood & Wood Manufactures (excluding furniture)	Division 24, 63
22	Paper and Pulp	Division 25, 64
23	Textile Fibers	Division 26
24	Crude Fertilizers & Crude Minerals	Division 27
25	Metalliferous Ores & Metal Scrap	Division 28
32	Mineral Fuels	Section 3
41	Coconut Oil	424,31, 424.32
42	Other Coconut Products	
43	Other Animal & Vegetable Oils	Section 4 exclusing Coconut Products
51	Fertilizer	Divisiion 56
52	Chemicals	Sections exclusing Fertilizer
61	Textile & Garment Products	Division 65

COMMODITY CLASSIFICATION

CODE NO.	NAME OF COMMODITY	CODE NO. OF PSCC
62	Iron & Steel	Division 67
63	Non-Ferrous Metals	Division 68
64	Manufactures of Metal, n.e.s.	Division 69
71	Machinery & Transport Equipment	Section 7
81	Miscellaneous Others	Section 8

CODE FOR PORT OF CALL

CODE NO.	CLASSIFICATION OF PORT OF CALL
01	Philippine Local
02	U.S.A.
03	Other North or South American
04	Japan
05	Taiwan
06	Hong Kong
07	Other East Asia
08	Singapore
09	Other ASEAN Countries
10	Australia/New Zealand
11	Europe
12	Others Ports

CLASSIFICATION FOR PACKING TYPE

CODE NO.	PACKING TYPE
01	Loose (Break-Bulk) Cargo
02	Containerized Cargo
03	Bulk (Dry)
04	Liquid

CODE OF MOORING FACILITY/ZONE

NAME NO.	NAME OF MOORING FACILITY/ZONE
01	South Harbor Pier 3
02	South Harbor Pier 5
03	South Harbor Pier 9
04	South Harbor Pierr 13
05	South Harbor Pier 15
06	South Harbor Anchorage
11	MICT Berth
12	MICT Anchorage

CLASSIFICATION FOR TYPE OF SHIP

CODE NO.	NAME OF SHIP TYPE
1	Conventional General Cargo Ship
2	Semi-Container
3	Container Ship
4	Ro-Ro Ships
5	Bulk Carrier
6	Tanker
7	Passenger Ship
8	Others

CODE OF FLAG REGISTRY

CODE NO.	FLAG OF REGISTRY
1	Philippine
2	Foreign Country

Appendix 11.2.1 Economic Service Life

No.	Assets	Economic Service Life in Years
1	Breakwater	50
2	Causeways	50
3	Wharves/Piers	
	a) Timber Decks	50
	b) Concrete Wharfs	50
	c) Concrete Piers	50
	d) Docks	50
	e) Quays	50
	f) Jetties	50
	g) Slips	50
	h) Fender Systems (Rubber)	10
	i) Fender Systems (Wooden)	5
	j) Mooring Buoys	10
4	Navigation Aids and Lighthouses	
	a) Lighthouses	25
	b) Lighting Fixtures	5
5	Buildings and Structures	
	a) Office Buildings	30
	b) Workshops	30
	c) Terminal Offices	30
6	Warehouses	
	a) Warehouses	30
	b) Open Storage Areas	30
	c) Transit Sheds	30
	d) Cargo Sheds	30
7	Roads and Pavements	
	a) Roads	20
	b) Pavement	20
8	Other Port Facilities	
	a) Fences	15
	b) Gates	15

Source: PPA Memorandum Order No. 32-79 (1977)

Appendix 11.2.2 Average Exchange Rates of Peso

	1 U.S. dollar =		1 U.S. dollar =	
1978	7.38	Pesos	194.60	Yen
1979	7.42	Pesos	239.70	Yen
1980	7.60	Pesos	203.00	Yen
1981	8.20	Pesos	219.90	Yen
1982	9.17	Pesos	235.00	Yen
1983	14.00	Pesos	232.20	Yen
1984	16.64	Pesos	251.10	Yen
1985	18.709	Pesos	254.10	Yen
1986	20.326	Pesos	177.81	Yen
1986 August	20.552	Pesos	154.00	Yen

Source: Philippine Yearbook 1985
Central Bank of the Philippines Annual Report

Appendix 11.2.3 Cargo Throughput under the "With" Case (1000 Tons)

Ship Type	Semi-Container*2				Conventional				Bulk				Iron & Steel		Lumber	Bagged Fertilizer				Self-Sustaining Container				Grain	Tank
Ship Class	-10,000		10,001-		-10,000		10,001-		-10,000		10,001-		-10,000	10,000-	10,001-	-10,000		10,000-		-10,000		10,000-		Ave 30,000	
Area	P*1	P	P	P	A*1	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P
Year																														
1988																														
1989																														
1990	(28)	74	(12)	32	62	177	249	266	37	54	148	215	50	50	62	64	16	64	16	223		149		673		289				
1991	(29)	74	(12)	32	63	181	253	271	39	56	156	225	55	54	60	63	21	64	21	224		149		724		300				
1992	(29)	74	(12)	32	64	185	256	277	41	59	165	235	59	59	58	63	26	63	26	224		149		775		310				
1993	(30)	75	(13)	32	65	188	260	282	44	61	173	244	64	63	57	62	31	63	31	225		150		827		321				
1994	(30)	75	(13)	32	66	192	263	288	46	64	182	254	68	68	55	62	36	62	36	225		150		878		331				
1995	(31)	75	(13)	32	67	196	267	293	48	66	190	264	73	72	53	61	41	62	41	226		150		929		342				
1996	(32)	77	(14)	33	67	204	269	306	49	69	195	277	69	69	52	56	44	57	44	231		154		989		356				
1997	(33)	78	(14)	34	68	213	271	319	50	72	200	289	66	65	50	52	47	52	47	236		157		1048		370				
1998	(35)	80	(15)	34	68	221	274	331	52	76	205	302	62	62	49	47	51	48	51	242		161		1108		385				
1999	(36)	81	(15)	35	69	230	276	344	53	79	210	314	59	58	47	43	54	43	54	247		165		1167		399				
2000	(37)	83	(16)	36	69	238	278	357	54	82	215	327	55	55	46	38	57	38	57	252		168		1227		413				
2001	(38)	88	(16)	38	71	246	285	369	57	86	226	343	60	60	45	35	64	35	64	268		179		1301		431				
2002	(39)	93	(17)	40	73	254	293	380	60	90	237	360	65	65	43	32	71	32	71	284		189		1375		450				
2003	(40)	99	(17)	43	75	261	300	392	62	94	249	376	70	70	42	29	78	29	78	299		200		1449		468				
2004	(41)	104	(18)	45	77	269	308	403	65	98	260	393	75	75	40	26	85	26	85	315		210		1523		487				
2005	(42)	109	(18)	47	79	277	315	415	68	102	271	409	80	80	39	23	92	23	92	331		221			1597	505				
2006	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		↓		↓		↓				
2007																														
2008																														
2009																														
2010																														
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2015																														
2016																														
2017	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▼		▼		▼				

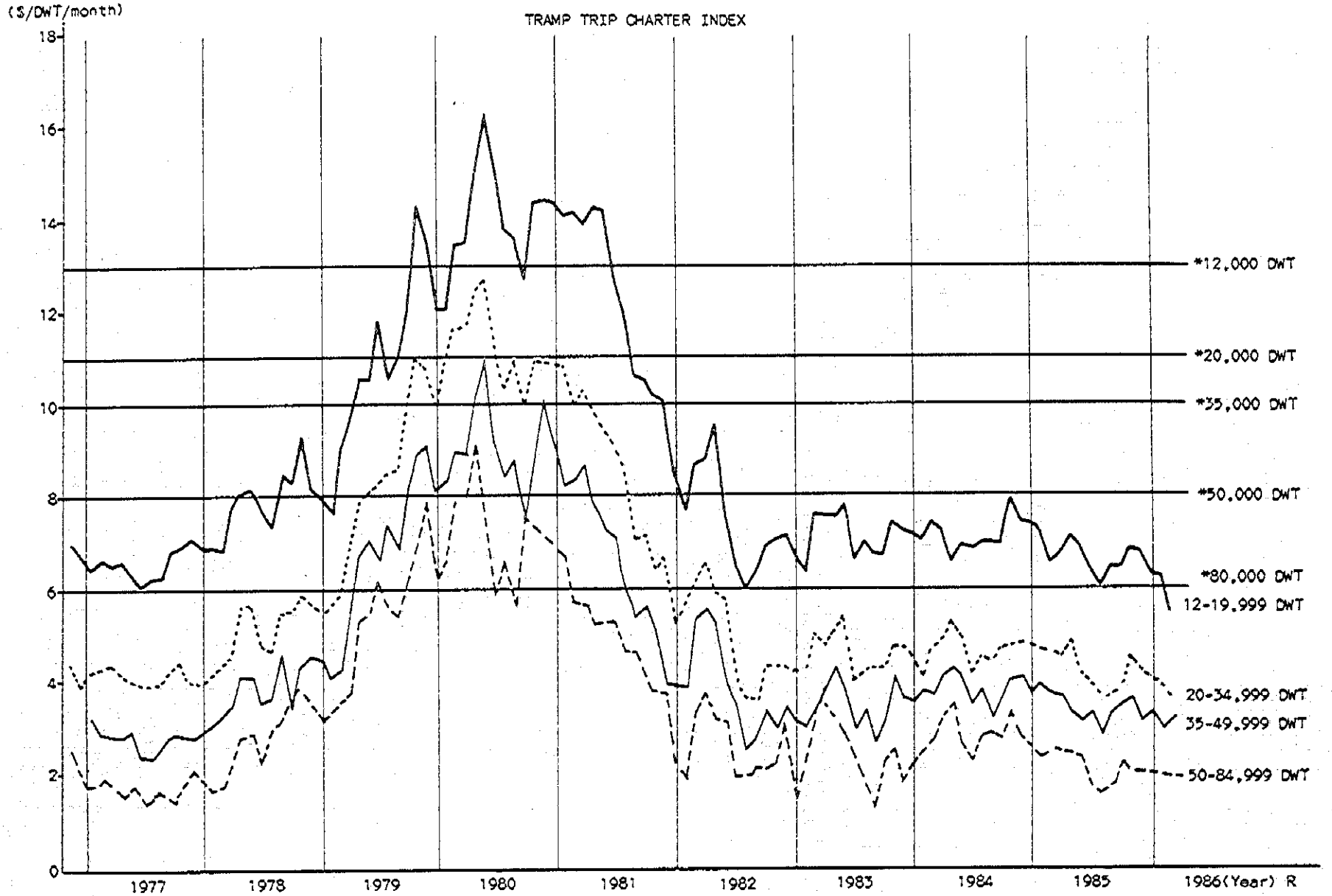
Note: *1 A: Anchorage P: Pier
*2 Figures in parentheses show the volume of loose cargo.

Appendix 11.2.4 Cargo Throughput under the "Without" Case (1000 Tons)

Ship Type	Semi-Container*2				Conventional				Bulk				Iron & Steel				Lumber	Bagged Fertilizer		Self-Sustaining Container		Grain	Tank
Ship Class	-10,000		10,001-		-10,000		10,001-		-10,000		10,001-		-10,000		10,000-		10,001-	-10,000	10,000-	-10,000	10,000-	Ave 30,000	
Area	P*1	P	P	P	A*1	P	A	P	A	P	A	P	A	P	A	P	A P	A P	A P	A P	A P	A P	A P
Year																							
1988																							
1989																							
1990	(28)	74	(12)	32	62	177	249	266	37	54	148	215	15	35	15	35	62	80	80	223	149	673	289
1991	(29)	74	(12)	32	63	181	253	271	39	56	156	225	16	38	16	38	60	85	84	224	149	724	300
1992	(29)	74	(12)	32	64	185	256	277	41	59	165	235	17	41	18	41	58	89	89	224	149	775	310
1993	(30)	75	(13)	32	65	188	260	282	44	61	173	244	19	45	19	45	57	94	93	225	150	827	321
1994	(30)	75	(13)	32	66	192	263	288	46	64	182	254	20	48	21	48	55	98	98	225	150	878	331
1995	(31)	75	(13)	32	67	196	267	293	48	66	190	264	21	51	22	51	53	103	102	226	150	929	342
1996	(32)	77	(14)	33	68	203	273	303	49	69	195	277	20	48	21	48	52	101	101	231	154	989	356
1997	(33)	78	(14)	34	70	209	278	313	50	72	200	289	19	46	20	46	50	100	99	236	157	1048	370
1998	(35)	80	(15)	34	71	216	284	324	52	76	205	302	18	43	19	43	49	98	98	242	161	1108	385
1999	(36)	81	(15)	35	73	222	289	334	53	79	210	314	17	41	18	41	47	97	96	247	165	1167	399
2000	(37)	83	(16)	36	74	229	295	344	54	82	215	327	16	38	17	38	46	95	95	252	168	1227	413
2001	(38)	88	(16)	38	75	238	301	357	57	86	226	343	18	42	18	42	45	99	99	268	179	1301	431
2002	(39)	93	(17)	40	77	246	307	370	60	90	237	360	19	45	20	45	43	103	103	284	189	1375	450
2003	(40)	99	(17)	43	78	255	313	382	62	94	249	376	21	49	21	49	42	107	107	299	200	1449	468
2004	(41)	104	(18)	45	80	263	319	395	65	98	260	393	22	52	23	52	40	111	111	315	210	1523	487
2005	(42)	109	(18)	47	81	272	325	408	68	102	271	409	24	56	24	56	39	115	115	331	221	1597	505
2006	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
2007																							
2008																							
2009																							
2010																							
2011																							
2012																							
2013																							
2014																							
2015																							
2016																							
2017	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼

Note: *1 A: Anchorage P: Pier
*2 Figures in parentheses show the volume of loose cargo

Appendix 11.3.1 Ship Cost



Source: General Conncil of British Shipping

Appendix 11.3.2 Foreign Trade of the Philippines, By Nationality of Vessel

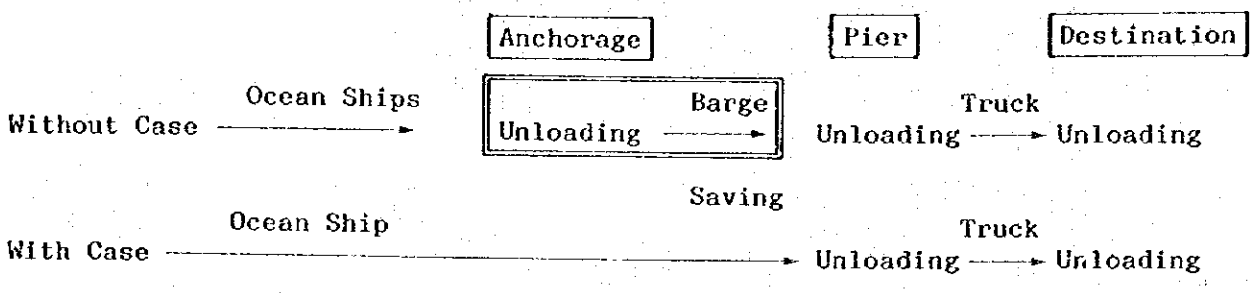
Year	Trade	Nationality of Vessel	
		Philippines (%)	Foreign (%)
1983	Exports	15.7	84.3
	Imports	35.7	64.3
	Total	28.1	71.9
1984	Exports	13.3	86.7
	Imports	40.0	60.0
	Total	27.8	72.2
1985	Exports	15.0	85.0
	Imports	33.2	66.8
	Total	25.0	75.0

Source: Foreign Trade Statistics of the Philippines (1984, 1985)
Philippine Year Book 1985

Appendix 11.3.3 Calculated Savings in Ships' Staying Costs

Ship Type	Ship Class	Average Loading and Unloading	Average DWT	Ship Cost $/ship/day	Staying Time(days)		Staying Cost ($1000)		65% of Staying Cost ($1000)	
					1995	2005	1995	2005	1995	2005
1 Conventional	-10,000	1,100	6,000	2,600	52	204	135.2	530.4	87.9	344.8
2 Conventional	10,001-	4,600	17,000	6,600	58	285	382.8	1,881.0	248.9	1,222.7
3 Semi-Container	-10,000	1,800	8,000	3,500	13	111	45.5	388.5	29.6	252.6
4 Semi-Container	10,001-	2,400	22,000	8,000	18	168	144.0	1,344.0	93.6	873.6
5 Self-Container	-10,000	2,400	6,000	2,600	17	126	44.2	327.6	28.8	213.0
6 Self-Container	10,001-	2,200	16,000	6,300	59	666	371.7	4,195.8	241.7	2,727.3
7 Bulk	-10,000	4,400	7,000	3,100	16	46	49.6	142.6	32.3	92.7
8 Bulk	10,001-	12,600	20,000	7,400	56	360	414.4	2,664.0	269.4	1,731.6
9 Iron & Steel	-10,000	1,800	7,000	3,100	77	111	238.7	344.1	155.2	233.7
10 Iron & Steel	10,001-	5,500	20,000	7,400	57	145	421.8	1,073.0	274.2	697.5
11 Lumberr		3,000	28,000	9,700	38	139	368.6	1,348.3	239.6	876.4
12 Fertilizer	-10,000	4,400	7,500	3,300	19	50	62.7	165.0	40.8	107.3
13 Fertilizer	10,001-	8,800	15,000	6,000	20	37	120.0	222.0	78.0	144.3
				Total	500	2,448	2,799.2	14,626.3	1,820.0	9,507.5

Appendix 11.3.4 Cargo Flow of Fertilizer, Iron and Steel



Appendix 11.3.5 Saved Labor (man·hours)

Ship Type	Ship Class	Cargo Volume (1000 ton) *1 (Without) 1995 A*5	1995 P*5	2005 A	2005 P	Cargo Volume (1000 ton) *1 (With) 1995 A	1995 P	2005 A	2005 P	Handling Productivity *1 (tons/ship·hour) (Without) A	P	Labor/ship	Handling Productivity *1 (tons/ship·hour) (with) A	P	Labor/ship	Labor (man·hours) (without) 1995	Labor (man·hours) (without) 2005	Labor (man·hours) (with) 1995	Labor (man·hours) (with) 2005	Saved labor (man·hours) (without-with) 1995	Saved labor (man·hours) (without-with) 2005
Semi-Container	-10,000	(31)	75	(42)	109	(31)	75	(42)	109	-	145+(35)	2gx9=18	-	198+(43)*2	2gx9=18	32,339	44,731	26,283	35,092	6,056	9,639
	10,001-	(13)	32	(18)	47	(13)	32	(18)	47			2.9gx9=(26)		225+(43)*3	3gx9=(27)	12,630	19,206	11,072	15,062	2,558	4,144
Conventional	-10,000	67	196	81	272	67	196	79	277	21	35	3gx9=27	21	43	3gx9=27	237,343	313,971	209,212	275,501	28,131	38,470
	10,001-	267	293	325	408	267	293	315	415							569,315	732,600	527,262	665,581	42,053	67,019
Bulk Cargo	-10,000	48	66	68	102	48	66	68	102	39	62	3gx9=27	39	70	3gx9=27	61,973	91,496	58,687	86,419	3,286	5,077
	10,001-	190	264	271	409	190	264	271	409							246,507	365,728	233,367	345,372	13,140	20,356
Iron & Steel	-10,000	21	51	24	56		73		80	21	34	2.5gx9=23	21	70	2.5gx9=23	71,706	80,403	23,985	26,285	47,721	54,118
	10,001-	22	51	24	56		72		80							73,477	80,403	23,657	26,285	49,820	54,118
Lumber	10,001-		53		39		53		39	21	33	2.6gx9=24	21	50	3gx9=27	38,546	28,363	28,620	21,060	9,926	7,303
Bagged fertilizer	-10,000	103		115		61	41	23	92	39	53	3.5gx9=31.5	39	70	3.5gx9=31.5	132,525	147,964	88,130	67,673	44,395	80,291
	10,001-	102		115		62	41	23	92			3gx9=27*4			3gx9=27*4	131,238	147,964	89,273	67,673	41,965	80,291
Self-sustaining	-10,000		226		331		226		331	-	145	2gx9=18	-	198 *2	2gx9=18	28,055	41,090	20,545	26,480	7,510	14,610
Container	10,001-		150		221		150		221					225 *3		18,621	27,434	13,636	17,680	4,985	9,754
																			Total	301,546	445,190

Note: *1 ( ): loose cargo at pier
*2 1995
*3 2005
*4 at Anchorage
*5 A: Anchorage P: Pier

Appendix 11.3.6 Legislated Minimum Daily Wage Rates in the Private Sector
By Type of Compensation: 1972 - 1984
(Nominal Terms : Pesos)

SECTOR/TYPE	1980	1981	1982	1983	1984 MAY 1	1984 JUNE 16	1984 NOV. 1
Nonagricultural Sector							
National Capital Region (M.M.)							
Total	29.85	31.82	31.82	42.07	43.67	51.92	57.08
Minimum Wage	14.00	18.00	18.00	21.00	32.00	35.00	37.00
Cost of Living Allowance	14.68	12.32	12.32	19.32	9.00	14.00	17.00
13th Month Pay	1.17	1.50	1.50	1.75	2.67	2.92	3.08
Regions Outside Metro Manila							
Total	28.76	30.74	30.74	40.99	42.58	50.83	56.00
Minimum Wage	13.00	17.00	17.00	20.00	31.00	34.00	36.00
Cost of Living Allowance	14.68	12.32	12.32	19.32	9.00	14.00	17.00
13th Month Pay	1.08	1.42	1.42	1.67	2.58	2.83	3.00
Agricultural Sector							
Plantation							
Total	24.70	26.17	26.17	34.42	35.75	42.50	46.67
Minimum Wage	11.00	15.00	15.00	18.00	27.00	30.00	32.00
Cost of Living Allowance	12.78	9.92	9.92	14.92	6.50	10.00	12.00
13th Month Pay	0.92	1.25	1.25	1.50	2.25	2.50	2.67
Nonplantation							
Total	18.67	19.65	19.65	25.90	26.75	32.00	35.67
Minimum Wage	10.00	14.00	14.00	17.00	21.00	24.00	26.00
Cost of Living Allowance	7.84	4.48	4.48	7.48	4.00	6.00	7.50
13th Month Pay	0.83	1.17	1.17	1.42	1.75	2.00	2.17

Source: National Wages Council
Philippine Yearbook 1985

Appendix 11.3.7 Tug and Barge Operating Costs (1980)

(Excluding Fuel Taxes)

	TUG	BARGE	
1. Premises			
a) Capacity	1,200 BHP	1,200 DWT	
b) Purchase Price (5 years old)	₱ 6.6 million	₱ 1.8 million	
c) Speed	6 knots	-	One leg empty
d) Life (remaining)	11 years	15 years	
e) Operating Days	310	310	
2. Annual Operating Costs (₱ '000)			
a) Depreciation and Interest	1,155	255	
b) Wages/Salaries	516	52	
c) Maintenance & Repairs	150	28	
d) Supplies	208	20	
e) Insurance	123	20	
Total Cost (₱ '000)	2,152	375	
3. Daily Cost in Port	6,942	1,210	
4. Daily Fuel Cost at Sea	14,920	-	
5. Daily Cost at Sea	21,862	1,210	
6. Ship Costs at Sea			
a) Tons Carried per Voyage	1,920		Two-1200 ton Barges (80%)
b) Distance Covered per Day (Km)	266		1 knot=1.85 Km
c) Ton-Kilometers per Day	702,720		
d) Daily Tug & Barge Costs at Sea (₱)	0.035		(21862+2x1210) ÷ 702,720
e) Tug & Barge Costs per Ton-km (₱)	0.07		No backhaul
7. Ship Costs in Port			
a) Tons handled per day in Port	500 - 1000		
b) Daily Cost of Tug and Barges in Port (₱)	9,362		6942+2x1210
c) Cost per Ton of Cargo in Port (₱)	19 - 9.5		

Source: NTPP Final Report Part V (1982)

Appendix 11.3.8 Consumer Price Index, 1974 - 1986
(1978 = 100.0)

Year	All Items	Growth Rate (Percent)	CONSUMER PRICE INDEX					
			Food, Beverages & Tobacco	Clothing	Housing and Repairs	Fuel, Light & Water	Services	Miscellaneous Items
1974	72.5	34.5	74.5	72.5	68.2	68.8	68.5	70.9
1975	77.5	6.9	78.5	79.5	71.0	75.4	76.6	80.0
1976	85.0	9.7	86.0	83.0	80.5	83.6	83.1	89.0
1977	93.0	9.4	94.0	91.3	90.9	89.4	91.9	93.8
1978	100.0	7.5	100.0	100.0	100.0	100.0	100.0	100.0
1979	117.5	17.5	115.6	117.9	118.3	127.6	121.1	119.1
1980	138.9	18.2	132.6	144.2	137.4	173.8	152.0	139.8
1981	157.1	13.1	149.8	162.0	154.7	211.5	171.2	153.3
1982	173.2	10.2	162.5	178.2	180.3	240.0	192.9	165.9
1983	190.5	10.0	176.5	194.5	200.3	281.6	216.8	180.6
1984	286.4	50.3	271.5	303.7	266.6	426.8	311.9	278.1
1985	352.6	23.1	332.0	387.3	334.3	548.3	366.0	345.6
1986	358.9	1.8	334.7	404.6	354.5	534.6	374.7	358.9

Source: 1984 Economic and Social Indicators (NEDA)

Source of Basic Data: NCSO, Prices Division

Appendix 11.3.9 Data for Calculation of Savings in Time Cost

1) Cargo Volume (South Harbor: 1000 tons)

	1990	1995	2000	2005
Imp.	2,521 (84%)	3,066 (85%)	3,589 (85%)	4,489 (85%)
Exp.	489 (16%)	526 (15%)	609 (15%)	746 (15%)
Total	3,010(100%)	3,592(100%)	4,198(100%)	5,235(100%)

2) Reduction in ships' staying period (days)

	1990	1995	2000	2005
Total (Imp+Exp)	454	500	1,142	2,448
Imp.	381 (84%)	425 (85%)	970 (85%)	2,080 (85%)
Exp.	73 (16%)	75 (15%)	172 (15%)	368 (15%)

3) Average Cargo Value (Exports)

Commodity (Export)	Share of Exports A (%)		Cargo Value B ($/ton)	A x B ($/ton)	
	1995	2005	1986	1995	2005
1) Fish & Fish Preparations	3	5	2,976	90	149
2) Feedstuff	3	3	83	3	3
3) Other Food	15	16	271	41	44
4) Wood & Wood Manufactures	12	6	276	33	17
5) Coconut Oil (liquid)	15	11	1,236	186	136
6) Other Coconut Products	9	6	1,733	156	104
7) Other	43	53	1,000	430	530
Total	100	100		939	983
				Average	960

Source: Foreign Trade Statistics (1985 P429)
Central Bank of the Philippines Annual Report

Appendix 11.4.1 Annual Construction Costs at Market Prices (1,000 Pesos)

	Without Case	1988	1989	1990	1991	1992	1993	1994
1) Pier 3								
o Repair of Slab and Beam	O			9,430				
o Fender	O				13,560			
2) Pier 5								
o Additional Central Upper Deck				52,700				
o Fender	O			17,670				
o Demolition of Transit Shed			8,800					
3) Pier 9								
o Central Upper Deck					38,640			
o Fender	O			9,710				
o Extention Work				73,890				
4) Pier 13								
o Repair of Slab and Beam	O		3,990					
o Fender	O		18,250					
5) Pier 15								
o Repair	O		3,580	3,590				
o Central Upper Deck			22,740	22,730				
o Fender			17,670					
o Demolition of Transit Shed			4,410					
6) Back-Up Area								
o Pavement (CY-01)				20,800	20,800			
o Demolition and Reconstruction (Block 141)					31,770			
o Demolition (Block 147,150)								
7) Grain Terminal								
o Floating Unloader								
8) Dredging								
o Slips/piers	O		5,500	5,500	5,500	5,500		
o Anchorage				11,330	11,330	11,470		
o Maintenance Dredging	O		—	—	—	—	—	—
9) Engineering Fee (8%)		36,140						
Total (With Case)		36,140	84,940	227,350	121,600	16,970		
(Without Case)		8,140	31,320	45,900	19,060	5,500		

Appendix 11.4.2 Costs and Benefits at Market Prices

Year	Costs (1000 pesos)							Benefits (1000 pesos)				
	With Case		Without Case (Avoidable Costs)		(With-Without) Case			Ships' Staying Costs	Cargo Handling Costs		Time Costs	Total Benefits
	Construction Costs	Maintenance Costs	Construction Costs	Maintenance Costs	Construction Costs	Maintenance Costs	Total Costs		Labor Costs	Tug & Barge Costs		
1988	36.140	0	8.140	0	28.000	0	28.000					
1989	84.940	20.000	31.320	20.000	53.620	0	53.620					
1990	227.350	20.360	45.900	20.200	181.450	160	181.610					
1991	121.600	22.320	19.060	20.530	102.540	1.790	104.330					
1992	16.970	23.460	5.500	20.650	11.470	2.810	14.280					
1993		23.460		20.650		2.810	2.810	35.928	2.051	3.693	324	41.996
1994								36.619	2.102	4.159	330	43.210
1995								37.310	2.152	4.625	336	44.423
1996								47.701	2.212	4.788	447	55.148
1997								58.092	2.272	4.951	558	65.873
1998								68.483	2.331	5.114	669	76.597
1999								78.874	2.392	5.277	780	87.323
2000								89.264	2.451	5.439	890	98.044
2001								110.392	2.597	6.068	1.179	120.236
2002								131.520	2.742	6.697	1.467	142.426
2003								152.648	2.887	7.326	1.756	164.617
2004								173.776	3.032	7.955	2.044	186.807
2005								194.904	3.177	8.584	2.332	208.997
2006												
2007												
2008												
2009												
2010												
2011												
2012												
2013												
2014												
2015												
2016												
2017												

Appendix 11.5.1 Conversion Factors for Short-term Plan

ITEM	Construction Costs (₱1,000,000)	Foreign Currency Items	Local Curency Items: Tradable Goods	Non-Tradable Goods	Skilled Labor	Unskilled Labor	Others (Tax,etc)	Total Conversion Factor	Economic Price (₱1,000,000)
		1.00	1.00	0.833	0.833	0.666	0.0	(2)	(1)x(2)
1) Pier 3									
o Slab and Beam	9.43(100%)	26.8 %	15.4 %	19.0 %	4.3 %	25.0 %	9.5 %	0.782	7.37
o Fender	13.56(100%)	67.3 %	7.5 %	8.9 %	1.4 %	11.6 %	3.3 %	0.911	12.35
2) Pier 5									
o Additional Central Upper Deck	52.70(100%)	20.8 %	15.7 %	21.1%	5.1 %	27.5 %	9.8 %	0.766	40.37
o Fender	17.67(100%)	67.3 %	7.5 %	8.9 %	1.4 %	11.6 %	3.3 %	0.911	16.10
o Demolition of Transit Shed	8.80(100%)	0.0 %	13.5 %	13.5 %	12.4 %	50.6 %	10.0 %	0.688	6.05
3) Pier 9									
o Central Upper Deck	38.64(100%)	20.8 %	15.7 %	21.1 %	5.1 %	27.5 %	9.8 %	0.766	29.60
o Extention Work	73.89(100%)	54.1 %	8.7 %	14.3 %	5.7 %	10.4 %	6.8 %	0.864	63.84
o Fender	9.71(100%)	67.3 %	7.5 %	8.9 %	1.4 %	11.6 %	3.3 %	0.911	8.85
4) Pier 13									
o Slab and Beam	3.99(100%)	26.8 %	15.4 %	19.0 %	4.3 %	25.0 %	9.5 %	0.782	3.12
o Fender	18.25(100%)	67.3 %	7.5 %	8.9 %	1.4 %	11.6 %	3.3 %	0.911	16.63
5) Pier 15									
o Repair	7.17(100%)	26.8 %	15.4 %	19.0 %	4.3 %	25.0 %	9.5 %	0.782	5.61
o Central Upper Deck	45.47(100%)	20.8 %	15.7 %	21.1 %	5.1 %	27.5 %	9.8 %	0.766	34.83
o Fender	17.67(100%)	67.3 %	7.5 %	8.9 %	1.4 %	11.6 %	3.3 %	0.911	16.10
o Demolition of Transit Shed	4.41(100%)	0.0 %	13.5 %	13.5 %	12.4 %	50.6 %	10.0 %	0.688	3.03
6) Back-up Areas									
o Pavement (CY-01)	41.60(100%)	40.0 %	17.2 %	8.3 %	7.4 %	17.1 %	10.0 %	0.817	33.99
o Demolition and Reconstruction (Block 141)	31.77(100%)	9.4 %	11.9 %	14.2 %	11.2 %	44.6 %	8.2 %	0.727	23.10
o Demolition (Block 147,150)	0.00(100%)	0.0 %	17.0 %	11.8 %	12.4 %	49.0 %	9.8 %	0.698	0.00
7) Grain Terminal									
o Floating Unloader	220.00(100%)	100.0 %	-	-	-	-	-	1.000	220.00
8) Dredging									
o Slips/Piers	22.00(100%)	0.0 %	89.0 %	3.0 %	3.0 %	4.0 %	1.0 %	0.966	21.25
o Anchorage	34.13(100%)	0.0 %	89.0 %	3.0 %	3.0 %	4.0 %	1.0 %	0.966	32.97
o Maintenance Dredging	0.00(100%)	0.0 %	89.0 %	3.0 %	3.0 %	4.0 %	1.0 %	0.966	0.00
9) Engineering Fee	36.14(100%)	85.0 %	-	-	9.0 %	3.0 %	3.0 %	0.945	34.15
10) Others									
o Tug and Barge Cost			57.4 %	21.3 %	6.4 %	14.9 %	0.0 %	0.904	
o Arrastre and Stevedoring			27.9 %	20.3 %	6.1 %	24.3 %	21.4 %	0.661	
o Products of Petroleum and coal			59.7 %	10.7 %	0.5 %	0.6 %	28.5 %	0.695	

Appendix 11.6.1 Calculation of Internal Rate of Return

Project Name : SHORT TERM PLAN (BASE CASE)
I.R.R. (%) : 18.46

NO.	YEAR	COST	BENEFIT	BNFT.-COST	P. COST	P. BNFT	P.VALUE
1	1988	26450.00	0.00	-26450.00	26450.00	0.00	-26450.00
2	1989	42600.00	0.00	-42600.00	35961.80	0.00	-35961.80
3	1990	149730.00	0.00	-149730.00	106702.00	0.00	-106702.00
4	1991	82180.00	0.00	-82180.00	49438.30	0.00	-49438.30
5	1992	13330.00	0.00	-13330.00	6769.55	0.00	-6769.55
6	1993	2340.00	40958.00	38618.00	1003.18	17559.00	16555.90
7	1994	2340.00	42110.00	39770.00	846.86	15239.80	14392.90
8	1995	2340.00	43261.00	40921.00	714.90	13216.70	12501.80
9	1996	2340.00	53950.00	51610.00	603.50	13913.90	13310.40
10	1997	2340.00	64640.00	62300.00	509.46	14073.20	13563.70
11	1998	2340.00	75329.00	72989.00	430.07	13844.80	13414.70
12	1999	2340.00	86017.00	83677.00	363.05	13345.70	12982.60
13	2000	2340.00	96704.00	94364.00	306.48	12665.80	12359.30
14	2001	2340.00	118787.00	116447.00	258.72	13133.80	12875.00
15	2002	2340.00	140869.00	138529.00	218.41	13148.30	12929.90
16	2003	2340.00	162950.00	160610.00	184.38	12839.20	12654.90
17	2004	2340.00	185032.00	182692.00	155.64	12307.30	12151.70
18	2005	2340.00	207112.00	204772.00	131.39	11629.30	11498.00
19	2006	2340.00	207112.00	204772.00	110.92	9817.20	9706.28
20	2007	2340.00	207112.00	204772.00	93.63	8287.43	8193.80
21	2008	2340.00	207112.00	204772.00	79.04	6996.04	6917.00
22	2009	2340.00	207112.00	204772.00	66.73	5905.88	5839.15
23	2010	2340.00	207112.00	204772.00	56.33	4985.60	4929.27
24	2011	2340.00	207112.00	204772.00	47.55	4208.71	4161.16
25	2012	2340.00	207112.00	204772.00	40.14	3552.89	3512.75
26	2013	2340.00	207112.00	204772.00	33.89	2999.26	2965.37
27	2014	2340.00	207112.00	204772.00	28.61	2531.90	2503.29
28	2015	2340.00	207112.00	204772.00	24.15	2137.37	2113.22
29	2016	2340.00	207112.00	204772.00	20.39	1804.31	1783.92
30	2017	2340.00	207112.00	204772.00	17.21	1523.15	1505.94
	TOTAL	372790.00	3803060.00	3430270.00	231666.00	231667.00	0.09

UNIT = 1000P

Note : P.COST --- Present Value of Cost
: P.BNFT --- Present Value of Benefit