2-2-2 Relative Humidity

The annual mean relative humidity is 74% as shown in Table 2-2-2-1, and the monthly variation of mean relative humidity through the year is relatively small.

Table 2-2-2-1 Monthly Mean Relatively Humidity (1981-1991)
(Source: Direccion Nacional De Meteorologia)

unit: %

	Annual	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
1981	74	65	--	--	71	78	80	80	82	73	71	69	75
1982	74	61	--	69	82	--	75	80	82	77	78	65	68
1983	74	72	69	68	67	75	80	80	78	77	72	70	77
1984	76	--	75	77	72	--	76	77	77	73	81	--	73
1985	76	71	76	66	68	69	78	83	79	80	82	78	73
1986	74	67	67	67	73	79	74	86	76	81	73	73	71
1987	73	70	68	72	74	76	76	70	81	79	69	72	72
1988	71	62	70	75	78	69	75	78	75	72	71	66	63
1989	73	69	64	66	74	76	73	82	79	76	75	69	70
1990	74	64	63	79	75	80	78	76	74	73	76	76	71
1991	76	77	67	68	72	79	82	81	79	80	72	72	78
Ave.	74	67	69	71	73	75	77	79	78	76	75	71	71
Seasonal Average		(Summer) 69			(Fall) 75			(Winter) 77			(Spring) 72		

2-2-3 Rainfall

The average of annual rainfall is 1163.3mm, ranging from 801.0mm (in 1987) to 1437.2mm (in 1986) as shown in Table 2-2-3-1. It can be seen that monthly rainfall is around 100mm in average and its variation through the year is not so large.

Table 2-2-3-1 Monthly Rainfall (1981-1991)
(Source: Direccion Nacional De Meteorologia)

unit: mm

	Total	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
1981	1276.3	102.9	130.0	112.9	62.9	92.2	287.5	45.5	85.5	69.4	134.5	89.0	64.0
1982	1083.4	57.6	33.7	102.4	72.4	33.6	124.8	219.6	112.8	71.0	152.3	64.4	38.8
1983	1233.3	54.0	91.2	112.5	36.2	73.1	42.9	103.5	23.4	198.0	105.3	265.1	128.1
1984	1265.2	30.5	156.7	121.4	65.7	134.5	159.9	86.6	120.5	35.5	65.2	220.5	68.2
1985	1406.1	15.1	49.7	30.5	230.0	129.9	223.4	162.0	30.1	54.0	114.7	183.3	183.4
1986	1437.2	40.2	124.6	23.6	34.1	131.6	89.4	151.1	52.1	318.9	147.8	133.5	190.3
1987	801.0	66.6	39.2	131.9	159.2	44.6	27.3	1.3	122.7	39.0	48.1	72.7	48.4
1988	1049.0	95.5	119.6	86.3	316.6	27.0	20.7	6.1	58.0	91.9	33.8	116.4	77.1
1989	823.5	115.0	14.0	42.4	104.3	153.2	22.0	24.0	60.5	160.3	33.5	24.6	69.7
1990	1257.7	150.3	127.3	142.0	62.2	172.2	72.1	51.8	20.9	24.0	68.9	132.3	233.7
1991	1050.3	50.3	62.9	52.0	18.5	102.9	87.9	125.0	160.4	107.3	87.4	116.4	79.3
Ave.	1163.3	72.8	88.6	90.6	114.4	99.2	107.0	85.2	68.7	106.2	90.4	130.2	110.2
Seasonal Average		(Summer) 84.0			(Fall) 106.9			(Winter) 86.7			(Spring) 110.3		

2-2-4 Atmospheric Pressure

The annual mean atmospheric pressure is around 1,015mb as shown in Table 2-2-4-1, and there is tendency that mean atmospheric pressure in winter of 1,018.2mb is slightly higher than that in summer of 1,011.6mb.

Table 2-2-4-1 Monthly Mean Atmospheric Pressure (1981-1990)
(Source: Direccion Nacional De Meteorologia)

unit: mb (----+1000)

	Total	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
1981	---	11.5	---	---	13.9	17.1	15.3	16.7	21.9	17.1	19.0	17.0	12.1
1982	14.7	11.5	13.7	12.2	13.8	18.3	16.1	15.0	15.5	17.5	18.2	11.8	12.2
1983	15.0	12.7	9.8	13.0	14.2	13.5	15.1	16.6	17.8	19.4	18.1	15.7	14.3
1984	14.4	11.9	9.9	9.7	14.8	14.7	11.3	17.6	16.8	20.3	17.7	13.7	13.9
1985	15.0	12.8	11.5	12.7	10.5	14.1	13.9	19.0	19.6	19.2	18.1	14.1	14.3
1986	14.9	12.2	10.0	11.3	14.6	13.8	12.1	16.7	21.5	17.1	19.8	17.6	12.6
1987	14.6	12.1	11.2	13.3	12.4	15.3	15.5	16.4	12.5	18.7	18.9	15.5	13.2
1988	15.7	10.4	10.3	13.6	12.4	16.4	19.2	18.7	23.5	17.6	19.1	13.9	13.2
1989	15.2	11.2	9.9	11.3	13.2	14.5	20.7	18.1	19.5	16.0	18.1	17.7	11.6
1990	15.3	12.7	10.0	12.9	13.1	12.7	15.9	18.4	21.2	19.8	19.4	14.7	12.2
Ave.	15.0	11.9	10.7	12.2	13.3	15.0	15.5	17.3	19.0	18.3	18.6	15.2	13.0
Seasonal Average		(Summer) 11.6			(Fall) 14.6			(Winter) 18.2			(Spring) 15.6		

2-2-5 Wind

The data of wind for the last two years, 1990 to 1991, observed at the Carrasco Airport (latitude 34°50' S, longitude 56°02' W) by Direccion De Nacional Meteorologia are analyzed and expressed in diagrams of monthly and annual frequencies of occurrence by direction and intensity (Figure 2-2-5-1 and Table 2-2-5-1).

These diagrams show the following general characteristics:

(1) In summer season, December to February, the predominant wind direction is in range from North North East to South.

(2) In winter season, June to August, the predominant wind direction is in range from West to North North East.

(3) In the other seasons, there can be seen no particularly predominant winds.

(4) Accordingly, in range from South to West there are not so many winds blowing through the year.

(5) But, taking a view of wind velocity, strong winds blow mainly in this range from S to W, and the frequencies of occurrence of strong winds more than 54 km/hr (15m/sec) is only 0.7 %.

Another data from Direccion De Nacional Meteorologia, which were observed at the Foreport from 1906 to 1967, show that the predominant wind direction of storm more than 100 km /hr (28 m/sec) is in range from South East to West, which indicates the same tendency as the above (5) (See Figure 2-2-5-2).

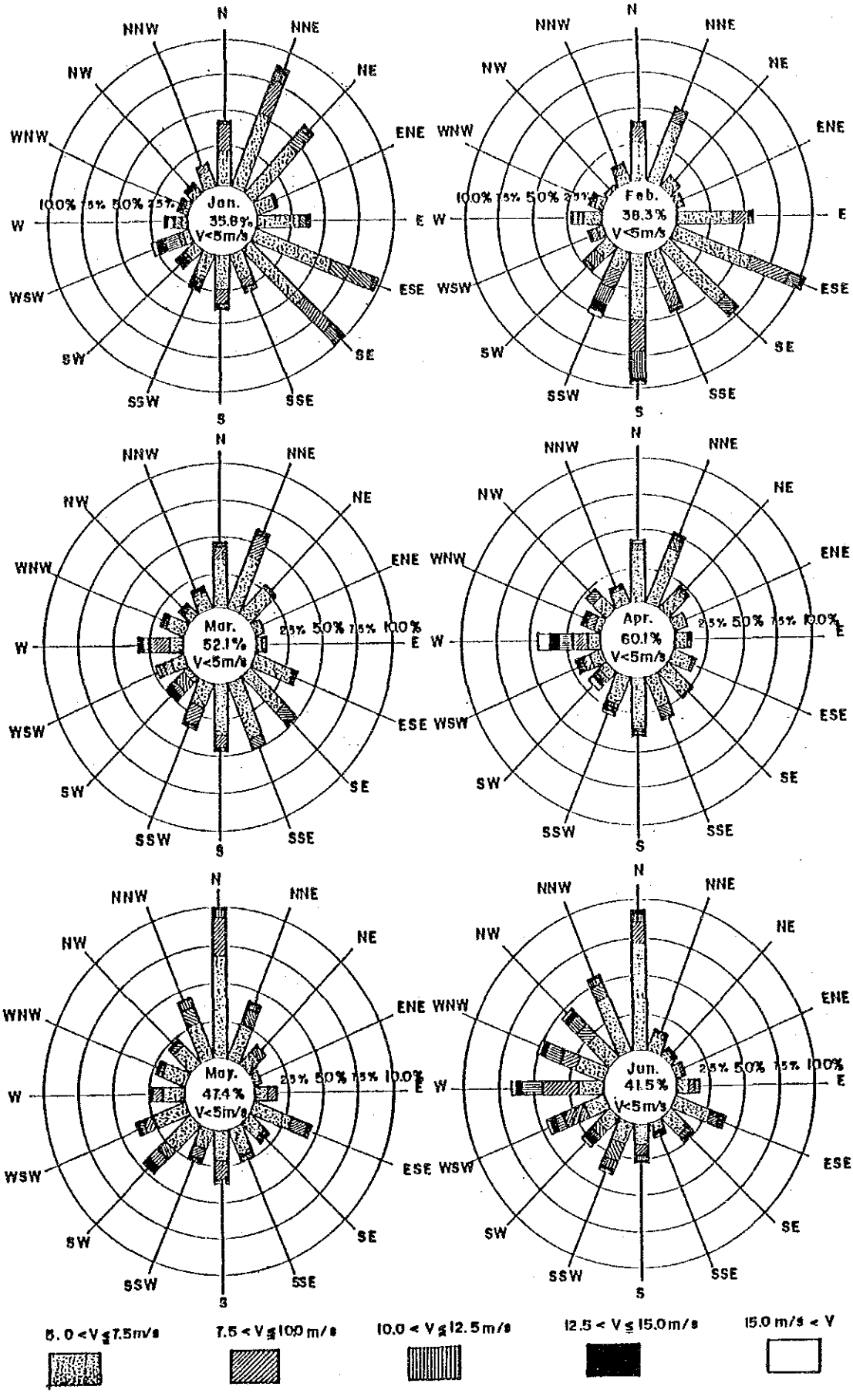


Figure 2-2-5-1-(1) Monthly Wind Rose (1990 - 1991)
Source: Direccion Nacional De Meteorologia

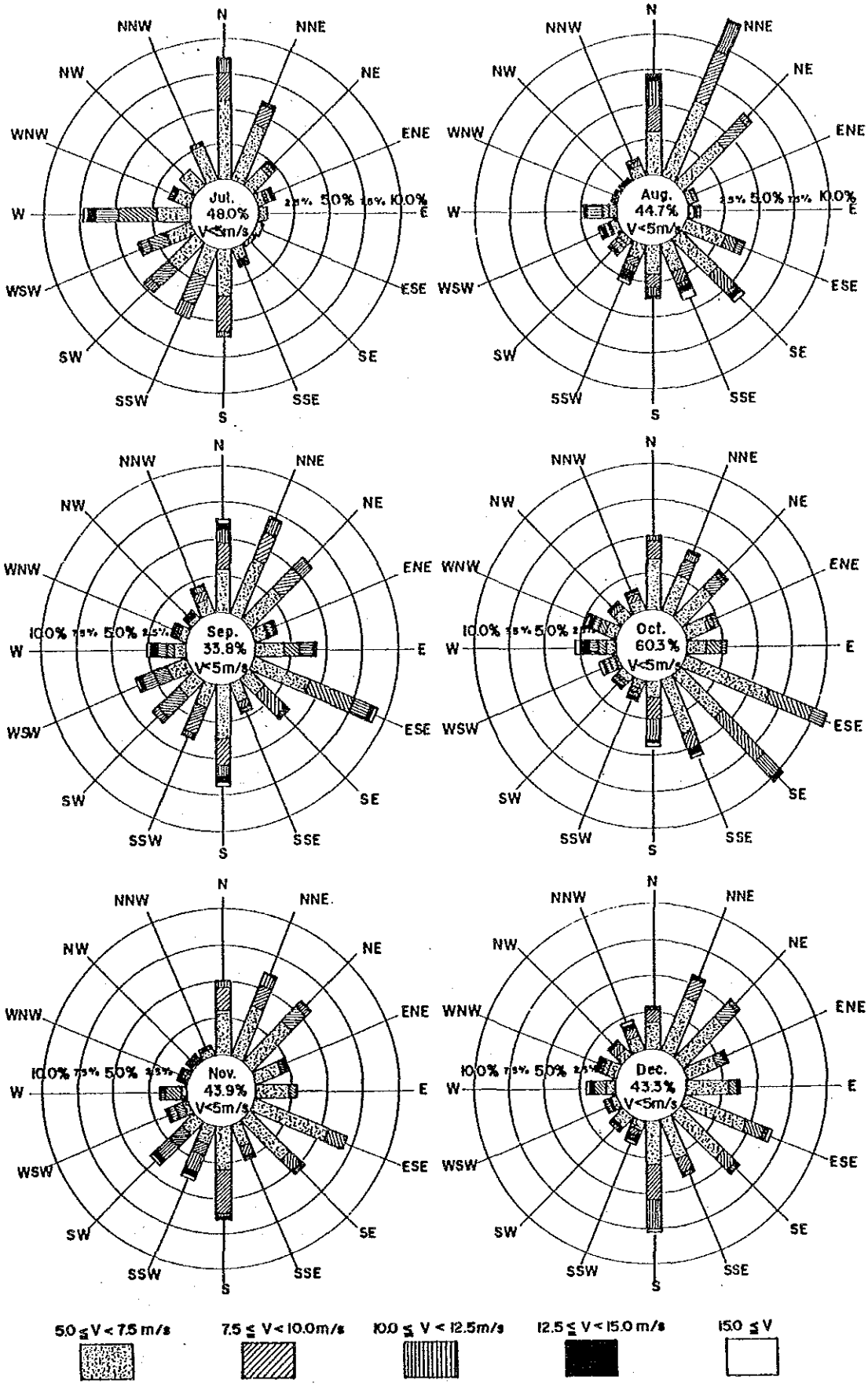


Figure 2-2-5-1-(2) Monthly Wind Rose (1990 - 1991)

Source: Direccion Nacional De Meteorologia

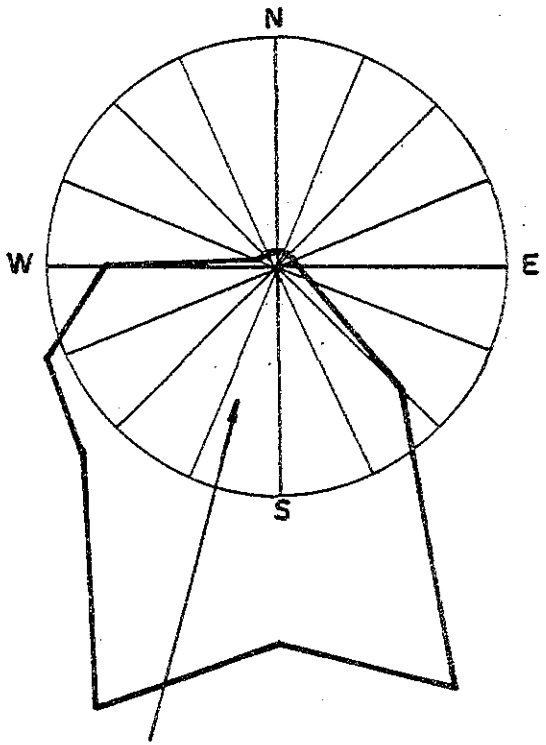
Table 2-2-5-1 Frequencies of Occurrence of Wind by Direction and Intensity (1990 - 1991)

Source: Direccion Nacional De Meteorologia

Direction / Wind Velocity (m/sec)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
V < 2.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	12.63
2.5 ≤ V < 5.0	3.81	2.53	2.26	2.53	3.11	3.01	2.17	1.93	2.16	0.86	0.58	0.50	0.78	1.04	1.47	2.45	31.19
5.0 ≤ V < 7.5	3.89	3.79	2.59	1.12	1.73	3.89	3.17	2.27	2.80	1.40	1.15	0.91	1.02	0.92	0.91	1.47	33.03
7.5 ≤ V < 10.0	1.46	1.58	0.90	0.19	0.58	1.63	1.42	0.74	1.50	0.99	0.75	0.68	1.10	0.44	0.26	0.47	14.69
10.0 ≤ V < 12.5	0.48	0.51	0.25	0.07	0.21	0.43	0.39	0.19	0.80	0.52	0.49	0.55	0.70	0.22	0.15	0.20	6.16
12.5 ≤ V < 15.0	0.13	0.07	0.01	0.01	0.02	0.05	0.06	0.05	0.14	0.20	0.18	0.18	0.29	0.09	0.03	0.03	1.54
15.0 ≤ V	0.01	---	0.01	---	0.01	0.01	0.05	0.03	0.07	0.04	0.06	0.19	0.21	0.04	0.02	0.01	0.76
TOTAL	9.78	8.48	6.02	3.92	5.66	9.02	7.26	5.21	7.47	4.01	3.21	3.01	4.10	2.75	2.84	4.63	100.00

Note : Percentage of winds not more than 2.5 m/sec is 12.63 %.

Velocity km/h	NE	ENE	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NNW	Σ	%
100 _ 110		1	1	3	21	14	17	11	13	5		1	87	31.3
110 _ 120	2	1	1	8	16	17	22	8	8	5		1	88	31.7
120 _ 130			3	6	10	7	12	5	4	6	1		55	19.8
130 _ 140				3	5	2	4	2	2	1	1		20	7.2
140 _ 150					1	1	1	1	2				6	2.2
150 _ 160					1	3		3	1				8	2.8
160 _ 170			1		1			1		1			4	1.4
170 _ 180						1				1			2	0.7
180 _ 190				1			1	1					3	2.1
190 _ 200					1	1	1	1		1			5	1.8
Σ	2	2	6	21	56	46	58	33	30	20	2	2	270	100
%	0.7	0.7	2.1	7.6	20.1	16.6	20.9	11.9	10.8	7.2	0.7	0.7	100	
$\overline{v}$	112.00	115.00	127.00	122.52	117.46	120.20	118.50	124.64	116.07	123.65	128.00	112.00		
S	—	—	21.90	17.48	17.90	20.38	17.51	23.99	13.35	24.76	—	—		



$\overline{v}$ Maximun Mean Velocity
S Standard Deviation

- Source : Direccion General de Meteorologia
- Station : Foreport of Montevideo
- Period : 1906 1967

Figure 2-2-5-2 Storm Wind Records (1906-1967)

2-3 Sea Conditions

2-3-1 Tide and Tidal Current

In order to make out the Master Plan of the Montevideo Port, extensive and detailed studies were carried out by Consultant "INTECSA" about tides and currents through collection of literatures and data, field observations and numerical model simulations. Here will be extracted some important properties on the tides and currents of the coast of Montevideo from the reports on the above mentioned studies.

(1) Outline of tidal currents of the La Plata River

Montevideo Port is situated in the mouth of the La Plata River, so that total conditions of tidal currents in the mouth should be described before that of the coast of Montevideo Port.

Figure 2-3-1-1 shows a plan of the La Plata River. Tides reach the Uruguayan Coast first, full tide occurring at the Punta del Este approximately one hour earlier than at San Clemente of Argentine side. On the other side, the larger tide amplitude at the Argentine side causes the water level at the Bahia de Samborombon to be lower than at the Uruguayan coast at the starting of rising tide. Thus, during this period, there appear week currents along the Uruguayan coast of the east of Montevideo which turn to the south immediately after passing the north side of Banco Ingles. Such currents are kept until rising tides fully cover the Bahia de Samborombon and reach the line connecting Punta Espinillo and Punta Piedras.

From the above moment, rising tidal currents become practically parallel to the coast in the whole area and go to the more upper part of the La Plata River and they reach their maximum level. From this phase, high levels are kept in the Uruguayan coast until ebb currents start, thus rising period is longer than ebb period.

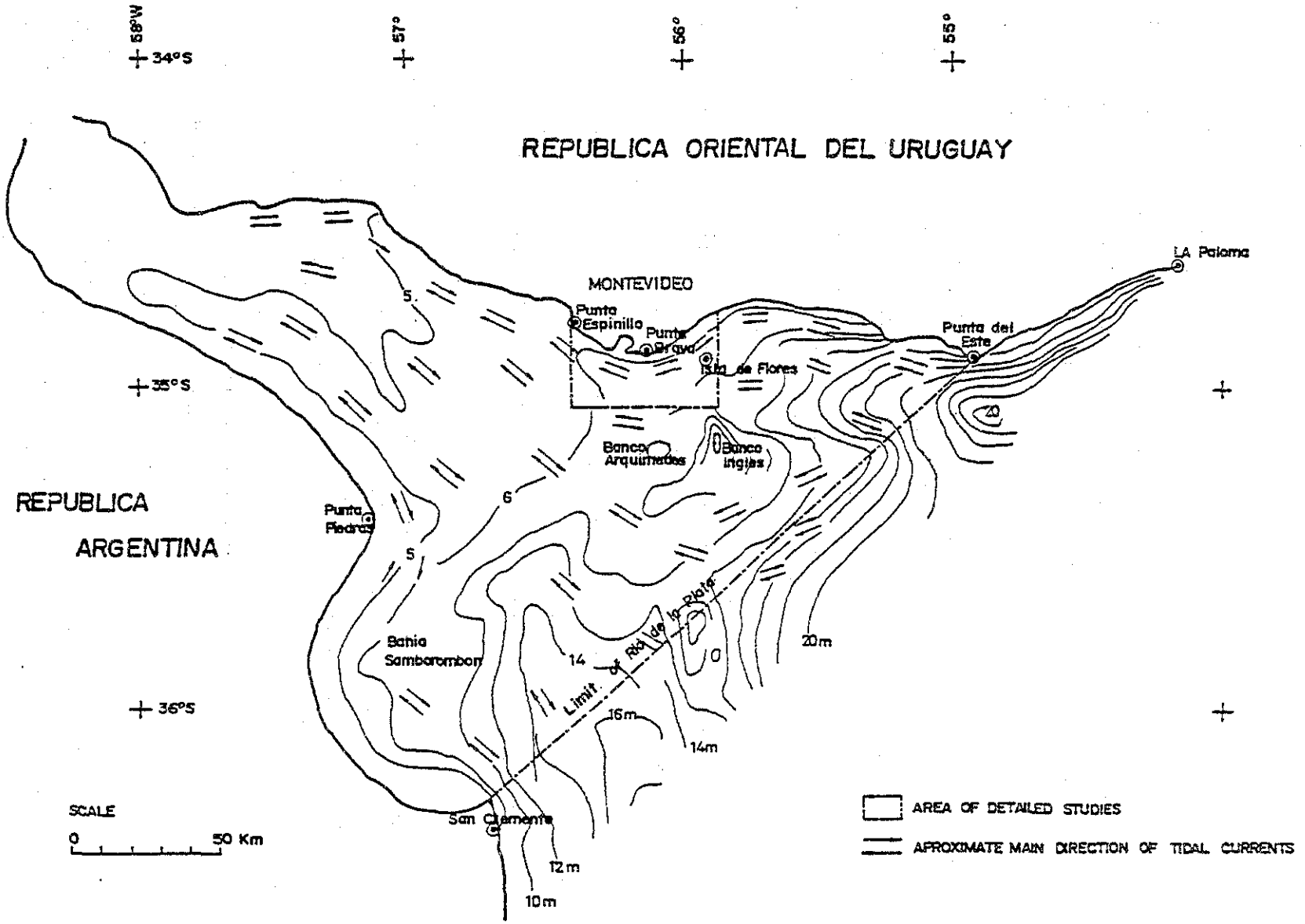


Figure 2-3-1-1 Plan of La Plata River

Then ebb currents in the Uruguayan coast go to east and in parallel with the coast from the moment when ebb tide starts at the line connecting Punta Espinillo and Punta Piedras.

The river water discharged into the La Plata River mainly follows the direction of the main tidal current and has strong influence to residual currents together with local winds. In the origin of La Plata River, the rivers of Parana and Uruguay discharge with the annual average current volume of 17,000 and 6,000 m^3/sec, respectively.

(2) Characteristics of tide and tidal currents in the vicinity of Montevideo Port

Tide and tidal currents in the vicinity of Montevideo Port, that is the area surrounded by a dotted line in Figure 2-3-1-1, suffer influence of winds in addition to the astronomical tide which has been described in the above (1). The characteristics of this area are as follows:

1) The average amplitude of tide at Montevideo varies between 60 cm under spring tides and 30 cm under neap tides.

2) The rotation of tidal currents around Banco Ingles, which was referred before, continues only during 1.5 to 2 hours, but in the rest period, currents in this area have predominately the direction parallel with the coastal line.

3) A significant variation of tidal amplitude and phase occurs in the W-E direction. The tide at Punta Espinillo has, in average, double the amplitude of Banco Ingles, full tide and ebb tides occurring with an approximate 3-hours difference.

4) In the area where the Approach Channel exists, the maximum velocity of rising and ebb currents is about 30 cm/sec and about 40 cm/sec, respectively.

5) The main direction of currents does not influenced by winds, through dispersion of current direction becomes larger by them.

6) Winds give influence to the velocity of the currents. In the west of

Punta Brava where the currents participate in the general flows of the mouth of La Plata River in rising tide, the velocity of current is increased by wind of south-east in rising tide to reach one of passing over the velocity without wind by 50 to 100 %, but is not nearly influenced by such wind in ebb tide.

7) In the east of Punta Brava, the influence of south-easterly wind is little on current, but that of north-westerly wind is large. It is because the general flows in ebb tide of the mouth of La Plata River are accelerated by such wind and go into this area. That is, strong north-westerly wind increases the current velocity by 10 to 15 cm/sec.

8) Residual currents are very small and never beyond 10 cm/sec, and winds seem to have an important influence against them.

(3) Tide and tidal currents of Montevideo Port

In Figure 2-3-1-2, are shown Mean High Water Level (M.H.W.L), Mean Water Level (M.W.L) and Mean Low Water Level (M.L.W.L) in Montevideo Port. M.W.L is situated at 91 cm above the tidal datum which corresponds to +- 0 meter of the navigation chart. This rising tide is longer than the ebb tide approximately by one hour.

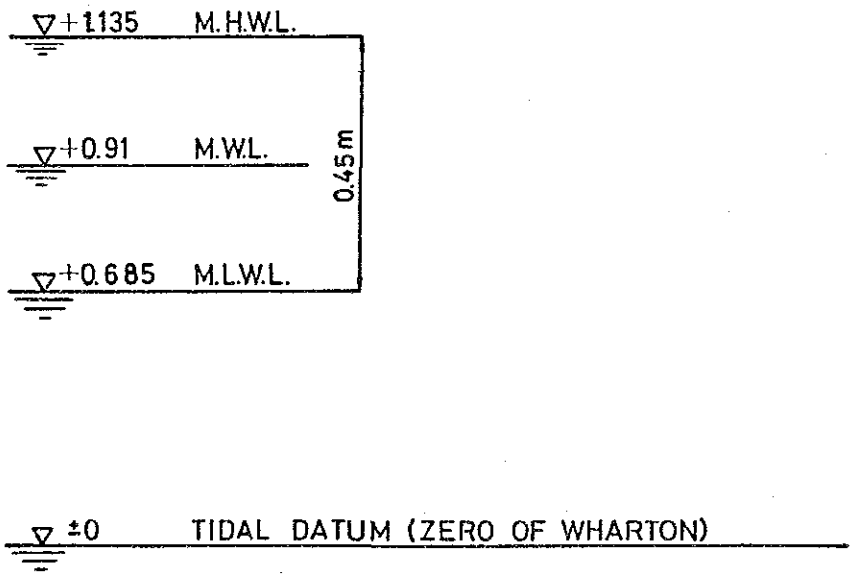


Figure 2-3-1-2 Tide Level of Montevideo Port

Figure 2-3-1-3 is an actual example which shows rising of sea water level by action of winds and waves, although waves were not measured. From this figure, it is seen that sea level rising of more than 1.5 meters easily occurs when strong winds blow from southerly direction. The maximum high level in the past 50 years is 3.4 meters above the tidal datum.

Regarding tidal current, the inside area from the vicinity of the line connecting the north end of Escollera Oeste and the Punta de Rodeo has very weak velocities of less than 0.1 m/sec when strong winds do not blow. In Montevideo Port, there are predominant currents entering from an opening between the north end of Escollera Oeste and the Dique de Cintura and leaving from the mouth of the Port. Although the velocity of entering currents is less than 0.1 m/sec, that of leaving currents reaches nearly 20 cm/sec, when do not blow strong winds.

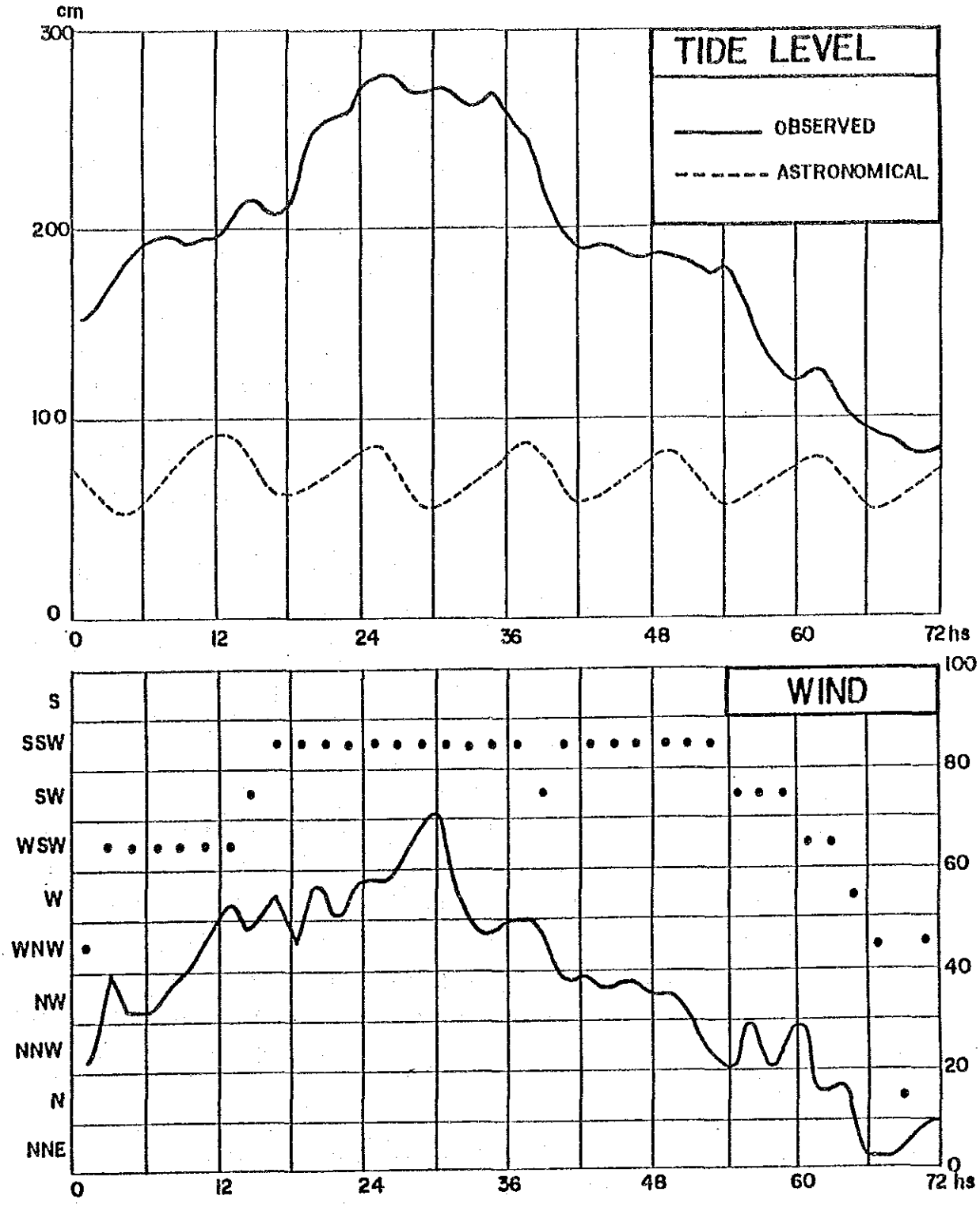


Figure 2-3-1-3 Example of the effect of winds on the tidal level at Montevideo Port, 15 to 17 of May, 1977 (from Conservacion Y Mejora De Playas, Ministerio De Transport Y Obras Publicos 1979)

2-3-2 Wave

The analysis of the data of wave observation by a Datawell-Waverider Buoy, which was situated at the point of about 7 meters deep of 14 Km south from Punta Brava during November 16, 1986 to April 5, 1987, showed the followings:

(1) There did not happen waves having an average period T above 5 seconds, the average value of all T being 3.25 seconds.

(2) The maximum value of the significant wave height H1/3 was 2.0 meters and that of the maximum wave Hmax was 3.90 meters.

(3) The mean value of H1/3 was 0.75 meters during this observation period.

On the other hand, Table 2-3-2-1 shows the correlation between height and period of the waves obtained at the point of about 10 meters deep near to Isla De Lobos in the south-east of Punta De Este using a Datawell-Waverider Buoy. From this table it is sure that there happen waves of more than 2 meters in H1/3 and more than 5 seconds in T in the offing of Montevideo.

Regarding the data of deep water waves, is serviceable "Ocean waves Statistics" by Hogben and Lumb, published in London by the National Physical Laboratory, which compiles the data obtained by ships in the various ocean areas during the period 1953 to 1961. During this period, 4,243 of waves were observed in the area No. 44 which corresponds to the deep sea area off Port Montevideo. Table 2-3-2-2 shows the distribution of wave height for the directions which seems to have influence on the coast of Montevideo. The wave direction is divided by 10 degree, so that North, East and South correspond to 0^{o}, 90^{o} and 180^{o}, respectively.

From this table, are seen the following annual tendencies on the deep water waves:

(1) The occurrence frequency of more than 0.25 m in wave height is 24.28 %, but that of 2 meters and more is only 8.2 %.

Table 2-3-2-1 Correlation of wave heights and wave periods observed near to the Isla de Lobo.

Period: June 25, 1976 to June 4, 1978.
Record time: 4 times a day (0, 6, 12, 18 hours)

HEIGHT (meters)

PERIOD (sec)	0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	N	%
15		1												1	0.05
14			1			1	2							4	0.2
13			1	1	3	2	2							9	0.5
12		1	2	5	7	5	2	2	2	1				27	1.4
11		2	12	13	17	7	8	2			1	1		63	3.4
10		1	20	52	31	13	12	5	2		1	1		138	7.4
9		3	42	71	40	21	12	3	4	1	3		1	201	10.7
8		1	46	92	85	37	11	14	4	4	2	1		297	15.9
7			37	107	73	53	24	15	14	7	5	2	1	338	18.1
6			39	83	87	82	51	31	20	8	9			410	21.9
5			19	52	86	49	34	3	1					244	13.0
<=4			29	54	37	16	4							140	7.5
N		9	248	530	466	286	162	75	47	21	21	5	2	1872	100
%		0.5	13.2	28.3	24.9	15.3	8.7	4.0	2.5	1.1	1.1	0.3	0.1	100	

Table 2-3-2-2 Number of Occurrence of Deep Water Wave by Height and Direction

Direction / Wave Height	110° to 130°	140° to 160°	170° to 190°	Total	Percentage against TN (%)
0.25	15	10	9	34	0.80
0.50	32	35	29	96	2.26
1.00	56	85	99	240	5.66
1.50	87	93	132	312	7.35
2.00	35	55	77	167	3.94
2.50	14	37	32	83	1.96
3.00	8	15	26	49	1.15
3.50	5	6	12	23	0.54
4.00	5	2	9	16	0.38
4.50	--	1	4	5	0.12
5.00	--	--	--	0	0.00
5.50	--	--	--	0	0.00
6.00	1	--	3	4	0.09
6.50	--	--	1	1	0.02
Total	258	339	433	1030	24.27
Percentage against TN (%)	6.08	7.99	10.20	24.27	

Note : TN = Total Number of waves observed for all direction
= 4,243

(2) The occurrence frequency by directions concentrates mostly in the southerly direction. Deep water waves from south-westerly direction do not reach the coast of Montevideo because they are interrupted by the land of Argentine.

The relation between wave height and wave period of the same data for all directions is shown in Table 2-3-2-3. More than 50 % of waves are more than 5 seconds in period.

As for the reasons why waves of long period generated in deep water were not observed during the before-mentioned observation at Punta Brava, would be considered the following factors:

(1) Decrease of wave height by the existence of Banco Ingles
(2) Decrease of wave height by the bottom mud at the mouth of River La Plata

Seen from Figure 2-3-1-1 of the foregoing section, there exists Banco Ingles at about 40 km south-east of Port Montevideo. The length of Banco Ingles is about 20 km, 15km and 6km at the level of -5, -2 and -1 m deep, respectively. Therefore, south-easterly waves lose energy on Banco Ingles. Moreover, southerly waves also lose energy on Banco Ingles, because these waves refract toward the south-east until arriving near to Banco Ingles owing to that the equi-depth lines in the offshore run nearly from north-east to south-west.

The calculation based on the energy equilibrium equation concerning refraction and breaking on Banco Ingles of offshore waves of more than 7 seconds in period has resulted in the decrease of wave height of 25 to 35 %.[1] As for the decrease of wave height due to the bottom mud, there is the possibility of the decrease of wave height of about 30 to 60 % when waves of more than 7 seconds progress the distance of 40 km off the port mouth which is 5 to 8 meters deep[2]. Those calculation are shown in A-2-1 of Appendix.

Table 2-3-2-3 Correlation between wave heights and wave periods in the deep water (from "Ocean Wave Statistics")

PERIOD (seconds) \ WAVE HEIGHT (meters)	0.25	0.50	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	9.5	Σ	%
≥21	2	18	3	1	2													26	0.6
20-21	3	1																4	0.1
18-19									1				1					2	0.05
16-17							1	2	3				1	1		2		10	0.25
14-15			1	3	6	4	3	8	4	6		1					1	37	0.9
12-13	3	1	4	10	15	8	8	8	7	1	2		3	2		3		75	1.7
10-11		4	9	27	43	55	25	28	12	7	1	2	1	1				215	5.1
8-9	8	8	69	137	184	116	81	29	17	16	1	2	4	2				674	15.9
6-7	6	42	224	500	305	127	49	31	20	12	2	3	3	4	2			1330	31.3
≤5	150	334	710	384	90	41	16	2	3	3		1	1					1735	40.9
CALMA (*)	86	6	16	14	3	4	4		1	1								135	3.2
Σ	258	414	1036	1076	648	355	187	108	68	46	6	9	14	10	2	5	1	4243	100
%	6.1	9.7	24.4	25.4	15.3	8.4	4.4	2.5	1.6	1.1	0.1	0.2	0.3	0.2	0.05	0.1	0.02	100	

NOTE : THE TOTAL NUMBER OF WAVES OBSERVED IS 4,243

After all, deep water waves seem to become very low in height owing to the effect of refraction, Banco Ingles and the bottom mud and seem not to have been observed by the Waverider, being sheltered into local short period waves in the front of Port Montevideo.

Table 2-3-2-4 is the occurrence number of waves observed in the said position off Punta Brava which was extracted from the report of "Master Plan Development". The total observed number is 1,116 as shown in this table. During this observation, the wave direction was not observed.

Table 2-3-2-4 Occurrence Number of Waves
(Number of total observation is 1,116)

H1/3 (m)	Occurrence Number	H1/3 (m)	Occurrence Number
0.0	0	1.1	62
0.2	5	1.2	37
0.3	43	1.3	27
0.4	132	1.4	16
0.5	155	1.5	8
0.6	168	1.6	8
0.7	136	1.7	5
0.8	134	1.8	4
0.9	101	1.9	5
1.0	67	2.0	3

2-4 Soil Conditions

In this section, soil conditions at the candidate sites of a proposed fishery and grain terminal are discussed from an engineering point of view based on the results of the boring survey carried out there and the past relevant report prepared by the Consultant "E.I.H Grimaux". All the boring points discussed in this section have been set out in the said candidate sites, which are detailed in Part II.

2-4-1 Locations of Boring and Test Items

Borings in the inner port were carried out between March and April, 1992. Locations of boring points No.1 to 5 are shown in Figure 2-4-1-1. The other boring points No.6 and 7 which were carried out in the outer port by "E.I.H Grimaux" are also shown in this figure. Each boring point corresponding to each candidate site is as indicated in this figure. At the boring points No.1 to 5 carried out this time, soil samples were recovered by Shelby Tube Samplers and Standard Penetration Test Tubes, and 67 samples were used in 219 laboratory tests. Test items and numbers conducted on each boring point are listed in Table 2-4-1-1 below.

Table 2-4-1-1 Test Items and Boring Points

Test Items \ Boring Point	No.1	No.2	No.3	No.4	No.5	Total
Standard Penetration Test	25	15	8	3	3	54
Shelby Tube Sampling	2	1	6	2	2	13
Laboratory Test	68	35	69	27	20	219
Density Test	3	1	16	7	4	31
Water Content	27	16	14	5	5	67
Sieve Analysis	7	12	2	--	--	21
Atterberg's Limits	25	4	13	5	5	52
Specific Gravity	3	1	8	3	2	17
Unconfined Compression	1	--	14	4	2	21
Consolidation	2	1	2	3	2	10

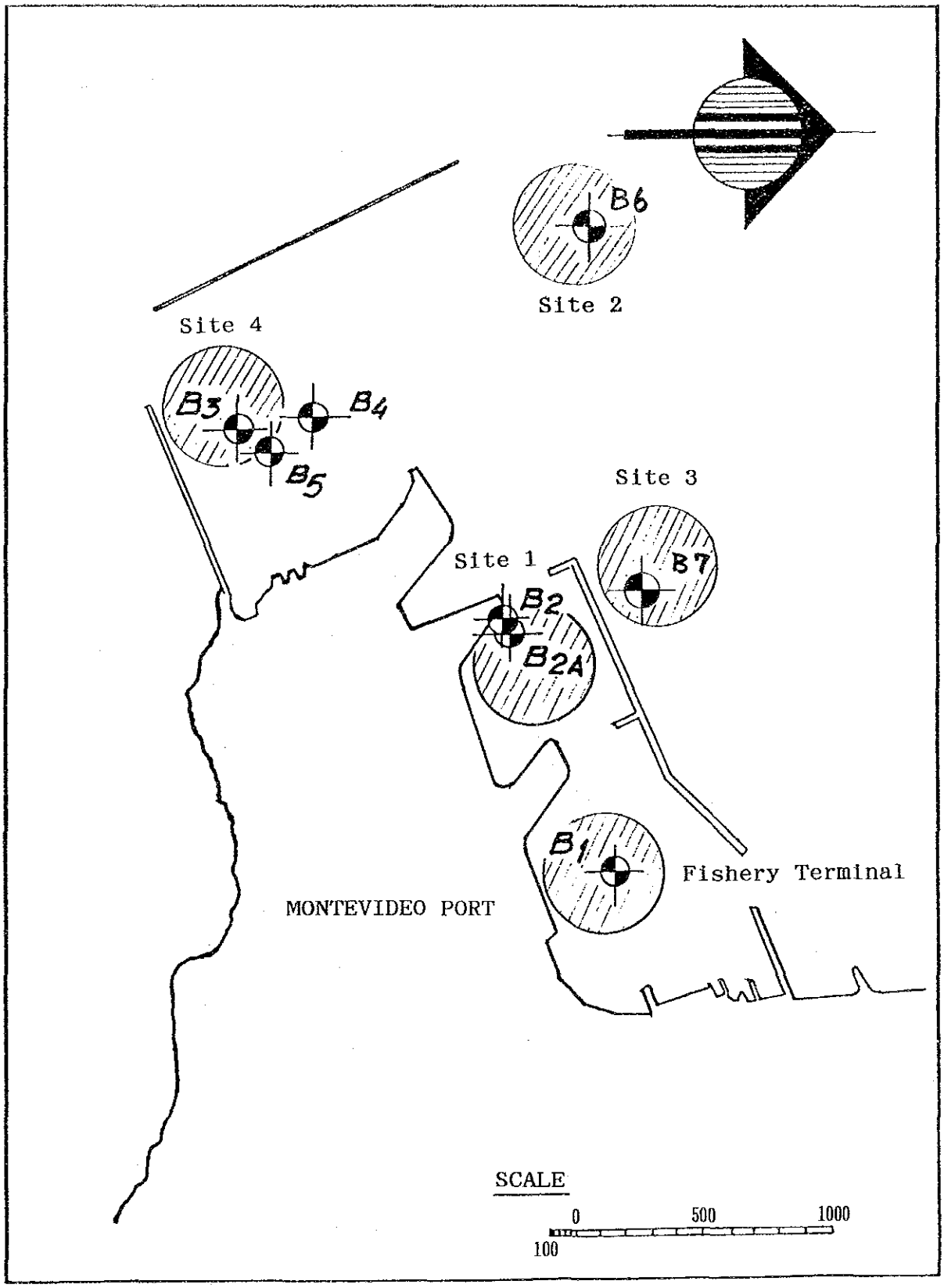


Figure 2-4-1-1 Location of Boring

2-4-2 Soil Profile and Engineering Evaluation

Soil profiles at boring points No.1 to 7 are shown in Figure 2-4-2-1. The more detailed soil profiles of the points No.1 to 5 including physical characteristics are shown in Appendix A-2-2 of this Part. Although the number of bore holes is limitted to the least necessary, from these profiles the soil conditions at the candidate sites can be characterized as a typical soil profile shown in Figure 2-4-2-2. The distribution of soil can be classified into the following five different types:

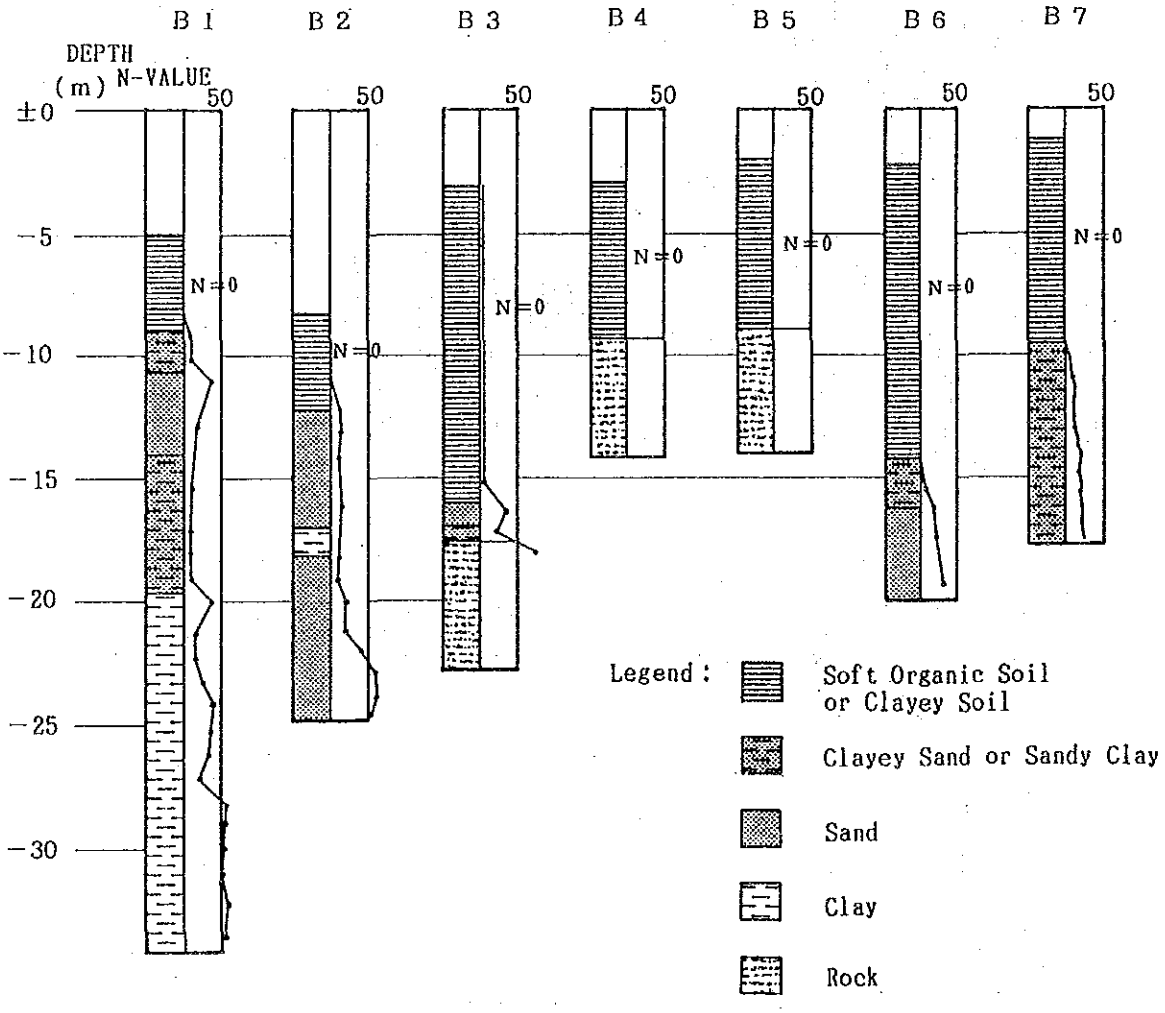


Figure 2-4-2-1 Soil Profile

(1) Soft organic soil or clayey soil layer

This soft surface layer covers the entire area surveyed, and especially in the layer close to the surface, it is extremely soft with its diameter of several microns as reported in Master Development Plan. It has been discharged from the La Plata River and been largely influencing the maintenance dredging in the River Plate including the surveyed area.

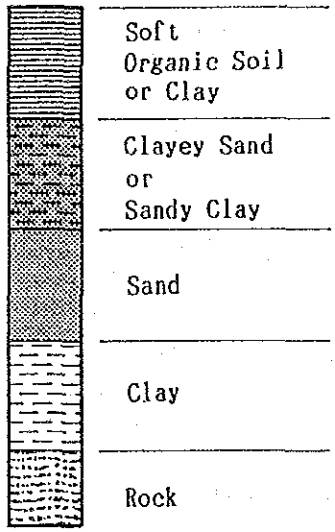


Figure 2-4-2-2 Typical Soil Profile

As shown in Table 2-4-2-1, the natural water content exceeds the liquid limit and it can be clearly seen that this organic soil or clayey soil layer is very soft.

Table 2-4-2-1 Physical Characteristics of Surface Layer

Natural Water Content	100 % to 211 %
Plastic Limit	30 % to 50 %
Liquid Limit	65 % to 90 %
N-value	Almost 0

From the engineering point of view, this soil is not of bearing strength and has to be removed or ignored in designing.

(2) Clayey sand or sandy clay layer

This layer underlies the surface organic soil or clayey soil layer in the most part of area surveyed and its thickness ranges from 0.3 m to about 10m. This soil is classified from soft to stiff soil in mechanical characteristics. At the points No.1 and 6, it proves relatively stiff with N-value of 10 to 20, which can be considered to be a friction stratum in the case of friction pile structures.

(3) Sand

This sand layer is not encountered in all the boring points but recovered at the points No.1, 2 and 3. Sand at the point No.2 is not likely to have been naturally existing there but have replaced soft soil for the construction of the existing wharf nearby. The physical characteristics are shown in Table 2-4-2-2. In general, sand is of high bearing capacity and friction force. Since the thickness of this layer at the Point No.1 is approximately 4 m with the N-value of about 25 in average as shown in Figure 2-4-2-1 and its coefficient of uniformity, Uc ranges from 2.5 to 8.0, this sand layer can be considered as a bearing or friction stratum in designing pile structures. Also at the point No.2, the same thing can be applied.

Table 2-4-2-2 Physical Characteristics of Sandy Soil Layer

D_{10}	0.1 mm to 0.3 mm
D_{60}	0.1 mm to 2.0 mm
Uc (D_{60}/D_{10})	2.5 to 8.0
N-value	10 to 38

(4) Clay

This clay layer underlies almost the entire area covered by boring survey and its thickness ranges from 1 m to more than 14 m. In general, clay layer is one of the most important layers as a bearing stratum for foundations. Since the thickness of this clay layer at the point No.1 is more than 14 m with N-value

ranging from 20 to 60, this clay layer can be considered as the most reliable bearing stratum.

(5) Rock

Rock is not of basic characteristics of plasticity as a soil, but in this section it is inclusively dealt as one of soil layers for structural design. There exists hard rock at the point No.3, 4 and 5. Rock at these points is very hard granite and can be considered as the most reliable bearing stratum but is not suitable for excavation or dredging.

In our progress report submitted in April, 1992, topographical plan of rock at the foreport is presented referring to the report by "E.I.H Grimaux" (see Figure 2-4-2-3). As shown in this figure, there exists a mountain-like bedrock between the Sarandi Breakwater and Fluvial Wharf with its top approximately -6.0 m and its slope being steep. From the boring data of points No.3, 4 and 5 which are obtained in the area close to the above mountain-like bedrock, the depth of bedrock is different at each point and those depth tend to be deeper than those of report by "E.I.H Grimaux". From the comparison of the above both survey data, the top of mountain-like bedrock could be assumed to locate a little more north-east from the location of report by "E.I.H Grimaux", which comes to be preferable in planning the turning basin there for large sized vessels. However, the number of bore holes is not enough to accommodate possible irregularity of bedrock depth in the planned turning basin area. Therefore, a full boring survey is recommended in the future planning and design stage.

To summarize, the soil conditions in the project site have reliable bearing or friction strata in certain depth, so that the port structures such as concrete pile with enough embedded length, gravity type structure with replaced sand foundation, etc, can be adopted. Also when filling the area behind wharves or for heavy structures, the surface soft organic soil or clayey soil shall be removed and replaced with good soil materials such as sand, gravels and so on for maintaining stability and as a countermeasure against subsidence.

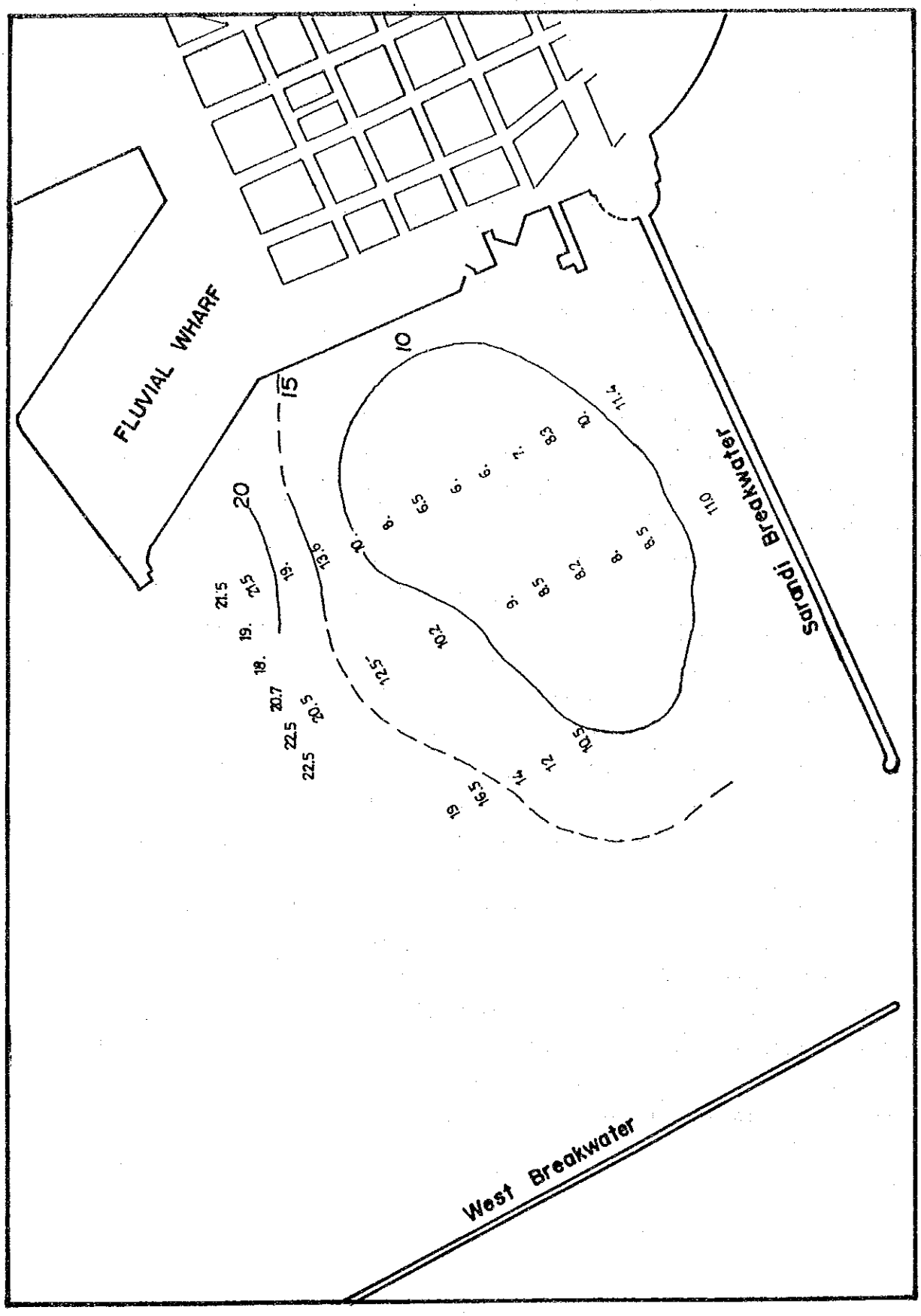


Figure 2-4-2-3 Topographical Plan of Rock at Foreport

3 PRESENT CONDITIONS OF THE PORT OF MONTEVIDEO

3-1 Location and Brief History of the Port of Montevideo

The Port of Montevideo is located at Lat.34 54' S, Long.56 12' W and in front of the capital of the country. This port is facing the mouth of the River of La Plata.

Many vessels have stopped over at the Port of Montevideo since the beginning of the 1770's. At that time, there was only a wooden wharf.

The development of the Port began in 1833. French engineer, Carlos Peregrini, formulated the first development plan of the Port of Montevideo. Unfortunately this plan was not implemented because of political reasons. Although tenders for construction of the Port were carried out at 1890 and 1899, implementation of the construction work was not conducted because of disagreement of tender condition.

The construction work eventually began in 1901. The construction plan in which the planned depth was 7.5 ~ 10 m was approved by the government on 25th of January. On 18th of August, the construction work was started with the installation of the base stone. And the infrastructure of the Port was provided for service on 25th of August in 1909. Basic port configuration has not changed until now except for the addition of a container terminal and fishery wharf. Construction began at both facilities in 1979. Construction of the fishery wharf was completed in 1983, while the reclamation of container yard was completed one year later. Installation of container crane was completed in 1987.

Meanwhile, the national government was designated as the administrative body of the Port based on a law which was made in January, 1909. And a new administrative body, Direccion del Puerto de Montevideo, was established, being attached to Ministry of Transport and Public Works on 15th of July, 1911. Administracion Nacional del Puerto de Montevideo was established based on the law dated 21 of July, 1916. Administracion Nacional del Puertos (present ANP) which administrates main ports in Uruguay is its successive body.

The Port of Montevideo is the only international trading port in Uruguay. Its hinterland is basically all the territory of the country.

3-2 Present Conditions of Port Facilities

3-2-1 General Description of Port Area

The mouth of the Port of Montevideo is composed of two breakwaters, namely, Sarandi breakwater (940m length) and west breakwater (1,300 m). There is a Naval branch office at the foot of Sarandi breakwater and the area in front of it is a candidate site to house navy headquarters. A part of it is already reclaimed by disposed soils conveyed from construction site in the city area. There is a ship repairing facility (slipway) to the north. This is a yard for ship repairing owned by ANP, but it is hardly used now.

The port area begins from the north end of the yard. The first area is the site of the container terminal and is separated completely by a fence. One container crane installed on the quay is used for handling containers from/to vessels and top-lifters are utilized for operation in the container yard. There are no reefer facilities. The east side of container wharf is used for the navy's activity. Two warehouses are also used by the navy. Navy vessels are moored double or triple at the berth.

Next to the navy base is A wharf. The basin between A wharf and the navy base is used for ferry boats and passenger boats. A part of the west side and the top of A wharf are used for ANP's vessels such as tug boats.

Cargo handling berth begins from the east side of wharf A. The apron of the east side of wharf A is about 10m wide and paved with stone. Crane rails and railways are laid in the apron. Two sheds with three floors are installed behind the apron.

A parallel wharf is installed between wharf A and wharf B. Apron is paved and the crane rails and railways are laid on it. There are three one-story sheds behind the apron.

The west side of wharf B is used for handling mainly bulk cargo by using high power cranes. This apron is paved and wider than other berths. Two sheds behind the berth are now being demolished. The top side of wharf B is now under construction for installation of cranes to be removed from the west side of wharf B.

Condition of the east side of wharf B is same as that of the east side of wharf A. The apron is narrow and paved by stone. A refrigerating wharf is installed from the foot of wharf B. Although refrigerating warehouses are not fully used now, the berth is fully used for mooring foreign fishing vessels. Embankment continues from the east edge of the berth, where several ANP's

working vessels are moored, to a fishing port section.

There is a fishing port section on the east side of the Port. The berth is used by domestic fishing boats and the area of apron is comparatively wide. There are several warehouses in the land area of the fishing port. These warehouses are called the second area warehouses and not so highly used. A ship repairing area continues from the fishing port section. There are two floating docks. (One is private and the other is ANP's)

North-eastern part of the Port is not used now. However, many containers are stacked in the land area.

Road called Rambla 25 de Agosto de 1825 which has two lanes each runs just behind the Port. And there is a central railway station on the east side of the Port across the road. Railway sidings are connected from here to the Port.

There is an oil refinery plant of ANCAP (National Administration of Combustibles, Alcohol and Cement) on the north side of the bay. Since crude oil is transported by pipeline from Jose Igunacio, port facilities here are mainly for distribution of products. There is an approach channel from the main port to ANCAP basin.

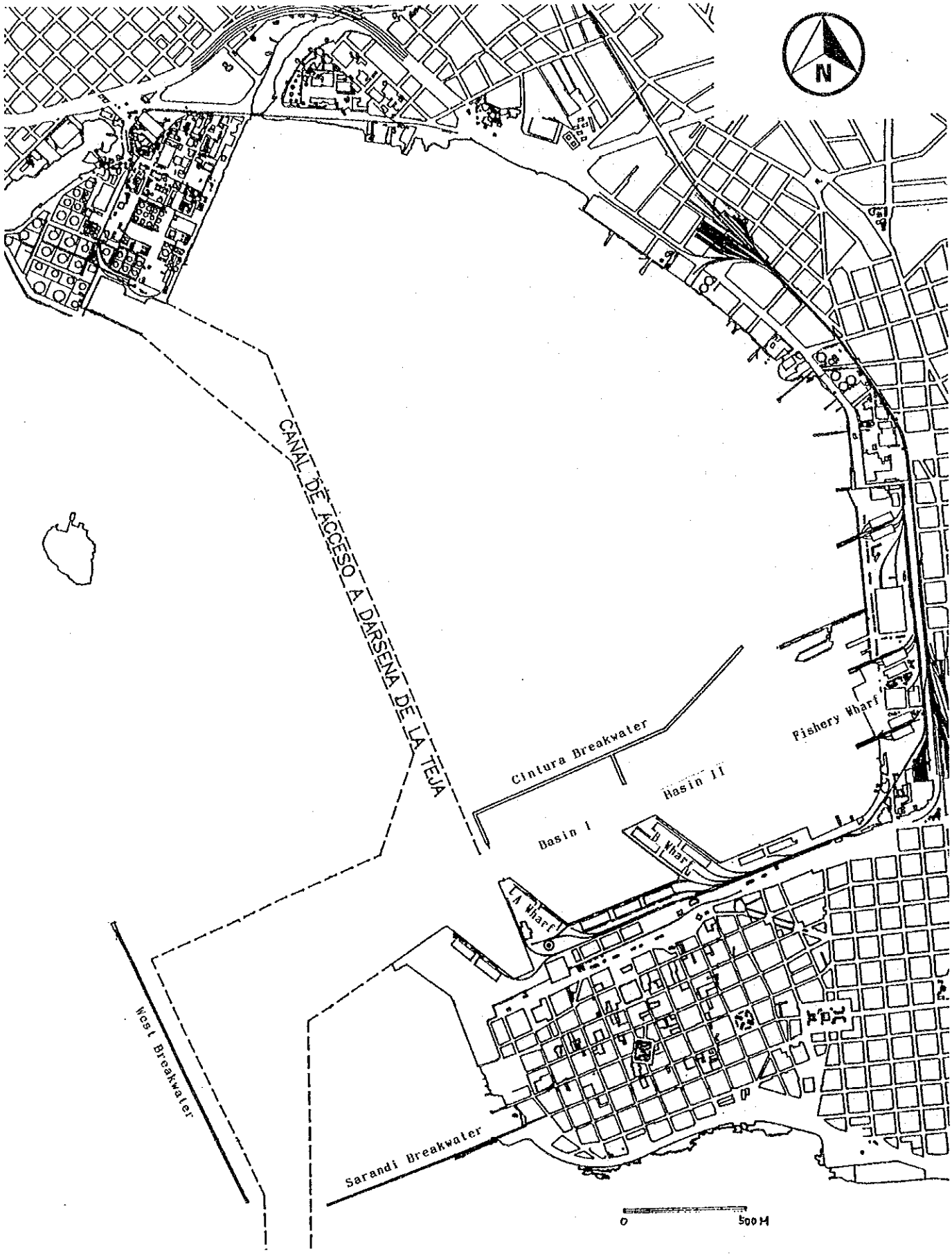


Figure 3-2-1-1 Layout of the Port of Montevideo

3-2-2 Present Condition of Each Port Facility

(1) Breakwater

There are two breakwaters at the mouth of the Port to protect the foreport area and the entrance channel from waves: the West breakwater and Sarandi breakwater. These breakwaters also function as protective walls against sedimentation. There is also the Cintura breakwater on the northern side of main basins. This breakwater was constructed for protection against sedimentation from La Plata River. Two small breakwaters, i.e., A, B, are attached to the breakwater. There is one breakwater called pier 'F' on the east side of the basin.

Table 3-2-2-1 Breakwater

No.	Neme	Length (m)	Structure
1	West Breakwater	1,300	Stone and Block
2	Sarandi Breakwater	940	Stone and Block
3	Cintura Breakwater	1,093	Stone and Block
4	Breakwater A	150	Stone and Block
5	Breakwater B	141	Stone and Block
6	Pier F	385	Stone and Block

Source: ANP

(2) Channel and Basin

The length of approach channel is 30 Km and the width is 200 m in north-south part, 100 m in east-west part. The depth is maintained at -10m. This channel runs south from the mouth of the Port and begins to turn east at 6.5Km south of the mouth of the Port and continues to a depth of 10m along the main stream of La Plata River.

The water area of the Port is divided mainly into three parts, i.e. foreport, basin I and basin II. There are two additional basins as well. One is a basin for river traffic activity surrounded by Wharf A and container terminal, and the other is a basin for coastal vessels and fishing boats, which is located on the east side of the Port.

There are several buoys both in the foreport and in basin II.

Table 3-2-2-2 Channel and Basin

No.	Neme	Length	Depth (m)	Width (m)
1	Channel	30,000	-10	(0-9Km) 200
			-10	(9Km) 100
2	Foreport		-10	
3	Basin I		-10	
4	Basin II		- 8.5	
5	Basin(Cabotaje)		- 4.5	
6	Basin(Fluvial)		- 5	
7	Channel(ANCAP)		- 9	
8	Basin(ANCAP)		- 9	

Source: ANP

(3) Wharves and Jetties

The total length of berthing facility is around 4,000 m. Of that, 278m is for container and around 2000m for other cargo except fish.

Table 3-2-2-3 Wharves and Jetties

No.	Neme	Length	Depth (m)	Ground Level(m)	Present Usage
1	Escale Wharf	278	-10	4	Container
2	Fluval Wharf	344	-5	4	Navy
3	Rinconada Wharf	88	-5	4	Ferry
4	Maciel Wharf	381	-6	4	Ferry, Tug Boat
5	A Wharf (top)	46	-10	4	Tug Boat
6	A Wharf (east)	303	-10	4	General Cargo
7	Wharf (BasinI)	492	-10	4	General Cargo
8	B Wharf (west)	294	-10	4	Bulk Cargo
9	B Wharf (top)	145	-10	4	Under Consyruction
10	B Wharf (east)	326	-10	4	General Cargo
11	Refrigertion Wharf	392	-10	4	Fishing Boat, Reefer
12	No.1 Wharf	208	-5	4	Fishing Boat
13	Fishery Wharf	335	-4	4	Fishing Boat
14	No.5 Wharf	170	-5	4	Fishing Boat
15	No.6 Wharf	227	-5	4	Auxiliary Craft

Source: ANP

(4) Handling Equipment

Many quay-side cranes on rail are installed in all quays except fishing port. Except for container berth, the largest crane is on the west side of wharf B and has a capacity of 40 tons.

Table 3-2-2-4 Handling Equipment

Type	Capacity (t)	Unit	RemarK	Type	Capacity (t)	Unit	Remark
Dockside Crane	40	1	Container	Truck	20	5	
	5	18	Maciel(3)		15	1	
			Wharf A East(7)	Top	40	4	
			Wharf B East(7)	Lifer	28	5	
	3	9	Basin I	Fork	2	37	
	12.5	4	Wharf B West	Lift	3	1	
	40	2	Wharf B West		13.5	3	
	6	4	Reefer		2.5	20	
Mobil	4	6			3	10	
Crane	40	2			3	10	
	20	2			3	14	
	30	1					
Tractor	50	9					
	50	4					

Note: Except repairing Equipment

Source: ANP

(5) Storage Facilities

There are many sheds and warehouses in the Port. Sheds for general cargo and for frozen cargo are located behind each berth. Other than those sheds, there are warehouses which are located at the inner part of land area behind general cargo quays and six warehouses behind the fishing port section.

There are three open storage yards behind the port road and railway.

Table 3-2-2-5 Open Storage Yards

Location (Name)	Area (m^2)	Major Stored Cargo	Pavement Coditon
Darsena I - Sur	7500	Automobiles	Bad
Darsena I&II	6000	Block of Granite Heavy Machine	Normal
Darsena II - Sur	5500	Tank of Lubricant	Normal

Source: ANP

Table 3-2-2-6 Sheds and Warehouses

Name	Floor	Area	Available	Year	Remarks
A					Navy
B					Navy
No. 1				1932	General Cargo
	GF	2,880	1,638		
	1F	3,420	2,394		
	2F	3,420	2,394		
	Total	9,720	6,426		
No. 2				1932	General Cargo
	GF	3,420	2,394		
	1F	3,420	2,394		
	2F	3,420	2,394		
	Total	10,260	7,182		
No. 3		4,536	3,175	1912	General Cargo
No. 4		3,672	2,872		General Cargo
No. 5		4,536	3,175		General Cargo
No. 6				1913	To be demolished
	GF	2,715	1,684		
	1F	3,425	2,404		
	Total	6,150	4,088		
No. 7				1913	To be demoloshed
	GF	3,810	2,667		
	1F	3,810	2,667		
	Total	7,620	7,620		
No. 8				1915	General Cargo
	GF	3,810	2,667		
	1F	3,810	2,667		
	Total	7,620	5,334		
No. 9				1915	General Cargo
	GF	3,810	2,667		
	1F	3,810	2,667		
	Total	7,620	5,334		
No.10					Frozen Food
	GF		5,270		Out of Work
	1F		5,270		To be Reconstructed
	Total		10,540		
No.11			24,300		Frozen Food
J.Herrera y Obes		3,863	3,670	1982	Automoble, Wool Cotton
Aduna Nueva		1,150	1,150		Storoge for adaned Cargo by custom
Santos					Not uesd
Artigas					Not uesd
No.20		4,372	4,251		Wool, Cotton
No.21		3,160	2,404		
No.22		3,610	1,920		Dangerous Cargo
No.23		7,150	7,000		CFS
No.24		3,500	3,400		CFS
No.25		3,600	3,000		Dabgerous Cargo
Mercado de Frutos	GF	12,312	12,312		
	1F	12,312	12,312		
		24,624	24,624		

Source: ANP

(6) Road and Railway

1) Road

Except for container terminal, wharf B (west), parallel berth and fishing wharf, all the aprons are paved with stone. Therefore, it is not conducive to smooth operation of vehicles. Some parts of the central port road are overlaid. The road behind the port is almost all paved-way except for the west limit where the bus terminal is located. This road is connected to the No.1 national road and the coastal road.

2) Railway

Sidetracks of railroad are laid on all aprons and the area behind sheds except for container terminal and the fishing wharf. There is a central railway station next to the port which is used for cargo transport only.

(7) Tug Boat

There are eight tug boats in the Port. Capacity of three boats exceeds 1,000 HP, and only one has a capacity of more than 2,000 HP.

Table 3-2-2-7 Tug Boat

Name	Capacity	SIZE			GRT	Year	Speed
	(H.P.)	L (m)	B (m)	D (m)	(ton)	Built	(knots)
GAUCHO	2x2,000	36.4	9.8	4.8	497	1985	13.0
LAVALLEJA	1,680	30.18	8	3.2	286	1961	12.6
GUENOA	700	27	7.72	2.4	79.139	1982	10.0
Gral. L. GOMEZ	550	20	6	3	90	1976	11.0
SANDUCERO	550	20	6	3	90	1978	11.0
GRITO DE ASENCIO	2x180	8.3	5.18	0.92	64.52	1931	10.0
23 DE SETEMBRE	130	11.15	3.29	0.98	10	1951	6.0
Ing. P. FERRES	1,100	26	7.3	3.66	232.85	1959	12.0

Source: ANP

3-2-3 Improvement Plan to Be Implemented

Improvement works now under construction or to be implemented near future are as follows

(1) Improvement of the Top Side of Wharf B

This work is done for transference of quay-side crane from the west side of wharf B.

(2) Demolition of Warehouses (West side of wharf B)

(3) Pavement of the Inner Port Road

(4) Transference of Bus Terminal

This work is carried out by MTOP. After the removal is completed, container yard is constructed at the site.

(5) Connection of the Road Behind the Port to the Coastal Road

3-3 Present Port Management and Operation

3-3-1 Outline of Port Management and Operation in Uruguay

Ports in Uruguay play an important role not only in handling the country's foreign trade and transit cargo from/to neighbouring countries, but also in providing passenger services to/from Argentina and services for the foreign/domestic fishing fleets operating in the South Atlantic. MTOP (Ministry of Transport and Public Works) and the ANP (National Port Administration) are mainly respqnsible for the management and operation of the ports. The ANP, an autonomous state public enterprise, under control of MTOP, is responsible for construction, maintenance, management and operation of Montevideo Port. The ANP is also responsible for the management and operation of all commercial ports. DNH (National Directorate for Hydrography, MTOP) is responsible for construction/maintenance of these commercial ports. DNH is also responsible for construction and operation of small craft harbors and the fishing port of La Paloma. These functions are summarized in Table 3-3-1-1.

Table 3-3-1-1 Main Ports in Uruguay

Name of Port	Construction/ Maintenance Body	Management/ Operation Body	Major Role
Montevideo	ANP	ANP	Trade, passenger fishing
Colonia	DNH	ANP	Passenger, trade
Nueva Palmira	DNH	ANP	Trade (International Transit)
Fray Betos	DNH	ANP	Trade (International Transit)
Salto	DNH	ANP	Trade
Carmelo	DNH	ANP	Passenger, Trade
Sauce	DNH	ANP	Trade, Pleasure
Punta del Este	DNH	DNH	Pleasure, Fishing
Piriapolis	DNH	DNH	Pleasure, Fishing
La Paloma	DNH	DNH	Fishing

(Note 1) ANP: National Port Administration
DNH: National Directorate for Hydrography
(Note 2) There is oil berth managed by ANCAP in Montevideo and a Private berth in Nueva Palmira which handles international transit cargo.

3-3-2 Functions and Organization of the ANP

The ANP, established by Law No.5495 in 1916, is an autonomous state enterprise responsible for provision of cargo handling (except stevedoring which is carried out by the ANSE; National Administration for Stevedoring Service) and marine services (towage, dredging), construction and maintenance works (including ship repair services) and granting of licences for port services within the port of Montevideo. In addition, it manages and operates other commercial ports such as Colonia, Fray Bentos and Nueva Palmira. However, in Nueva Palmira and Fray Bentos, loading/unloading facilities and silos for grain are built and operated by Directorate of Grain, MGAP (Ministry of Livestock, Agriculture and Fishing).

The Board of Directors of the ANP is composed of a President, a Vice President and three Directors appointed by the President of the Republic. (The term for Directors is five years.). Main function of the board is to decide important matters such as budget, personnel assignment and tariff.

The ANP is required to seek Government approval for tariff increases, investments and the annual budget.

Under the Board, the ANP has an organization governed by two general managers as shown in Figure 3-3-2-1.

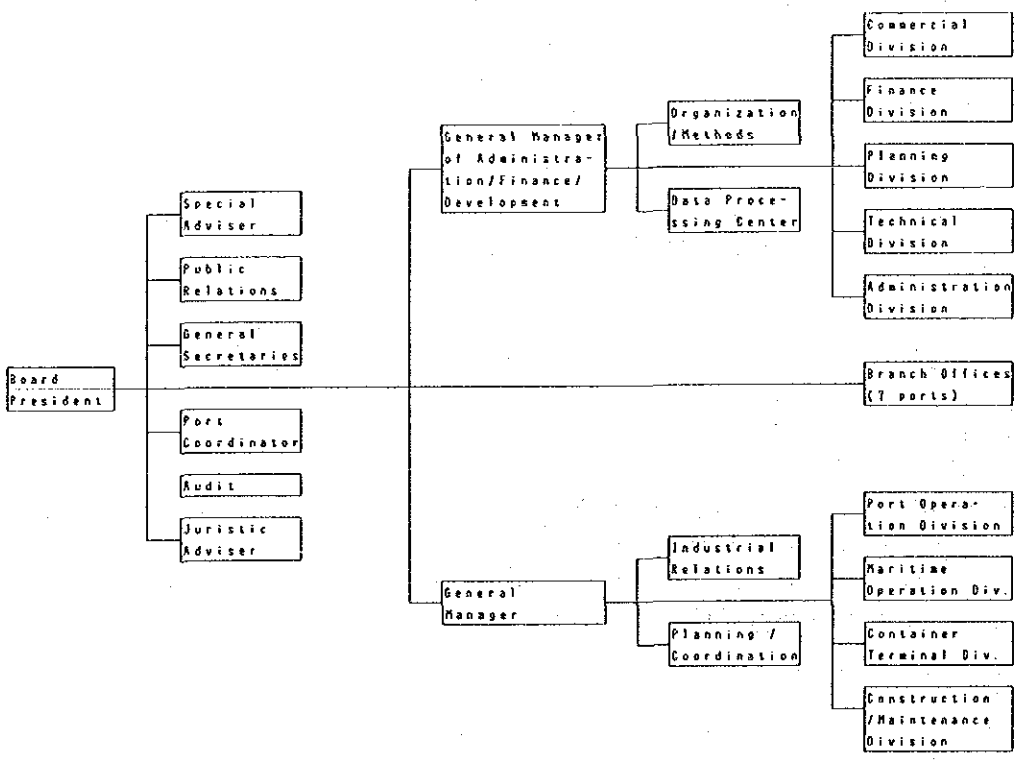


Figure 3-3-2-1 Organization Chart of the ANP

The number of employees of the ANP is 3,362 in total as of March, 1992, which is a large number, as shown in Table 3-3-2-1. As for the number of employees by age group, age group of over 51 forms 36 % of the total employees and that of 41-50 forms 28%. Therefore, the composition of the employees of the ANP seems to be aging. Also, the number of engineers is 32 as shown in Table 3-3-2-2. This is rather a small number, considering the total number of employees and scale of the organization.

Table 3-3-2-1 Number of Employees of the ANP by Age Group

Section	Total	-30	31-40	41-50	51-60	61-70
Board & Advisors	142	13	29	46	36	18
General Manager & Secretaries	31	2	5	9	13	2
Port Operation Division	808	80	189	235	257	47
Maritime Operation Division	575	44	208	135	155	33
Container Terminal Division	194	33	62	53	39	7
Total of General Manager Section	598	59	145	182	190	22
Manager of Administration/Finance	2,206	218	609	614	654	111
Maneger of Administration/Finance /Development & Secretaries	41	16	16	6	2	1
Commercial Division	6	1	4	1	0	0
Finance Division	291	42	85	74	71	19
Planning Division	24	6	10	3	5	0
Technical Division	38	5	14	9	8	2
Administration Division	466	22	103	123	167	51
Total of Adm./Fin./Develop. Section	866	92	232	216	253	73
Branch Offices & Coordinators	148	10	18	48	58	14
Grand Total	3,362	333	888	924	1,001	216

Table 3-3-2-2 Number of Engineers of the ANP

Civil Engineer	14
Architect Engineer	8
Systematic Engineer	4
Electrical Engineer	2
Industrial Engineer	2
Marine Engineer	1
Agricultural Engineer	1
Total	32

The organizational structure of the ANP is rather an old-fashioned, based on the principle that almost all port services should be provided from within; The ANP directly provides towage and dredging services using its own vessels, provides cargo handling services using its own workers, and provides ship repairing services in its own dock. Not surprisingly, the ANP has a lot of employees.

3-3-3 Control of Vessel's Navigation in Montevideo Port

The navigation of vessels is under control of the National Navy, and pilotage service is provided by the Pilotage Office of the National Navy. Pilotage service is compulsory in Montevideo Port except vessels less than 1000GRT, vessels belonging to the National Navy and other specific vessels. Pilots normally get on board in the access channel, 9350m south of the entrance to the foreport, where there is a mid-channel buoy.

Towage service is provided by the Division of Maritime Operation of the ANP, which has 8 tugboats from 130HP to 4000HP, and Reyla (private company), which has 5 tugboats from 250HP to 750HP. It is compulsory to use two tugboats from the foreport for berthing and vice versa except fishing vessels of Uruguay, Paraguay and Argentina and coastal vessels. Application for towage should be made two hours beforehand.

Line handling service is also provided by the Division of Maritime Operation of the NP.

All these services are available 24 hours.

3-3-4 Berth Assignment in Montevideo Port

The owners or agents of a vessel proposing to call at an ANP berth shall notify the ANP not less than ten days prior to the estimated time of arrival. Furthermore, they must present a required document not less than 72 hours prior. Berths are available 24 hours. The ANP holds a meeting with shipping agents at 10:00 a.m. (Monday to Saturday), one day before the berth usage, to discuss and arrange the berthing and unberthing of ships in the port of Montevideo. The ANP gives priority use as follows;

(1) Buoys of foreport

Priority 1: Transshipment vessels

Priority 2: Vessels entering for changing of crew

(2) Escalla Wharf

Priority 1: Container vessels

Priority 2: Vessels transporting containers

Priority 3: Vessels transporting containers and general cargo

Priority 4: Coastal container vessels

(3) Coastal Wharf

Priority 1: Passenger vessels (connecting Montevideo-Buenos Aires)

(4) Basin I (Deposito 1-5 berth)

Priority 1: Passenger vessels (especially Deposito 3-5 berth)

Priority 2: Ro-Ro vessels, container vessels, vessels carrying grain and stock raising goods

Priority 3: Other vessels

(5) Deposito 6,7 berths

Priority 1: Bulk cargo vessels

Priority 2: Vessels, carrying container and heavy cargo, which have no cranes

(6) Head of B jetty

Every vessel except passenger vessels

(7) Basin II

1) Buoys

Priority 1: Fishing vessels for changing crew and supplying goods

Priority 2: Fishing vessels and vessels which need repair

2) Deposito 8 berth

Priority 1: Coastal vessels that transship to Paraguay and Bolivia

Priority 2: Every vessel except passenger vessels

3) Deposito 9 berth

Every vessel except passenger vessels

4) Deposito 10 berth

Priority 1: Coastal vessels

Priority 2: Ro-Ro vessels (When Deposito 3 berth is occupied)

Priority 3: Every vessel except passenger vessels

5) Deposito 11 berth

Priority 1: Vessels loading/unloading to the refrigerator warehouse

6) Florida (next to Deposito 11 berth, bit 137-141, berthing vertically)

Priority 1: Fishing vessels and vessels for repair, changing crew and supplying goods

As a general rule, for vessels of the same category, the vessel that arrives first is given preference in berthing.

Based on present berth assignment system, container, passenger and cargo vessels get priority but foreign fishing vessels do not get any priority except Florida bits. As a result, fishing vessels use empty berths and if cargo vessels enter the port to use the berth, fishing vessels have to move to another empty berth.

3-3-5 Cargo Handling

Generally, conventional cargoes are directly brought into the port by exporters on the day of shipment to vessels. After customs clearance and measuring, cargoes are brought into open space near the back of the berth. This temporary stock space is allotted by agents and permitted by the ANP the day before shipment. Wool and raw cotton is once brought into the warehouse (mainly Deposito 20) and heavy articles such as granite and marble are brought into Rambla open yard about one month prior to shipment. Conventional import cargoes are mainly also directly brought out by importers on the day discharged. Though the Study Team could not obtain the information to calculate the ratio of direct loading/discharging from/to land and use of warehouse/open storage yard, it seems that direct loading/discharging is dominant.

Land-side cargo handling operations on piers are principally done by ANP's workers and equipment. Ship-side cargo handling operations are done by the ANSE (National Administration for Stevedore Services). The formation of the gang and operational hours are as follows:

(1) Formation of gang

Formation of gang and total number of laborers of the ANP and the ANSE are shown in Table 3-3-5-1 and Table 3-3-5-2.

Table 3-3-5-1 Formation of Gang

	ANP(Land-side Operation)	Num.	ANSE(Ship-side Operation)	Num.
Container	Crane operator	2	First Foreman	1
	Commander at pier	1	Second Foreman	2
	Fork lift operator	1	Tally Clerk	1
	Arrangement of container	1	Winch man	2
	Worker(Using spreader)	2	Watchman	2
			Worker	5
	Total	7	Total	13
General Cargo	Crane operator	1	First Foreman	1
	Fork lift operator	1	Second Foreman	2
	Worker	4	Tally Clerk	1
			Winch man	2
			Watchman	2
			Worker	8
	Total	6	Total	16
Bulk Cargo	Crane operator	1	First Foreman	1
	Worker	2	Second Foreman	1
			Tally Clerk	1
			Winch man	2
			Watchman	2
			Worker	6
	Total	3	Total	13
Fishery Products	Crane operator	1	First Foreman	
	Fork lift operator	2	Second Foreman	
			Tally Clerk	
			Winch man	
			Watchman	
			Worker	
	Total	3	Total	12

Table 3-3-5-2 Approximate Number of Workers (as of March, 1992)

ANP(Land-side Operation)	Num.	ANSE(Ship-side operation)	Num.
Worker	100	Foreman	30
Crane operator	60	Tally Clerk	94
		Winch man	78
		Watchman	65
		Worker	248
Total	160	Total	515

(2) Operational hours

1) Ship-side cargo handling (ANSE)

Normal operational hours (from Monday to Saturday)

1st shift 07:00-13:00

2nd shift 13:00-19:00

Night time operational hours (50% surcharge)

3rd shift 19:00-01:00

4th shift 01:00-07:00

On Sundays and holidays services are provided with 75 % / 50 % surcharge.

There are about 298 normal port operation days (except 52 Sundays & 15 Holidays).

2) Land-side cargo handling (ANP)

Operational hours of land-side cargo handling service is the same as the ship-side cargo handling's.

Normal operational hours

1st shift 07:00-13:00

2nd shift 13:00-19:00

Night shift (19:00-07:00) and Sundays and holidays services are provided with 20 % surcharge. When berths are crowded the ANP can order agents to use night shifts.

(3) Strikes

The operation of the port is sometimes halted by strikes of the labor unions of the ANP (SUANP) and the ANSE (SAEDU). Table 3-3-5-3 shows the halted hours by strikes. In 1987 and 1988, about 30 % of annual normal working hours were halted by strikes of labor unions.

Table 3-3-5-3 Halted Hours by Strikes of Labor Unions

(Unit Hours)

	1985	1986	1987	1988	1989	1990	1991
SUANP	(1.7%) 61	(2.6%) 94	(0.7%) 25	(3.7%) 133	(1.5%) 55	(2.1%) 74	(2.5%) 90.5
SAEDU	(7.3%) 260	(7.8%) 277	(34.2%) 1223	(29.8%) 1066	(0.7%) 25	(4.0%) 142	(9.2%) 329.8

Note: ( ) indicates the halted hours ratio of strikes.

Halted hours ratio = Halted Hours/Annual Normal Working Hours x 100 (%)

Annual Normal Working hours = 298 days x 12 hours = 3,576 hours

3-3-6 Tariff

(1) Tariffs of the ANP

All charges of the ANP are expressed in US dollars. Main tariffs of the ANP are shown in Table 3-3-6-1. Tariff of maritime services consist of use of port, wharfage and tugboat charge. Use of port and wharfage are based on vessel's size and berthing hours. As for Uruguayan flag fishing vessels, and foreign fishing vessels less than 600GRT, there are substitutive rules as written in notes of the Table 3-3-6-1.

Tariff of shore services mainly consist of tariffs for imports/exports, tariffs international/national transit, charge for container and storage charge. Tariffs for imports is based on C.I.F. value of the import goods not based on freight volume of goods. On the other hand, tariffs for exports is based on freight volume of goods. Both import and export goods are classified into groups according to N.A.D.I./ N.A.D.E. Code, (Import; 4 groups, Export; 10 groups), and each group has a different tariff rate.

Tariffs international/national transit is based on freight volume of goods. Tariffs of international transit is cheaper than those of national one.

Storage charge is based on freight volume of goods and staying period. Transit cargo has 3 months free storage period.

Table 3-3-6-1 Main Tariffs of the ANP

Item	Kind of Charge	Tariff
Entering the Port	Use of Port	~7000GRT: $0.90/24h, 100GRT 7000GRT~: $1.20/24h, 100GRT
Use of wharf	Wharfage	$1.00/meter,day
Use of tugboat	Tugboat charge (with 2 tugs)	Below 3000GRT: $250/h 3001~ 5000GRT: $ 400/h 5001~ 9000GRT: $ 650/h 9001~12000GRT: $ 800/h 12001~15000GRT: $1200/h 15001~20000GRT: $2000/h 20001~: $200 + $120/3000GRT
Shore services	1)Charge for imports	Group I: C.I.F.value x 7.5% Group II: C.I.F. value x 5.5% Group III: C.I.F. value x 3.5% Group IV: C.I.F. value x 2%
	2)Charge for exports	Group I: $ 28.00/t Group II: $ 22.00/t Group III: $ 12.00/t Group IV: $ 7.5/t, G.V:$4.5/t G. VI: $1.0/t, G.VII: $0.3/t, G.VIII: $3.0/h, G.IX: $1.0/t Group X: $0.05/t
	3)International Transit	$7.5/t
	4)National transit	Inward: $12.00/t Outward: $10.00/t
Shifting of Cargo	Shifting charge	$1.00/t (normal working hours)
Storage (in warehouse)	Storage charge 1)Import	1st month: $6.00/t 2nd month: $8.00/t 3rd month~ : $20.00/t
	2)Export	First 15 days: $2.00/t 15th-31th. days: $2.00/t 2nd. month: $6.00/t 3rd. month~: $15.00/t
	3)Transit	First 3 months: Free 4th month~: $30.00/t

(Note 1) Substitutive fees of use of port & wharfage for Uruguayan flag fishing vessels are as follows:
Coastal vessels: $150/month
Medium range vessels: $300/month
Sea-going vessels: $500/month
Reefer vessels: $600/month

(Note 2) Substitutive fees of use of port & wharfage for foreign flag fishing vessels of up to 600 GRT are $2.80/GRT, month.
(Fishing vessels over 600 GRT are subject the above Table.)

(Note 3) Transshiped or lightened goods from vessel to vessel without utilizing wharves are changed $2.30/ton.

(2) Operating Revenue of the ANP

Table 3-3-6-2 shows the operating revenue of the ANP in 1990.

Comparing maritime service revenue and land service revenue, maritime revenue is less than one sixth of land service.

Among maritime revenues, share of tugboat service revenue is 60 % of total maritime revenues, but share of wharfage charge revenue is only 16 %.

As for land service revenue, share of charges for imports is 55 % of the total land service revenue, which is much bigger than that of exports, which is 18 % of the total land service revenue.

Table 3-3-6-2 Details of Operating Revenue in 1990

(Unit US$)

	Montevideo	Other Ports	Total
Revenue form Maritime Service	6,168,130	285,016	6,453,146
-Use of Port	346,188	5,646	351,834
-Wharfage	960,640	64,996	1,025,636
-Revenue from Domestic Fishery Vessels	454,999	201,289	656,288
-Towing Service	3,848,736	0	3,848,736
-Other Revenues	557,567	13,085	570,652
Revenue from Land Service	37,076,397	5,439,408	42,515,805
-Charge for Imports	19,503,625	4,126,027	23,629,652
-Charge for Exports	7,294,170	285,509	7,579,679
-Chrage for Transit Cargo	1,015,278	431,873	1,447,151
-Revenue from Container	3,170,442	5,752	3,176,194
-Revenue from Storage	1,318,759	155,087	1,473,846
-Other Revenues	4,774,123	435,160	5,209,283
Sundry Income	2,754,539		2,754,539
Total	45,999,066	5,724,424	51,723,490

(3) Tariffs of the ANSE

Tariffs of the ANSE, which provides ship-side handling operation are mainly based on personnel cost as shown in Table 3-3-6-3. These are tariffs of normal working hours and in case of night/holidays work, 50 % surcharges

are added (in case of Sundays, 75 % surcharges are added). Besides the personnel cost, agents have to pay a bonus when labors handle more than minimum tonnage based on the tariffs. Furthermore, a commission fee, which is 11 % of total personnel cost, is added.

All these tariffs are expressed in New Uruguayan Pesos.

Table 3-3-6-3 Main Tariffs of the ANSE (As of March, 1992)

First Foreman	N$ 61,145/shift
Second Foreman	N$ 58,258/shift
Tally Clerk	N$ 58,258/shift
Stevedores	N$ 49,810/shift
Watchmen	N$ 46,807/shift

On the other hand, tariffs for handling fishing products are based on handling freight volume. For example, direct transshipment from a fishing to a carrying vessel in foreport is N$41,850/t.

3-3-7 Financial Situation of the ANP

(1) Profit and Loss Statement of the ANP

The Profit and Loss Statements of the ANP between 1987-1990 are shown in Table 3-3-7-1. The ANP shows a deficit in all four years, though there was a surplus in operating income. There may be a lot of reasons for the deficit, but loss of revaluation of foreign loans seems to be the biggest reason. This suggests that the deficit of the ANP is only nominal.

Table 3-3-7-1 Profit and Loss Statement of the ANP

(Unit US$)

	1987	1988	1989	1990
Operating Reveune	10,808,548	15,314,117	26,819,351	51,723,489
-Reveune form Land Service	8,884,154	12,996,844	22,817,133	42,515,805
-Revenue form Maritime Service	1,210,094	1,734,320	3,562,064	6,453,146
-Sundrt Income	714,300	582,953	440,154	2,754,538
Operating Expense	8,645,305	13,684,696	21,906,206	46,231,352
-Personnel Expense	5,582,911	8,772,707	14,092,344	28,748,712
-Depreciation	1,377,310	2,261,277	3,986,052	8,147,633
-Other Expense	1,505,084	2,650,712	3,827,810	9,335,007
Operating Income	2,343,243	1,629,421	4,913,145	5,492,137
Non-operating Revenue		404,353	1,351,720	4,665,526
Non-operating Expense	7,519,608	8,809,117	17,835,269	38,640,583
-Interest on Long-term Loan	-7,519,608	1,883,401	3,233,940	5,552,307
-Loss of Revaluation of Loan		6,925,716	14,601,329	33,088,276
Non-Operating Income	-7,519,608	-8,404,764	-16,483,549	-33,975,057
Surplus or Deficit	-5,176,365	-6,775,343	-11,570,404	-28,482,920

(2) Operational Efficiency

Operating Ratio:

$$\frac{\text{Operating Expense}}{\text{Operating Revenue}} \times 100\ (\%)$$

Working Ratio:

$$\frac{\text{Operating Expense - Depreciation Cost}}{\text{Operating Revenue}} \times 100\ (\%)$$

The operating ratio shows the operational efficiency of the organization as an enterprise, and the working ratio shows the efficiency of the routine operations of the port.

When the calculated operating ratios are less than 70-75 %, and the working ratios are less than 50-60 %, the operations are efficient.

The operating ratio and the working ratio of the ANP between 1987 and 1990 are shown in Table 3-3-7-2.

Both the operating ratio and the working ratio do not reach the preferable level during these four years.

Table 3-3-7-2 Operating Ratio and Working Ratio of the ANP

	1987	1988	1989	1990
Operating Ratio	78.3%	89.4%	81.7%	89.4%
Working Ratio	65.6%	74.6%	66.8%	73.6%

3-4 Port Activities

3-4-1 General Traffic

(1) Total cargo volume at Montevideo Port

Total cargo volume by packing type at Montevideo from 1985 is shown in Table 3-4-1-1. In this table, transit cargo volume is counted twice, because cargo volume at the port should be counted on throughput basis.

Table 3-4-1-1 Total Cargo volume by Packing Type

Unit:tons

Year		Bulk L.	Bulk S.	Container	Con. T1	Con. T2	General	Gen. T1	Gen. T2	Total	Ex+Im
1985	Export	1,875	127,665	74,011	12,960	1,824	392,174	118,001	157,625	886,135	
	Import	74,357	209,143	13,726	12,960	1,824	117,657	118,001	157,625	705,293	1,591,428
1986	Export	31,609	96,164	98,921	17,678	2,115	261,307	64,579	133,323	705,696	
	Import	155,072	324,152	31,319	17,678	2,115	117,451	64,579	133,323	845,689	1,551,385
1987	Export	8,827	26,990	85,667	17,121	1,833	358,146	97,906	152,133	748,623	
	Import	131,522	371,524	33,366	17,121	1,833	169,241	97,906	152,133	974,646	1,723,269
1988	Export	1,332	22,497	125,118	52,293	10,514	517,457	70,168	122,894	922,273	
	Import	485,670	247,624	56,610	52,293	10,514	119,435	70,168	122,894	1,165,208	2,087,481
1989	Export	3,703	36,008	150,951	80,342	4,194	432,594	108,907	1,903	818,602	
	Import	523,027	344,646	72,463	80,342	4,194	83,680	108,907	1,903	1,219,162	2,037,764
1990	Export	0	22,290	176,618	164,161	5,223	355,447	79,853	187,609	991,201	
	Import	232,228	266,843	93,154	164,161	5,223	47,360	79,853	187,609	1,076,431	2,067,632

Source:ANP
Bulk L.:Liquid Bulk
Bulk S.:Solid Bulk
Con. T1:Container of international Transit Cargo
Con. T2:Container of Domestic Transit Cargo
Gen. T1:General Cargo of International Transit Cargo
Gen. T2:General Cargo of Domestic Transit Cargo
Ex+Im:Export Plus Import

Total cargo volume in Montevideo is increasing slightly. Its growth rate between 1985 and 1990 is 5.3 %. Liquid bulk had been increasing till 1989, but it dropped in 1990. Solid bulk was decreasing slightly. General cargo was decreasing between 1988 and 1990. International transit of general cargo did not show a big change. Domestic transit of general cargo had been decreasing till 1989, but increased rapidly in 1990.

Container cargo has been increasing satisfactorily till 1990 except domestic transit container.

Growth of total cargo volume depends on that of container cargo volume. Import volume is larger than export volume. Figure 3-4-1-1 shows the transition of cargo volume by packing type. International and domestic transit cargo are expressed by T1 and T2 in this figure.

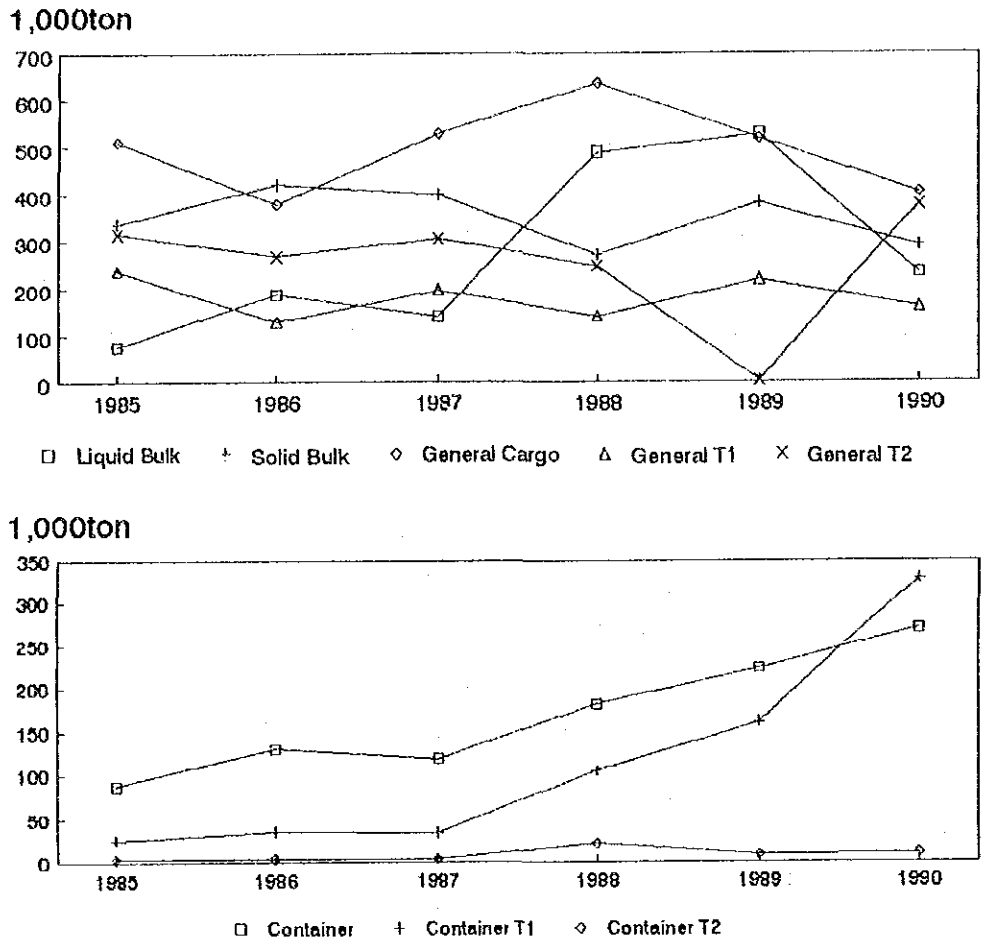


Figure 3-4-1-1 Total Cargo Volume by Packing type

(2) Export

Figure 3-4-1-2 shows export cargo volume by packing type except transit cargo.

Liquid Bulk consists almost entirely of vegetable oil such as sunflower oil, linen oil and so on. Handling volume of these cargoes hold a very low share of the export volume. In 1990, liquid bulk was not exported.

Solid bulk consists of grain such as rice, sunflower, maize, soy beans, chemical products such as fertilizer and so on, fish, animal oil and Citrus. Solid bulk cargo volume has shown a tendency to decline.

Container cargo is increasing slightly. Meat, textile materials as well as, manufactured stone, glass, leather and so on are stuffed in container.

General cargo is leading export cargo with share of 64 % of export cargo in 1990. General cargo includes meat, vegetable products, wood, fish,

dairy products and so on.

Table 3-4-1-2 shows export cargo volume by classification of tariff.

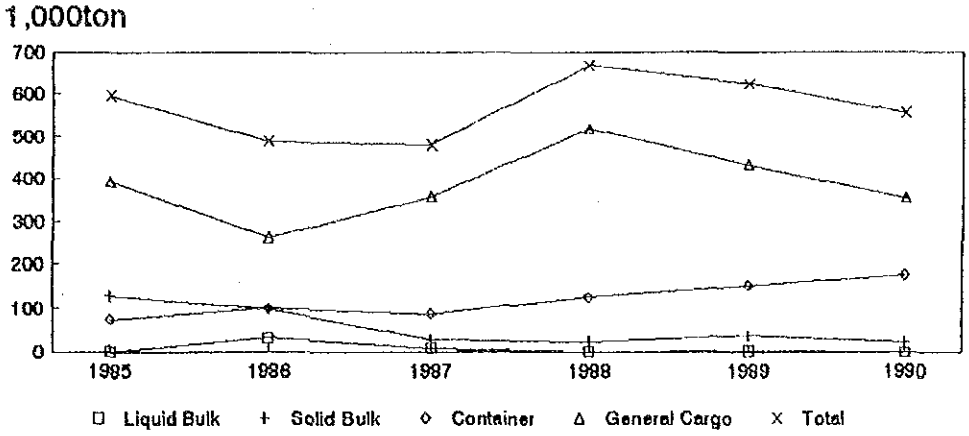


Figure 3-4-1-2 Export Cargo Volume by Packing Type (except Transit Cargo)

Table 3-4-1-2 Export Cargo Volume by Classification of Tariff

Unit:Tons

Commodity by N.A.D.E.	1985	1986	1987	1988	1989	1990
Live Animals & Related Products	137,101	144,867	103,066	155,632	175,027	150,836
Live Sheep(unit:number)	2,142	5,680	2,469	174,134	22,438	1,044
Vegetable products	304,645	156,704	199,585	258,651	220,551	175,297
Oil(Animal & Vegetable)	7,801	12,050	8,975	11,658	6,574	9,045
Food Products	52,522	27,181	23,423	38,312	56,666	32,749
Mineral Products	4,053	32,458	13,007	15,606	7,058	7,663
Chemical Products	10,229	10,751	41,611	21,988	11,087	14,217
Plastic Material	363	461	897	832	593	527
Hide/Leather & Related Products	12,358	11,658	9,319	12,883	15,234	13,767
Wood	501	104	316	58,744	49,543	64,993
Material of Fabrication Paper	208	1,711	709	184	166	179
Textile Material	53,073	75,540	66,122	70,519	54,608	63,127
Shoes, Hat	360	202	294	299	399	465
Manufacturing Stone	7,190	8,640	9,593	17,721	22,632	18,563
Precious Stone, Coin	36	133	57	126	35	125
Common Metals	2,468	3,692	1,719	1,949	1,383	1,478
Machine & Apparatus	895	598	159	260	466	396
Transportation Equipment	283	164	243	432	254	235
Optical Instrument	19	13	4	7	9	17
Arms & Munition	0	0	0	0	0	0
Merchandise & Diverse Products	1,612	1,074	531	601	972	676
Object of Art	8	0	0	0	0	0
Total	595,725	488,001	479,630	666,404	623,256	554,355

Source: ANP

In 1990, main commodities consisted of 96,940 tons of meat (84,154 tons beef, 556 tons chicken, 12,230 tons other meat), 16,145 tons of food subproducts, 74,627 tons fruits, 59,323 tons wool, 20,144 tons dairy products, 64,291 tons wood, 3,850 tons stone and gypsum, 30,036 tons fish, 95,649 tons grain and 93,350 tons others cargo. Almost all cargo are agricultural products.

Destination countries are Netherlands (13.7%), Brazil (10.9%), Germany (7.4%), Italy (5.5%), Spain (5.2%) and so on in 1990.

(3) Import

Figure 3-4-1-3 shows import cargo volume by packing type except transit cargo.

Liquid bulk is fuel oil, gas oil, lubricant and so on. And theseliquid bulks are unloaded in front of A.N.C.A.P. plants. Cargo volume had been increasing till 1989, but decreased drastically in 1990. However, liquid bulk holds leading share of import cargo volume.

Solid bulk consists of chemical products, fertilizer, material of fertilizer and so on. Import volume of solid bulk has not changed so much in the six years prior to 1990.

Container share of all import is very low. However, handling volume of container is increasing slightly.

General cargo share of all import cargo volume is also very low. General cargo has decreased as container increases.

Table 3-4-1-3 shows import cargo volume by classification of tariff.

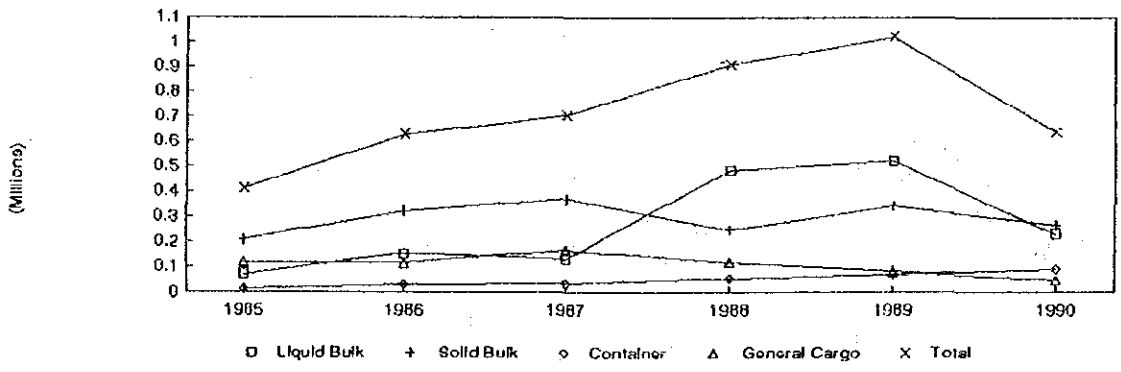


Figure 3-4-1-3 Import Cargo Volume by Packing Type (except Transit Cargo)

Table 3-4-1-3 Import Cargo Volume by Classification of Tariff

Unit:Tons

Commodity by N.A.D.E.	1985	1986	1987	1988	1989	1990
Live Animals & Related Products	684	1,064	6,831	984	499	916
Live Sheep(unit:number)	8	0	0	0	0	0
Vegetable products	35,817	109,905	168,867	37,096	76,124	26,212
Oil(Animal & Vegetable)	867	850	1,377	524	2,888	2,167
Food Products	10,650	5,257	5,290	8,885	6,846	5,497
Mineral Products	119,834	270,970	189,892	599,515	617,774	306,167
Chemical Products	190,852	174,213	243,816	192,340	249,634	227,568
Plastic Material	6,800	8,949	10,543	7,648	8,587	11,390
Hide/Leather & Related Products	439	722	930	694	404	561
Wood	3,792	4,389	9,810	5,973	1,836	1,717
Material of Fabrication Paper	11,452	10,142	10,733	8,435	7,629	7,059
Textile Material	4,146	3,913	6,788	5,890	6,808	5,339
Shoes, Hat	22	40	44	173	31	54
Manufacturing Stone	1,365	1,049	1,223	1,271	1,567	2,399
Precious Stone, Coin	0	40	0	16	1	1,634
Common Metals	10,879	14,448	29,903	19,043	21,237	12,114
Machine & Apparatus	9,558	11,700	12,576	10,537	11,159	10,835
Transportation Equipment	2,188	3,261	2,838	4,836	3,870	4,240
Optical Instrument	313	246	466	915	1,212	261
Arms & Munition	21	16	102	42	29	906
Merchandise & Diverse Products	5,204	6,820	3,619	4,521	5,588	12,543
Object of Art	0	0	5	1	3	6
Total	414,883	627,994	705,653	909,339	1,023,816	639,585

Source: ANP

In 1990, main commodity cargo handling volume consisted of 303,979 tons of mineral products (215,581 tons crude petroleum oil, 16,161 tons petroleum, 72,237 tons steel), 221,812 tons chemical products (179,893 tons inorganic, 2,796 tons organic, 56,071 tons fertilizer), 10,287 tons bean and plant, 4,938 tons grain, 2,200 tons machinery and 96,269 tons others cargo.

Origin countries are Argentina (22.5%), United States (15.9%), Chile (7.6%), Brazil (5.6%) and so on in 1990.

(4) Transit cargo

Transit cargo consists of international container, international general cargo, domestic container, domestic general cargo.

Figure 3-4-1-4 shows the tendency of transit cargo in recent six years.

Domestic container cargo changed little, and handling volume is the lowest in transit cargoes.

International container cargo is increasing rapidly. Also, share of

volume in transit cargo has been ranked number two recently.

International general cargo has a constant handling volume recently.

Domestic general cargo holds leading share of total transit cargo volume except 1989.

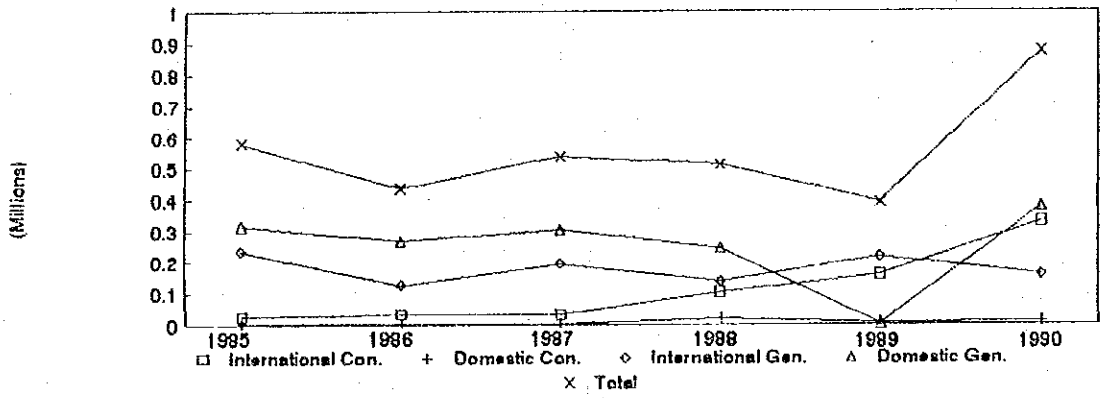


Figure 3-4-1-4 Transit cargo volume in Montevideo Port

(5) Container cargo

Montevideo Port started to handle containers at container terminal in 1986. Some parts of containers are handled at multipurpose terminal. Container handling volume has increased steadily. Empty containers accounted for 37 % of container imports and 27 % of container exports in 1990. Ratio of non empty container has not changed in the last six years, and its ratio is about 33 %. Average cargo volume per container has increased little by little (10 tons in 1990).

Table 3-4-1-4 and Table 3-4-1-5 show containers handled in terms of TEUs at Montevideo Port. Almost all containers are handled at Montevideo Port in Uruguay.

Table 3-4-1-4 Containers Handled (in TEU) at Montevideo Port

Year	Import			Export			Total
	Laden	Empty	Total	Laden	Empty	Total	IM+EX
1985	6,426	5,467	11,893	9,040	2,573	11,613	23,506
1986	9,360	6,802	16,162	11,428	3,629	15,057	31,219
1987	12,953	7,758	20,711	13,658	5,632	19,290	40,001
1988	14,411	8,569	22,980	15,708	6,723	22,431	45,411
1989	16,281	9,328	25,609	17,758	7,219	24,977	50,587
1990	20,618	12,215	32,833	22,718	8,735	31,453	64,286

Source: ANP

Table 3-4-1-5 Container Cargo Traffic

	1985	1986	1987	1988	1989	1990
Cargo Volume in container(TON)	100,697	147,918	136,154	234,021	303,756	433,933
Number of Container(TEU)	23,506	31,219	40,001	45,411	50,587	64,286
Number of container empty con.(TEU)	8,041	10,431	13,390	15,292	16,547	20,950
Average volume per container	7	7	5	8	9	10
Ratio non empty container(%)	34	33	33	34	33	33

Source: ANP

3-4-2 Ship calling at the Montevideo Port

Table 3-4-2-1, which shows the GRT distribution of the vessels calling at Montevideo Port, shows that maximum sized (over 50,000 GRT) ships called the port infrequently and that ships between 10,001 and 50,000 GRT called the port 470 times in 1990. This class of ship calling the port has increased slightly.

Ships below 500 GRT called the port 1760 times in 1990. This class of ship calling the port has top share of total calling ships.

The number of vessels that called at Montevideo Port and the average gross registered tonnage by vessel type are shown in Table 3-4-2-2. This table shows

that the size of the ships calling at Montevideo Port, except fishing boat, have changed very littled.

Table 3-4-2-1 GRT Distribution of Vessels at Montevideo Port

GRT	1987	1988	1989	1990
Below 500	58	1,965	2,169	1,760
501- 1000	133	262	323	269
1001- 2000	336	298	411	413
2001- 3000	373	394	276	199
3001- 4000	221	204	258	140
4001- 5000	25	43	45	46
5001- 6000	51	47	44	46
6001- 7000	41	49	40	21
7001- 8000	49	39	36	40
8001- 9000	88	90	91	77
9001-10000	127	109	111	121
10001-15000	265	249	238	278
15001-50000	122	162	192	192
Over 50000	4	2	1	1
Total	1,893	3,913	4,235	3,603

Source: ANP

Table 3-4-2-2 Vessels Calling at Montevideo Port Ship Type

Year	Passen-ger	Passenger & Cargo	Cargo	Bulk	Tanker	Reefer	Container	Fishing	Others	Total
1985	362	14	653	40	181	67	91	207	35	1,650
	1,234,941	82,023	5,008,110	640,872	925,464	408,834	1,548,717	424,738	119,914	10,393,613
	3,411	5,859	7,669	16,022	5,113	6,102	17,019	2,052	3,426	6,299
1986	300	87	700	29	173	57	69	239	20	1,674
	1,164,744	312,153	5,599,838	421,889	1,078,336	263,195	1,120,733	474,568	119,652	10,555,108
	3,882	3,588	8,000	14,548	6,233	4,617	16,243	1,986	5,983	6,305
1987	28	482	754	22	168	96	102	202	39	1,893
	359,375	1,580,430	5,970,323	360,164	834,715	443,715	1,431,650	412,729	139,692	11,532,793
	12,835	3,279	7,918	16,371	4,969	4,622	14,036	2,043	3,582	6,092
1988	31	370	708	33	197	110	119	2,315	30	3,913
	364,925	1,324,014	5,261,139	477,529	1,012,943	542,090	1,873,598	1,083,967	109,103	12,049,308
	11,772	3,578	7,431	14,471	5,142	4,928	15,745	468	3,637	3,079
1989	29	397	766	17	231	123	110	2,537	25	4,235
	364,981	1,612,019	5,737,721	286,468	923,259	518,593	2,207,692	1,222,872	96,054	12,969,659
	12,586	4,061	7,490	16,851	3,997	4,216	20,070	482	3,842	3,062
1990	175	146	600	29	189	175	130	1,928	231	3,603
	971,646	416,374	4,654,646	426,102	677,341	1,122,388	2,345,992	725,673	1,355,055	12,695,217
	5,552	2,852	7,758	14,693	3,584	6,414	18,046	376	5,866	3,524

Source:ANP
Upper:Nos of Ships Calling
Middle:Total GRT
Lower:Average GRT

Table 3-4-2-3 shows ships calling by flag and percentage of national ships calling by type. Rate of Uruguayan ships calling at Montevideo Port is 54 % in 1989 and it showed a steady increase.

In recent years,over 70 % of fishing and tanker vessels are national. Number of national flag are very small in grain and cargo ships in Montevideo Port.

Table 3-4-2-3 Ships Calling by Flag and Percentage of National Ships Calling by Type

Year	Pass-enger	Passenger & Cargo	Cargo	Bulk	Tank-er	Reefer	Con-tainer	Fish-ing	Others	Total
1985	362	7	600	40	28	67	86	207	35	1,432
	0	7	53	0	153	0	5	–	0	218
	0	50	8	0	85	0	5	–	0	13
1986	300	10	655	29	47	55	69	239	20	1,424
	0	77	45	0	126	2	0	–	0	250
	0	89	6	0	73	4	0	–	0	15
1987	28	359	709	22	36	91	102	202	35	1,584
	0	123	45	0	132	5	0	–	4	309
	0	26	6	0	79	5	0	–	10	16
1988	31	317	673	33	53	108	118	553	28	1,914
	0	53	35	0	144	2	1	1,762	2	1,999
	0	14	5	0	73	2	1	76	7	51
1989	29	266	726	16	55	123	104	584	25	1,928
	0	131	40	1	176	0	6	1,953	0	2,307
	0	33	5	6	76	0	5	77	0	54
1990	175	146	600	29	189	175	130	1,928	231	3,603
	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Source:ANP
Upper:Nos of Foreign Ships Calling
Middle:Nos of National Ships Calling
Lower:National Ships Calling Percentage at Montevideo
NA: not available

3-4-3 Terminal Performance

(1) Berth Performance

Table 3-4-3-1 shows number of berthing vessels by berth between July 1 and September 30 in 1991 except Escala wharf and domestic fishing wharf. Container and semi-container vessels mainly use Deposito 6 berth, since this berth is available when they cannot berth at Escala wharf because of occupation. Though conventional vessels use every berth, use of Deposito 7 and 10 berths is high. Refrigerating vessels use every berth except Deposito 6 and 7 berths. Only 5 vessels use Deposito 11 berth which is located in front of the refrigerating warehouse.

As for fishing vessels, they use every wharf, though nearly half of fishing vessels use Deposito 11 berth.

Table 3-4-3-1 Number of Berthing Vessels by Berth
(July 1 - September 30 in 1991)

Type of Vessel	No.1	No.2	No.3	No.4	No.5	No.6	No.7	No.8	No.9	No.10	No.11	Total
Container	3	1	1	2	2	11	1					21
Semicontainer			1			2						3
Conventional	10	8	11	16	21	17	26	7	13	29	15	173
Passenger				1								1
Passenger/Cargo						1						1
Refrigerator	2	3	8	1	3			3	2	3	5	30
Factory	5	1		3				4	3		5	21
BUlk	2			2	1	3	2	1		1		12
Barge	3	1	3	3	2	1	10	1		9	4	37
Fishing	17	19	2	8	8	2	1	9	12	25	79	182
Others	1		2		1	2	1	2		1		10
Total	43	33	28	36	38	39	41	27	30	68	108	491

Source: ANP

Table 3-4-3-2 shows the average berthing hours of vessels in the same period.

Excluding passenger vessels, the shortest average berthing hours were for container vessels at 25.6 hours. Average berthing hours of conventional vessels is 82.4 hours and that of bulk vessels is 103.4 hours; berthing hours by berth varied greatly.

Average berthing hours of fishing vessels is 141 hours. In particular, berthing hours of Deposito 8 to 11 berths are long. This indicates that fishing vessels mainly use these berths.

On the other hand, when we analyze each berth, average berthing hours of Deposito 7 to 11 berths are long.

Deposito 7 berth (41 vessels) are used predominantly by Paraguayan vessels (30 vessels), which is evidence that these Paraguayan vessels stay long.

Deposito 11 berth is mostly used by fishing vessels. These fishing vessels stay for a long period. It seems that this berth is mainly used for repair and rest of fishing vessels.

Table 3-4-3-2 Average Berthing Hours of Vessels by Berth
(July 1 - September 30 in 1991)

(Unit Hours)

Type of Vessel	No.1	No.2	No.3	No.4	No.5	No.6	No.7	No.8	No.9	No.10	No.11	Average
Container	15.5	29.3	10.8	26.5	65.1	21.4	32					25.57
Semicontainer			42			99.6						80.42
Conventional	67.9	86.2	53.1	39.9	31.7	46.4	121	108	138	112	91.1	82.44
Passenger				8.5								8.50
Passenger/Cargo						23.5						23.50
Refrigerator	42.1	41.9	114	50.5	29.1			36.1	22	80.2	69.2	68.97
Factory	36.5	101		54.7				138	50.9		213	94.32
BUlk	152			53.9	181	63.5	58.8	45		161		103.40
Barge	44	72.5	20.7	33.1	112	24.5	135	70.8		60.9	109	80.86
Fishing	80.2	72.5	27.3	26.7	45.8	26	42.5	87.2	134	78.7	236	141.26
Others	185		14.1		0.25	8.13	20.8	46		17.5		35.98
Total	69.2	72.6	60.5	37.1	43.5	42.7	115	89.1	120	91.1	201	99.94

Note: There were 13 vessels (9 fishing vessels + 4 others) which stayed over the end of November. In above calculation these vessels were excluded.

(Source: ANP)

(2) Performance of Cargo Handling Efficiency

Though the Study Team could not get data on cargo handling efficiency, the team observed the handling efficiency of bulk cargo on March 6. The results are shown in Table 3-4-3-3. This is the case of handling import wheat in Deposito 6 berth, and four quay cranes (one crane with capacity 40 ton and three cranes with capacity of 12.5 ton) and hoppers were used. The average cycle time of the crane with capacity 40 ton was 2 minutes 56 seconds and that with capacity 12.5 ton was 2 minutes 8 seconds. The average handling volume per hour was estimated at about 131 ton/hour (crane with capacity 40 ton) and about 113 ton/hour (crane with capacity 12.5 ton). Therefore, total handling volume/hour was estimated 469 ton/hour (131 ton x 1 + 113 ton x 3).

Cargo handling was not carried out from 12:45-14:45.

Table 3-4-3-3 Handling Efficiency of Bulk Cargo by Study Team's Observation

Observation Day: March 6 '92
Berth: Deposito 6 berth
Handling Cargo: Wheat (unloading)
Handling System: 4 cranes (3 cranes with capacity 12.5t & 1 crane with capacity 40t) and hoppers
Grab bucket: 8m3 (6.4t) x 1 + 5m3 (4t) x 3
Average Cycle Time: Grab bucket 5m3; 2 minutes 8 seconds
Grab bucket 8m3; 2minutes 56 seconds
Handling Volume/hour=6.4t x 60 minutes/2 minutes 56 seconds
+4t x 60 minutes/2 minutes 8 seconds x 3=469t/h

Observed Cycle Time: Below Table

Grab Bucket 5m3				Grab Bucket 8m3			
Morning		Afternoon		Morning		Afternoon	
Watching Time	Cycle Time	Watching	Cycle Time	Watching Time	Cycle Time	Watching	Cycle Time
11:53.45	2.45	14:44.28	1.47	11:53.52	3.04	14.44.27	1.47
11:55.10	2.25	14:46.15	2.00	11:55.56	2.54	14:47.45	3.18
11:57.35	2.05	14:48.15	2.01	11:58.48	3.00	14:51.15	3.30
11:59.40	2.19	14:50.16	1.47	12:01.43	3.04	14:54.30	3.15
12:01.49	3.11	14:52.03	1.47	12:04.52	2.53	14:57.53	3.23
12:05.00	2.18	14:53.50	1.55	12:07.45	2.50	15:00.49	2.56
12:07.18	2.17	14:55.45	1.53	12:10.35	2.57	15:04.08	3.19
12:09.35	2.25	14:57.38	1.55	12:13.32	3.03	15:06.45	2.37
12:12.00	2.30	14:59.33	1.50	12:16.35	3.10	15:09.52	3.07
12:14.30	2.45	15:01.23	1.37	12:19.45	2.49	15:12.38	2.46
12:17.15	2.10	15:03.00	2.00	12:22.34	2.56	15:15.29	2.51
12:19.25	2.30	15:05.00	1.40	12:25.30	2.42	15:18.40	3.11
12:21.55	4.45	15:06.40	1.45	12:28.12	2.51	15:21.55	3.15
12:24.40	2.38	15:08.25	1.50	12:31.03	2.37	15:25.17	*5.13
12:27.18	2.22	15:10.15	1.48	12:33.40	3.10	15:29.30	2.55
12:29.40	2.20	15:12.03	1.52	12:36.50	3.09	15:34.35	2.48
12:32.00	2.32	15:13.55	1.55	12:39.59		15:37.23	1.47
12:34.32	2.36	15:15.50	1.53			15.39.10	2.00
12:37.28	2.18	15:17.43	*3.34			15:41.10	
12:39.26	2.44	15:21.17	2.30				
12:42.10		15:23.43	1.28				
		15:25.21	1.54				
		15:27.15	1.37				
		15:28.52	1.28				
		15:30.20	1.40				
		15:33.40	1.40				
		15:34.39	0.59				
		15:37.00	2.21				
		15:38.45	1.45				
		15:40.30	1.45				
		15:42.35	2.05				
		15:44.20	1.45				
		15.46.10	1.50				
		15:48.00					

*:Waiting for truck

(3) Performance of Cargo Handling Equipment

Table 3-4-3-4 and 3-4-3-5 show the performance of quay cranes and mobile cranes. The container crane of Escala wharf, which is the only container crane that the ANP has at present, shows the highest working ratio of 242 hours/month.

The working hours of the cranes of Wharf A is about 30-50 hours/month (less than two hours/day), which is rather low. Some of them are hardly used and most of them are not in good condition. This is mainly because of superannuation.

The working hours of the cranes located in Basin 1 (Deposito 3-5 berths) is about 91 hours/month, which is relatively higher than that of cranes of wharf A. Condition of these cranes can be judged good.

Two Takrat Habich cranes with capacity of 40 ton located in Deposito 6 and 7 berths show high working ratio of 115 hours/month, which is the second highest working ratio following the container crane. It seems that the main reason for high working ratio is that only these two cranes can handle heavy cargo including container. Repair hours of these cranes, which is 46 hours man/month, is relatively short. Therefore, condition of these two cranes can be judged good.

The working hours of cranes located in Deposito 8 and 9 berth (B-2) is 45 hours/month, and the repairing hours of them is 99 man hours/month. Condition of half of these cranes seems bad and becoming superannuated.

The average working hours of mobile cranes is 23 hours/month, which is not high. Condition of these cranes can be judged as average.

On the other hand, Table 3-4-3-6 shows the working ratio of fork lift trucks. The total number of the fork lift trucks is 107, but some of them hardly work, especially, Komatsu fork lift trucks which have a capacity of two ton. There are 37 fork lift trucks, but 21 fork lift trucks work less than 10 hours/month and the remaining 16 fork lift trucks work at most 24 hours/month. Condition of these can be judged poor.

Table 3-4-3-4 Working Situation of Quay Cranes

Location	Type Maker	Nos.	Use '89/1 -'90/3		Repair '91/1 - 12		Condition		
			Hour/ Month	Ave- rage	Hour Man/Mon.	Ave- rage	G	R	B
Container Yard	C/Crane Inia Emar		242	242	-	-	0		
Wharf A-1	Potal/Cr.	40	3		-			0	
	5T-3	41	7	16	-	-			0
	Demag	48	37		-				0
Wharf A-2	Semi	70	65		129				0
	Potal	71	39		16			0	
	Crane	72	42		58				0
		73	-	43	-	64			0
	SKODA	74	30		-				0
		75	43		120			0	
		76	36		61				0
Basin 1		10	110		91		0		
	High	11	106		8		0		
	Pedestal	12	109		260			0	
	Jib Crane	13	84		-		0		
	3T-9	14	71	91	-	57	0		
		15	49		-		0		
		16	93		37		0		
	Duro-	18	92		93		0		
	Felgura	19	107		24		0		
Wharf B-1	High	30	46		-		0		
	Pedestal	31	65	52	-	-	0		
	Jib Crane	32	35		-		0		
	12.5-4	33	58		-		0		
	40T-2	36	141	115	92	46	0		
	Takrat/Ha	37	90				0		
Wharf B-2	Semi	80	35		122			0	
	Potal	82	52		176			0	0
	Crane	83	81		75				0
		84	14	45	12	99			0
	5T-7	85	33		-			0	
		86	54		-			0	
	DEMAG	87	46		310				0
Basin 2	H.P. Jib	20	77		-		0		
	Crane	21	91	79	18	14	0		
	6T-4	22	67		23		0		
	DURO	23	82		16		0		
	DEMAG	42	37	37	-	-			
Under Repair	DURO	17	-	-	15	-			
	DEMAG	50	3	3	-	-			

Note: (1) Except Under Repair
(2) Standard of Classification
G = Good :Wroking
R = Regular:Repair cost is low
B = Bad :Almost beyond repair

(Source: ANP)

Table 3-4-3-5 Working Situation of Mobile Crane

Type	Maker	Nos.	Use '89/1 -'90/3		Repair '91/1 - 12		Condition		
			Hour/ Month	Ave- rage	Hour Man/Mon.	Ave- rage	G	R	B
Crane 4T-6	Insley	G14	16		-			0	
		G15	47		-			0	
		G16	12	21	18				0
		G17	28		-			0	
		G18	23		5			0	
		G19	0		36			0	
Crane 40T-2	Pocline	G 5	31					0	
		G 6	38	35				0	
Crane 20T-2	Pocline	G 8	48					0	
		G 9	0	24				0	
Crane	Bu, 30T-1	G 7	8	8					0

Note: (1) Except Under Repair

(2) Standard of Classification

G = Good :Wroking

R = Regular:Repair cost is low

B = Bad :Almost beyond repair

(Source: ANP)

Table 3-4-3-6 Working Situation of Fork Lift Trucks

(1)

Type	Maker	Nos.	Use '89/1 -'90/2		Repair '91/10 - 12		Condition		
			Hour/ Month	Ave-rage	Hour Man/Mon.	Ave-rage	G	R	B
Top Lift 40T-4	Belotti	G 1	0		91			0	
		G 2	123	104	238	158		0	
		G 3	162		285		0		
		G 4	129		16		0		
Top Lift 28T-5	Kalmar	E 1	147		2		0		
		E 2	103		29		0		
		E 3	56	110	63	19		0	
		E 4	145						0
		E 5	97						0
Top Lift 12T-3	Kalmar	E 9	62		6			0	
		E10	35	34	26	16		0	
		E11	6		15			0	
Fork Lift 2T-37	Komatsu	22	1						
		38	2						
		44	2						
		49	1						
		50	6						
		51	25						
		54	14						
		56	5						
		58	18						
		60	5		3				
		61	15		34				
		62	18		17				
		64	35		4				
		67	26		3				
		71	16						
		72	2						
		73	9	10		5		0	
		74	21						
		75	5						
		77	8						
		78	9		33				
		79	1						
		83	10						
		84	14		2				
		85	2		8				
		86	30		11				
		91	30						
		92	34		27				
		93	68		15				
		94	1						
		95	5						
		96	5						
		97	5						
		98	6						
		100	4						
		101	6		17				
		E 5	15						

Note: (1) Except Under Repair
(2) Standard of Classification
G = Good :Wroking
R = Regular:Repair cost is low
B = Bad :Almost beyond repair

(Source: ANP)

(2)

Type	Maker	Nos.	Use '89/1 -'90/2		Repair '91/10 - 12		Condition		
			Hour/ Month	Ave- rage	Hour Man/Mon.	Ave- rage	G	R	B
FORK 3T-1	Komatsu	E49	14	14					0
Fork 13.5T-3	Komatsu	E 6	23		65				
		E 7	11	12	8	24			0
		E 8	3						
Fork 2.5T-20	Komatsu	215	78						
		252	88						
		253	52		7				
		254	103						
		255	105		11				
		256	93						
		257	114		16				
		258	89		5				
		259	75		2				
		260	68	84		6		0	
		261	83		9				
		262	68		17				
		263	84						
		264	80						
		265	90						
		266	81		22				
		267	85		3				
		268	85		13				
		269	80		9				
		270	84						
Fork 3.0T-10	Komatsu	301	75		21				
		302	40						
		303	63		6				
		304	66		1				
		305	52	61		4		0	
		306	58		7				
		307	51	51					
		308	61						
		309	69						
		310	71		6				

Note: (1) Except Under Repair
(2) Standard of Classification
G = Good :Wroking
R = Regular:Repair cost is low
B = Bad :Almost beyond repair

(Source: ANP)

(3)

Type	Maker	Nos.	Use '89/1 -'90/2		Repair '91/10 - 12		Condition		
			Hour/ Month	Ave- rage	Hour Man/Mon.	Ave- rage	G	R	B
Fork Lift 3T-10	Toyota	30	116		5				
		31	64		-				
		32	63		62				
		33	88		-				
		34	123	82	-	15		0	
		35	73		67				
		36	73		-				
		37	108		7				
		38	69		9				
		39	44		2				
Fork Lift 4T-14	Toyota	14	41		-				
		15	61		4				
		16	40		-				
		17	69		7				
		18	0		-				
		19	56		-				
		20	60	41	18	18		0	
		21	36			7			
		22	56		-				
		23	0		128				
		24	58		58				
		27	51		-				
		28	45		35				

Note: (1) Except Under Repair
(2) Standard of Classification
G = Good :Wroking
R = Regular:Repair cost is low
B = Bad :Almost beyond repair

(Source: ANP)

(4) Performance of Warehouse

Table 3-4-3-7 shows in and out volume of storage facilities except a refrigerating warehouse in January, 1992.

Table 3-4-3-7 In/Out Volume of Storage Facilities in January, 1992

	In Volume (Ton)	Out Volume (Ton)
Deposito 1	9	9
Deposito 2	60	183
Deposito 3	142	230
Deposito 4	1,123	1,284
Deposito 5	722	311
Deposito 8	6	85
Deposito 9	181	280
Deposito 20	702	1,098
Deposito 22	116	57
Deposito 24	1,260	427
Deposito 25	77	34
Mercado de Frutos	43	208
Rambla 1	557	265
Rambla B Wharf	537	422
Rambla 2	699	135
Total	6,235	5,028

(Source: ANP)

In and out volume of the refrigerating warehouse is shown in Table 3-4-3-8.

The tariff of using refrigerating warehouse is based on using period. Furthermore, because main use period of fishing products is from March to August and that of fruits is from July to September, the tariff of February to July and that of August to January is different (the latter is cheaper than the former) as shown in Table 3-4-3-9.

Table 3-4-3-10 shows the revenue and expense of the refrigerating warehouse. The annual revenue of 1988 and 1989 is about $800 thousand, but those of 1990 and 1991 are half the level of 1988 and 1989. Though in volume of 1991 (13,500 ton) is increasing compared with that of 1990 (8,902

ton), the revenue of 1991 (US$ 310,000) is less than that of 1990 (US$ 450,774). This means that the average use period of the refrigerating warehouse became shorter in 1991.

Judging from the above mentioned, it seems that use ratio of the refrigerating warehouse is tending to decline. On the other hand, according to our hearings with port users, transshipment cargo of tuna is mainly stored in private companies' refrigerating warehouses because the tariff is cheaper than that of the ANP.

Table 3-4-3-8 In /Out Volume of Refrigerrating Warehouse

(Unit: Ton)

	'88		'89		'90		'91	
	In	Out	In	Out	In	Out	In	Out
January	17	202	171	649	902	455	101	490
February	312	190	280	204	1,110	742	4	62
March	3,601	134	3,687	2,556	3,062	1,439	956	104
April	3,839	1,480	4,606	1,451	635	2,662	967	1,095
May	763	4,710	2,241	2,798	425	1,386	-	486
June	1,568	2,216	3,569	1,564	-	184	1,388	1,126
July	2,330	2,781	278	1,369	20	181	3,808	3,388
August	1,036	1,809	1,475	420	489	409	3,704	4,120
September	596	739	262	1,001	616	834	2,553	3,091
October	419	863	628	1,622	697	490	5	94
November	256	677	192	747	473	674	14	4
December	843	620	558	2,607	473	704	-	11
Total	15,580	16,421	17,947	16,988	8,902	10,160	13,500	14,071

Source: ANP

Table 3-4-3-9 Tariff of Refrigeraing Warehouse

(Unit: US$)

	February to July				August to January			
Vol./Section	Month	Half Month	Day 15 - 30	Day 1 - 15	Month	Half Month	Day 15 - 30	Day 1 - 15
957.5 m^3	7,000	3,850	233.33	256.67	5,800	3,190	193.33	212.67
479 m^3	4,025	2,214	134.17	147.60	3,335	1,834	111.17	122.30
290 m^3	3,016	1,695	100.53	110.60	2,499	1,374	83.30	91.60
5,745 m^3	29,000	-	-	-	26,100	-	-	-
3,745 m^3	32,000	-	-	-	28,800	-	-	-

Source: ANP

Note:(1) 15 - 30 Remtal fee per day in case of rental period is from 15 to 30 day.

(2) 1 - 15 Rental fee par day in case of rental period is from 1 to 15 days.

Table 3-4-3-10 Revenue and Expense of Refrigerating Warehouse

(Unit: US $)

	'88	'89	'90	'91
Total Revenue	793,060	796,540	450,774	310,579
Rental Fee				
Room	699,013	718,807	342,270	228,507
Fork Lift	61,447	41,083	39,363	17,109
Permission Fee	32,600	36,650	20,700	7,500
Delvery Fee	0	0	48,441	57,463
Total Expense	517,263	523,390	469,522	515,492
Personnel Expense	269,290	286,732	285,474	258,773
Overtime Allowanse	138,129	131,945	119,173	175,242
Miscellaneous	109,844	104,713	64,875	81,477
Balance	+ 275,797	+ 273,144	- 18,748	- 204,913

Source: ANP

3-5 Fishing Vessels' Activity

3-5-1 Domestic Fishing Vessel

(1) Registered Vessel in the Port of Montevideo

There are 68 vessels registered at the Port of Montevideo. Of these, 47 belong to the category ALTURA which is more than 100 GRT and 21 belong to COSTERO which is less than 100 GRT.

(2) Vessel Size Distribution

Table 3-5-1-1 shows the distribution of the domestic fishing vessel size. Vessels less than 100 GRT hold 30.9 %, and vessels with 100 to 300 GRT hold 55.9 %. Accordingly, 86.8 % of vessels in the port are less than or equal to 300 GRT.

Table 3-5-1-1 Distrubution of Fishing Vessel Size (1991.1.1)

Size	No.	%
- 100	21	30.9 %
101 - 300	38	55.9 %
301 - 500	6	8.8 %
501 - 1000	3	4.4 %
1001 - 2000	0	0.0 %
Total	68	100.0 %

Sourece: INAPE

(3) Pattern of Behavior

1) Monthly Fluctuation of vessels' entering

Table 3-5-1-2 shows monthly fluctuation of vessels' entering in 1991 excluding December. It is understood that there is not a large fluctuation among months. The reason why there are many entries in both months of July and August is assumed to be due to the end of fishing season of squid.

Table 3-5-1-2 Monthly Fluctuation of Fishing Vessel's Entering in 1991

	1	2	3	4	5	6	7	8	9	10	11	12
Calling Vessel No.	132	146	165	160	131	166	194	183	164	167	159	

2) Normal pattern of Each Vessel

It is said that vessels in the category of ALTURA, normally, operate ten days in the sea, and stay at the port for one day for unloading and preparation. On the other hand, the cycle time of the vessels in the category of COSTERO is about six days, i.e., five days in the sea and 18 hours at the port.

Table 3-5-1-3 was made using the data of two months (July and August in 1991). According to this table, some characteristics are understood as fol lows:

a) There are many vessels which enter or leave the port at the same time. It is considered that they are acting as one group.

b) Duration of stay in the sea is somewhat shorter than the said pattern, while staying period at the port is rather longer than the said pattern.

c) Only forty nine (49) vessels are operated during these two months. The rest of the vessels are considered to be moored at the berth.

3) Staying Period

Table 3-5-1-4 shows distribution of average staying period of each vessel in three months(July to September) in 1991. If the vessel obeys the normal pattern of behavior described above, significant difference should be shown on this table. However, it is impossible to acknowledge such a difference from this table. Only vessels more than 500 GRT show some difference in that they stay at the port more than 100 hours, longer than average.

Table 3-5-1-4 Distribution of Average Staying Period of Each Vessel

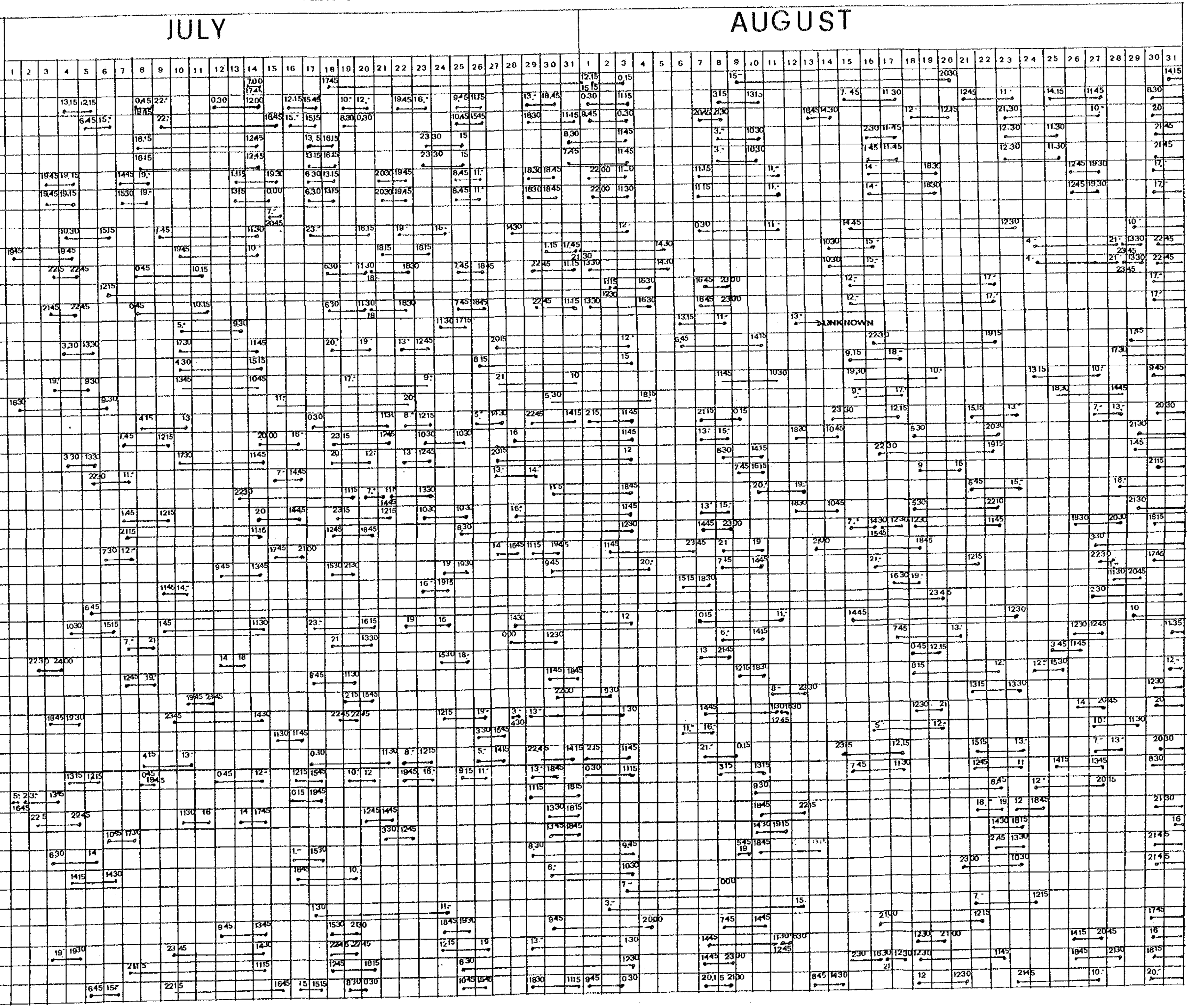
Unit: Hours

GRT	A.S.P.	GRT	A.S.P.	GRT	A.S.P.	GRT	A.S.P.	GRT	A.S.P.
25	13.75	104	59.19	213	91.19	315	50.67	531	122.58
44	42.57	104	59.40	228	53.27	315	44.28	608	132.50
50	85.71	106	71.06	28	46.84	325	81.25	718	106.88
50	54.86	110	75.58	229	59.50	351	361.63		
51	50.13	114	93.65	29	71.97	352	72.19		
54	41.65	121	54.38	229	63.61	352	28.89		
76	102.90	139	130.43	240	67.75	398	521.00		
85	59.47	139	65.55	240	29.25				
88	46.48	160	100.92	240	74.17				
88	42.53	160	71.08	240	40.05				
91	87.06	182	70.96	257	44.97				
94	87.31	182	62.73	274	74.64				
97	91.88	189	51.59	285	69.98				
		199	132.33						
Ave.	62.02	Ave.	78.49	Ave.	60.55	Ave.	165.70	Ave.	120.65

Note: A.S.P.= Average Staying Period

Table 3-5-1-3 Behavior of Domestic Fishing Vessels

NAME	GRT
ALDEBERAN I	398
ALMAFUERTE	54
ANTARES I	228
BESUGO I	104
BESUGO II	104
CALON I	88
CALON II	88
CANGREJO	25
CARLA	160
DARTESA I	182
DARTESA II	182
DARTESA III	139
DARTESA IV	139
DEL PLATA I	315
DELFIN C	114
DON PACO	274
EL CELTA	50
ESOL	213
ESPARTACO	85
EXPRESO OPTIMO II	106
FLOPPY I	97
FRICERSEN I	315
INSIGNIA I	191
LA PALOMA	160
LA PALOMA I	91
LAURA ADRIANA	240
LAVALLEJA S-S	325
MAGDALENA MARIA	240
MAGRITTE	351
MALVINAS II	76
MANDRAKE I	228
MARIANA ROJAMAR	240
NURYMAR I	240
ODIN I	257
ORANWA	51
PATO	189
PEREGRINO I	229
PHOENIX	44
PINTAMAR	285
POLARBORG I	352
POLARBORG II	352
PROMOPEZ I	229
PROMOPEZ II	229
RIO SOLIS	718
ROCHA	531
SAN GENARO	110
SAN RAFAEL	50
SANTA MARIA DER MAR	94
TACUAREMBO S-2	121



Legend: Time — Entering the Port; Time — Departing the Port

3-5-2 Foreign Fishing Vessel

(1) Vessel Size Distribution

Table 3-5-2-1 shows the vessel size distribution in 1990. Large fishing vessels entered the port. Number of vessels more than 2,000 GRT is fifty one (51), representing a share of 10.2%. On the other hand, number of vessels less than 500 GRT is 240 and the proportion is 48.0%.

Table 3-5-2-1 Distribution of Vessel Size (1990)

Size	No	%
- 100	0	0.0
101 - 300	24	4.8
301 - 500	216	43.2
501 - 1000	99	19.8
1001 - 2000	110	22.0
2001 - 3000	27	5.4
3001 - 4000	15	3.0
4001 - 5000	7	1.4
5001 - 6000	0	0.0
6001 - 7000	2	0.4
7001 -	0	0.0
Total	500	100.0

Source: ANP

(2) Transition of Foreign Fishing Fleet Visiting the Port of Montevideo

According to the statistics of ANP, Poland was ranked No.1 with 141 vessels visiting the Port, followed by Argentina and Spain in 1985.

In the number of vessel call, the difference between Poland and other countries was very large. This pattern continued to 1986. In 1987, there was small change in that Spain doubled its number of visits while Argentina's were cut in half.

In spite of the fact that Poland remained first in 1988, the disparity with other countries became less pronounced. The biggest change was the appearance of new comers such as China, Japan and USSR. However, there is other information revealing that these countries have sent many vessels to this sea area from the beginning of 1980's and visited the Port of Montevideo. In 1989, USSR was ranked No.1 with its number of

visiting vessels reaching 111. It was followed by Poland 109, China 89, Japan 76, Spain 53 and Korea 22.

Table 3-5-2-2 Calling of Fishing Vessels by Country

Unit: ton

	1985		1986		1987		1988		1989	
	No.	GRT	No.	GRT	No.	GRT	No.	GRT	No.	GRT
Korea	0	0	0	0	0	0	0	0	22	14,216
China	0	0	0	0	0	0	86	41,907	89	40,380
Spain	19	13,558	18	12,101	37	49,843	72	88,777	53	62,336
Japan	5	3,637	0	0	7	6,291	88	100,857	76	55,721
Poland	41	318,797	166	358,668	83	177,695	111	223,990	109	227,784
USSR	5	13,740	2	5,248	11	33,496	58	175,189	111	338,216
others	37	75,006	53	98,551	64	145,404	138	180,387	124	15,951
Total	270	424,738	239	474,568	202	421,729	553	811,107	584	891,604

Source: ANP

According to eleven months data of 1991, there occurred some changes in the composition of foreign countries. Soviet Union, Poland and Japan lowered their positions, while Spain and Korea were ranked No.1 and 2, respectively, in number. In particular, Korea showed a dramatic increase. Recently, there is a trend for vessels from Taiwan to increase.

Table 3-5-2-3 Monthly Calling of Fishing Vessels by Country(1991)

	1	2	3	4	5	6	7	8	9	10	11	12	Total
Korea	7	4	2	6	3	19	25	3	4	5	2		80
China		4	13	7	6	5	3	3	2	2	1		46
Spain	12		3	9	22	19	17	4	2	4	5		97
Japan		1	4	2	4	11	1	1					24
Ploand	7	1			2	3	2		1		2		18
USSR	5	4	3	6	4	5	7	4	2		3		43
others	5	4	10	5	2	9	14	5	4	4	3		65
Total	36	18	35	35	43	71	69	20	15	15	16		373

Source: ANP

(3) Pattern of Behavior of Foreign Fishing Vessels

1) Monthly Fluctuation of the Number of Arrival Vessels

Table 3-5-2-4 shows the monthly fluctuation of foreign fishing vessels arriving at the Port of Montevideo. According to the table, the number increases from the beginning of the year, excluding February.

Table 3-5-2-4 Monthly Fluctuation of Fishing Vessel's Call(1991)

	1	2	3	4	5	6	7	8	9	10	11	12
Calling Vessels No.	36	18	35	35	43	71	69	20	15	15	16	11

It is said that there are plenty of squid in the Southwest Atlantic Ocean, especially in the area around 200 miles off the coast of Argentina. Fishing season of squid begins in January and it continues to July. Many foreign fishing vessels gather in this area to catch squid during this time. They continue to conduct fishing without going back to the port during that period. Therefore, the number of calling vessels at the port reaches its maximum level around June or July when fishing of squid is completed. In these months, double the average number of vessels visit the port. After these months, foreign fishing vessels calling at the port decrease drastically to one-third or a quarter of the peak level. There are two patterns evident among squid fishing vessels. One is the vessel exclusively used for squid catching. These vessels either move to fishing spots other than the Southwest Atlantic Ocean after July, or stay at the port until the next season. The other type of vessel continues to operate, catching other fish such as hake and white croaker for the rest of year.

There are other foreign vessels using the Montevideo port periodically. Most of them are the vessels for tuna catching. This kind of vessel visits the port every two to four months. However, its proportion in the number of visiting vessels is comparatively small.

2) Staying Period in the Port

Table 3-5-2-5 was made using the data on calling vessels from July to September in 1991. There are some limitations in the data. Since many data did not include information on the departure date those data were excluded in making this table.

Table 3-5-2-5 Distribution of Staying Period

Staying Period (Hours)	Frequency (Times)	Share
0 - 72	29	37.7%
72 - 144	16	20.8%
144 - 216	8	10.4%
216 - 288	5	6.5%
288 - 360	4	5.2%
360 - 432	0	0.0%
432 - 504	1	1.3%
504 - 576	0	0.0%
576 - 648	1	1.3%
648 - 720	5	6.5%
720 - 792	0	0.0%
792 - 864	0	0.0%
864 - 936	1	1.3%
936 - 1008	1	1.3%
1008 - 1080	0	0.0%
1080 - 1152	1	1.3%
1152 - 1224	0	0.0%
1224 - 1296	2	2.6%
1296 - 1368	1	1.3%
1368 - 1440	0	0.0%
1440 - 1512	0	0.0%
1512 - 1684	1	1.3%
1584 - 1656	1	1.3%
Total		100.0%

According to the table, 37.7% of vessels completed their stays within 3 days, 20.8% between 4 days and 6 days, 10.4% between 7 days and 9 days. Accordingly, 68.9% of foreign fishing vessels depart the port within 9 days after their arrivals. On the other hand, there are several vessels which stay in the Port more than one month. They hold 10.4% in total and there is one vessel which stays more than 1,600 hours (more than 66 days).

It is necessary to pay attention to the excluded data. 26 pieces of data of 103 were excluded. If the data are looked into in more detail, followings are clarified. Namely, 12 of 69 vessels, which enter the Port in July, continue to stay at the Port beyond the end of November. 2 of 20 vessels in August and 2 of 14 vessels in September continue to stay at the Port beyond the end of November. As described above, most of them are assumed to stay at the Port until January when the new fishing season begins.

Figure 3-5-2-1 shows the difference of staying period by vessel size. The staying period of each size is the averaged one within vessels belonging to each category. It does not show any significant difference by the vessel size.

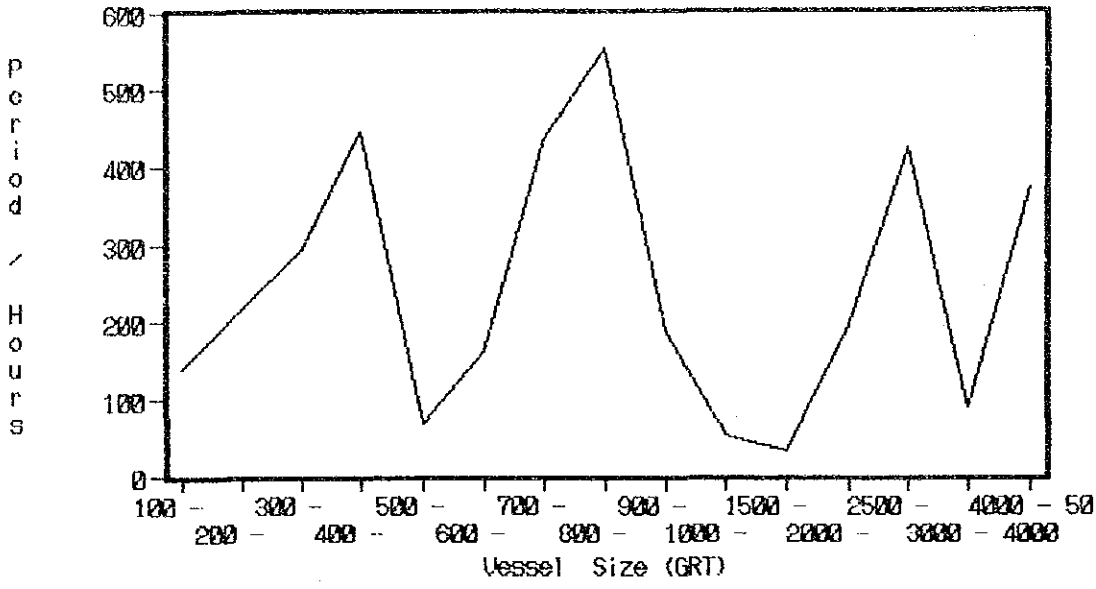


Figure 3-5-2-1 Staying Period by Vessel Size

3) Frequency of Berth Changing

The berthing priority of foreign fishing vessels is ranked very low and they must relinquish the berth to a vessel with a higher priority if that vessel can not moor at the berth.

Table 3-5-2-6 shows the times of transferring of berth made by foreign fishing vessels in the Port. Since this table was made with only three months data (July to September), it does not show the complete picture. Low times of transference would be calculated more, because continuous staying in October are neglected. Approximately 50 % of vessels have to change their berths from the one they used upon entry. More than a quarter have to change more than twice.

Table 3-5-2-6 Changing Times of Berth per One Entrance

Changing Times	No. of Vessels	Frequency
0	51	49.5%
1	26	25.2%
2	12	11.7%
2	6	5.8%
4	3	2.9%
5	3	2.9%
6	2	1.9%
Total	103	100.0%

The main purpose of the foreign fishing vessels' visit is to transship their catch to transport vessels in the port. At the same time, refueling, water receiving, exchanging of crews, procurement of commodity including fresh food and so on are very important factors for their visiting. In several cases, they are ordered to transfer the berth at each occasion of activity.

4) Transshipment of Fish Catch

There are three methods used in the transshipment of fish catch: ship to ship transshipment in the water area, ship to ship transshipment while mooring at the quay and transshipment through storage facilities on the land. The most common approach is the first one and this accounted for the majority of all transshipment in 1990.

a) Ship to Ship Transshipment in the Water Area

This method is the cheapest way of transshipment and it is usually selected by ship owners. Until November of 1990, most transshipment activities were carried out mainly at the zone called Z.T.E (Zona de Transbordo Este). However, the Transshipment in the zone was prohibited and now all the transshipment is carried out within the Port. Handling activities are carried out by ANSE.

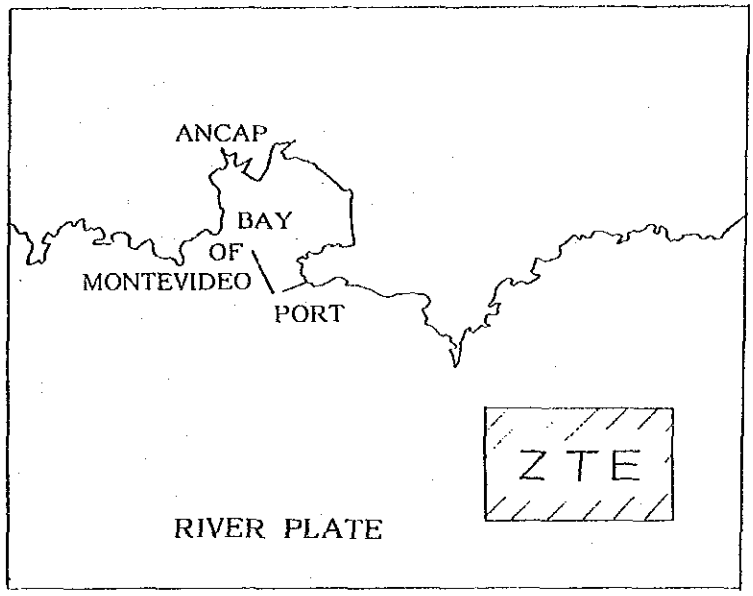


Figure 3-5-2-2 Location of Z.T.E

Table 3-5-2-7 shows the volume transshipped in water area in these 5 years. From 18,000 tons to 47,000 tons of fish have been transshipped during these five years. Table 3-5-2-8 and 3-5-2-9 show the detailed data of transshipment for two months, July and August, in 1991. Average volume per vessel is 280.1 tons in July, 212.9 tons in August, in 1991.

Table 3-5-2-7 Transshipped Cargo Volume of Fish in Water Area

Unit: ton

	1987	1989	1989	1990	1991
Jaunary	327	190	1954	140	
February		203		288	
March	402		2904	88	
April	7938	3982	1053	623	2500
May	7858	5196	12136	2074	4567
June	4074	2038	10169	2892	4582
July	9377	5661	7311	9114	7386
Augues	992	521		11195	5535
September			1472	8456	2437
October	673			6170	846
November		866	5880	507	575
December	1223	184	3900	750	
Total	32909	18841	46779	42237	28428

Note: (1) Area for Transhipment
Until 1990: Zona de Trasbordo Este (Out of Port)
After April 1991: Foreport (Basin I, Basin II)

Table 3-5-2-8 Transshipped Cargo Volume of Fish in Water Area (July, 1991)

Name of Vessel	Flag	Name of Vesses Transshipped	Kilogram	Destination
YUKO MARU 10	Japan	FRIO MARATHON	387,900	TOKYO
YUKO MARU 18	Japan	FRIO MARATHON	436,240	TOKYO
SANKO MARU 18	Japan	FRIO MARATHON	360,000	TOKYO
YUKO MAR 88	Japan	FRIO MARATHON	355,820	TOKYO
YUKO MARU 11	Japan	FRIO MARATHON	406,080	TOKYO
YUKO MARU 8	Japan	FRIO MARATHON	392,480	TOKYO
CHUN YANG 3	Korea	FRIO NARUTO	339,256	SEUL
AN YANG 71	Korea	FRIO NARUTO	207,935	SEUL
JAI WON 11	Korea	FRIO NARUTO	110,430	SEUL
PUK YANG 7	Korea	FRIO NARUTO	193,799	SEUL
ARCO	Korea	FRIO NARUTO	385,911	SEUL
DONG WON 517	Korea	FRIO ADRIATIC	223,856	TRANSIT
DONG WON 519	Korea	FRIO ADRIATIC	320,577	TRANSIT
DONG WON 510	Korea	FRIO ADRIATIC	230,173	PUSAN
FIASCO	Spain	FRIO ADRIATIC	175,660	VIGO
DONG BANG 39	Korea	FRIO MARATHON	122,500	SEUL
OLCHAN	Russian	FRIO MARATHON	196,160	TOKYO
LAGUNA	Russian	FRIO MARATHON	520,550	LOS ANGELES
SUN FLOWER	Korea	FIRO MARATHON	280,090	SEUL
SABINA	Sierra Leone	FRIO MARATHON	402,870	KOREA
DONG EUN 520	Korea	FRIO ADRIATIC	368,719	PUSAN
SUR ESTE 705	Panama	FRIO ADRIATIC	159,996	PUSAN
MANTA	Poland	RYBAK MORSKI	18,930	POLAND
PUENTE PEREIRA	Spain	FRIO ARTIC	469,038	VIGO
FRAGANA	Spain	FRIO ARTIC	124,919	VIGO
CODESIDE	Spain	FRIO ARTIC	195,977	VIGO
TOTAL			7,385,866	

Source: ANP

Table 3-5-2-9 Transshipped Cargo Volume of Fish in Water Area
(August, 1991)

Name of Fishing Vessel	Flag	Name of Vesses Transshipped	Kilogram	Destination
SABINA	Sierra Leona	FRIO MARATHON	5,000	KOREA
DONG WONG 602	Korea	FRIO MARATHON	96,910	KOREA
PETERO 607	Korea	FRIO MARATHON	232,120	SEUL
PETERO 601	Korea	LICHTENNAGEN	397,910	SEUL
FRIO ADRIATIC	Cyprus	KICHTENNAGEN	175,660	VIGO
POONG SAN 88	Korea	FRIO ARTIC	15,123	SEUL
DAE HO No.1	Korea	POONG SAN 11	7,287	SEUL
GLORY	Korea	CHUNG YONG 3	386,106	BUSAN
HORIZON	Korea	FRIO ADRIATIC	274,385	SEUL
POONG SN 11	Korea	FRIO ADRIATIC	164,882	SEUL
DAE JIN 7	Korea	FRIO ADRIATIC	387,999	SEUL
DONG BAND 57	Korea	FRIO ADRIATIC	39,467	SEUL
DAE JIN 6	Korea	FRIO ADRIATIC	322,944	SEUL
KWAN MYONG 82	Korea	FRIO ADFIATIC	29,440	SEUL
KAM KYUNG 58	Korea	FRIO ADRIATIC	20,064	SEUL
TAE woong	Korea	FRIO ADRIATIC	269,101	SEUL
SERREKUNDA	Korea	FRIO ADRIATIC	288,373	SEUL
SAM WON 77	Korea	FRIO ADRIATIC	321,970	SEUL
PUK YANG 1	Korea	FRIO ADRIATIC	264,188	SEUL
DONG BANG 59	Korea	FRIO ADRIATIC	58,081	SEUL
KWAN YANG 108	Korea	FRIO ADFIATIC	66,416	SEUL
FRIO ARTIC	Panama	FRIO ADRIATIC	351,710	SEUL
PETERO 605	Korea	FRIO ADRIATIC	285,838	SEUL
CHUNG YONG 3	Korea	FRIO ADRIATIC	110,738	SEUL
AN YANG 71	Korea	FRIO ADRIATIC	67,984	SEUL
MINDULLE 106	Korea	FRIO ADFIATIC	212,940	SEUL
FRIO ARTIC	Panama	FRIO ADRIATIC	681,902	SEUL
TOTAL			5,534,538	

Source: ANP

b) Ship to Ship Transshipment While Mooring at the Berth.

There are two methods in this type of transshipment. One sees transshipment carried out from ship to ship while mooring double or triple at the same berth. The other sees unloaded cargoes from the vessel to the quay directly loaded to another vessel mooring at the other berth without passing through storage facilities. This latter method is used for tuna; the

former is preferred by most.

c) Transshipment through Storage Facilities on Land

Transshipment is conducted through storage facilities, especially refrigerating warehouse, in this method. The fishing vessels do not need to wait for reefer vessels for transshipment. Unloaded cargoes are stored at the refrigerating warehouse and loaded when transportation vessels such as reefer vessels arrive.

Table 3-4-3-8 shows the volume of all the cargoes stored in the refrigerating warehouse. It is understood that a very small amount of fishing cargoes were handled through the refrigerating warehouse.

4 PRESENT CONDITION OF GRAIN TRANSPORTATION

4-1 Present Condition of Ports in the River Plate Area

4-1-1 Uruguay

Main ports handle grain cargoes, for example, wheat, soybeans, beet pulp pellets, barley etc., and are located in three areas of Uruguay as shown in the map below.

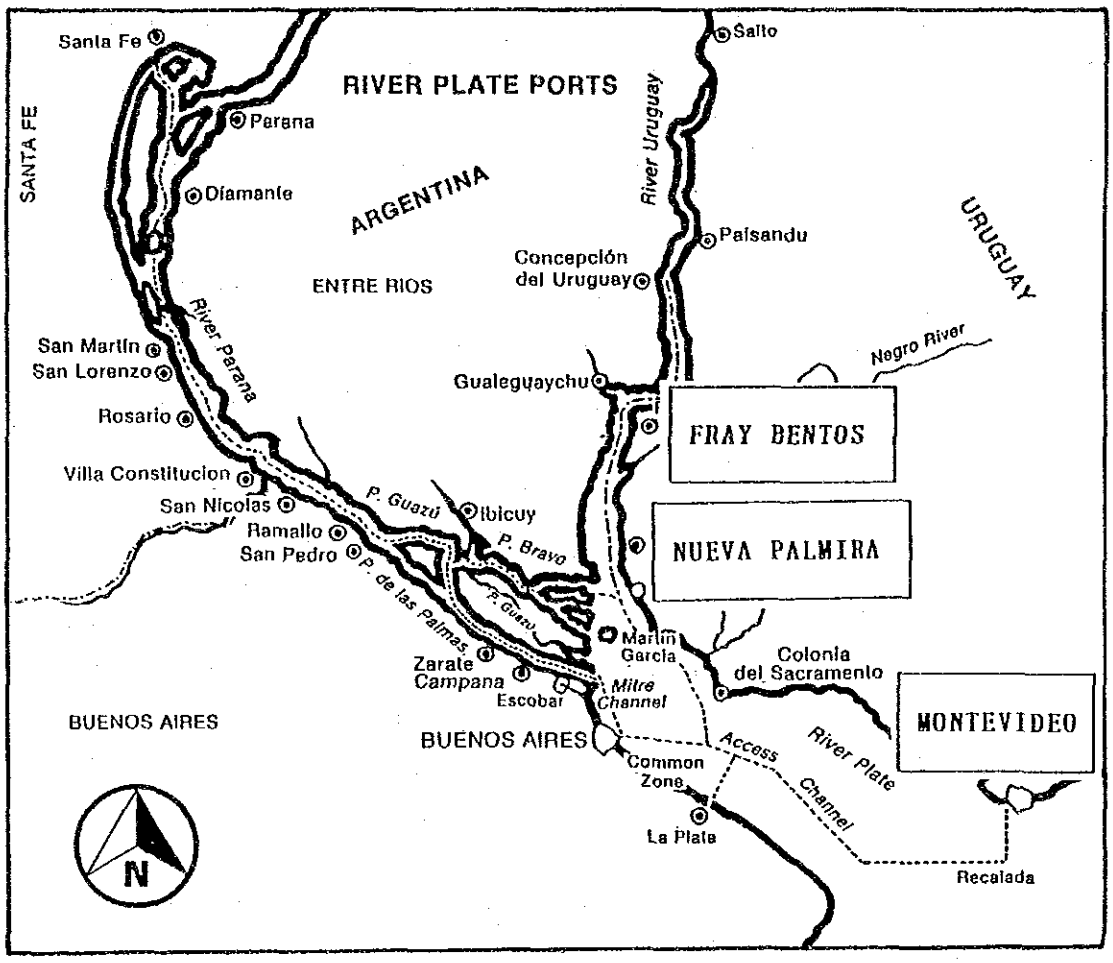


Figure 4-1-1-1 Ports Located along the Uruguay River, the Low Part of Parana River and the Mouth of La Plata River.

(1) Fray Bentos

Port of Fray Bentos is situated on the left bank of the river Uruguay, about 340 km by river from Montevideo and 234 km from Buenos Aires. This port, where the first bridge was constructed on the Uruguay River, is linked by land to Argentina and by rail to Paraguay. In future, grain terminal owned MGAP (Ministerio de Ganaderia Agricultura y Pesca) and managed by DIGRA (Direccion de Granos) in this port will be expected to handle more volume of soybean from Paraguay and wheat produced in Uruguay. (Figure 4-1-1-1)

The length of the berth is 224 m for ocean vessels and 125 m for river ships. The depth alongside is 9 m for each. The total storage capacity of the silos is 21,000 tons (Horizontal 12,000 tons, Vertical 9,000 tons). The delivery rate of loader is 400 tons/hour and 120 tons/hour for the unloader. The loader also serves as a unloader. (Table 4-1-1-1)

Main export grain cargoes in this port are wheat, beet pulp pellets, sorghum. It also handles soybeans transported by railway from Paraguay. Recently, no grains were imported except barley (2,979 tons) in 1986, and wheat (527 tons) in 1987 (Table 4-1-1-2)

(2) Nueva Palmira

The port is situated on the left bank of the river Uruguay, about 248 km by river from Montevideo. The location is the mouth of the river Uruguay, opposite the mouth of the River Parana Bravo. Large size vessels cannot be fully loaded because of the approximately 8 m draft of Martin Garcia bar or 9 m draft of Mitre Channel. (Figure 4-1-1-1)

A free zone has been established near the grain elevator of MGAP in this port area. It is considered that the two grain terminals (MGAP, Private) will become increasingly the transit zones of grain cargoes carried by river transportation.

Table 4-1-1-1 Grain Cargo Facilities in Uruguay

Name of Port	Fray Bentos	Nueva Palmira		Montevideo
	MGAP	MGAP	PRIVATE	ANP
Length of Wharf (m)				Wharf B No.6,7
(Ocean)	224	240	240	294.35
(River)	125	240	170	-
Breadth of Wharf (m)				
(Ocean)	25	11	8 Cylindri.Con	19
(River)	34	11	10	-
Depth of Wharf (m)				
(Ocean)	- 9	- 8.1	- 8.4	- 9.5
(River)	- 9	- 4.2	- 4.0	-
Capacity of Silo(tons)				
Horizontal	1 : 12,000	1 : 10,000	3 : 75,000	
Vertical Bin Big	12 : 9,000	14 : 32,000	0	
Small	6	6		
Total	21,000	42,000	75,000	Nil
Handling Equipment	1 Pneumatic	1 Pneumatic	Loader & Crane	
Capacity				
Loading hour/tons	400	500	Loader× 400	1 Unit ×60-80
Unloading :	120	500	Crane × 300	Crane 40t × 2
Belt Conveyer :	400	500	400	: 12.5× 4
Handling Cargoes	Wheat, Soybean Beet Pellet	Wheat	Wheat,Soybeans Pellets	Rice, Soybean

SOURCES: ANP

Table 4-1-1-2 Handling Volume of MGAP elevator in Fray Bentos ('80-'91)

(Export) Unit:tons

	'86	'87	'88	'89	'90	'91
Wheat	0	0	0	12,000	28,650	42,959
Beet Pellets	9,350	9,200	10,531	7,380	10,090	7,740
Soybeans	17,000	11,420	0	54,876	26,070	0
Sorghum	0	0	0	0	0	1,000
Total	26,350	20,620	10,531	74,256	64,810	51,699

(Import) Unit:tons

	'86	'87	'88	'89	'90	'91
Barley	2,979	0	0	0	0	0
Wheat	0	527	0	0	0	0
Total	2,979	527	0	0	0	0

SOURCES: ANP

In Paraguay, it is a popular opinion that grain cargoes will be the primary means of obtaining foreign money. Furthermore, grain cargoes will be adapted for river routes because transportation costs are less for the Uruguay side as well as Paraguay.

1) Private Elevator (Navios Corporation)

The silo company consists of agents, exporters, shipbuilders and so on. The pier is parallel to the river and has a berth of 8 cylindrical concrete dolphins equally spaced over a distance of 240 m. Discharging is conducted by a crane on one of the dolphins using a bucket or grab to deliver to a hopper onto the belt. The depth alongside is 8.4 m. (Table 4-1-1-1)

The silos have a storage capacity of 75,000 tons with horizontal style. The average rate of loading grain is 400 tons per hour and 300 tons per hour for unloading. At present, grain cargoes including soybeans transshipped by river ships from Paraguay are mostly handled most volume by this berth in Uruguay. The capacity of the open yard, used only for Brazilian manganese, is 50,000 tons. The loading capacity is 800 tons per hour. (Table 4-1-1-3)

Sailing draft from this berth admits up to 29 feet. Namely a panamax size vessel can be loaded with 33,000 tons of grain cargoes.

Employees work three rotating 8 hour shifts per day, if necessary. However, there are only three days off per year; 1st/January, 1st/May and 25/December.

2) MGAP Elevator

The elevator silo has a capacity of 42,000 tons including horizontal and vertical types. The wharf is 240 m long and has an outside part for ocean vessels. The delivery rate of loading is around 500 tons per hour. The new quay was built in 1991 and only 2,400 tons of wheat have ever been loaded to Bolivian two ships. (Table 4-1-1-1, 4-1-1-4)

Table 4-1-1-3 Cargo Volume of Private elevator in Nueva Palmira ('88-'91)

Unit:tons

Country of Product	'88	'89	'90	'91
Uruguay				
Wheat	0	104,112	128,066	93,039
Sunflower	551	0	0	0
Sorghum	33,705	0	0	0
Barley	0	0	5,000	0
Soybeans	0	4,000	3,097	0
Paraguay				
Soybeans	394,508	666,576	482,224	219,892
Cotton Pell.	0	0	0	16,965
Brazil				
Soybeans	3,600	0	13,136	21,002
Bolivia				
Soybeans	0	0	7,383	0
Argentina				
Wheat	0	2,371	0	0
South Africa				
Oats	0	3,019	0	0
Total	432,364	780,078	638,906	350,898

SOURCES: ANP

Table 4-1-1-4 Cargo Volume of MGAP elevator in Nueva Palmira

Unit: tons

	'87	'88	'89	'90
Barley	5,000	14,500	20,000	25,000
Wheat	16,000	10,000	9,000	11,000
Sorghum	-	7,000	8,000	3,000
Maize	200	-	2,000	2,000
Sunflower	-	3,000	-	-
Total	21,200	34,500	39,000	41,000

Martin Garcia bar:

The maximum permissive draught for crossing the bar is normally 7.92 m (26f) and the vessels must have a speed of at least 10 knots. For ships of less speed, the draught is reduced to 6.70 m (22f) and even to 6.10 m (20f) when the speed is between 5 to 8 knots.

The depth of water at Martin Garcia bar varies from hour to hour with no pattern and it is not dependent on the depth of water in the Parana River. The force and direction of the wind greatly influence the depth at the bar. There is no restriction on the length of ships crossing the Martin Garcia bar.

If the draught is 27 or 28 feet, it will be necessary to adopt the route of the Parana Bravo/Parana de las Palmas/Mitre Channel.

(3) Montevideo

The eastern wharf on pier 'B' is 294.35 m long. The berth in front of warehouse No.6 and No.7 is mostly used for handling import and export bulk cargoes. (Table 4-1-1-1)

Operation of import cargoes, for example, salts and chemical products is done through the hopper by shore crane with power of 12.5 tons or 40 tons.

Export bulk cargoes such as soybeans, pellets are handled by several screw conveyer sets with a speed of 60-80 tons per hour/set.

Currently there are no storage silos for operating bulk grain cargoes within the port area. Handling cost will be reduced so as to load efficiently, if loading facility of grain cargoes is constructed on land in this port area. (Table 4-1-1-1, 4-1-1-5)

Table 4-1-1-5 Export Volume of Grain Cargoes in Montevideo ('87-'90)

Unit:tons

Name	'87	'88	'89	'90
Rice	42,715	120,956	19,578	7,866
Soybeans	0	10,113	31,724	12,005
Gurten				
Linen	0	0	0	1,268
Maize	504	2,409	2,024	1,771
Pellets				
Sunflower	3,836	2,082	2,672	5,784
Linen	1,404	833	641	1,302
Soybeans	4,900	4,777	11,177	999
Wheat	1,125	0	1,073	0
Total	54,484	141,170	68,889	30,995

SOURCES: ANP

4-1-2 Argentina

The loading of dry bulk cargoes in Argentina is conducted in four areas; Up-River Port (including Rosario, San Martin and San Lorenzo), Buenos Aires located in the La Plata River, Alpha Zone, offshore of Montevideo, and Bahia Blanca.

Argentina is one of the largest grain producers in the world and grain represents a very important means of obtaining foreign money. However, navigation of the river La Plata and Parana is restricted which sometimes makes it difficult to export grain cargoes. Both these rivers require constant dredging to maintain the draft of navigation route and ship berth. Moreover large vessels of panamax size, that normally carry grain throughout the world, cannot be loaded completely in these river ports because of the existing shallows of Mitra Channel and Martin Garcia bar.

For this reason, it is necessary that large vessels are topped-off by top-off vessel at a particular area such as Alpha Zone at the mouth of La Plata River or by grain loader at port of Bahia Blanca, which has the deepest draft in Argentina.

Up-River Port: so-called because it lies on the upper reaches of the San Pedro, 240 km distance from Buenos Aires.

(1) Rosario

Rosario is situated on the right bank of the river Parana. It is about 420 km from Buenos Aires and Argentina's chief export center for grain and by products. The grain terminals of the port stretch out along the bank for about 10 km. To navigate this area, vessels must have a safety margin of 1 foot below keel. (Figure 4-1-2-1)

There are many modernized grain elevators in Rosario. Punta Alvear elevator berth and Genaro Garcia elevator berth are owned by two private companies. Also, the elevators of Unit II, III, IV, VI, VII are operated by J.N.G. (Junta Nacional de Granos).

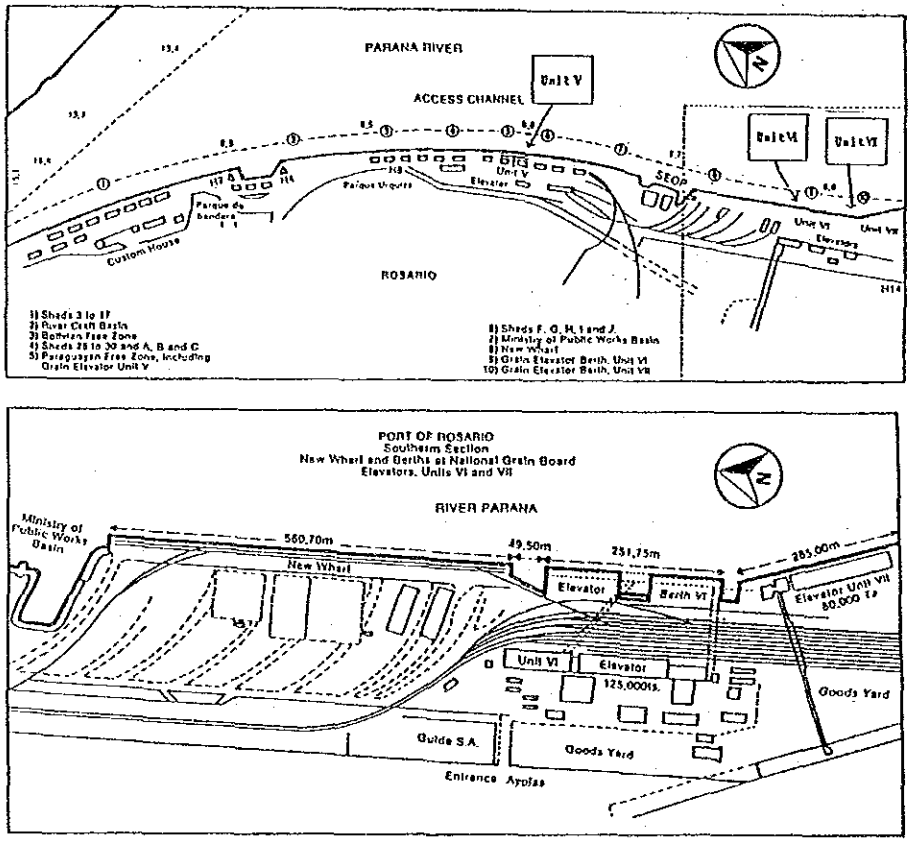


Figure 4-1-2-1 Port of Rosario

In 1989 the handling cargo volume of above two private elevators was 723,000 tons and accounted for 36 % of the total volume in Rosario. A private company, Punta Alvear, took 13.2 rotation per year for the capacity