

5. Current Situation and Issues of the Ports at the Sea of Marmara

5.1 Coastal Land Use

Turkey has 2753 km of land border lines with 7 neighboring countries. On the other hand, she is an ocean country holding 8333 km of coast line. Most of the populated cities situated at coastal area are developed in economy. And they have functional ports also. Nine provinces with 1 million of population equip port facilities(refer to Table bellow). Among them Istanbul, Bursa, Kocaeli and Balikesir are in Marmara Region.

A quarter of Turkish population live in this area. And Istanbul is situated in the center of this region. She has many problems such as traffic congestion, unemployment, independent investment, etc. to be solved. This Port Development Plan shall aim to relive and encourage Istanbul.

On the other hand the development plan on the Sea of Marmara includes not only regional themes but also international maritime themes. The sea of Marmara has two channels at both sides. A large number of vessels shall pass with safe and on schedule. Around eighty ports receive their callings and handle cargo as much as they can. But cargo vessels are always waiting on the anchorage.

(1) Zoning

Usually, coastal area is divided into special zones described bellow:

As Humanity area, 1) Politic zone 2) Culture zone 3) Housing zone are considered. As preserved area, 4) Tourism zone 5) Refreshment zone 6) Prohibited zone are considered. And as developing area, 7) Business zone 8) Heavy industry zone 9) Light industry zone 10) agricultural zone are considered.

When zoning is applied to Marmara region tentatively, each district will belong to independent zone respectively as follows:

Humanity Area

- | | |
|----------------------------|---|
| 1) Political Area | :European-Istanbul,
Central city of province |
| 2) Culture. Education Area | :Istanbul |
| 3) Settlement Area | :Outside-European Istanbul,
Asian-Istanbul
whole Region |

Preserved Area

- | | |
|----------------|---|
| 4) Turism Area | :European-Istanbul,
Islands off coast of Asian Istanbul, |
|----------------|---|

	Bursa, Kapidag peninsula and Marmara islands Chanakkale
5) Refreshment Area	:Tekirdag
6) Prohibited Area	:Bursa coastal area
Development Area	
7) Business Area	:European-Istanbul, Bursa
8) Heavy Industry Area	:Kocaeli, Bursa
9) Light Industry Area	:whole Region
10) Agricultural Area	:Bursa, Balikesir Tekirdag

(2) Basic policy to develop coastline

1) Purpose to develop

- a) To develop coast further 663+264km in length in order to contribute to development of Turkey
- b) To solve existing problems and prevent problems to be expected in the future
- c) To protect valuable nature for future generations
- d) To take human life seriously
- e) To set proper size and effective buffer zone in order to prevent the zones from effecting each other

**TABLE 5.1.1 Population (more than 1 million in 1994) and
GDP (in 1994 at 1987 prices) by Region**

		(unit: million TL)	
province	population	GDP	GDP/capita
a. Province facing to sea			
Adana	2,105,200	137,038,945	
Antalya	1,351,000	96,500,900	
Balikesir	1,022,600	67,889,400	
Bursa	1,846,200	155,469,151	
Istanbul	8,622,600	774,576,333	
Izmir	3,011,800	293,462,640	
Kocaeli	1,111,100	189,859,485	
Samsun	1,196,500	53,493,394	
Zoguldak	1,095,200	49,248,355	
Total	21,062,200	1,817,538,603	86.3
b. Province without coast			
Ankara	3,501,000	326,161,845	
Diyarbakir	1,230,900	53,120,616	
G. Antep	1,288,900	61,698,106	
Hatay	1,196,400	67,262,231	
Kayseri	1,006,800	45,340,703	
Konya	1,905,200	87,826,218	
Manisa	1,238,000	83,486,940	
S. Urfa	1,187,500	40,163,876	
Total	12,554,700	704,060,535	56.1
c. Provinces with population below 1 million			
Other Total	27,566,100	1,346,830,051	48.9
d. Whole Turkey			
Grand Total	61,183,000	3,868,429,189	63.2

**TABLE 5.1.2 Gross Domestic Product in 1994 at 1987 prices
- by kind of activity in producers' value**

	BALIKESIR		BURSA		CANAKKALE	
	Value	share in	Value	share in	Value	share in
	million TL	Marumara GDP	% million TL	Marumara GDP	% million TL	Marumara GDP
1. Agriculture	480 233	1.5	516 409	1.6	239 219	0.7
a. Agriculture and livestock production	433 169	1.3	482 627	1.5	200 963	0.6
b. Forestry	32 693	0.1	23 950	0.1	24 645	0.1
c. Fishing	14 371	0.0	9 832	0.0	13 611	0.0
2. Industry	291 888	0.9	1 466 334	4.5	254 532	0.8
a. Mining and quarrying	51 173	0.2	17 828	0.1	17 617	0.1
b. Manufacturing	218 388	0.7	1 400 647	4.3	232 966	0.7
c. Electricity, gas, water	22 327	0.1	47 859	0.1	3 949	0.0
3. Construction	130 385	0.4	230 473	0.7	43 817	0.1
4. Trade	161 892	0.5	547 128	1.7	122 514	0.4
a. Wholesale and retail trade	116 363	0.4	453 611	1.4	95 884	0.3
b. Hotel, restaurants services	45 529	0.1	93 517	0.3	26 630	0.1
5. Transportation and communication	221 221	0.7	399 404	1.2	116 412	0.4
6. Others	759 436	2.3	1 037 580	3.2	342 554	1.1
7. Total GDP (In purchasers' value)	1 564 822	4.8	3 680 919	11.3	879 830	2.7

	ISTANBUL		KOCAELI		TEKIRDAG	
	Value	share in	Value	share in	Value	share in
	million TL	Marumara GDP	% million TL	Marumara GDP	% millio TL	Marumara GDP
1. Agriculture	158 539	0.5	126 457	0.4	148 021	0.5
a. Agriculture and livestock production	112 687	0.3	116 984	0.4	140 062	0.4
b. Forestry	8 597	0.0	4 331	0.0	1 870	0.0
c. Fishing	37 256	0.1	5 142	0.0	6 089	0.0
2. Industry	6 604 214	20.3	2 211 244	6.8	349 928	1.1
a. Mining and quarrying	54 289	0.2	11 048	0.0	1 238	0.0
b. Manufacturing	6 138 340	18.9	2 187 052	6.7	339 722	1.0
c. Electricity, gas, water	411 586	1.3	13 144	0.0	8 968	0.0
3. Construction	947 906	2.9	144 645	0.4	128 402	0.4
4. Trade	4 886 709	15.0	397 735	1.2	108 568	0.3
a. Wholesale and retail trade	4 123 090	12.7	370 369	1.1	93 450	0.3
b. Hotel, restaurants services	763 619	2.3	27 366	0.1	15 118	0.0
5. Transportation and communication	2 739 831	8.4	282 582	0.9	90 623	0.3
6. Others	3 340 279	10.3	1 193 959	3.7	309 964	1.0
7. Total GDP (In purchasers' value)	18 518 939	56.9	4 230 165	13.0	987 485	3.0

	MARMARA Region		TURKEY	
	Value	share in	Value	share in
	million TL	Marmara GDP %	million TL	Turkish GDP %
1. Agriculture	2 163 873	6.7	14358229	15.7
a. Agriculture and livestock production	1 939 011	6.0	13 265 809	14.5
b. Forestry	126 589	0.4	751 866	0.8
c. Fishing	98 274	0.3	340 554	0.4
2. Industry	12 068 141	37.1	24 774 978	27.1
a. Mining and quarrying	173 623	0.5	1 641 971	1.8
b. Manufacturing	11 232 946	34.5	20 472 575	22.4
c. Electricity, gas, water	661 573	2.0	2 660 433	2.9
3. Construction	1 846 697	5.7	6 144 351	6.7
4. Trade	6 618 055	20.3	18 455 150	20.2
a. Wholesale and retail trade	5 596 052	17.2	15 473 879	16.9
b. Hotel, restaurants services	1 022 003	3.1	2 981 271	3.3
5. Transportation and communication	4 128 375	12.7	11 835 117	13.0
6. Others	7 872 874	24.2	30 111 127	33.0
7. Total GDP (In purchasers' value)	32 534 142	100.0	91 320 722	100.0

5.2 Ports at the Sea of Marmara

5.2.1 General

There are 10 major public ports and 28 private large facilities at the Sea of Marmara and the two Straits (the Bosphorus, the Dardanells) which has an area of 11,500 km² and a length of 1,300 km coastline. Ten major public ports are Haydarpasa, Istanbul, Tekirdag, Gelibolu, Canakkale, Lapseki, Marmara Island, Bandirma, Mudanya and Derince. (See Table 5.2.1, 5.2.2 & Figure 5.2.1) Most major public ports are situated at the southern side of the Sea, because of the hinterland. They are also located on the coast of bays and the Straits, only Tekirdag port is on a simple coastal line.

In general, the topic in the agenda concerns the port congestion in the Marmara region, unable to meet the requirements of busy industrial estates located in the surrounds of the Marmara sea as well as the requirement of additional establishment/plants, due to providing service to the Central Anatolian Hinterland.

It does not seem that additional capacity requirements can be met from Haydarpasa Port, the most important issue of the region, due to its inner city location and geometry, not allowing for extensions.

The establishing of a container terminal with sufficient capacity at Derince port, due to its motor way and railways connection, plus convenient location is required, in order to provide port services for cargo directed to the Izmit Bay and inner Anatolian hinterland. Economy can be achieved, due to the fact that it is located in a protected gulf location and the fact that a breakwater is not required. The establishment of a container terminal here shall provide 700,000 TEU/year container handling.

The cargo requirement of the Thrace region is generally met through the Haydarpasa Port, connecting with the Bosphorus Bridge, causing density/jams on the Bosphorus bridges.

The Tekirdag port only provides very limited service in this matter. This matter may be resolved by constructing a new port in the Tekirdag, Marmara Egerli region.

Bandirma, Mudanya, Gemlik, Gemport, and high numbers of private sector piers in the Izmit Bay are located along the Western Marmara Coast.

Total number of wharves in above ten public ports which can berth vessels up to 5,000 D/W is 39 berths. Out of this total, the Port of Haydarpasa has 15 berths and the Port of Bandirma has 14 berths.

TABLE 5.2.1 Major Ports in Marmara Sea

Name	Operator	Function	Cargo 95: 000t	Container 94: TEU	Main Cargo	Berth over-7.5m	Hinterland (Main City)
Haydarpasa	TCDD	Comercial	11482	179830	Container	15	Istanbul
Istanbul(Sarpajari)	TDI	Passenger	0	0 (Passenger)		-	Istanbul
Ambarli	Private	Comercial	8000	0	Dry Bulk	12	Istanbul
Silivri	Municipality Local		1040	0	Oil	0	Silivri
Marmara Ereğli	Municipality Local			0	Dry Bulk	0	Marmara Ereğli
Tekirdag	TDI	Comercial	1406	0	Dry Bulk	3	Tekirdag
Gelibolu	Municipality Local		324	0	Ferry	0	Gelibolu
Canakkale	Municipality Local		3337	0	Ro/Ro Ferry	1	Canakkale
Karabiga	Municipality Local		134	0	Dry Bulk	0	Karabiga
Erdek	Municipality Local		137	0	Ferry	0	Erdek
Bandirma	TCDD	Comercial	2772	2663	Coal	14	Bandirma
Mudanya	Municipality Local		489	0	Dry Bulk	1	Bursa
Gemlik(Gemport)	Private	Comercial	2135	17	Container	2	Bursa
Derince	TCDD	Comercial	28421	13728	Dry Bulk	5	Istanbul, Izmit

TABLE 5.2.2 Port Facilities of Marmara Sea

No	Port	Type	Operator	Facility	No	Length(m)	Depth(m)	Width(m)	Cargo
1	Haydarpasa	Commercial TCDD		Brakewater	1	600			
		Commercial TCDD		Brakewater	2	1,750			
		Commercial TCDD		Quay	1	150	4.5		Ferry
		Commercial TCDD		Quay	2	220	6		Grain/General
		Commercial TCDD		Quay	3	190	10		General/Dry bulk
		Commercial TCDD		Quay	4/5	334	10		General
		Commercial TCDD		Quay	6	220	10		General
		Commercial TCDD		Quay	7/8	246	10		General
		Commercial TCDD		Quay	9	207	8.5		General
		Commercial TCDD		Quay	10/11	350	10		General
		Commercial TCDD		Quay	12	300	12		Container
		Commercial TCDD		Quay	13/14	295	10		General
		Commercial TCDD		Quay	15	220	8		General
		Commercial TCDD		Quay	16	160	8		General
		Commercial TCDD		Quay	17	141	8		Ro/Ro
		Commercial TCDD		Quay	18	164	6		Ro/Ro
		Commercial TCDD		Quay	19	97	6		General
		Commercial TCDD		Quay	20/21	80	6		General
2	Istanbul(Taksim) (Eminonu)	Passenger TDI		Quay		705	10.5		Ferry(Passenger)
		Passenger TDI		Quay		490	8		Ferry(Passenger)
3	Ambarli	Enrgy MOEN		Pier		104	2~2.9		
		Commercial Private		Breakwater	1				
		Commercial Private		Breakwater	2				
		Commercial Private		Quay	1	650	8~14		General
		Commercial Private		Jetty	2/3	225	3.5~7.0		Sand
		Commercial Private		Jetty	4/5	225	3.5~7.0		Sand
		Commercial Private		Jetty	6/7	225	3.5~7.0		Sand
		Commercial Private		Jetty	8/9	225	3.5~7.0		Sand
		Commercial Private		Jetty	10/11	525,325	12		Cement
		Commercial Private		Jetty	12/13	350	14~15		General
		Commercial Private		Jetty	14/15	340,250	12.5		General
		Commercial Private		Jetty	16/17	300	12.5		General
		Commercial Private		Jetty	18/19	340,240			Cement
		Commercial Private		Quay	20	300			General / Ro/Ro
		Commercial Private		Platform	21				Oil product
4	Mimar Sinan(Buyukcekmece)	Local Municipality		Breakwater		290			
		Local Municipality		Pier		105	2.5~3		
5	Mimar Sinan	Local Municipality		Breakwater					
		Local Municipality		Pier					
6	Silivri	Local Municipality		Breakwater	Main	270			Fishing boat
		Local Municipality		Breakwater	Sub	244			
		Local Municipality		Jetty		230	2.3~3.7		5 General
7	Marmara Eregli	Local Municipality(?)		Jetty	1	120	3~4.8		6 Fuel oil
		Fishery Municipality		Breakwater		160			
		Fishery Municipality		Jetty	2	48	2		Fishing boat
		Local Municipality(?)		Jetty	3	200	3~4		10 Bitume
8	Tekirdag	Commercial TMO		Jetty		150(627)	12		12.5 Grain(Export)
		Commercial TDI		Jetty	New	343	4~10		18~21 General/Passenger
		Commercial TDI		Jetty	Old	189(229)	7		18
		Fishery TDI(?)		Quay	1	70	2~2.5		Fishing boat
		Fishery Municipality		Jetty	3	24(110)	5~10		10 Wine Products
9	Barbaros	Fishery Municipality		Breakwater		300+90	1~2		
		Fishery Municipality		Quay		224			
10	Kumbag	Local Municipality		Breakwater		330+105			
		Local Municipality		Quay		125	1~2		
11	Hoskoy	Local Municipality		Breakwater		340+80			
		Local Municipality		Quay		84	1~2		
12	Murefte	Local Municipality		Pier	1	60(210)	3~5	10	
13	Sarkoy	Local Municipality		Jetty	1	175		10	
		Fishery Municipality		Breakwater	1.2	443+180			
		Fishery Municipality		Quay		130	2~3		

TABLE 5.2.2 Port Facilities of Marmara Sea

No	Port	Type	Operator	Facility	No	Length(m)	Depth(m)	Width(m)	Cargo
14 Gelibolu		Passenger	Municipality	Jetty(L)	1	125	5~8	10	Ferry
		Passenger	Municipality	Ramp	1	20	5~8		Ferry
		Fishery	Municipality	Quay		300	2.5		Fishing boat
15 Karakova		Local	Municipality	Pier		87	2~3	5~8	
16 Eceabat		Passenger	TDI	Breakwater		280			
		Fishery	TDI	Quay		70	3		Fishing boat
		Passenger	TDI	Pier	Ferry	70	4.3	20	Ferry
		Fishery	Municipality	Pier	Small	40	3~4		Fishing boat
17 Kilitbahir		Local	Municipality	Breakwater		85			
		Local	Municipality	Quay		185	1~2.5		
		Local	Municipality	Pier		25	1~1.5	3.5	
18 Seddulbahir Village		Local	TDI	Breakwater		110			
		Local	TDI	Quay		162	1~2.5		Pilot boat
19 Canakkale		Passenger	TDI	Breakwater	South	70			
		Passenger	TDI	Jetty(L)	1	176	5~8	8~12	General/Passenger
		Passenger	TDI	Jetty	2	67	6~9	8	Ferry
		Passenger	TDI	Quay	1	99	1~1.5		
		Passenger	Custom	Jetty	1	26	1.5~4	4	Service Boat
Canakkale(Fishery)		Fishery	Municipality	Breakwater	1	113			
		Fishery	Municipality	Quay		370	2		Fishing boat
Canakkale(Marina)		Fishery	Municipality	Pier	1	14	1.5		Fishing boat
		Marina	Municipality	Breakwater	Main	265			
		Fishery	Municipality	Quay		123	2		Yatch
		Fishery	Municipality	Jetty		80	3~4.5	3~9	Yatch
		Fishery	Municipality	Pier		70	1		Yatch
20 Canakkale(Kepez)		Passenger	Municipality	Jetty		214.6	10~26		Under construction
21 Canakkale(Guzelyali) *			Municipality	Pier		25.5	0.5~2.5	4	
22 Canakkale(Canakkale Cement)		Industrial	Private	Pier		208	5~13		Cement
		Industrial	Private	Pier		251	14		Cement
23 Lapseki		Passenger	Municipality	Pier	1	193	7~9	6~9	Ferry
24 Cardak		Local	Municipality	Pier		135	2.5~2.9	4.5~6	
25 Sevketiye Village		Fishery	Municipality	Breakwater		130+40	2		
26 Kemer(Biga)		Fishery	Municipality	Breakwater		216	3		
27 Aksas Village		Local	Municipality	Breakwater		170+45			
		Local	Municipality	Pier		39	3	4	
28 Karabiga		Local	Municipality	Jetty	1	65(165)	32~5.2	5.5~10	
		Local	Municipality	Quay		310	4~5		
		Local	Municipality	Breakwater North		220			
		Local	Municipality	Breakwater South		80			
29 Musakca Village		Local	Municipality	Pier		148	2.5	6	
30 Marmara Island		Ferry	Municipality	Pier	1		11.5	10	Ferry
		Fishery	Municipality	Breakwater		417			
		Fishery	Municipality	Pier		44.1	2~3		
		Fishery	Municipality	Quay		193	2~3		
31 Cinari Village(Marmara Island)		Local	Municipality	Pier		48	1~1.5	4	
32 Saraylar Village(Marmara Island)		Local	Municipality	Breakwater		200+140			
		Local	Municipality	Quay		220	4~7		
33 Asma'i Village(Marmara Island)		Local	Municipality	Breakwater		200	1~5		
		Local	Municipality	Quay		22	2~4	4	
34 Top Agac Village(Marmara Island)		Local	Municipality	Breakwater		210+150			
		Local	Municipality	Quay		50			
35 Gundogdu Village(Marmara Island)		Local	Municipality	Pier	1.2	61	2~4	6	
		Local	Municipality	Quay		57	2~4		
36 Ekinlik Village(Ekinlik Island)		Local	Municipality	Pier		43	2.2~2.8	4	
37 Turkeli(Avsa) Island		Local	Municipality	Pier		93	3~3.5	8	
		Local	Municipality	Pier		19	2~3		
38 Turkeli(Avsa-Yigitler) Island		Fishery	Municipality	Breakwater		120+30	1~4		
		Local	Municipality	Pier		55.8	1~4	6	
39 Pasa'Imani(Pasalimani Island)		Local	Municipality	Pier		35	2~3.5	6	
40 Harmanli(Pasa'Imani Island)		Local	Municipality	Pier		35	1~1.5	4	
41 Poyrazli(Pasalimani Island)		Local	Municipality	Pier		35	1~3.5	4	
42 Ba'kli(Pasalimani Island)		Local	Municipality	Pier		35	2~2.5	5	
43 Tuzla(Pasa'Imani Island)		Local	Municipality	Pier		30	1~3	4	

TABLE 5.2.2 Port Facilities of Marmara Sea

No	Port	Type	Operator	Facility	No	Length(m)	Depth(m)	Width(m)	Cargo
44	Shell(Edincik)		Private	Buy	1				Fuel oil
45	Etbank(Edincik)		Private	Buy	1				Fuel oil
46	Petrol Ofisi		Private	Pier	1	77	8	26	Fuel oil
47	Erdek	Local	Municipality	Jetty	1	80	5~9	8	
		Local	Municipality	Breakwater	1	270			
		Local	Municipality	Quay		389	1~5		Fishery boat
48	Ocaklar Village	Local	Municipality	Pier		35	2~29	4	
		Local	Municipality	Quay		110	1~29		
49	Nartkoy	Local	Municipality	Pier		36	1~3	6	
50	Ihanlar Village(Kapidag)	Local	Municipality	Pier		36	1~1.5	4	
		Local	Municipality	Breakwater		365+130			
		Local	Municipality	Quay		450	2~4		
51	Doganlar Village(Kapidag)	Local	Municipality	Pier		30		4	
52	Turan Village(Kapidag)	Local	Municipality	Pier		30	1.5~2.5	4	
53	Ormanli Village(Kapidag)	Local	Municipality	Pier		36	4	1~1.8	
54	Balıpinar Village(Kapidag)	Local	Municipality	Pier		43	1~2	4	
55	Sahinburgas Village(Kapidag)	Local	Municipality	Breakwater		110			
		Local	Municipality	Quay		36.6	1~3		
56	Kestanelik Village	Local	Municipality	Pier		32	2.2~2.5	4	
57	Cakilkoyu	Local	Municipality	Breakwater		155			
		Local	Municipality	Pier		35	1~5	4	
58	Karsiyaka Village(Bandirma Bay)	Local	Municipality	Pier		25	0.5~1.5	6	
		Local	Municipality	Quay		145			
59	Tadisu Village	Local	Municipality	Pier		35	1~1.5	6	
		Local	Municipality	Quay		110	1~1.5		
		Local	Municipality	Breakwater		70+65			
60	Bagfas Bandirma Fertilizer	Industrial	Private	Pier	1	125	10	15~25	Raw materials
		Industrial	Private	Pier	2	125	13~17	22.4	
61	Bandirma	Commercial	TCDD	Breakwater	1	995			
		Commercial	TCDD	Breakwater	2	500			
		Commercial	TCDD	Quay	1	130	8.25		Passenger
		Commercial	TCDD	Quay	2/3	224	10		General
		Commercial	TCDD	Quay	4/5	324	10		General
		Commercial	TCDD	Quay	6	130	10		
		Commercial	TCDD	Quay	7	190	12		Dry Bulk
		Commercial	TCDD	Quay	8	190	10		
		Commercial	TCDD	Quay	9	203	10		
		Commercial	TCDD	Quay	10	100	10		
		Commercial	TCDD	Quay	11	190	10		
		Commercial	TCDD	Quay	12	182	10		
		Commercial	TCDD	Quay	13	80	10		
		Commercial	TCDD	Quay	14	180	8.25		
		Commercial	TCDD	Ro/Ro Ramp		20	8.25		Passenger/Cars
		Commercial	TCDD	Quay	15~20	792	4		
		Commercial	Municipality	Pier	1	90	8	15	Passenger
62	Dut Port Village(Bandirma)	Fishery	Municipality	Breakwater		120+22			
		Fishery	Municipality	Pier		22	1.3	4	
63	Karacabey Kursunlu Village	Fishery	Municipality	Breakwater		430+120			
64	Zeytinbag	Local	Municipality	Jetty		43.5	1~1.5	6	
65	Zeytinbag(Mudanya)	Fishery	Municipality	Breakwater		250			
		Local	Municipality	Pier		115	1~3		
66	Guzelyali(Burgaz)	Local	Municipality	Pier		22	1~1.5	4	
67	Kumyaka	Local	Municipality	Breakwater		135	1~3		
68	Mudanya	Commercial	Municipality	Jetty	1	73	4~11	12	General
		Commercial	Municipality	Jetty	2	96	11		General
		Commercial	Municipality	Jetty	3	75	5~7		
		Commercial	Municipality	Jetty	New				
69	Gemlik Borusan *	Commercial	Private	Pier	1	204	5~10	15	
70	Marmara Integrated Chemical *	Commercial	Private	Dolphin	1		12		

TABLE 5.2.2 Port Facilities of Marmara Sea

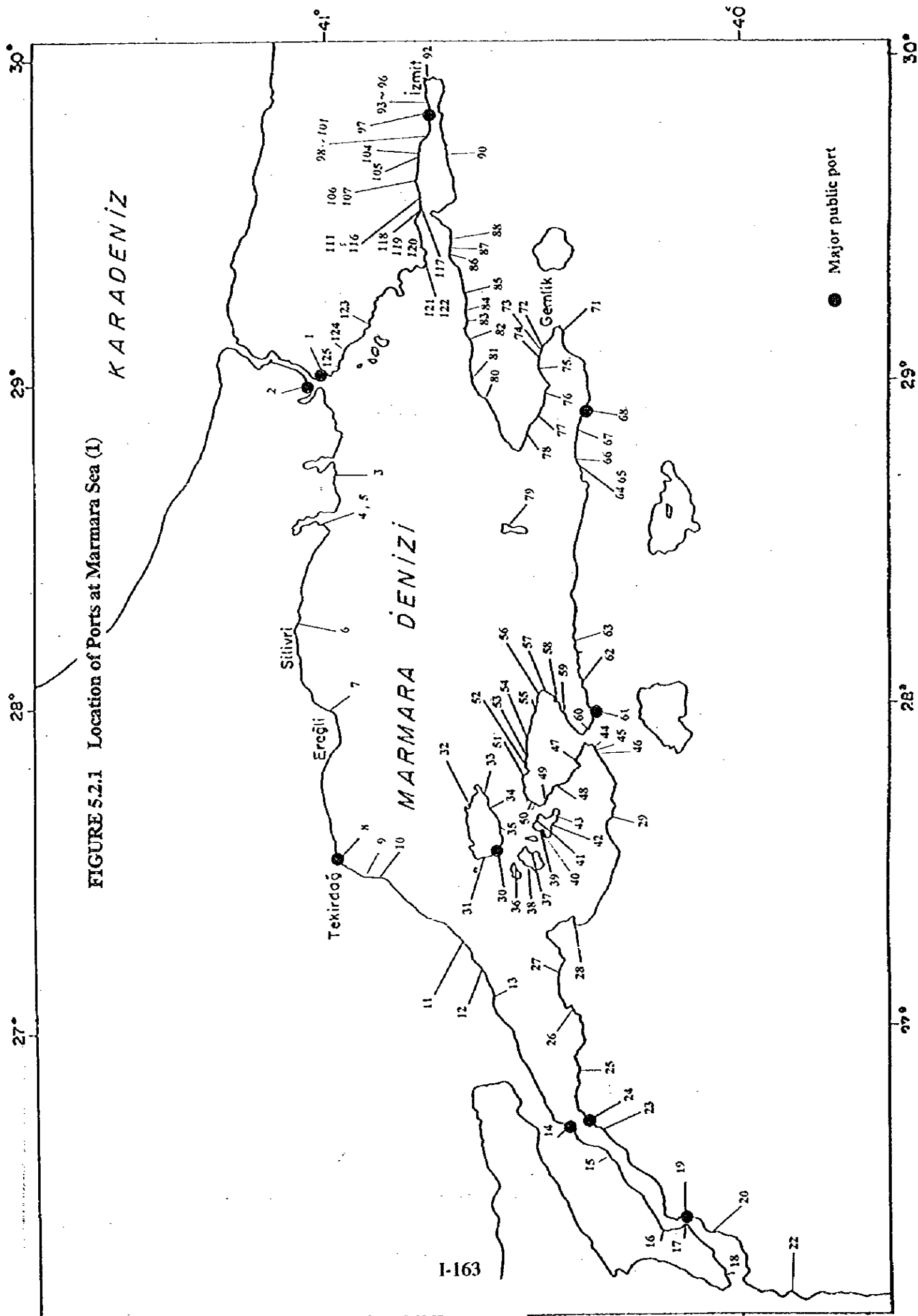
No.	Port	Type	Operator	Facility	No.	Length(m)	Depth(m)	Width(m)	Cargo
71	Gemlik	Commercial Private(Azote)	Quay		1	300	14		Liquid bulk
		Commercial Private(Azote)	Pier		1	65	9~11		(mooring)
		Commercial Private(Gemport)	Quay		1	185	12		General/Container
		Commercial Private(Gemport)	Quay		2	140	9~12		General/Container
		Commercial Private(Gemport)	Quay		3	110	7		Dry Bulk
		Commercial Private(B.P.)	Jetty		1	55	4~10		10 Oil, Fuel oil
		Commercial Municipality	Breakwater	Main		115			
		Commercial Municipality	Breakwater	Sub		120			
		Commercial Municipality	Quay		1.2	197	4~6		
		Commercial Municipality	Pier			125	5~11	12	
72	Kucukkumla Village	Local	Municipality	Pier		29	1.5~5	6	
73	Narlı Village(Gemlik)	Fishery	Municipality	Breakwater		167			
		Local	Municipality	Quay		127	1~3		
		Local	Municipality	Pier		32	1~3		
74	Buyuk kumla	Local	Municipality	Pier		535	2.5~5	4	
75	Karaca Ali Village	Local	Municipality	Pier		30	0.5~2.5	4	
76	Kapaklı Village(Gemlik)	Local	Municipality	Pier		255	2~3	4	
77	Fistikli Village	Local	Municipality	Pier		65	3~3.5	4	
78	Armutlu	Local	Municipality	Pier		83	5~8	8	
79	Imarî Island	Local	Municipality(?)	Jetty		60	6~8	8	
80	Esenkoy	Fishery	Municipality	Breakwater		587+70	1~3		
81	Kocadere(Cinarcık)	Local				100	3~3.5	5	
82	Cinarcık(Yalova)	Fishery		Breakwater		350			
		Fishery		Quay		160	4		
		Local	TDI	Pier		95	3~5	6.5	
83	Konukoy(Yalova)	Local	Municipality	Pier		39		4	
84	Samanlıdere(Yalova)	Fishery	Municipality	Breakwater		150+50	4		
85	Yalova	Local	Municipality,TDI	Jetty		55	4.5	10.5	Ferry
		Fishery	Municipality	Breakwater		195+70			
86	Aksa(Yalova)	Local	Private	Dolphin			2~4		
87	Yalova Elyaf Ve İplik San. Ve Tic.	Local	Private	Pier			2.5~6	291	Liquid Bulk
88	Topcular(Karamürsel)	Ferry	Municipality(?)	Pier	1.2	168	5.5		Ferry
89	Etemit Sanayi *	Local	Private	Quay		110	3.5	275~10	Cement
90	Karamürsel Ereğli	Fishery	Municipality(?)	Breakwater	1	230			
		Fishery	Municipality(?)	Quay		75	2		
91	Pursan(Gölcük) *	Industrial	Private	Quay	1	100	0.5~1	1.5	Liquid Bulk
92	Seka (Cellulose & Paper)	Industrial	Private	Jetty	1	140	7~10.5	19	Dry Bulk(Cellulose etc)
93	Transtürk Chemistry	Industrial	Private	Jetty	1	92	6.3~7.6	3	Chemical product
94	Protective Agricultural Medicine	Industrial	Private	Jetty	1	46	8	18	
95	Derice Shell	Industrial	Private	Jetty	1	90	9~10.5	3	Liquid Bulk
96	Petrol Ofisi	Industrial	Private	Jetty	1	160	3~12		
		Industrial	Private	Jetty	2	155	3~12	10	Fuel oil, Mineral oil
97	Derince	Commercial TCDD		Quay	1	110	4		
		Commercial TCDD		Quay	2	82	7		
		Commercial TCDD		Quay	3/4	440	9~15		
		Commercial TCDD		Quay	5	140	12		Ro/Ro
		Commercial TCDD		Quay	6	220	12		
		Commercial TCDD		Quay	7	160	10		
		Commercial TCDD		Quay	8	120	6		
98	Tupras İzmit Refinery Marine T.	Industrial	Private	Dolphin	1-1~6	300	6~15		
		Industrial	Private	Dolphin	2-1.2	325	14~20		
		Industrial	Private	Dolphin	3	400	27~29		Crude oil, LPG
99	İstanbul Fertilizer Industry	Industrial	Private	Jetty		123	8.5~16	17	Urea
100	Yarınca Aygaz Co.	Industrial	Private	Platform		110	7~8		LPG
101	Yarınca Petro-chemical & Trade	Industrial	Private	Dolphin		282	11		Petrochemical products
102	Türkpetrol *	Industrial	Private	Pier		30	11	17	Fuel
103	Sugar Factories of Turkey *	Industrial	Private	Pier		67	10	7	Molasses
104	Yarınca	Industrial	Municipality	Quay	1	94	7~11		
		Industrial	Municipality	Quay	2	258	3~5		

TABLE 5.2.2 Port Facilities of Marmara Sea

No	Port	Type	Operator	Facility	No	Length(m)	Depth(m)	Width(m)	Cargo
105	Yarimca Superphosphate	Industrial	Private	Jetty		102	7~10	138	Fertilizer
		Industrial	Private	Quay		144	7~10		Fertilizer
106	Hereke	Ferry				24	2		8 Ferry
		Fishery							
107	NUH Cement Industry	Industrial	Private	Quay		250	11~17		General cargo
108	Oler Steel Industry	Industrial	Private	Jetty		232	9~18	15	
109	Tavşanlı	Fishery							
110	Tavşanlı Karayolları Asfalt	Industrial	Private	Jetty		64.5	8~10		8 Bituminous asphalt
111	Upet Uluslararası Petrol ticareti	Industrial	Private	Dolphin			10~16		Fuel
112	Istanbul Iron Steel(Kızıkaya)	Industrial	Private	Jetty		163	10	20	Various Cargo
113	Solventas Teknik Diploma	Industrial	Private	Dolphin		120	8~13		Chemical product
		Industrial	Private	Jetty		69			Chemical product
114	Altinel Melan Industry Co. Inc.	Industrial	Private	Jetty		225	8~12.5	10	Urea, Liquid bulk
115	Alemder Döşekesi İşletmeleri A	Industrial	Private	Jetty	1	210	12~15	12	Mixed cargo
		Industrial	Private	Quay	2	210	12		Ro/Ro, Mixed cargo
		Industrial	Private	Quay	3	120	10		Under construction
		Industrial	Private	Jetty	4	170	8		Under construction
116	Sedef Ship Industry Co. Inc	Industrial	Private	Jetty		100	10~12	10.3	Bar iron, Steel
		Industrial	Private	Quay		168.5	10~12		Bar iron, Steel
117	Colakoglu Metalurji A.S.	Industrial	Private	Quay	1	170			Stone, Sand, Gravel
		Industrial	Private	Quay	2	115			
		Industrial	Private	Quay	3	120			
		Industrial	Private	Jetty		231		23	
118	Izmir Chemical Ex. & Im. Co., Inc	Industrial	Private	Jetty(L)		63	8~11	12.5	Urea, Chemical product
119	Eskihisar(Atabey)	Marina		Slip			3~8		17 Yatch
120	Eskihisar(Gebze)	Ferry	TDI	Quay		537.5			Ferry
		Fishery	Municipality	Quay		50	3		
		Fishery	Municipality	Breakwater		150			
121	Darica(Aslan Cement)	Industrial	Private	Jetty	Old	95	7~7.5	10	Cement, Clinker
		Industrial	Private	Jetty	New	154	15.5~26	21	
		Industrial	Private	Jetty	New	132	10~17		
		Industrial	Private	Jetty	New	73	4.5~7		
122	Darica	Local	Private	Jetty	1	26	3~5	9.5	
		Local	Private	Jetty	2	15	3~6	9.5	Ferry
		Local	Private	Ramp	1			20	Ferry
123	Kartal	Local	Municipality	Pier	1	48.4	3~4	2.5	Passenger
124	Bostancı	Local	Municipality	Pier	1	20.4	2~4	2.5	Passenger
125	Moda	Local	Municipality	Pier	1	98.3	2~4	17.7	Passenger
	(Haydarpaşa)								
126	Kuzguncuk	Local	Municipality	Pier	1	8.5	6~7	14.6	Passenger
127	Beylerbeyi	Local	Municipality	Pier	1	8.6	6	15	Passenger
128	Cengelköy	Local	Municipality	Pier	1	8.6	6~7	14.4	Passenger
129	Vaniköy	Local	Municipality	Pier	1	9.1	5~6	14.6	Passenger
130	Kandilli	Local	Municipality	Pontoon	1	18	21~23	8	Passenger
131	Kucukusu	Local	Municipality	Pier	1	15	4	12.4	Passenger
132	Anadoluhisari	Local	Municipality	Pier	1	10.6	6~7.5	11.7	Passenger
133	Kanlica	Local	Municipality	Pier	1	5.8	7	14.7	Passenger
134	Çubuklu	Local	Municipality	Pier	1	17.7	5	12.1	Passenger
135	Pasabahçe	Local	Municipality	Pier	1	13.4	3	17.1	Passenger
136	Beykoz	Local	Municipality	Pier	1	18	7	16.1	Passenger
137	Anadolukavagi	Local	Municipality	Pier	1	11.5	5	13.5	Passenger
138	Rumelikavagi	Local	Municipality	Pier	1	11.5	6	12.7	Passenger
139	Sarıyer	Local	Municipality	Pier	1	8.2	4	12.5	Passenger
140	Büyükdere	Local	Municipality	Pier	1	15	4	16	Passenger
141	Tarabya	Local	Municipality	Pier	1	11	4	16.8	Passenger
142	Yeniköy	Local	Municipality	Pier	1	8.3	3	16	Passenger
143	İstinye	Local	Municipality	Pontoon	1	9	5	15.2	Passenger
144	Emirgan	Local	Municipality	Pier	1	7	7	15.7	Passenger
145	Rumelihisari	Local	Municipality	Pier	1	9.3	6	13.6	Passenger
146	Bebek	Local	Municipality	Pier	1	11.7	4	8.8	Passenger
147	Arnavutköy	Local	Municipality	Pier	1	10.1	3.5~6	15.6	Passenger
148	Kurucemesi	Local	Municipality	Pontoon	1	5	3.5	11	Passenger
149	Ortaköy	Local	Municipality	Pier	1	10	6.5~8.5	10.3	Passenger
150	Besiktas	Local	Municipality	Pier	1	18.4	5	30	Passenger

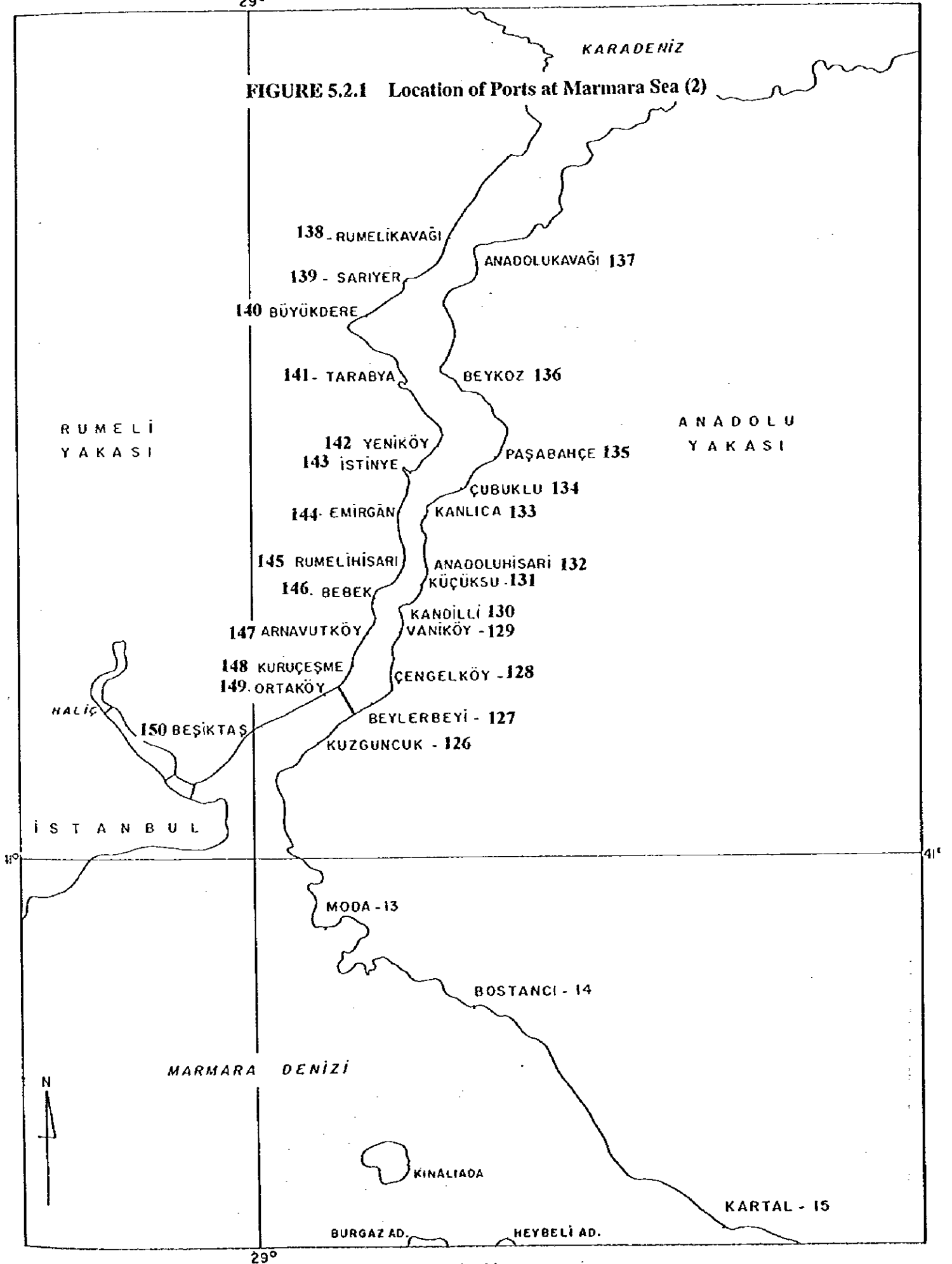
TABLE 5.2.2 Port Facilities of Marmara Sea

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		Industrial	Private	Quay		144	7~10		Fertilizer
106	Hercke	Ferry				24	2	8	Ferry
		Fishery							
107	NUH Cement Industry	Industrial	Private	Quay		250	11~17		General cargo
108	Difer Steel Industry	Industrial	Private	Jetty		232	9~18	15	
109	Tavşancıl	Fishery							
110	Tavşancıl Karayolları Asfalt	Industrial	Private	Jetty		64.5	8~10	8	Bituminous asphalt
111	Upet Uluslararası Petroticareti	Industrial	Private	Dolphin			10~16		Fuel
112	Istanbul Iron Steel(Kizilkaya)	Industrial	Private	Jetty		163	10	20	Various Cargo
113	Solventas Teknik Diploma	Industrial	Private	Dolphin		120	8~13		Chemical product
		Industrial	Private	Jetty		69			Chemical product
114	Altinel Melan Industry Co. Inc.	Industrial	Private	Jetty		225	8~12.5	10	Urea, Liquid bulk
115	Alemdar Dışişleri İşletmeleri A	Industrial	Private	Jetty	1	210	12~15	12	Mixed cargo
		Industrial	Private	Quay	2	210	12		Ro/Ro, Mixed cargo
		Industrial	Private	Quay	3	120	10		Under construction
		Industrial	Private	Jetty	4	170	8		Under construction
116	Sedef Ship Industry Co. Inc.	Industrial	Private	Jetty		100	10~12	10.3	Bar iron, Steel
		Industrial	Private	Quay		163.5	10~12		Bar iron, Steel
117	Çolakoglu Metalurji A.S.	Industrial	Private	Quay	1	170			Stone, Sand, Gravel
		Industrial	Private	Quay	2	115			
		Industrial	Private	Quay	3	120			
		Industrial	Private	Jetty		231		23	
118	Izmir Chemical Ex. & Im. Co., Inc	Industrial	Private	Jetty(L)		63	8~11	12.5	Urea, Chemical product
119	Eskihisar(Atabay)	Marina		Ship			3~8	17	Yatch
120	Eskihisar(Gebze)	Ferry	TDİ	Quay		537.5			Ferry
		Fishery	Municipality	Quay		50	3		
		Fishery	Municipality	Breakwater		150			
121	Darica(Asian Cement)	Industrial	Private	Jetty	Old	95	7~7.5	10	Cement,Clinker
		Industrial	Private	Jetty	New	154	15.5~26	21	
		Industrial	Private	Jetty	New	132	10~17		
		Industrial	Private	Jetty	New	73	4.5~7		
122	Darica	Local	Private	Jetty	1	26	3~6	9.5	
		Local	Private	Jetty	2	15	3~6	9.5	Ferry
		Local	Private	Ramp	1			20	Ferry
123	Kartal	Local	Municipality	Pier	1	49.4	3~4	2.5	Passenger
124	Bostancı	Local	Municipality	Pier	1	20.4	2~4	2.5	Passenger
125	Moda	Local	Municipality	Pier	1	98.3	2~4	17.7	Passenger
	(Haydarpaşa)								
126	Kuzguncuk	Local	Municipality	Pier	1	8.5	6~7	14.6	Passenger
127	Beylerbeyi	Local	Municipality	Pier	1	8.6	6	15	Passenger
128	Gengelköy	Local	Municipality	Pier	1	8.6	6~7	14.4	Passenger
129	Venköy	Local	Municipality	Pier	1	9.1	5~6	14.6	Passenger
130	Kandırlı	Local	Municipality	Pontoon	1	18	21~23	8	Passenger
131	Kucukusu	Local	Municipality	Pier	1	15	4	12.4	Passenger
132	Anadoluhisari	Local	Municipality	Pier	1	10.8	6~7.5	11.7	Passenger
133	Karlıca	Local	Municipality	Pier	1	5.8	7	14.7	Passenger
134	Cobuklu	Local	Municipality	Pier	1	17.7	5	12.1	Passenger
135	Pasabahce	Local	Municipality	Pier	1	13.4	3	17.1	Passenger
136	Beykoz	Local	Municipality	Pier	1	18	7	16.1	Passenger
137	Anadolukavagi	Local	Municipality	Pier	1	11.5	5	13.5	Passenger
138	Rumelikavagi	Local	Municipality	Pier	1	11.5	6	12.7	Passenger
139	Sarıyer	Local	Municipality	Pier	1	8.2	4	12.5	Passenger
140	Buyukdere	Local	Municipality	Pier	1	15	4	16	Passenger
141	Tarabya	Local	Municipality	Pier	1	11	4	16.8	Passenger
142	Yenikoy	Local	Municipality	Pier	1	8.3	3	16	Passenger
143	İstinye	Local	Municipality	Pontoon	1	3	5	15.2	Passenger
144	Emirgan	Local	Municipality	Pier	1	7	7	15.7	Passenger
145	Rumelihisari	Local	Municipality	Pier	1	9.3	6	13.6	Passenger
146	Bebek	Local	Municipality	Pier	1	11.7	4	8.8	Passenger
147	Arnavutkoy	Local	Municipality	Pier	1	10.1	3.5~6	15.6	Passenger
148	Kurucemesi	Local	Municipality	Pontoon	1	5	3.5	11	Passenger
149	Ortakoy	Local	Municipality	Pier	1	10	6.5~8.5	10.3	Passenger
150	Besiktas	Local	Municipality	Pier	1	18.4	5	30	Passenger



29°

FIGURE 5.2.1 Location of Ports at Marmara Sea (2)



Most of the private port facilities are located on the north coast of the Izmit Bay around where heavy industries are densely located and some are on the depth of the Gemlik Bay, the base of the Kapidag Peninsula and on the northeastern coast of the Sea of Marmara. These private facilities are mainly specialized, however, general cargo such as container cargo has been handled in these ports recently. In particular, the Gemport and the Ambarli ports are used for general cargo, such as construction materials, container, etc..

Small ports are concentrated around the Kapidag Peninsula and islands, because of poor land transportation. Ports and facilities along the Straits are mainly used for passenger transportation.

Generally speaking, almost all ports do not have sufficient storage yards and expansion area.

5.2.2 Cargo Handling Volume of the Ports in Marmara Sea

Turkey is surrounded by Aegean Sea, Mediterranean Sea, Black Sea and Marmara Sea. Total cargo handling volume of Turkish ports in 1987 - 1995 is shown in Table 4.1.2. Historical trend of share of cargo handling volume of Marmara sea ports is shown in Table 5.2.3

TABLE 5.2.3 Trend of Share of Cargo Handling Volume of Marmara Sea Port (ton)

year	Total cargo volume of Turkey	Total cargo volume of Marmara port	Share %
1987	151,089,664	42,328,319	28.0
1988	178,901,293	41,584,054	23.2
1989	183,679,840	39,327,395	21.4
1990	149,181,096	42,582,162	28.5
1991	103,617,752	43,946,848	42.2
1992	107,432,309	45,777,985	42.6
1993	119,692,083	51,044,275	42.6
1994	108,934,631	46,536,417	42.7
1995	119,031,162	51,676,592	43.4

Source: Undersecretariat for Maritime Affairs

After the embargo of Iraq oil in 1990 , share of cargo volume through the Marmara Sea ports has been 42 - 43 % of total cargo volume. Annual handling cargo volume is approx. 50 million tons. The cargo handling volume of Marmara Sea ports in 1987 and 1995 is shown in Table 5.2.4

TABLE 5.2.4 Cargo Handling Volume of Marmara Sea Ports in 1987 and 1995

Year 1987						unit : ton
Port	Domestic	Transit	Export	Import	Total	Share %
Bandirma	237,641	2,200	1,093,275	1,249,004	2,582,120	6.1
Canakkale	237,399	0	219,465	177,944	634,808	1.5
Erdek	244,487	0	5,970	0	250,457	0.6
Gelibolu	47,464	0	0	68,108	115,572	0.3
Gemlik	327,652	2,718	149,182	783,385	1,262,937	3.0
Istanbul	8,365,624	0	710,571	2,245,547	11,321,742	26.7
Izmiy	8,075,487	0	2,222,298	14,036,301	24,334,086	57.5
Karabiga	241,511	0	13,222	1,274	256,007	0.6
Mudanya	103,553	0	93,717	197,655	394,925	0.9
Silivri	92,569	0	7,200	0	99,769	0.2
Tekirdag	393,149	29,084	28,807	624,856	1,075,896	2.5
Total	18,366,536	34,002	4,543,707	19,384,074	42,328,319	100.0

Year 1995						unit : ton
Port	Domestic	Transit	Export	Import	Total	Share %
Bandirma	265,843	14,984	1,245,690	1,245,401	2,771,918	5.4
Canakkale	1,274,143	0	1,566,397	495,998	3,336,538	6.5
Erdek	136,710	0	0	0	136,710	0.3
Gelibolu	226,789	0	7,225	89,966	323,980	0.6
Gemlik	379,089	0	349,775	1,406,498	2,135,362	4.1
Istanbul	9,257,245	0	570,864	1,653,488	11,481,597	22.2
Izmit	6,844,745	0	3,387,620	18,188,397	28,420,762	55.1
Karabiga	124,944	0	9,000	0	133,944	0.3
Mudanya	141,903	0	256,306	91,188	489,397	0.9
Silivri	112,418	0	0	927,987	1,040,405	2.0
Tekirdag	285,523	0	393,117	727,339	1,405,979	2.7
Total	19,049,352	14,984	7,785,994	24,826,262	51,676,592	100.0

Source: Maritime Organization

Note: Istanbul includes Haydarpasa, Sarpajari Ambarli

Izmit includes 31 wharves and piers

Cargo handling volume of Izmit is more than 50 % of the total Marmara Sea ports cargo volume. Istanbul share is decreased to 22.2 % in 1995 (26.7 % in 1987). Shares of Canakkale, Gelibolu, Gemlik and Silivri are increasing. Among these four ports, cargo volume growth at Canakkale has been particularly remarkable.

5.2.5 Container Handling at Marmara Sea Port

In Marmara Sea area, there are 5 ports which handle container cargo. Three are Haydarpasa, Derince and Bandirma under control of TCDD and Gempont and Sedef under private Authority. Historical trends of container cargo volume of 3 ports of TCDD are shown

in Table 5.2.5. and Figure 5.2.2

TABLE 5.2.5 Container Handling Volume of Marmara Sea Port

Hydarpasa Port Container Handling Volume

year	Load				Unload				Total	
	20 foot		40 foot		20 foot		40 foot		quantity	TEU
	laden	empty	laden	empty	laden	empty	laden	empty	number	
1984	2,950	2,133	1,525	608	3,934	1,647	1,611	541	14,949	19,234
1985	3,613	1,899	2,178	682	4,561	1,165	2,280	876	17,254	23,270
1986	4,525	4,306	3,114	1,338	7,099	2,011	2,585	1,540	26,518	35,095
1987	7,833	3,806	3,616	1,140	8,139	2,666	2,663	1,648	31,511	40,578
1988	7,960	5,098	4,128	1,766	10,243	2,885	3,884	1,662	37,626	49,066
1989	10,882	4,066	4,773	1,916	12,924	4,575	5,055	1,967	46,158	59,869
1990	15,379	11,029	7,680	5,471	25,318	3,309	13,554	1,680	83,420	111,805
1991	16,856	21,538	9,596	7,976	33,102	3,096	15,819	2,336	110,319	146,046
1992	24,388	22,535	13,987	7,461	39,444	6,392	18,154	2,819	135,180	177,601
1993	26,856	29,685	14,649	13,430	55,298	5,235	27,273	2,288	174,714	232,364
1994	25,162	16,272	17,882	5,393	37,372	6,659	18,821	5,087	132,648	179,831
1995	30,557	21,169	19,651	11,814	56,485	7,376	34,439	2,087	183,578	256,569

Bandirma Port Container Handling Volume

year	Load				Unload				Total	
	20 foot		40 foot		20 foot		40 foot		quantity	TEU
	laden	empty	laden	empty	laden	empty	laden	empty	number	
1991	0	943	0	0	162	781	0	0	1,886	1,886
1992	191	460	0	0	170	292	2	0	1,115	1,117
1993	173	802	0	0	336	639	0	0	1,950	1,950
1994	582	947	0	0	349	785	0	0	2,663	2,663
1995	0	585	0	0	162	369	0	0	1,116	1,116

Derince Port Container Handling Volume

year	Load				Unload				Total	
	20 foot		40 foot		20 foot		40 foot		quantity	TEU
	laden	empty	laden	empty	laden	empty	laden	empty	number	
1991	440	810	1	297	861	335	195	0	2,939	3,432
1992	1290	753	37	229	722	1019	262	0	4,312	4,840
1993	190	358	34	109	1234	17	266	0	2,208	2,617
1994	480	731	61	18	647	626	162	160	2,885	3,238
1995	983	167	449	121	572	1193	301	207	3,993	5,071

Source: TCDD

FIGURE 5.2.2 Haydarpasa Port Container Handling Volume

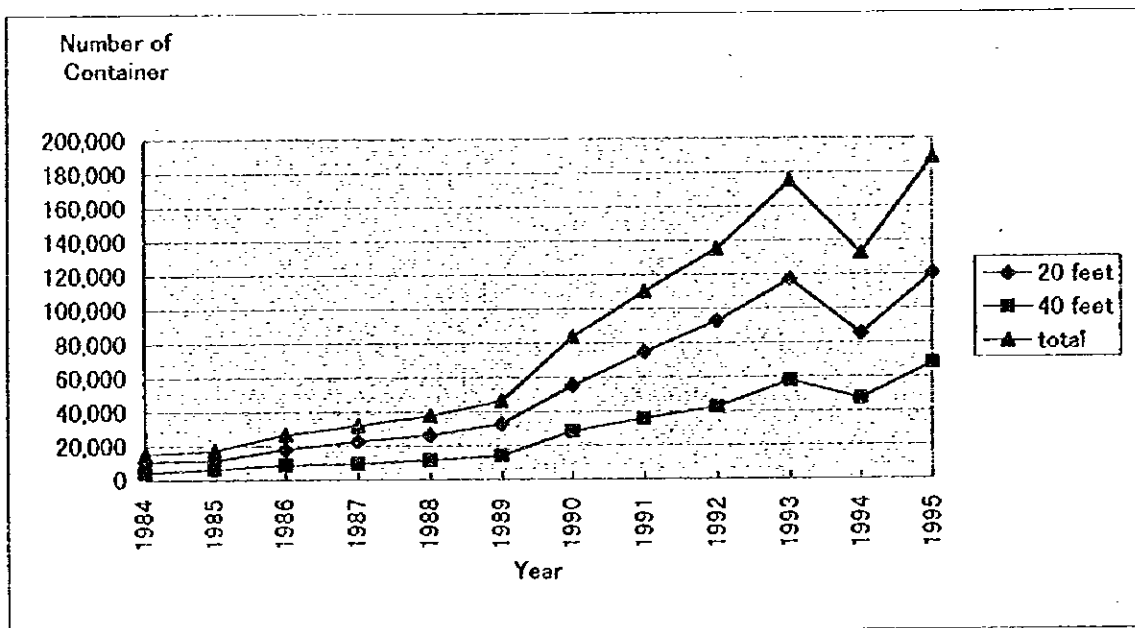
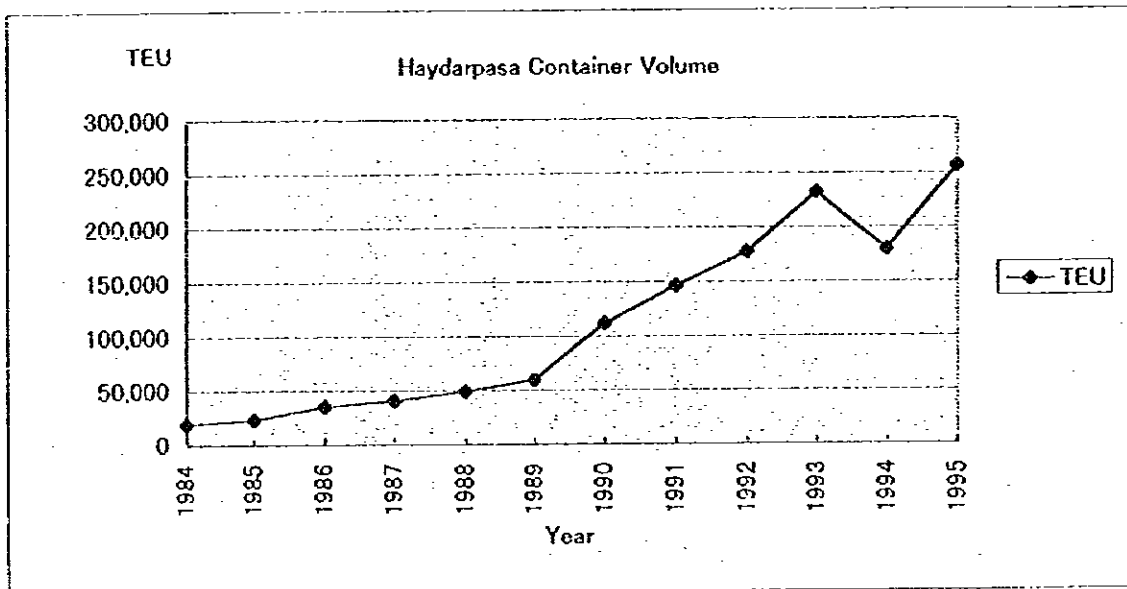


TABLE 5.2.6 Annual Increase Rate of Container Cargo in Haydarpasa Port

Year	TEU	Annual Increase Rate %
1984	18,234	
1985	23,270	21.0
1986	35,095	50.8
1987	40,578	15.6
1988	49,066	20.9
1989	59,869	22.0
1990	111,805	86.7
1991	146,046	30.6
1992	177,601	21.6
1993	232,364	30.8
1994	179,831	-22.6
1995	256,569	42.7

Source: TCDD

The share of container cargo volume of Haydarpasa port is 51 % of the total cargo volume in 1995. Haydarpasa port still has a large demand of container cargo, as annual increase rate of container volume since 1984 is more than 20 % except for year 1987 and 1994. The share of containerized cargoes in the volume of general cargoes is 77 % in 1995. The share of 40 feet containers is 36 % of the total box number in 1995. The share of unloaded containers is 25 % of the total number of containers in 1995. Container handling volume of Bandırma has fluctuated since it is an alternative port. At Derince port, container handling volume has been increasing since 1993. The potential demand from the hinterland of İzmit bay is high.

5.2.4 Passenger Traffic of Marmara Sea port

The number of passengers of Marmara Sea ports in 1993 and 1994 is shown in Table 5.2.7

Most passengers are engaged in domestic movement except for Istanbul. In Istanbul port, the number of passenger are increasing, as increment of transit passenger. Canakkale port has domestic ferry service to Gökçeada islands and international passenger vessel for its historical remains. Passengers using Bandırma port and Erdek port are increasing.

TABLE 5.2.7 Passenger Traffic of Marmara Sea port in 1993 and 1994

Year	1993				1994			
	Domestic	Transit	Inter-national	Total	Domestic	Transit	Inter-national	Total
Istanbul	270,919	304,795	32,140	607,854	255,832	354,629	30,938	641,399
Izmit				0				0
Bandirma	29,275			29,275	73,851			73,851
Canakkale	76,940	20,717		97,657	86,861	23,050	156	110,067
Gemlik				0				0
Erdek	1,915			1,915	38,498			38,498
Tekirdag	6,147			6,147				0
Gokceada	77,375			77,375	84,216			84,216

Source: Maritime Organization

Note: Gokceada is an off shore island of Canakkale

5.2.5 Cargo Vessel Calling at Marmara Sea Ports

Historical trend of calling vessel at Marmara Sea ports is shown in Table 5.2.8. The annual number of vessels at Bandirma port has varied within the range of 850 to 1000 except for 1985, 1987 and 1994. Since 1990, number of calling vessels at Haydarpasa is within the range of 1,900 to 2,150. Number of calling vessels of Gemlik, Derince and Izmit ports is increasing.

TABLE 5.2.8 Trend of Cargo Vessels Calling Number at the Port of Marmara Sea

year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Bandirma	1,197	858	771	838	981	858	843	856	857	1,073	972
Canakkale				42	70	79	70	42	65	42	53
Gemlik									1,354	1,213	1,545
Haydarpasa	1,214	1,563	1,754	1,461	1,539	1,940	2,043	2,137	2,116	1,913	1,946
Izmit										6812	7,681
Derince	301	311	531	475	476	728	462	496	702	571	818
Mudanya								353	540	448	412
Tekirdag							1,468	1,762	1,580	974	696

Source: TCDD, Canakkale Port, Gemlik Port, Chamber of Shipping, Mudanya Port, Tekirdag Port

Note: Vessel number of Canakkale cement is not included for Canakkale

5.3 Port of Haydarpasa

5.3.1 Location

Port of Haydarpasa is situated on the Anatolian side of Bosphorus in Istanbul, a city with nearly 10 million inhabitants, Turkey's largest trade, industry and business center. The port is connected with state railways and highway network. Istanbul is the main city in the hinterland of the port.

5.3.2 Port facility

The port has two breakwaters to protect vessels from all types of sea effects. The port's maximum water depth is 12 meters and holds berths with a total length of 3,393.5 m. Detail of the berths are mentioned in the following Table 5.3.1. (See Figure 5.3.1)

TABLE 5.3.1 Port Facilities of Haydarpasa Port

Berth	Length(m)	Depth(m)	Remarks
No.1	150	4~5	Ferry
No.2	240	6	General cargo
No.3	190	10	Dry bulk
No.4,5	334	10	General cargo
No.6	220	10	General cargo
No.7,8	246	10	General cargo
No.9	206.5	8.5	General cargo
No.10,11	350	10	Container
No.12	300	12	Container
No.13,14	295	10	Container
No.15	220	8	General cargo
No.16	160	8	General cargo
No.17	141	8	Ro/Ro
No.18	164	6	Ro/Ro
No.19	97	6	General cargo
No.20	40	6	General cargo
No.21	40	6	General cargo

No. 12 berth with a length of 300 m and a depth of 12 m is equipped with gantry cranes.

The storage area of the Haydarpasa Port is 126,750 m² of open storage area and 29,808 m² of closed storage area. The annual storage capacity of these areas is 762,000 tons per year for the open storage and 476,928 tons per year for the closed storage. The existing facilities of the closed storage are shown in Table 5.3.2. CFS (Container Freight Station) is

The drawing is a top-down view of the HAF campus. It features several large circular areas, likely sports fields or parking lots, labeled with dimensions such as "Ø 300 m". The campus is divided into sections by roads and pathways. Buildings are represented by rectangular outlines, some with internal details indicating different rooms or functions. Key labels include "RN17", "RN18", "RN19", "RN20", "RN21", "RN22", "RN23", "RN24", "RN25", "RN26", "RN27", "RN28", "RN29", "RN30", "RN31", "RN32", "RN33", "RN34", "RN35", "RN36", "RN37", "RN38", "RN39", "RN40", "RN41", "RN42", "RN43", "RN44", "RN45", "RN46", "RN47", "RN48", "RN49", "RN50", "RN51", "RN52", "RN53", "RN54", "RN55", "RN56", "RN57", "RN58", "RN59", "RN60", "RN61", "RN62", "RN63", "RN64", "RN65", "RN66", "RN67", "RN68", "RN69", "RN70", "RN71", "RN72", "RN73", "RN74", "RN75", "RN76", "RN77", "RN78", "RN79", "RN80", "RN81", "RN82", "RN83", "RN84", "RN85", "RN86", "RN87", "RN88", "RN89", "RN90", "RN91", "RN92", "RN93", "RN94", "RN95", "RN96", "RN97", "RN98", "RN99", "RN100".

A compass rose is located in the bottom left corner, indicating North. A scale bar is present at the bottom center, labeled "I-172". In the bottom right corner, there is a legend with symbols for "YOL" (Road), "SULHUSUZLUK" (Peaceful Area), and "MÜHÜR" (Seal). The title "T.C.D.O. HAVA HARPAĞA LİMANININ GENEL MİZANET PLANI" is written vertically along the right edge.

available behind the container storage yard, and other general cargo storage facilities are located at No. 2 & 3 berth, and No. 4,5,6,7 berth area. Area of CFS is 4071m². In addition to this CFS, LCL cargo is unloaded from the container at quay side of berth No.9, which was allocated as a general cargo storage area originally.

TABLE 5.3.2 Closed Storage Facility of the port of Haydarpasa

Name	Area (m ²)	Capacity (ton)
Old Storage Shed	1770.6	1800
E Storage Shed	2068.5	1200
No.1 Storage Shed	3076	2000
No.2 Storage Shed	3474	2300
No.3 Storage Shed	3474	2300
No.4 Storage Shed	3474	2300
No.5 Storage Shed	3474	2300
Liquid Storage Shed	1362.1	440
CFS Station	4071	2800
Portable Storage Shed	2000	2700
Portable Storage Shed	2000	2700

The port has general cargo berths 2,038 m in length, between 6 and 10 m in depth. The silo which belongs to TMO with 70,000 ton capacity, has conveyor connection with the berth. The port also has a berth with the capacity to service dry bulk cargo vessels 190 m in length and 10 m in depth at berth No.3. The newly constructed ro-ro berth is open to service and has 410,000 ton/annual ro-ro cargo, 65,000 trailer and 60,000 travel vehicles capacity, plus 360 ro-ro and car carrier type vessels acceptance capacity.

According to the estimation of TCDD, vessel acceptance capacity is 2213 vessel/year and loading - unloading capacities are shown in Table 5.3.3.

TABLE 5.3.3 Vessel Acceptance Capacity

	1 SHIFT	2 SHIFTS	3 SHIFTS
General cargo	1,353,000	2,570,500	3,585,300
Container	501,200	952,200	1,328,100
Total	1,854,200	3,522,700	4,913,400

There is a bilge treatment plant with 10,500 m³/year capacity.

5.3.3 Cargo handling equipment

The existing cargo handling equipment at Haydarpasa port is shown in Table 5.3.4. In addition to this equipment owned by the port, there are many pieces of equipment brought

by agency, such as 4 ton capacity forklift for general cargo handling and 30 ton capacity container forklift. Mobile cranes are brought to the port by agency in accordance with cargo handling work load. As for the service vessel, the port possess one (1) floating crane of 250 ton lifting capacity, five (5) tugboats, three (3) rail ferries, and four (4) mooring boats. Details are described in Table 5.3.5.

TABLE 5.3.4 List of Cargo Handling Equipment of Port of Haydarpasa

Type	Capacity	Built Year	Number of Equipment			Remarks
			Total	Available	Repair	
Container Crane	35t	1988	2	2		MSM
Yard Crane	35t	1988	1	1		MSM
	25t	1960	1	1		DEMAG
	10t	1988	2	2		MSM
	5t	1984	7	7		MSM
	5t	1966	1	1		KOCKS
	3t	1958	7	7		DEMAG
	3t	1966	2	2		KOCKS
Reach Stacker	40t	1987	2	2		Belotti
		1992	2	2		
Transtainer	35t	1988	9	9		MSM
Mobile Crane	25t	1984	2	2		COLES
	25t	1978	1	1		NELLEN
	15t	1978	1	1		NELLEN
	10t	1983	10	10		COLES
	5t	1976	3	3		NELLEN
Container Fork Lift	40t	1987	3	3		
	10t	1983	1	1		
	10t	1988	2	2		
General Cargo Fork Lift	5t	1980-83	5	5		
	3.5t	1986	15	15		
	3t	1971	2	2		
	3t	1975	12	12		
	2.5t	1992	6	6		
	1.5t	1983	4	4		
Tugmaster		1982	2	2		
		1985	2	2		
		1988	15	15		
Loader		1982	1	1		
Tractor		1976	1	1		
		1981	2	2		
		1987	1	1		
Trailer	40t	1982	25	25		
	28t	1996	6	6		
	20t	1987	10	10		

TABLE 5.3.5 List of Port Service Boat of Port of Haydarpasa

Type	Built Year	Main Dimensions (m)			Capacity	Speed (kt)	Remarks
		L	B	d			
Floating Crane	1986	65.36	26	3.35	250 ton	6	Elect. Breakdown
Tugboat	1983	31.76	8.12	3.42	1500 HP	12	
Tugboat	1966	24.49	6.70	2.60	970 HP	10	
Tugboat	1966	24.29	6.70	2.60	970 HP	10	
Tugboat	1986	36.23	8.90	3.60	2500 HP	12	
Tugboat	1981	36.23	8.90	3.66	2500 HP	12	
Rail Ferry	1957	72.45	15	2.85	480 ton	11	
Rail Ferry	1966	72.45	15	3.68	480 ton	11	
Rail Ferry	1982	72.45	15	3.01	480 ton	11	
Mooring Boat	1975	10.35	3.31	1.00	100 HP	6	
Mooring Boat	1975	10.35	3.31	1.00	100 HP	6	
Mooring Boat	1995	10.30	3.30	1.30	185 HP	11	

5.3.4 Cargo

Main cargoes handled in the port are dry bulk cargo, container, general cargo. Constant ro-ro vessel service is available between the Haydarpasa and the Trieste. There are train ferry facilities in the port, with wagons operating with 3 train ferries between; Sirkeci Terminal - Haydarpasa Ferry port.

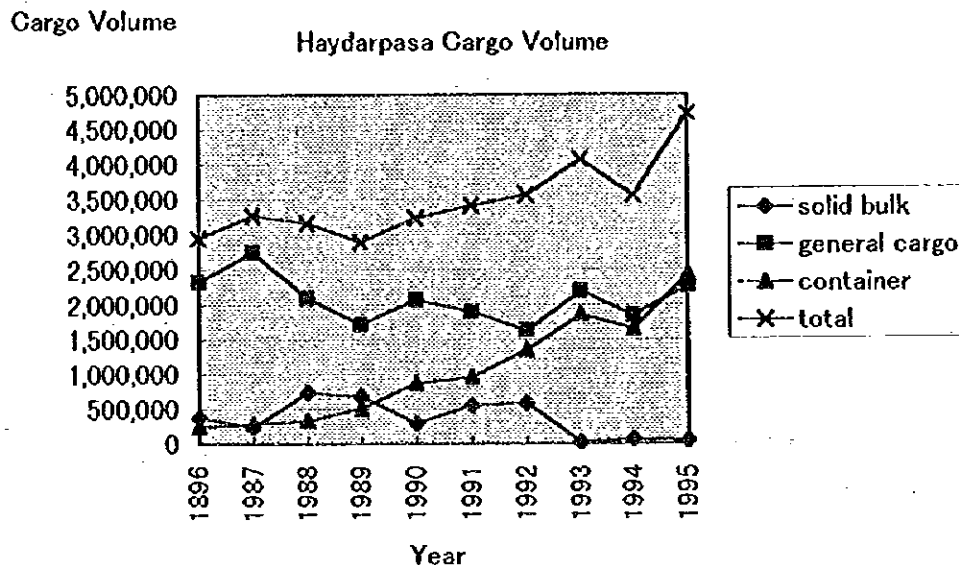
Historical trend of cargo handling volume in Haydarpasa is shown in Table 5.3.6. and Figure 5.3.2.

TABLE 5.3.6 Haydarpasa Port Cargo Handling Volume (unit : ton)

Year	Dry bulk	General cargo	Container	Liquid bulk	RO/RO	Total
1896	379,747	2,327,609	246,042	0		2,953,398
1987	242,289	2,740,119	292,226	0		3,274,634
1988	739,875	2,091,053	338,925	0		3,169,853
1989	679,050	1,712,574	504,882	0		2,896,506
1990	301,266	2,060,640	868,686	0		3,230,592
1991	551,675	1,899,840	959,887	0		3,411,402
1992	581,726	1,635,098	1,349,537	0		3,566,361
1993	24,851	1,483,445	1,855,190	0	710,036	4,073,522
1994	68,223	779,209	1,653,615	0	1,062,243	3,563,290
1995	41,939	713,151	2,427,568	0	1,544,047	4,726,705

Source: TCDD

FIGURE 5.3.2 Cargo Handling Volume of Haydarpasa



Haydarpasa port has a container terminal and Ro-Ro terminal which handled 2.4 million tons and 1.5 million tons respectively in 1995. Total annual cargo handling volume in 1995 is 4.7 million tons, the shares of container cargo volume and Ro-Ro cargo volume are 51.3 % and 32.7 % respectively in 1995 . Since 1993, Ro-Ro cargo volume has been increasing more than 45 % per year. Share of Ro-Ro cargo volume also increased from 17% to 33 % in 1993 - 1995. In contrast to of container & Ro-Ro handling cargo, volume of dry bulk and general cargo is gradually decreasing. Number of calling vessel is 1,946 in 1995.

5.3.5 Cargo Handling System

(1) Container Terminal

The port is equipped with 2 units of container gantry crane for the handling of containers to/from ship. 9 units of transtainers , 5 units of 42 - 10 ton container forklifts, 25 units of 40 ton trailers and 10 units of 20 ton trailers. Area of container terminal is about 100,000 m², and the holding capacity of the container terminal is 6,000TEU (both full and empty). The annual container handling capacity is about 144,000TEU. In these days, the number of handling containers exceeds this capacity. In order to storage such overflowed containers, vacant space of the yard is used as container store space. Therefore, there are plenty of containers, and this situation hinders proper container handling in the port, especially traffic in the port. For example, number of containers stored in the port is as follows.

Standard container storage area	5,000 TEU
Other area of the port (not standard area)	11,000TEU
(data of May 21, 1996)	

Thus, 3 to 4 times more containers than planned are stored in the port on average. Dwelling time of container is between 15 to 30 days. This dwelling time is rather longer than other container terminals and makes the terminal available capacity smaller than nominal capacity. From the economic point of view and for good port sales, it is recommended to analyze and research the reason why containers dwell such a long time in the terminal.

In addition to the container terminal of the port, there is one inland yard along the highway about 5km distance from the port. This inland yard stores mainly empty and export container. Storage capacity of this inland yard is about 2000TEU. Number of container on June 7, 1996, is as follows.

Empty Container	118 TEU
Export Container (full)	1201 TEU
Total	1319 TEU

Transportation of containers between the port and inland yard is carried out using 15 trailers through the highway, so that very smooth transportation is maintained.

Containers are handled by using the gantry crane at berth No.12, and using ship's gear or mobile crane at other berths. In addition to the berth Nos. 13, 14 and 15, which handles containers mainly, other berths also handle containers. Container handling efficiency is about 10 boxes per hour by using gantry crane, and 5 to 10 boxes by using ships gear. This figure is very low compared with other container terminals. Reason of this inefficiency is traffic congestion due to storage of containers in excess of the nominal capacity. Containers unloaded from ship waits the tractor arrival as hanged by gantry crane so many times. There are 10 (ten) bays of container storage and 9 (nine) transtainers in the container storage yard. Containers are stored three lows and three plus one tiers at each bay and keep one tracking lane normally. However, there are many stacking places with four low and four tiers in order to store containers up to maximum capacity. At the other storage area, containers are handled by using reach stacker and/or container forklift up to four tiers. Transportation of containers in the port is done by trailers, which are prepared by agency. Numbers of trailers assigned to the job depends on the work load. Five to six trailers are used normally. There are two (2) reefer container stations and 40 plugs are provide in total.

Computer system is used for the control of location of containers in the regular container terminal and inland container terminal. However this system is not connected to the other activities of container handling operation. Therefore, almost of all operation is performed using handwriting documents. The new computer system is under development and will be introduced within a few months.

There is a plan to install two (2) container gantry cranes at No. 10 and 11 berths, which are next to the existing container berth. These new container gantry cranes will be moved from the port of Mersin.

(2) Dry Bulk Cargo

Dry bulk cargo is unloaded by pneumatic unloader at berth No. 2&3 and transferred to the grain silo of 34,000 tons capacity by a conveyor from quay side. There are two pneumatic unloaders and capacity of the unloader is 2,000 ton per day respectively. Operation of dry bulk cargo is handled by TMO, and the port only carried out the ship mooring operation.

(3) General Cargo

General cargo is handled at berth No.4 and 5 using shore cranes. Main commodity is import of paper roll and packaged steel plate. Normal cargo handling efficiency is about 13 to 15 ton per hour for paper roll and 85 to 90 ton per hour for steel plate goods. However there is some waiting hours of work due to the custom clearance, unavailability of truck/forklift, etc.. Such waiting time makes cargo handling efficiency low.

(4) RO/RO Cargo

There is a RO-RO terminal at berth No. 17 and exclusive use gate near the berth. RO/RO cargo is transferred through this gate, so that smooth transportation is maintained for RO/RO cargo. Annual handling capacity of RO/RO cargo is as follows.

RO-RO cargo	410,000 ton
Truck	65,000 trucks
Car	60,000 cars

(5) Shift Hours

Port service is provided to vessels everyday of the week and 24 hours a day for container cargo. Worker formation and shift hour is as follows.

TABLE 5.3.7 Worker Formation of the Port of Haydarpasa

	Worker formation (per gang)	Shift Hour
Container by gantry crane	1 foreman 2 workers 2 - 3 trailers and crane	3 shift per day First shift 8:00 - 16:30 Second Shift 16:30 - 00:30 Third Shift 00:30 - 08:00
Container handling by ships gear	1 foreman 7 Workers 2 - 3 trailers	
Paper Roll Goods	1 foreman 6 workers	2 shift per day First shift 8:00 - 16:30 Second Shift 16:30 - 00:30
Steel Plate Goods	1 foreman 5 workers	

At inland container yard, 28 workers are working on one shift and 3 container reach stackers and 3 forklifts are used.

(6) Maintenance

Repair and maintenance are done by the same division in the Haydarpasa Port, while the other ports have different divisions for repair and maintenance. The reason that there is only one division is that the works in the port are so intense and the number of employee is limited. In order to perform the repair and maintenance as efficiently as possible, workers are divided into following teams based on the equipment type.

1. Berth crane
2. Velloti and mobile crane
3. Small forklift for general cargo and container forklift
4. Transtainer and gantry crane
5. Tug boats and land transportation vehicle

The team, which is responsible for the repair of one of these equipment groups, is also responsible for the maintenance works. The maintenance standards are established based on requirements of the General Order numbered 1101. These orders are issued by the General Directorates. Daily maintenance, such as oil check, air pressure check, water and fuel oil check and physical check of vehicle body, etc., are done by the operator himself.

Spare parts are regulated and purchased by the equipment office in Ankara for classified and registered equipment. All spare parts are controlled by the specific numbers. Spare parts for the equipment which are not registered are not stocked.

The port faces the following problems regarding repair and maintenance.

- The number of qualified workers is insufficient
- Number of spare parts for the container handling equipment is insufficient.
- The maintenance and repair shop is operative for 5 days a week. However, port operation is performed continuously. (24 hours a day and 7 days a week) In order to satisfy the repair requirement of the port operator, some of the workers are required to work overtime. Thus, cost of port operation is increased. Because of the policy to trim expenses, sufficient number of workers cannot be engaged to supply necessary port service.
- Infrastructure of the port is in poor condition and this has a negative influence on the vehicles and equipment.

5.3.6 Current Problems

Current problems of the Haydarpasa Port are as follows ;

- ① Number of stored containers in the port exceed the normal capacity of the port. This is due to the long dwelling time, especially of imported containers and empty container storage. This situation causes further traffic congestion in the port and reduces the efficiency of container handling. Then the cargo handling time comes to be longer, subsequently berthing time of each vessel is prolonged. Many vessels are waiting at anchorage place to enter to the port.
- ② Much of the cargo handling equipment is so aged that proper operation condition is not kept. Especially, some of the yard cranes are rather old. Also, capacity is too low to handle the containers. Therefore, mobile cranes or ships gears are used for container handling operation other than berth No. 12. And in addition, pavement of container terminal is deteriorated, preventing smooth transportation of container traffic.
- ③ Due to the congestion of the port, many obstacles are placed in the way of container trailer traffic, such as container vessel hatch cover, parked trailer, trucks discharging the goods from containers in the terminal. This situation obstructs the proper traffic flow in the port.

5.4 Port of Derince

5.4.1 Location :

Port of Derince is located on the north-east coast of Izmit Gulf, close to depth of the Gulf. The port is connected to Istanbul-Izmit Highway and Railroad.

Most of the cargo handled in the port are transported from/to the factories in industrial area around the Bay. The port has 5~10% share in cargo handling in the Bay including private berths. According to the port authority, the hinterland will be almost the same in future. Recently, the port located 120 km in distance, has increased its function as an

alternative of Haydarpasa.

5.4.2 Port Facility :

The port's maximum water depth is 12.5 meters and holds berths with total length of 1,480 m. The berths of the port are as follows; (See Figure 5.4.1

TABLE 5.4.1 Port Facilities of Derince Port

Berth	Length(m)	Depth(m)	Remarks
No. 1	110	4	Domestic
No. 2	80	7	General cargo
No. 3, 4	440	15	General cargo
No. 5	150	12.5	Ro/Ro
No. 6	200	12	Container(Under construction)
No. 7	220	12	General cargo
No. 8	160	10	General cargo
No. 9	120	4	General cargo

There are 122,120m² of open storage area and 10,500m² closed storage area in the port. The annual storage capacity of these storage areas is 2,930,880tons per year for the open storage and 168,000 tons per year for the closed storage. Details of the closed storage area are shown in Table 5.4.2.

TABLE 5.4.2 Closed Storage Area of Derince Port

Name	Area (m ²)	Capacity (ton/year)
Storage Shed	1700	27200
Storage Shed	600	9600
Storage Shed	700	11200
Storage Shed	3900	62400
Storage Shed	3600	57600

5.4.3 Cargo handling Equipment

The existing cargo handling equipment at Derince port is shown in Table 5.4.3. Main cargoes handled in the port are container, dry bulk cargo, liquid bulk cargo, and general cargo. The volume of container cargo has been increasing recently. As for the service vessel, the port possesses two (2) tugboats, one (1) pilot boat and two (2) mooring boats. Details are described in Table 5.4.4.

FIGURE 5.4.1 Layout of Derince Port

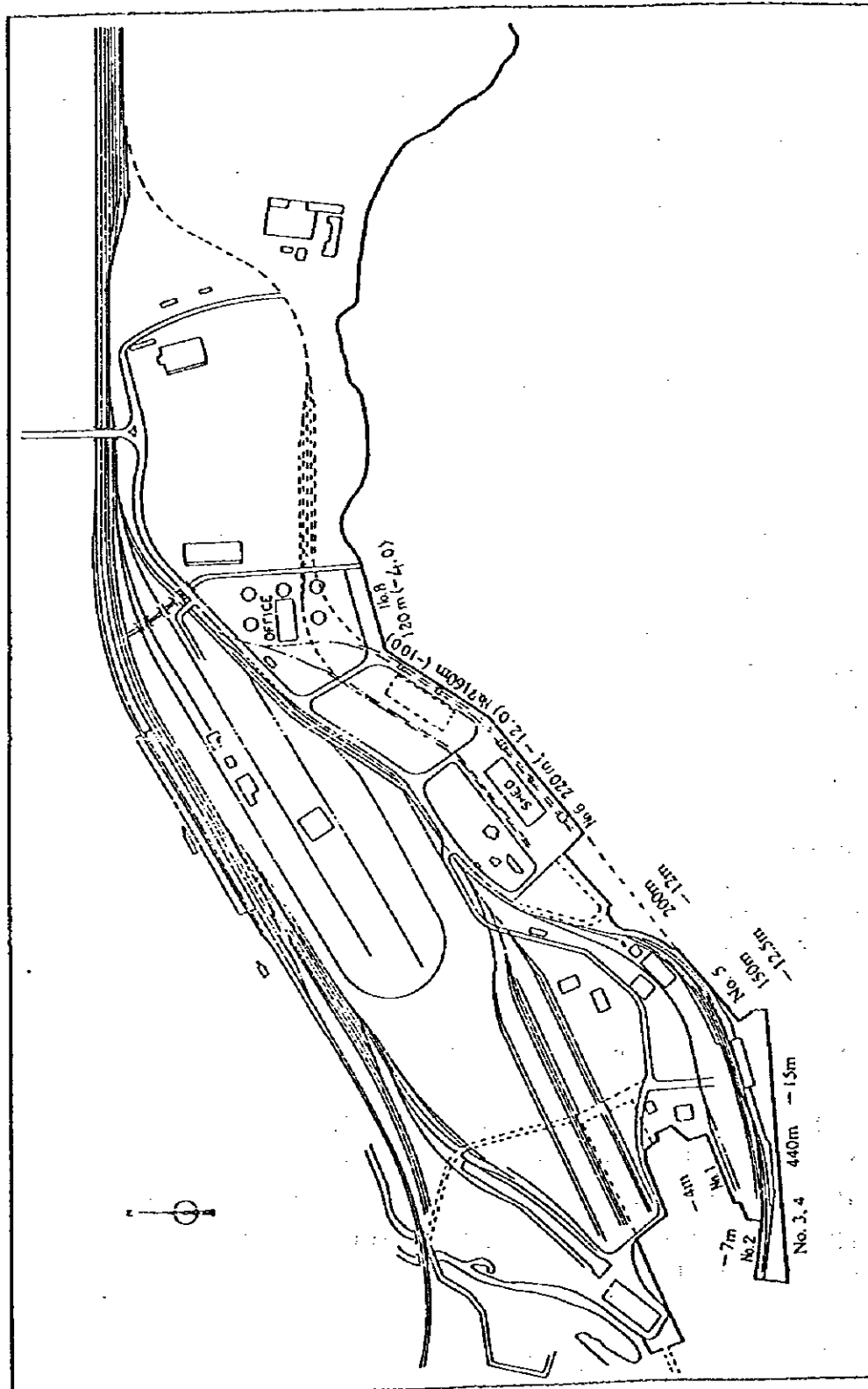


TABLE 5.4.3 List of Cargo Handling Equipment of Port of Derince

Type	Capacity	Built Year	Number of Equipment			Remarks
			Total	Available	Repair	
Yard Crane	35/23t	1985	1	1		
	25t	1983	1	1		fixed
	10t	1983	1	1		
	5t	1983	6	6		
	3t	1954	2	2		
Mobile Crane	25/5t	1982	1		1	
	10t	1982	4	3	1	
	5t	1954	3	3		
Crawler Crane	30t	1950	1	1		
	27/10t	1983	1	1		
	6t	1960	1	1		
Reach Stacker	40t	1985	5	4	1	
General Cargo Fork Lift	5t	1985	13	11	2	
	3t	1975	6	6		
	3t	1983	2	2		
	3t	1986	8	8		
Container Fork Lift	10t	1986	1	1		
Loader	1 m ³	1985	1	1		
Towing Tractor		1981	2	2		CLARK
Trailer	40t		8	7	1	
	20t		6	6		
Tractor		1981	4			STAIR
		1985	1			INTER

TABLE 5.4.4 List of Port Service Boat of Port of Derince

Type	Built Year	Main Dimensions (m)			Main Engine	Speed (kt)	Bollard Pull (t)
		L	B	d			
Tugboat	1965	26.15	6.7	3.22	970 hp		10T
Tugboat	1981	28.90	8.72	3.90	1500 hp		20T
Pilot Boat	1981	14.53	4.21	1.27	2x421hp	18	
Mooring Boat	1981				106 hp		
Mooring Boat	1966	8.5	2.6	0.57	85 hp		

5.4.4 Cargo :

Izmit bay has 31 wharves and piers including private facility and public facility. Cargo handling volume and number of vessel at each wharf in 1994 and 1995 are shown in Table 5.4.5. Total annual cargo handling volume is 28 million tons for approx. 300 industrial establishments in 1995. More than 60% import of cargo is crude oil and oil products. After

TABLE S.4.5 Cargo Handling Volume and Number of Vessel of IZMIT Bay in 1994 and 1995

year	1994			1995		
wharf name	loading ton	unloading ton	number of vessel	loading ton	unloading ton	number of vessel
ASLAN CIMENTO	134,900	459,900	514	495,450	215,000	130
IZMIT KIMYA	21,500	185,766	78	133,905	654,773	200
COLAKOGLU	1,030,000	1,100,000	177	1,011,000	137,000	200
SEDEF	34,672	46,000	171	2,123	2,321	240
ALEMDAR	171,354	756,269	589	148,000	1,346,310	250
ALTINTEL	122,658	79,992	123	64,578	288,245	200
SOLVENTAS	0	166,370	150	1,988	233,441	150
KIZILKAYA	291,045	557,502	321	220,046	1,055,752	200
UPEY(TOTAL)	130,000	346,000	486	165,000	470,000	500
DILER	192,675	719,429	229	170,078	597,710	270
NUH CIMENTO	0	0	0	654,773	133,905	200
KARAYOLLARI	0	0	0	0	0	20
YARIMCA GUBREBEL	36,249	254,305	107	15,481	396,298	120
MELAS	24,808	11,500	12	22,500	4,316	84
TURK PETROL	0	25,176	51	28,560	14,760	40
YARIMCA BEL	0	0	247	0	0	100
PETKIM	48,846	260,400	182	22,689	135,491	200
AYGAZ	238,482	0	56	289,561	0	250
IGSAS	0	0	0	0	214,883	75
TUPRAS	5,963,000	10,980,000	2,493	6,263,547	11,473,000	3,000
CAMAR	0	11,281	13	700	20,913	120
DERINCE	320,223	679,644	618	277,576	944,997	861
PETROL OF.	400,000	650,000	439	330,540	588,847	500
SHELL	150,000	32,000	69	45,000	78,352	120
KORUMA TARIM	0	0	0	0	0	10
TRANSTURK	0	40,223	21	0	29,976	60
SEKA	33,456	97,897	93	20,446	78,220	80
PURSAN	8,117	353,767	89	35,138	33,182	200
AKSA	0	159,194	92	0	192,235	150
ELYAF	0	7,585	10	0	9,024	12
ETERNIT	0	0	0	0	0	0
TOTAL	9,351,985	17,980,200	7,430	10,418,679	19,348,951	8,542

Source: Chamber of shipping

products. After being refined, oil products are delivered to domestic market by sea way and highway. Except for oil and oil products, cargo volume is approx. 10 million tons. Number of calling vessels is 8,542 in 1995.

Main cargo of Derince port is industrial goods from the heavy industrial area located at the north side of Izmit Bay. Handling volume of Derince port is less than 10 % of the total cargo volume handled in the Izmit Bay including private piers. However, as for the handling volume of general cargo, excluding liquid bulk and scraps, Derince is the main port handling more than 25 % of the total cargo volume in the Izmit Bay. Major handling cargo is solid bulk, grain, live stock, liquid bulk, paper, steel, timber, for import cargo. Main export cargo is clinker and dry bulk.

Derince port annual cargo handling volume is about 1.2 million tons. Cargo handling volume from 1986 to 1995 is shown in Table 5.4.6 and Figure 5.4.2.

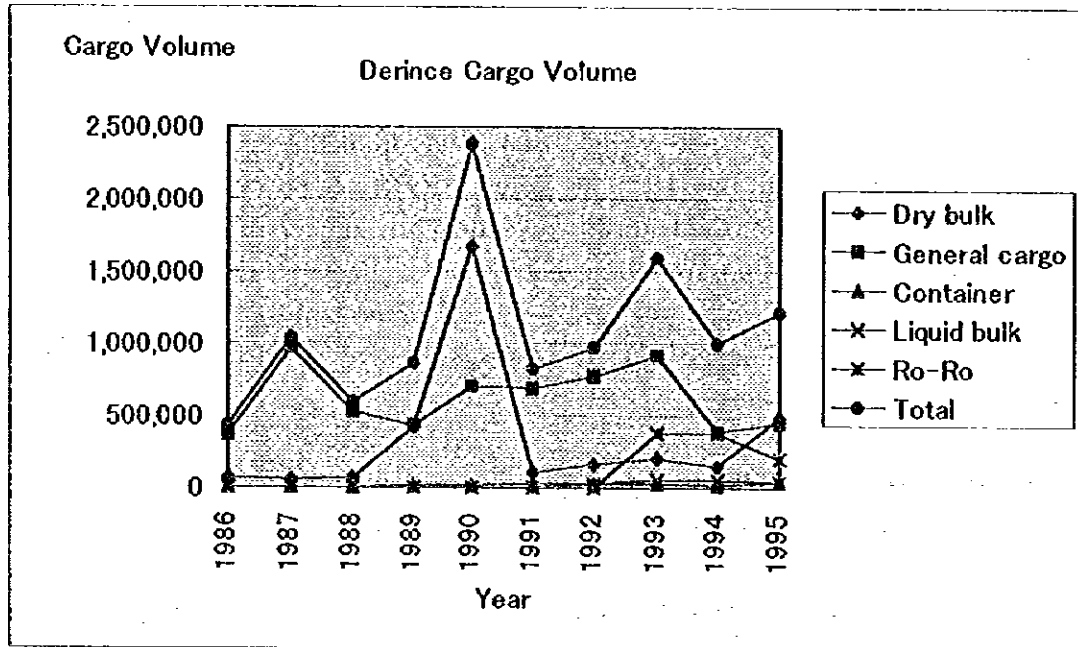
TABLE 5.4.6 Derince Port Cargo Handling Volume unit : ton

year	Dry bulk	General cargo	Container	Liquid bulk	RO-RO	Total
1986	62,957	369,834	760	0	0	433,551
1987	60,744	970,785	5,590	0	0	1,037,119
1988	63,783	528,235	5,510	0	0	597,528
1989	420,782	433,398	11,850	0	0	866,030
1990	1,670,990	697,065	13,094	0	0	2,381,149
1991	109,388	691,721	22,916	0	0	824,025
1992	159,222	765,992	25,649	24,229	0	975,092
1993	206,779	925,389	24,034	59,623	374,479	1,590,304
1994	142,628	397,584	17,083	58,413	381,159	996,867
1995	487,793	448,098	35,630	43,023	208,029	1,222,573

Source: TCDD

Cargo handling volume of Derince port has fluctuated due to economic stagnation, although the hinterland of port includes the biggest industrial area in Turkey which produces 25 % of GDP. In 1991 - 1994, share of general cargo were more than 78 %, in 1995 share was down to 54 % by the increment of dry bulk cargo volume and decrease of general cargo volume. Container handling volume is approximately 5,000 TEU in 1995. RO/RO cargo is also handled and handling volume in 1995 is about 210,000 tons. Number of calling vessels is 818 in 1995.

FIGURE 5.4.2 Cargo Handling Volume of Derince Port



5.4.5 Cargo Handling System

(1) General

The port is equipped with one (1) 35 ton yard crane, one (1) 25ton yard crane (fixed type), one (1) 10 ton yard crane six (6) 5ton yard crane and two (2) 3ton yard crane. In addition to the yard cranes, the port is equipped with one (1) 25 ton mobile crane, four (4) 10 ton mobile cranes and three (3) 5 ton mobile cranes. Container and heavy cargo is handled at No. 6 berth, where 35 ton yard crane and 25 ton fixed crane is located. Containers are loaded and unloaded by 35 ton yard crane and transferred by trailers to container storage yard. At the storage yard, containers are handled by 40 ton reach stacker. Total area of container storage yard is about 10,000 m², and storage capacity is about 2,000 TEU. Container handling efficiency is about 80 boxes per shift per gang.

(2) Grain Cargo

Grain is handled at No. 3 & 4 berth . There are two pneumatic unloaders and one pneumatic loader at this berth. Capacity of the pneumatic unloader and loader is 600 ton per hour each. There are two conveyors connecting from No. 3&4 berths to the TMO silo, which is located at the opposite bank from No. 2 berth. Capacity of the conveyor system is 1,200 ton per hour in total and capacity of silo is 96,000 tons. Clear height of this conveyor at No. 2 berth is 22 m from land surface.

(3) RO/RO Cargo

RO/RO cargo is also handled at RO/RO ramp at No. 6 berth. RO/RO cargo handling volume in 1995 is about 210,000 tons. There is a new RO/RO berth at the east side of No. 4 berth, which was completed in April 1996. This new berth is not yet used because official permission has not been obtained.

(4) Shift Hours

Port service is provided to vessels everyday of the week and 24 hours a day. Shift hours of the port are as follows.

First shift	8:00 - 16:30
Second Shift	16:30 - 00:30
Third Shift	00:30 - 08:00

5.4.6 Development Plan :

New RO/RO berth with 140 m in length, 12.5 m in depth, was completed at the east side of No.4 berth in April, 1996. Moreover, new container berth is scheduled to be constructed between ro-ro berth and No.6 berth and to be completed at the end of 1997. One gantry crane will be installed in the new container berth. Derince province also has a plan for dry port.

The plan to locate the new container terminal at the newly reclaimed land (Container handling capacity : 700,000 TEU, depth of berth : 15 m, length of berth : 700 m , four gantry crane) is being examined by DLH. Financing by BOT is possible.

5.4.7 Problems :

Since the port is located at the depth of the long and narrow Izmit Bay, and tidal difference is only about 30 cm, the circulation of sea water in the Bay is not fluent, furthermore, owing to drainage from industrial area on the north coast, water pollution has remarkably developed.

5.5 Port of Bandirma

5.5.1 Location

The port is on the south of the Sea of Marmara, to the Southeast of the Gulf of Bandirma, and approximately 65 miles to Istanbul. The Port is connected with state railways and highway network. The port is located in the west of Bandirma city.

Hinterland of the Port extends to cover the Marmara and Central Anatolian Regions. Nearest city is Bursa, which is located at 110 km from the port.

5.5.2 Port Facility

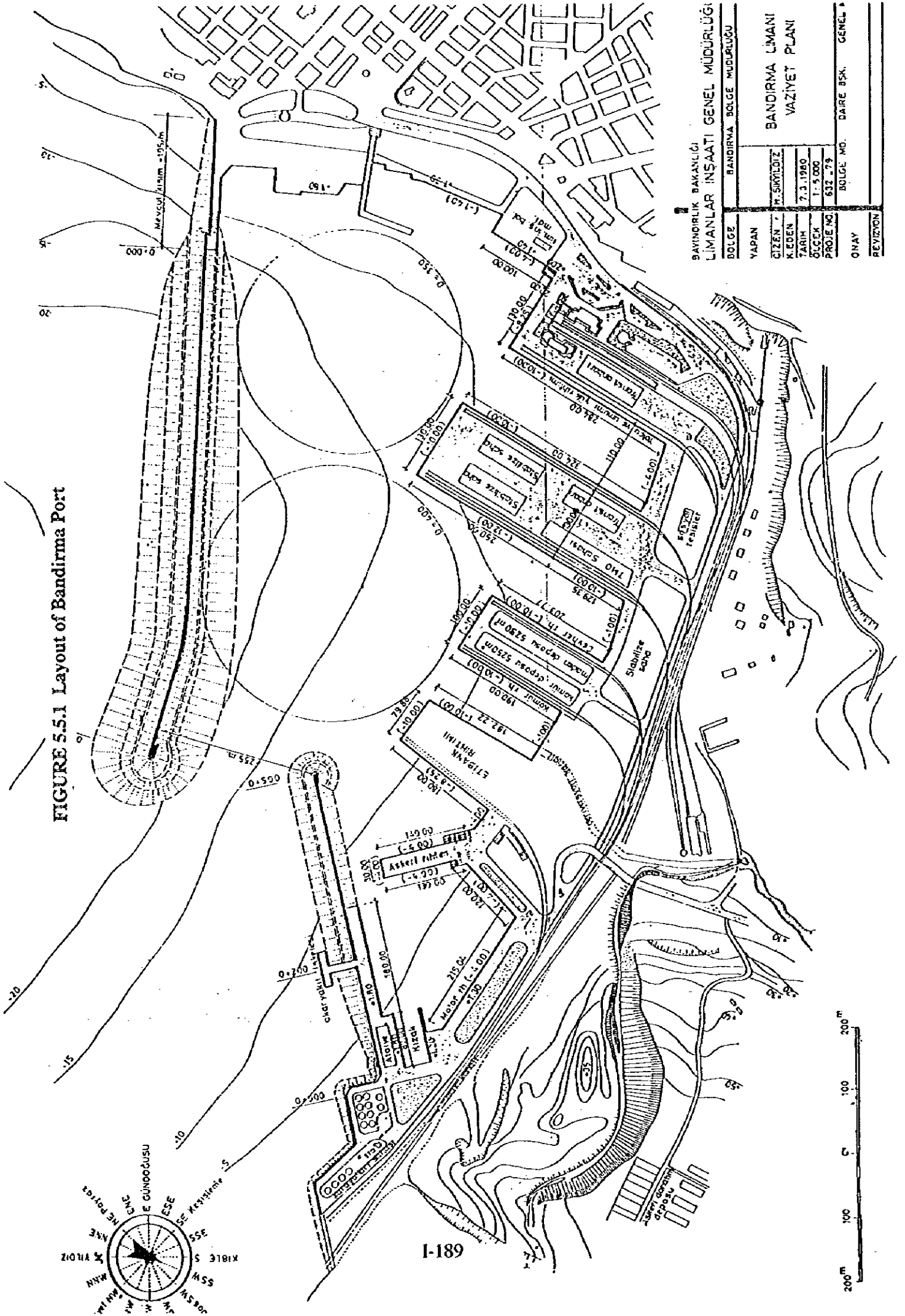
Bandirma port is surrounded by two breakwaters for protection against north winds. Main breakwater is 995 m in length, and secondary breakwater is 500 m in length. Distance between the two breakwaters at the mouth of the port is 225 m. Water surface area is approximately 150,000 m². Moreover, two maneuvering areas of 400 m and 350 m diameter are present in the protected area between the breakwaters. (See Figure 5.5.1)

TABLE 5.5.1 Port Facilities of Bandirma Port

Berth	Length(m)	Depth(m)	Remarks
No.1	130	8.25	Ferry
No.2,3	284	10	General Cargo
No.4,5	324	10	General Cargo / Grain
No.6	130	10	
No.7	250	12	Coal
No.8	129	10	Coal
No.9	203	10	Grain
No.10	100	10	Grain
No.11	190	10	Grain
No.12	182	10	Iron Ore / Chemical Product
No.13	80	10	
No.14	180	8.25	Sack
No.15/16/17/18	605	4	Domestic
No.19/20	287	4	Domestic

There is 79,845m² of open storage area and 7,000m² of covered storage area. The annual storage capacity of these areas is 1,916,280tons per year for the open storage and 112,000tons per year for closed storage. The port has a railway connection.

FIGURE 5.5.1 Layout of Bandirma Port



SAYINIRLIK BAKANLIĞI		LİMANLAR İNŞAATI GENEL MÜDÜRLÜĞÜ	
BÖLGE		BANDIRMA BÖLGE MÜDÜRLÜĞÜ	
YAPAN	Y. SIKYILDIZ	BANDIRMA LİMANI	
ÇİZEN	K. EDEN	VAZİYET PLANI	
TARİH	7.3.1980		
ÖLÇEK	1:5.000		
PROJE NO	632-79		
ONAY	BÖLGE MD.	DAİRE BSK.	GENEL M.
REVİZYON			

1-189

200m 100 0 100 200m

5.5.3 Cargo handling equipment

The existing cargo handling equipment at Bandirma port is shown in Table 5.5.2. Main cargoes handled in the port are dry bulk cargo, liquid bulk cargo, and general cargo. Containers are handled also, however the volume is small. As for service vessels, the port possesses three (3) tugboats, one (1) mooring boat, and one (1) pilot boat. Details are described in Table 5.5.3.

TABLE 5.5.2 List of Cargo Handling Equipment of Port of Bandirma

Type	Capacity	Built Year	Number of Equipment			Remarks
			Total	Available	Repair	
Yard Crane	25t	1983	1	1		
	10t	1983	4	4		
	4t	1983	10	10		
Mobile Crane	25t	1983	1	1		
	10t	1983	3	3		
Crawler Crane	27t	1977	3	3		
General Cargo Fork Lift	5t	1985	6	6		
	3t	1986	8	8		
Loader		1982	3	3		
Tractor		1981	5	5		
Pneumatic	50t/h	1984	4	4		

TABLE 5.5.3 List of Port Service Boat of Port of Bandirma

Type	Built Year	Main Dimensions (m)			Main Engine	Speed (kt)	Remarks
		L	B	d			
Tugboat	1981	26.15	6.7	2.6	1025	12	
Tugboat	1982	26.15	6.7	2.6	1025	12	
Tugboat	1983	26.15	6.7	2.6	1025	12	
Pilot Boat	-	-	-	-	-	-	
Mooring Boat	-	-	-	-	-	-	

5.5.4 Cargo

Cargo volume handled at the port in 1995 is 1,230,000 ton of loaded cargo and 1,340,000 ton of unloaded cargo. Port cargo handling volume from 1986 to 1995 is shown in Table 5.5.4. and Figure 5.5.2

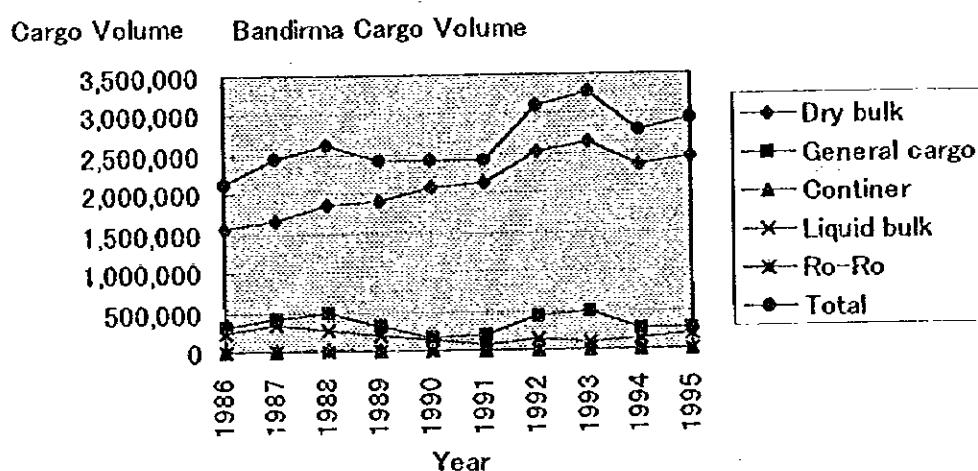
TABLE 5.5.4 Bandirma Port Cargo Handling Volume

(Unit : ton)

Year	Solid Bulk	General Cargo	Container	Liquid Bulk	RO/RO	Total
1986	1,571,383	306,524	5,511	249,517	0	2,132,935
1987	1,670,390	420,850	11,576	337,482	0	2,440,298
1988	1,852,918	485,221	12,458	268,014	0	2,618,611
1989	1,920,685	312,487	7,391	192,685	0	2,433,248
1990	2,077,802	175,279	8,480	155,054	0	2,416,615
1991	2,133,192	200,841	10,684	78,485	0	2,423,202
1992	2,510,961	440,860	6,202	150,099	0	3,108,122
1993	2,654,438	497,269	10,709	104,343	3,199	3,269,958
1994	2,356,342	272,412	10,990	138,611	0	2,778,355
1995	2,439,473	275,698	5,923	206,766	581	2,928,441

Source: TCDD

FIGURE 5.5.2 Cargo Handling Volume of Bandirma Port



Main type of cargo is dry bulk, such as coal, which has some 80 % share of the total. Handling volume of dry bulk has been stagnated since 1993. General cargo handling volume has varied within 175,000 - 500,000 tons. Main commodities are wheat, corn, soya, coal, boron, tomato paste, and general goods. Volume of general cargo and container cargo is not large. Number of calling vessels is 227 in 1995.

5.5.5 Cargo handling system

The port is equipped with one (1) 25 ton yard crane (fixed type), four (4) 10 ton yard crane and ten (10) 5 ton yard crane. Grain is handled at No. 4,5, 9 10 and 11 berths. There are two methods of grain unloading. One method is to use yard cranes and another method is to

use pneumatic unloaders at No. 11 berth. Unloaded cargoes are loaded onto truck through portable hopper or transferred to the grain silo through conveyor system. Efficiency of grain cargo handling using crane and grab is about 750 to 900 tons per shift. TMO is now installing new pneumatic unloaders and conveyor system connected to the storage silo. The new facility will be completed at the end of November, 1996. The capacity of these new unloaders is 450 tons per hour in total. The capacity of TMO's silo is 20,000 tons and they are constructing a new silo of 30,000 ton capacity.

Coal is handled at No. 7 and 8 berths using 5 ton and 10 ton cranes. Unloaded coal is transferred onto trucks through portable hopper. Efficiency of coal handling is about 600 to 700 tons per crane per shift. Clinker is also handled at the same berth and the handling efficiency is about 14,000 ton per day (by three shifts).

Containers are handled by general purpose fixed shore crane of 25 ton capacity, and/or ships gear, however there is no specific container handling equipment. Number of containers handled in the port of Bandirma is small.

Bandirma port has plans to purchase four electric mobile cranes in near future.

Port service is provided to vessels everyday of the week and 24 hours a day. Shift hours of the port are as follows.

First shift	8:00 - 16:30
Second Shift	16:30 - 00:30
Third Shift	00:30 - 08:00

5.5.6 Development Plan :

In order to deal with container cargo, they have an idea to extend container yards on a railway marshaling yard inside the port.

5.5.7 Problems

Since residences are close to the port area, countermeasure against dust of coal is necessary.

5.6 Port of Tekirdag

5.6.1 Location

The port, operated by TDI, is located in Tekirdag City in western Thrace, on the northwestern coast of the Marmara Sea. It is also located by Istanbul-Canakkale highway and has road connections with settlements in Thrace section.

5.6.2 Port facility

Maximum depth of the Port is 10 m. The facilities of the Port are shown in Table 5.6.1 as follows. (See Figure 5.6.1, 5.6.2, 5.6.3)

TABLE 5.6.1 Port Facilities of Tekirdag Port

Berth	Length(m)	Depth(m)	Remarks
No. 1(Old-Pier)	170	5.5 ~ 10	Passenger
No. 2	35	5.5	Wine-product
No. 3(New-Pier)	770	10	General-Cargo
No. 4(TMO)	925	4 ~ 8	Grain, Oil

Total open storage yard at New-Piers is 17,000m², and covered storage area is about 495 m². East wind is dominant at the Port and sand drift is from northeast to southwest. Dredged materials are dumped into water 5 miles off shore.

5.6.3 Cargo handling equipment

The existing cargo handling equipment at Tekirdag port is shown in Table 5.6.2, and Table 5.6.3. Main cargoes handled in the port are dry bulk cargo, liquid bulk cargo, and general cargo. Container is not yet handled in this port. Existing cargo handling capacity of the port is about 1 million tons per year for dry and liquid bulk cargo and 1 million tons per year for general cargo and 600,000 tons for containers if it is handled in this port. There is a separate pier of TMO for the handling of grain and fuel oil, capacity of which is about 1.2 million tons per year. As for the service vessels, the port possesses two (2) tugboats and two (2) mooring boats. Details are described in Table 5.6.4.

TABLE 5.6.2 List of Cargo Handling Equipment of Port of Tekirdag

Type	Capacity	Built Year	Number of Equipment			Remarks
			Total	Available	Repair	
Shore Crane	5t	1952	1	1		
	3t	1952	2	2		

FIGURE 5.6.1 Layout of Tekirdag Port

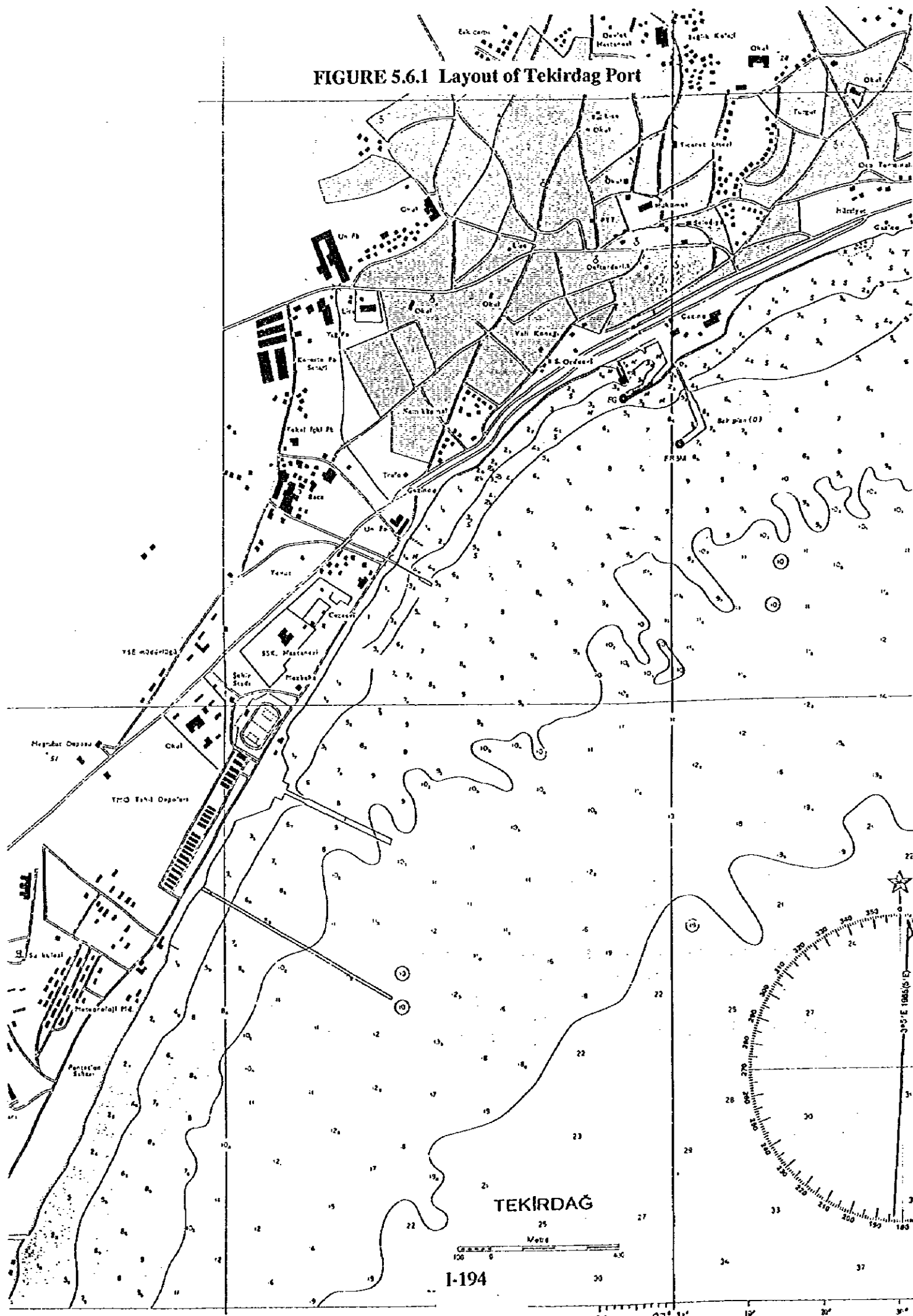


FIGURE 5.6.2 Layout of Piers in Tekirdag Port

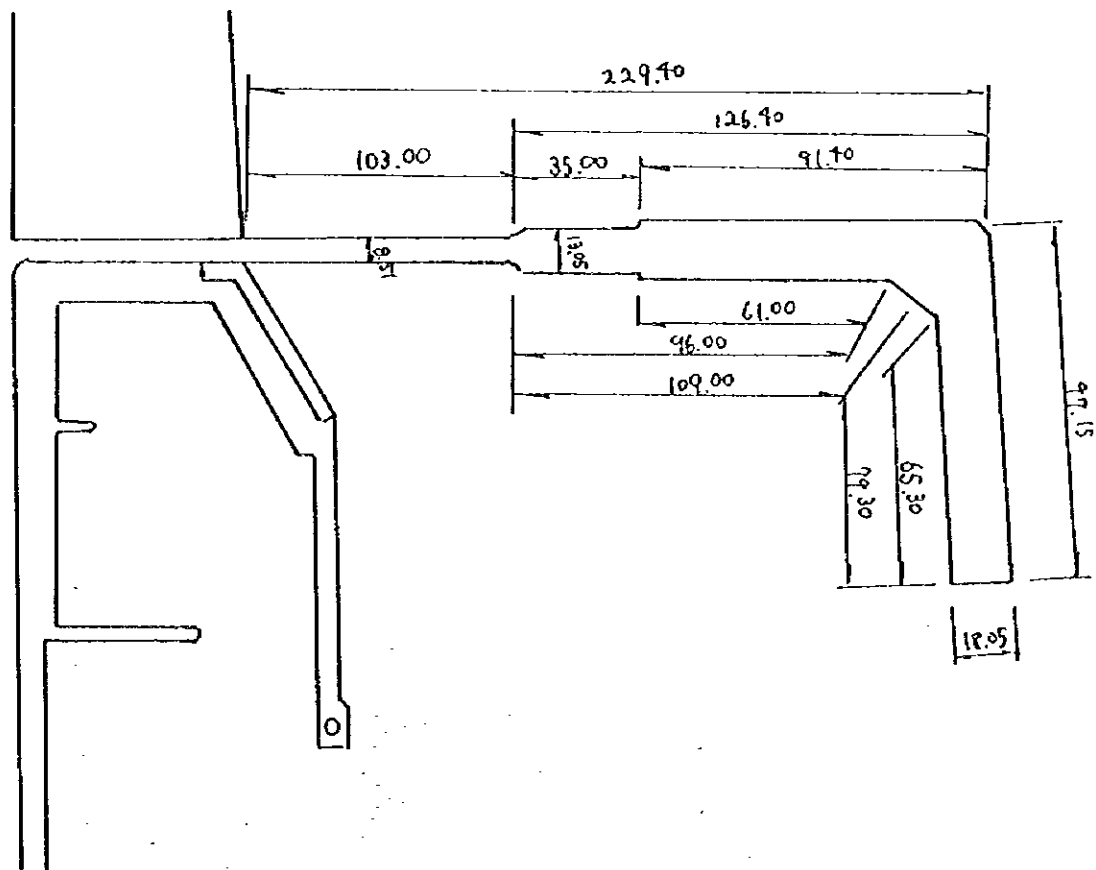
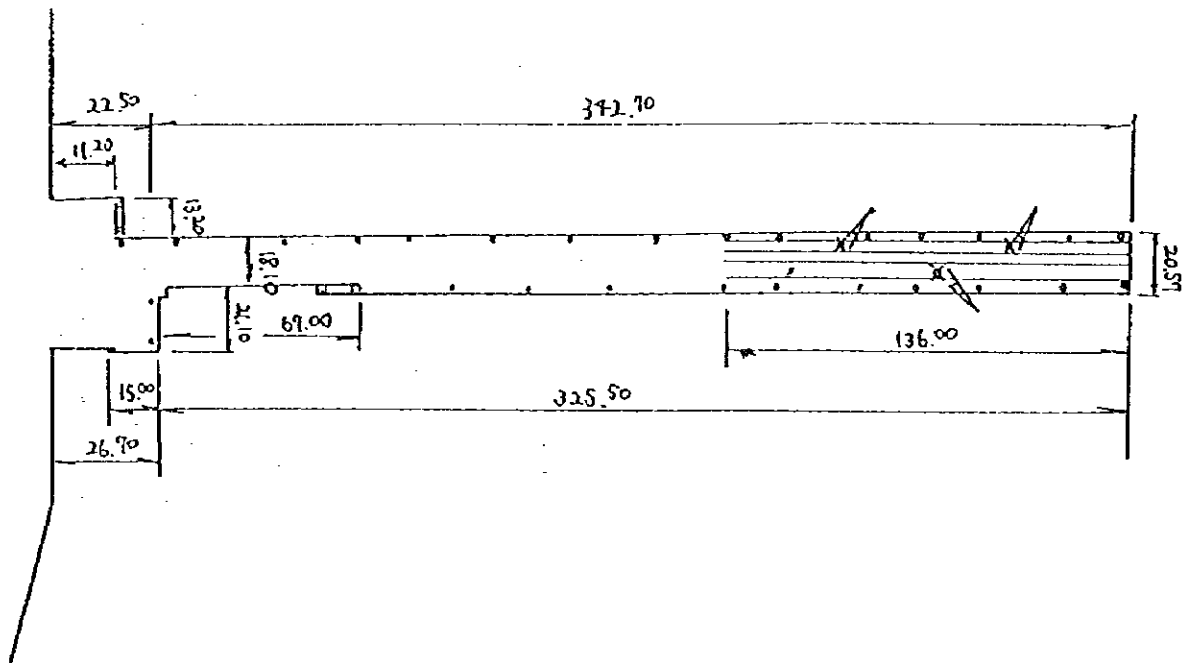


FIGURE 5.6.3 Future Layout of Tekirdag Port

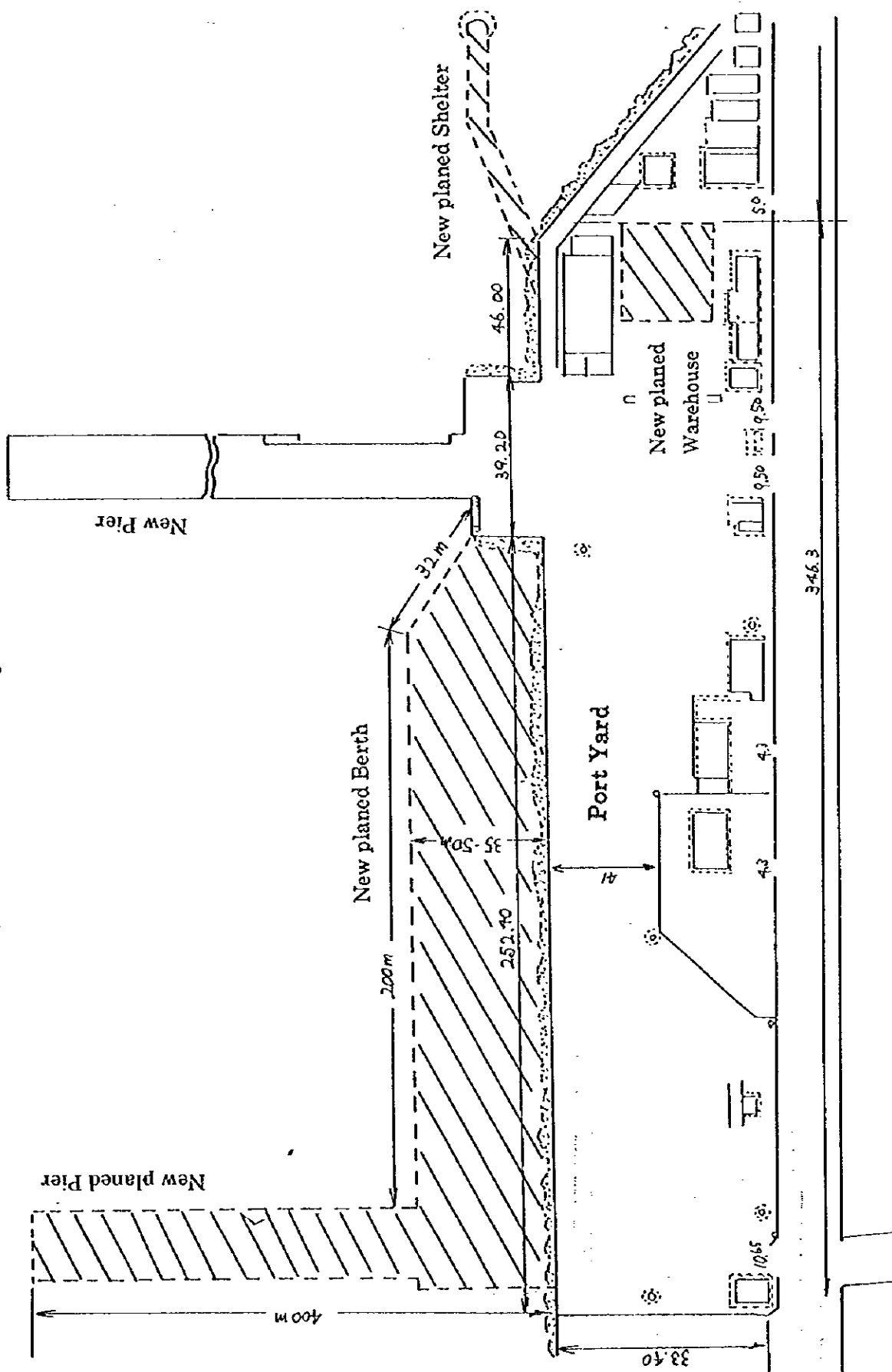


TABLE 5.6.3 List of Contractor's Equipment of Port of Tekirdag

Type	Capacity	Built Year	Number of Equipment			Remarks
			Total	Available	Repair	
Mobile Crane	35t		1	1		
	20t		1	1		
	10t		1	1		
	5t		1	1		
Fork Lift	10t		1	1		
	6t		2	2		
	3t		2	2		
	1.5t		2	2		
Tractor			3	3		
Tug Master	10t		6	6		
Loader			2			

TABLE 5.6.4 List of Port Service Boat of Port of Tekirdag

Type	Built Year	Main Dimensions (m)			Main Engine	Speed (kt)	Bollard Pull (t)
		L	B	d			
Tugboat	1983	26.15	5.70	3.45	1150 Hp	10	16
Tugboat	1991	26.00	8.00	1.95	540 Hp	8	10
Mooring Boat	1976	3.92	3.31	1.31	218 Hp	8	
Mooring Boat	1989	10.35	3.30	1.63	180 Hp	8	

Cargo handling equipment belonging to the port is three yard cranes only, two of them are 3 ton capacity and one is 5 ton capacity. Other equipment belongs to the private cargo handling contractor.

5.6.4 Cargo

Annual cargo handling volume at the Tekirdag port is 1.4 million tons in 1995. Port cargo handling volume from 1991 to 1995 is shown in Table 5.6.5. and Figure 5.6.4

TABLE 5.6.5 Tekirdag Port Cargo Handling Volume in 1991 - 1995

Domestic Trading

(Unit : ton)

year	Load				Unload				TOTAL
	Dry Bulk	Liquid Bulk	General Cargo	Total	Dry Bulk	Liquid Bulk	General Cargo	Total	
1991	86,494	2,791	943	90,228	297,299	36,691	0	333,990	424,218
1992	59,036	902	0	59,938	607,514	26,389	0	633,903	693,841
1993	19,131	30,858	92	50,081	416,910	25,117	0	442,027	492,108
1994	6,700	1,263	1,380	9,343	276,863	27,637	0	304,500	313,843
1995	23,403	4,109	615	28,127	158,307	33,304	0	191,611	219,738

Foreign Trading

(Unit : ton)

year	Export				Import				TOTAL
	Dry Bulk	Liquid Bulk	General Cargo	Total	Dry Bulk	Liquid Bulk	General Cargo	Total	
1991	627,986	0	447,819	1,075,805	224,509	195,577	145,415	565,501	1,641,306
1992	980,370	0	284,592	1,264,962	69,389	153,422	185,885	408,696	1,673,658
1993	398,921	0	294,206	693,127	165,031	165,474	288,728	619,233	1,312,360
1994	631,069	1,368	290,663	923,100	90,850	142,015	110,537	343,402	1,266,502
1995	200,195	900	252,380	453,475	327,604	150,853	245,077	723,534	1,177,009

Source: Tekirdag port Authority

Foreign trade volume and domestic trade volume are 1.2 million tons and 0.2 million tons respectively. Share of dry bulk cargo is 50 % of total cargo volume. Domestic trade volume has been decreasing due to the decline in dry bulk handling volume. Foreign trading volume has been decreasing since 1992. In 1995 import cargo volume exceeded export cargo volume. Main commodities are wheat, flour, sunflower seed, iron ore. Number of calling vessels is 777 in 1995.

5.6.5 Cargo handling system

Dry bulk cargo is handled by mobile crane and bucket, and loaded directly to truck through a portable hopper. General cargo is handled by ship gear from truck to the ship directly. Liquid bulk is unloaded from the tanker to tank lorry through portable manifold. Caustic soda is unloaded by the exclusive pneumatic unloader. TMO operates the grain terminal, which contains four portable pneumatic unloaders of 50 ton per hour capacity. There is a grain silo of 70,000 ton capacity, connected from the dolphin by conveyor system.

All cargo handling work is done by the private contractor, which is selected every 5 years by tender. Port authority's role in this port is vessel planning, management, water supply, solid waste disposal, electric power supply, and pilot service. Working hours are from 8:00 to 24:00 by two shifts. Shift hours of the port are as follows.

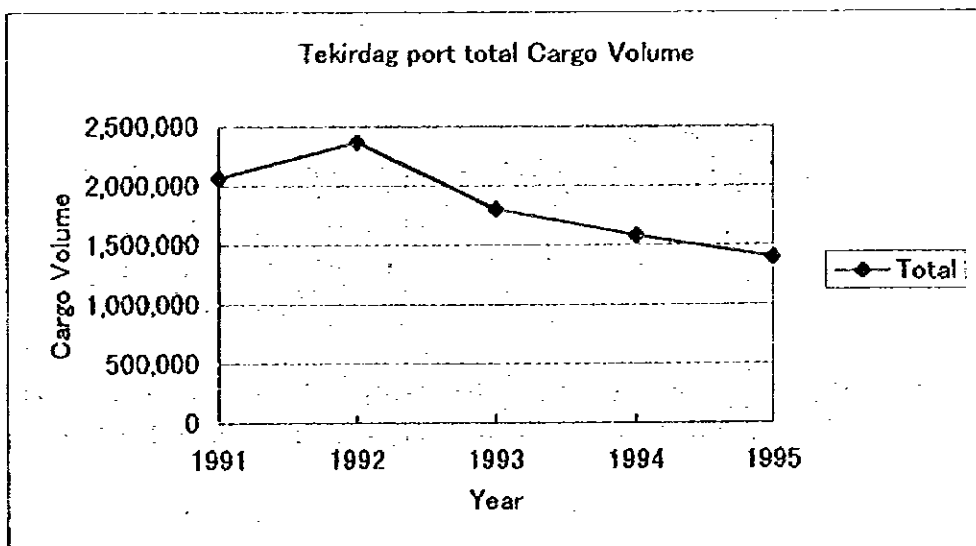
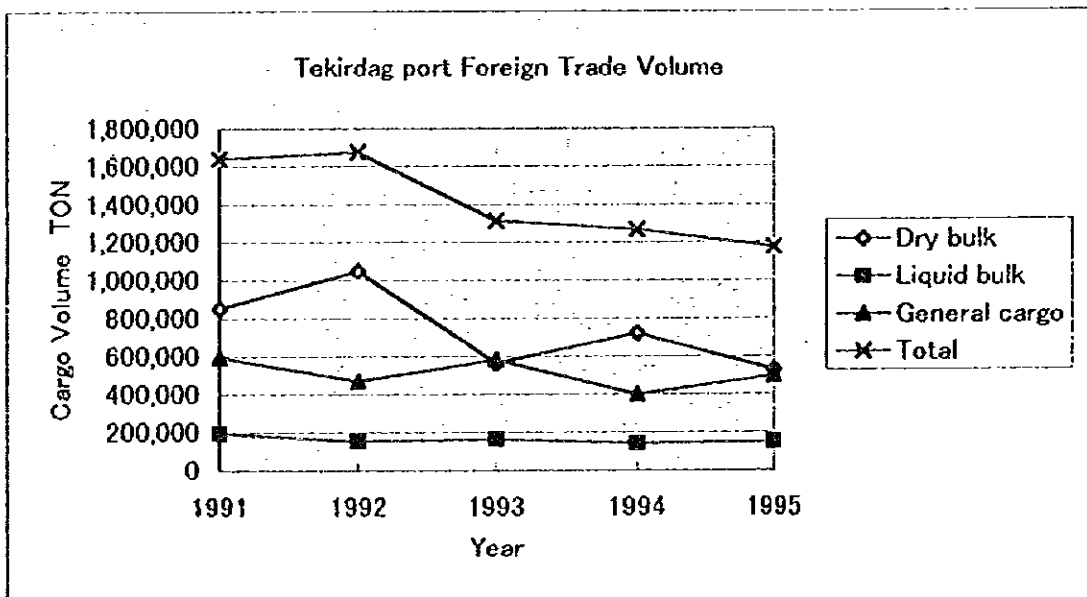
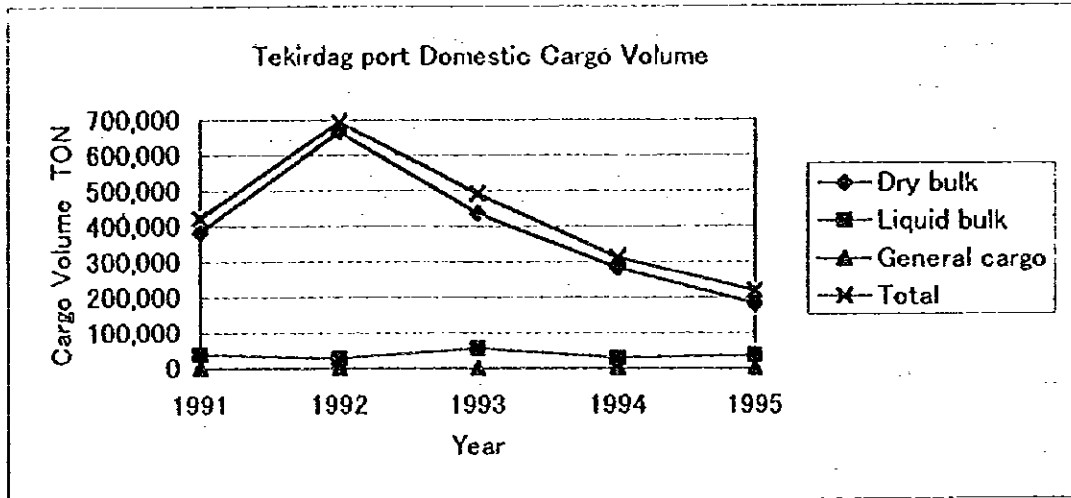
First shift 8:00 - 17:00

Second Shift 17:00 - 00:00

5.6.6 Development plan

New berth with a pier 400 m in length, 15 m in depth and a quay 200m in length, is planned on the east side of the New Pier to serve increasing traffic in future. Reclaimed land with area of about 7,500 m² is also planned. (See Figure 4-2- New Berth Plan of Tekirdag Port)

FIGURE 5.6.4 Cargo Handling Volume of Tekirdag Port



5.6.7 Problems

Problems of the port related to the port planning are as follows ;

- ① Since road running along the coastline is located between the port and city center, the increase in traffic and noise pollution caused by port expansion seems to be unacceptable.
- ② A number of vessels are waiting at basin area in front of the port to get a custom clearance.

5.7 Port of Gemlik

5.7.1 Location

The Gemport, which is a part of the Port of Gemlik, is located on the southeastern coast of the Bay of Gemlik, on the south- east part of the Sea of Marmara. It is the first private port for container transportation which commenced operation in 1993. The port is located by Izmit-Bursa highway, connected to the E80. On the east side of the Gemport, there is a BP pier for unloading and on the west side of the port, fertilizer factory and unloading pier for materials are located.

Hinterland of the port is the area around the Izmit bay, Bursa and its surroundings and the industrial estate behind the port. Since the port sometimes functions as an alternative to Haydarpasa or Derince port, it includes both hinterlands.

5.7.2 Port Facility

The port's maximum water depth is 12 meter and holds berths with total length of 426.5 m. Maximum Vessel for the port is 40,000 DWT . The berths of the port are as follows; (See Figure 5.7.1)

TABLE 5.7.1 Port Facilities of Gemport

Berth	Length(m)	Depth(m)	Remarks
No.1	185.5	12	General cargo/Container
No.2	141	9 - 12	General cargo/Container
No.3	100	7	General cargo/Container

The open storage area is 98,000m² of which capacity of the container is 3,500 TEU. There is one transit-shed of 2,400m² There is a RO/RO ramp of 20 m width on height 1.40 m.

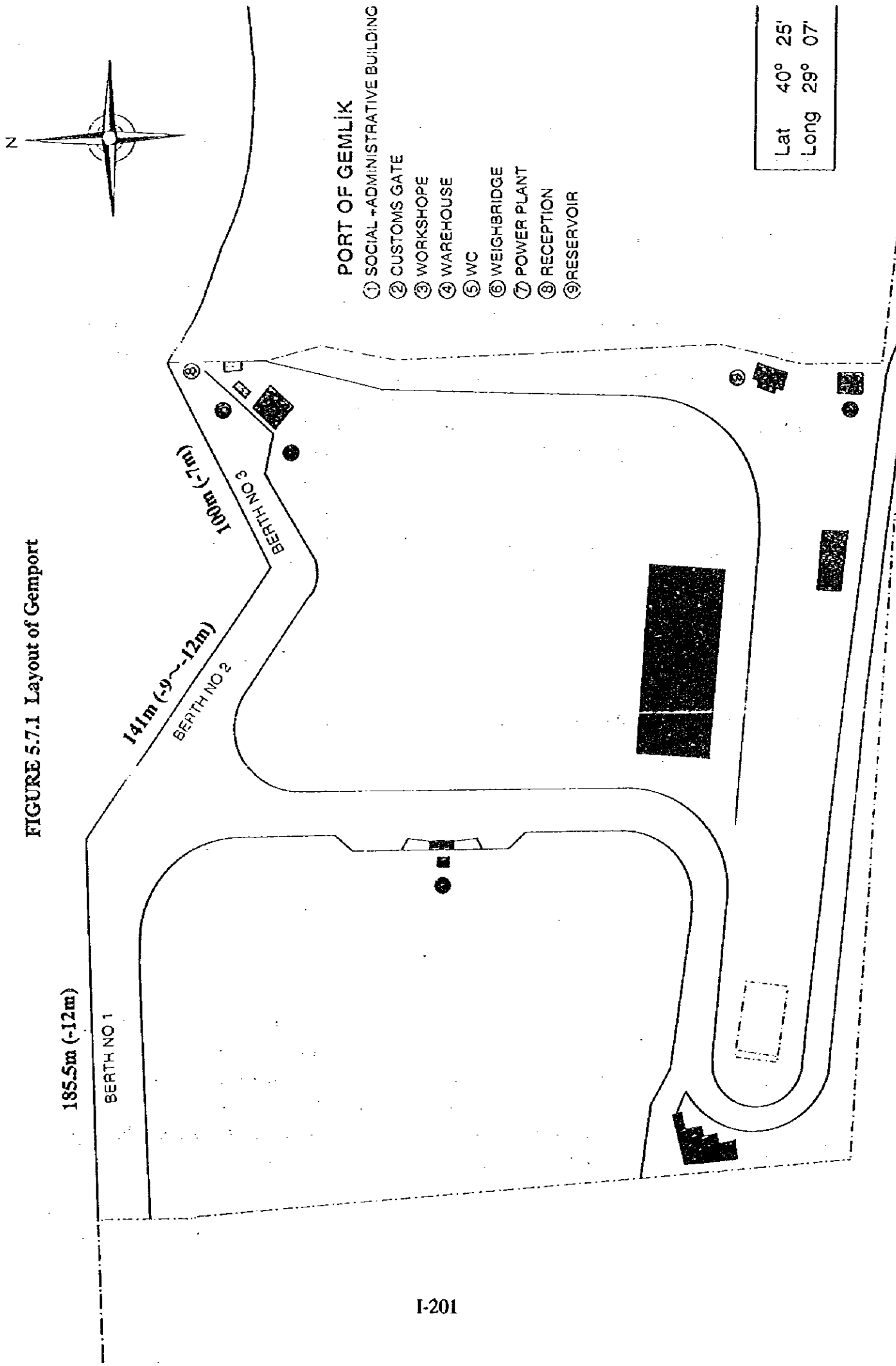


FIGURE 5.7.1 Layout of Gemport

The capacity of the port is 1,860,000 tons/year for general cargo or 40,000 unit/year for container.

5.7.3 Cargo Handling Equipment

The existing cargo handling equipment at Gemiport is shown in Table 5.7.2. Main cargoes handled in the port are container, dry bulk cargo, general cargo and export cars. Container is the main cargo of this port. As for service vessels, the port possesses two (2) tugboats and one (1) service boat. Details are described in Table 5.7.3.

TABLE 5.7.2 List of Cargo Handling Equipment of Port of Gemlik

Type	Capacity	Built Year	Number of Equipment			Remarks
			Total	Available	Repair	
Mobile Crane	40 ton	1992	1	1		
	40 ton	1995	1	1		
Stacking Machine	40 ton	1992	1	1		
	40 ton	1995	1	1		
	35 ton	1995	1	1		
Loader	20 ton	1995	2	2		
Tractor	300 hp	1996	3	3		

TABLE 5.7.3 List of Port Service Boat of Port of Gemlik

Type	Built Year	Main Dimensions (m)			Main Engine	Speed (kt)	Bollard Pull (t)
		L	B	d			
Tugboat	1982	24	6	3	1500 Hp	12	24
Tugboat	1982	24	6	3	1500 Hp	12	24
Pilot Boat	1996	6.5	3	1.5	165 Hp	13	-

5.7.4 Cargo

(1) Gempport

Cargo handling volume in 1993 - 1995 is shown in Table 5.7.4. The Gempport handles container, dry bulk, general cargo except for liquid bulk. Container handling volume has been increasing since the port opened. Annual handling volume of container is 35,000 TEU in 1995 (7,791 TEU in 1993). Main commodities are timber, coal, iron ore, automobile, general cargo. Units of automobiles traded in 1995 amounted to 27,000. Break bulk cargo handling ratio is 60 % and others are dry bulk cargo .

TABLE 5.7.4 Gemport Cargo Handling Volume in 1993 - 1995

Year	Container (TEU)	Other Cargo (ton)
1993	7,791	841,992
1994	17,800	756,974
1995	35,000	807,823

Source: Gemport

(2) Gemlik municipality port

Gemlik municipality port commenced operation in 1965. Annual cargo handling volume is 260,000 tons in 1995. Eighty percent of import is clay and paper raw material and 20 % is chemical raw material for textile factories. The length of pier is 165 m with 9.5 m width and 13 m draught. Number of calling vessels is 1,545 in 1995.

5.7.5 Cargo Handling System

There are two mobile cranes of 40 ton capacity for container and grab handling and three stacking machines for container stacking, two of them are 40 ton capacity and one is 35 ton capacity. There is RO/RO ramp with width of 20 m, height 1.40 m. There are 72 plugs for reefer container, which are mainly used for DOLE reefer containers of banana import. In addition, there is one inland yard 1.5 km away. Area of this inland yard is 12,000m², and storage capacity is 4,000 TEU. This inland yard stores mainly empty container.

Containers are loaded and unloaded by 40ton mobile crane and transferred by trailers to container storage yard. At the storage yard, containers are handled by 40 ton and 35 ton container stacking machines. Containers storage is usually three low in one bay for import and export cargo. Stacking height of container is three tiers. Container handling efficiency is about 20 to 30 boxes per hour. Size of calling container vessel is 450 to 500 TEU class feeder vessel. Maximum size of container vessel is 1000TEU class vessel. Dwelling time of container is 10 days for reefer container, and 20 days for others on average. Cargo handling efficiency of bulk cargo is about 4,000 tons per day, and 100 cars per day for car export.

There is a customs office in the port area, and customs is performed smoothly.

Worker formation and shift hour is as follows. The port provides 24 hours service, however normal working hour are from 8:00 to 24:00 by two shifts.

TABLE 5.7.5 Shift Hours

	Worker formation	Shift Hour
General Cargo and Log Vessel	2gangs per ship 6 workers per gang	3 shift per day First shift 08:00 - 16:00 Second Shift 16:00 - 00:00 (Third Shift 00:00 - 08:00, if required)
Bulk Cargo	6 gangs per ship (max) 3 workers per gang	
Container	2 gangs per ship 4workers, 1 mobile crane, 4 trailers per gang	

Source: Gempport

5.7.6 Development Plan :

In order to increase the capacity, Gempport authority has a plan to extend No.3 berth 110 m further as phase I, and to install a floating wharf with 25 m in width (5,000 D/W class, minimum 60~70m in length) between No.1 berth and No.2 berth. Moreover, installation of gantry crane will be introduced for case when a handling volume exceeds 60,000 TEU.

5.7.7 Problems :

It is impossible for Gempport to expand the quay and yard. Rehabilitation of the existing facilities and increasing cargo handling efficiency is the only way to increase capacity.

5.8 Other Ports in the North Side of Marmara Sea

5.8.1 Port of Istanbul

Port of Istanbul is situated on the western bank of the Bosphorus separating the Continents of Europe and Asia. There are many historical monument along the water front and buildings and houses are densely located behind the port

Total length of quay is 1,120 meters and its depth is 6.5~10. These facilities are used for passenger traffic and ferries.

5.8.2 Port of Ambarli

(1)Location

The port, operated by private complex (Ambarli Port complex), is located in western Istanbul. The port construction started in 1987 and distribution of bulky cargo to Istanbul has been in operation since 1994. Construction site has been decided with consideration that the port should be near to Istanbul which is the main destination of cargo, (Tekirdag is far from Istanbul), and that the hinterland of the port should not overlap with other adjacent ports.

(2)Port Facility

The port facilities consist of two breakwaters, nine piers/quays and one platform. There are seven piers for large vessels, over 5,000D/W. (See Figure 5.8.1)

TABLE 5.8.1 Port Facilities of Ambarli Port

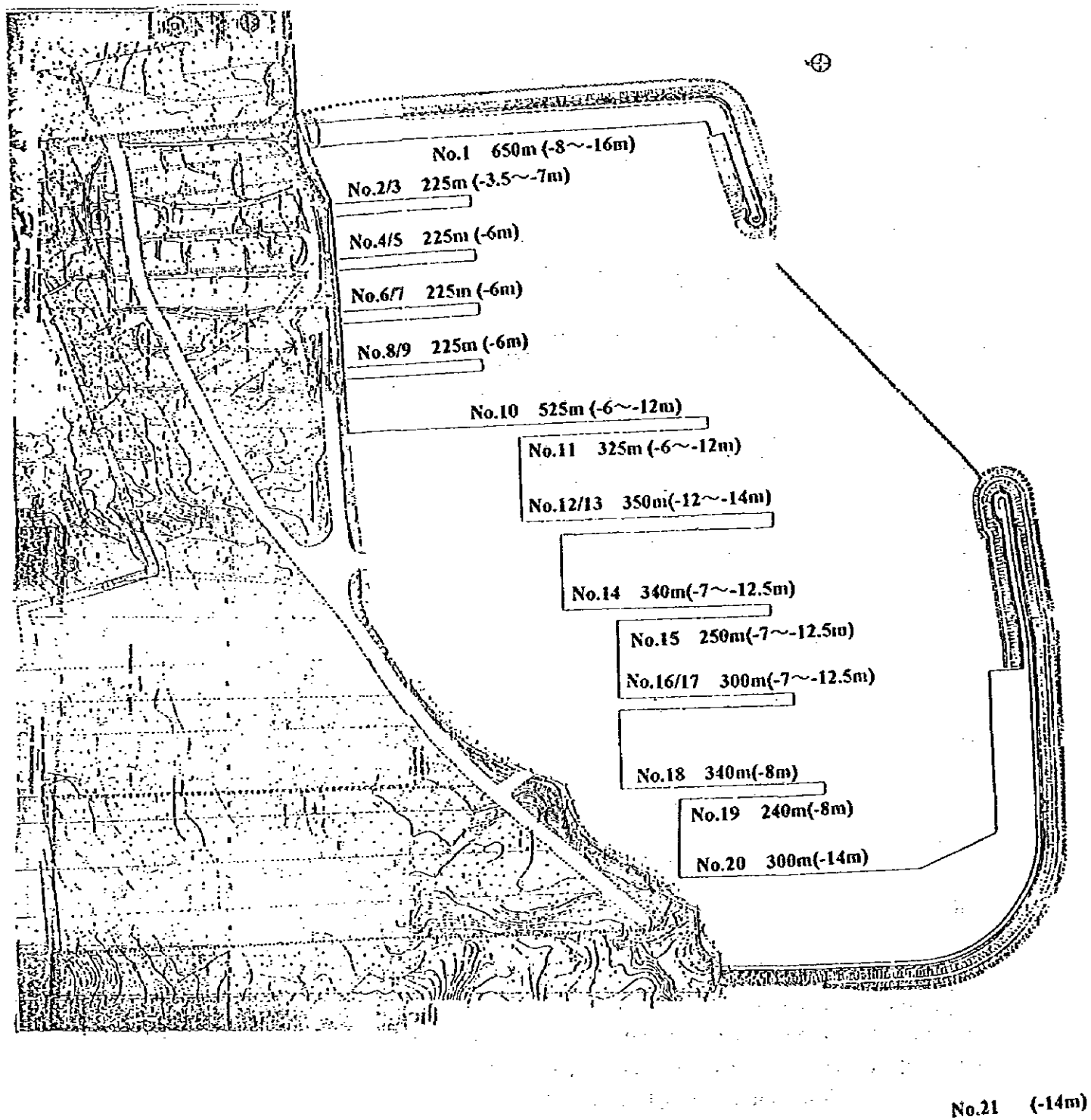
Berth	Length(m)	Depth(m)	Remarks
No.1	650	8.0~16.0	General cargo
No.2,3	2×225	3.5~7.0	Sand
No.4,5	2×225	6.0	Sand
No.6,7	2×225	6.0	Sand
No.8,9	2×225	6.0	Sand
No.10,11	525,325	6.0~12.0	Cement
No.12,13	2×350	12.0~14.0	General cargo
No.14,15	340,250	7.0~12.5	General cargo
No.16,17	2×300	7.0~12.5	General cargo
No.18,19	340,240	8.0	Cement
No.20	300	14.0	General cargo, Ro/Ro
No.21	(Platform)	14	Oil

The works for leveling and pavement of the storage-yard at the base of piers, extension of breakwater and pavement of access road are under construction or scheduled.

(3)Cargo

The port has been planned and newly constructed by private sector to solve the traffic congestion and environmental issues owing to bulk cargo handled in Istanbul port. Therefore, the cargo handled in this port belongs to the Complex and 70 % of the cargo are bulk, such as sand, cement, clinker, coal, scrap iron, which are distributed to Istanbul. The port has the role of distribution or supplement center of Istanbul. Export and import cargo are partly handled. The complex has an intention to handle cargo of other customers, such as

FIGURE 5.8.1 Layout of Ambarli Port



containers. The volume of cargo handled at the port is shown in Table 5.8.2. Cargo handling capacity of the port is estimated at 15,000,000 tons/year.

TABLE 5.8.2 Ambarli Port Cargo Handling Volume in 1994 - 1996

year	Kumport .S.	S.S. Istanbul koop	Canakkale Cement	Anadolu Cement	Mardas A.S.	TOTAL
1994	227,000	4,800,000	500,000	12,438		5,539,438
1995	650,000	4,360,000	785,000	140,171	835,100	6,770,271
1996	255,373	1,360,000	278,845	48,686	482,200	2,425,104

Source: ALTUS Note: as of May, 1996

Cargo volume shall steadily increase as Ambarli is gateway port of dry bulk for Istanbul.

(4)Problems

Problems of the port are as follows ;

- ① Storage or stock yards for bulk cargo in the port are narrow compared with number of piers,
- ② Cargo handling equipment is not sufficient. There is handling equipment only for cement on the piers,
- ③ There is not any extension area , two breakwaters are located at both sides of the port and hill at behind.,
- ④ The length of water channel is short for stopping distance of vessels.

5.8.3 Port of Silivri

(1)Location

It is located on northeastern coast of the Marmara Sea and 1,000m from the E5 motor-way, approximately 70 km to Istanbul.

The population of Silivri Municipality is 45,000 and boosted up to some 300,000 in summer. Most of the tourists are from Turkey. The length of coastal line is about 18 km and a lot of second houses stand close together along the shore. The main products of the Municipality are Sasa's plastic water bottles and plastic bags, sunflower oil, brick, sand, feed for livestock.

(2)Port facility &cargo

There is a pier which is 220 m in length, 5.5 m in depth. The pier is sheltered by north breakwater, 560 m in length, and south breakwater, 200 m in length, at both sides.
(See Figure 5.8.2 Layout of Silivri Port)

(3) Cargo

The main cargo handled at present are domestic cargo, such as coal, sunflower oil, sand, and brick. The port is operated by the Municipality.

(3) Development plan

The Municipality has a future policy to give priority to the development of tourism industry, and not to the development of port handling cargo. The coastal development plan of the Municipality is to reclaim an artificial beach about 1.2 km in length, at the front of cliff, on the east of existing port and to construct a marina, having a capacity of 380 yachts at the edge. The construction of the marina is conducted by D.L.H., M.O.T. and B.O.T. financing is considered.

(4) Problems

The port is close to the center of the town and traffic from the port cause road congestion and noise problems. Promenade, restaurants, rest house are located just behind the port. The Municipality does not intend to aggravate the present environmental situation by port extension.

5.8.4 Port of Marmara Eregli

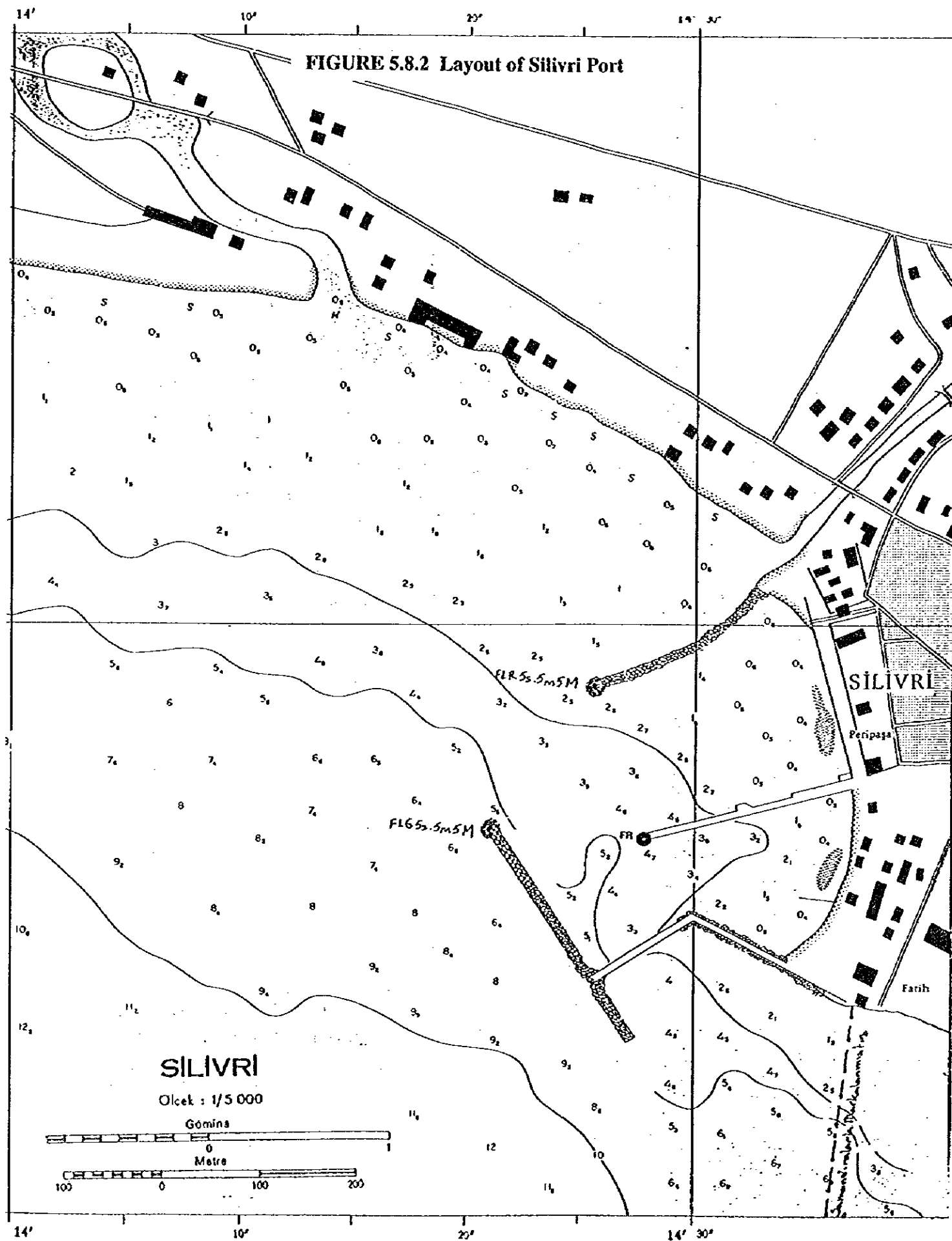
(1) Location

The port is located on a bay between Cape Eregli and Cape Adar on the north coast of the Marmara Sea. It is near Istanbul-Tekirdag highway, and connected to E5 at 1,000m distance.

The Eregli Municipality has a population of 8,000, and 250,000 in the summer season owing to tourists. Main industries are agriculture (80 % of the municipality's production) and fishery (10 %) and secondary industries are leather, textile industry. Most of the industries consist of minor enterprises. Three textile factories are under construction.

(2) Port facility

FIGURE 5.8.2 Layout of Silivri Port



The port facilities are operated by the Municipality. There are three jetty/piers, a pier 200 m in length, 4 m in depth for unloading bitumen which is a construction material, a jetty 160 m in length for fishing boat, a pier 120 m length, 3~4.8 m depth belonging to Army Head-quarters which is used for unloading oil products and working vessel berthing. (See Figure 5.8.3 Layout of Marmara Ereğli Port)

In addition, LNG base which has three LNG tanks 255,000m³ in capacity, and unloading dolphin 380 m in length, 16 m in depth, is located to the north of the port. Annual unloading capacity of the base is 2 billion m³. In 1994, 418 million m³ LNG was imported.

At the south of the port, a new private jetty, 180 m in length, 20 m in width, 26 m at point in depth is under construction. The work commenced in January 1995, and is scheduled to be completed in July 1996. Total cost including cargo handling equipment is 10 billion US\$ and 70 % of total cost was already used for construction. Steel has been exported to India on a trial basis. At present, no cargo handling equipment is installed on a pier. Unloading and loading are conducted by mobile crane or ship gear. Dry bulk cargo (sunflower seed, coal) is unloaded by mobile crane (or ship gear) and bucket through portable hopper directly to truck. Ten percent of the capital of the private port authority is financed by the Municipality.

According to the port authority, the criteria used in choosing the location of new port are as follows ;

- ① Tekirdag port does not have capacity for a vessel of 25,000 D/W, which is necessary for the private sector, it can accommodate vessel only up to 15,000 D/W ,10 m in draft.
- ② Port of Tekirdag is always congested with vessels.
- ③ The head office of private port authority is located near the port, 30 km inland.

The port is situated 30 km from Tekirdag, 100 km from Ambarli. Their recognition on hinterland is that the hinterlands of both ports do not overlap with each other. Their projection of cargo in future is 400,000 t export of steel and import of wheat, coal and sunflower seed.

(3)Development plan

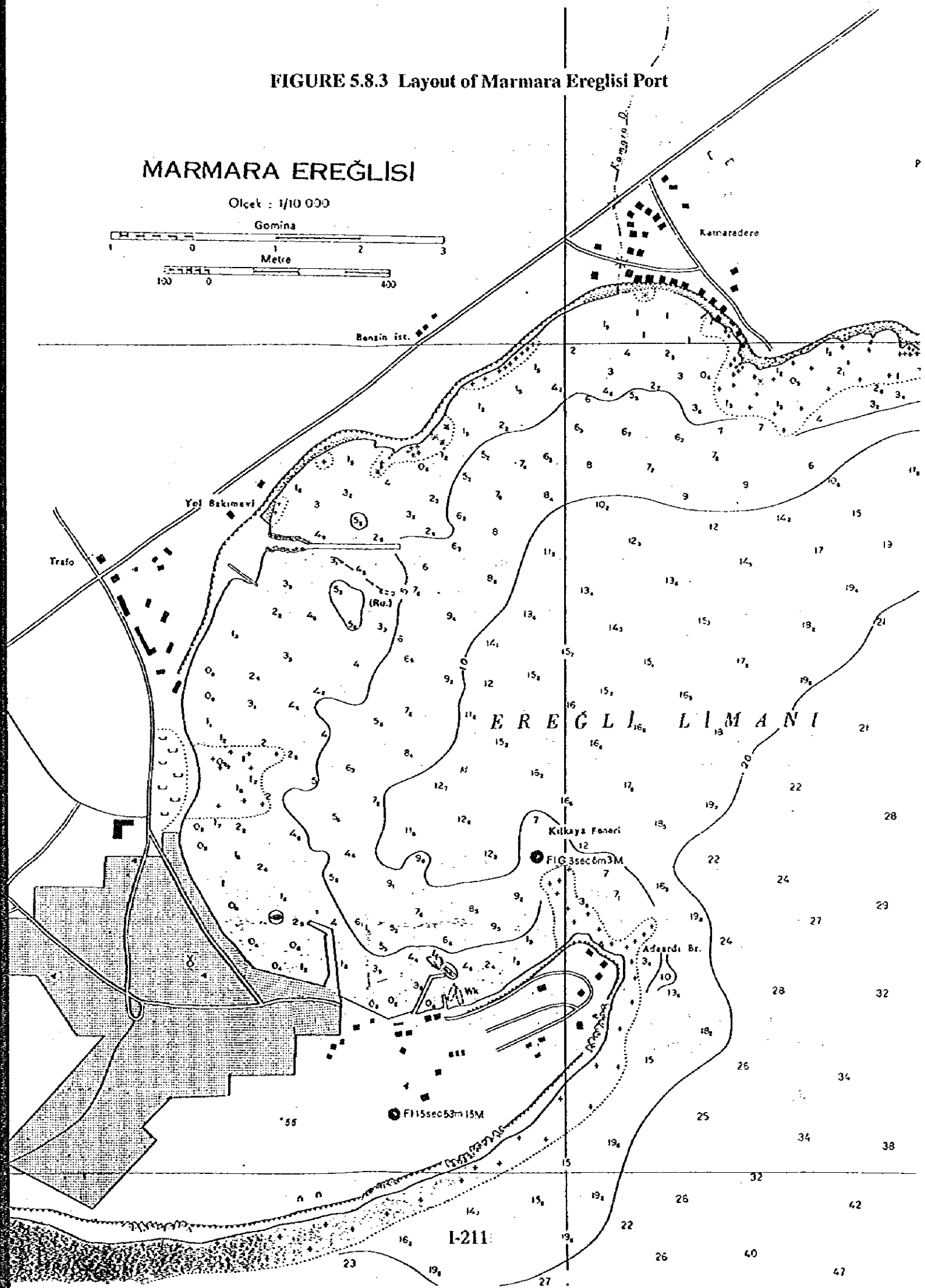
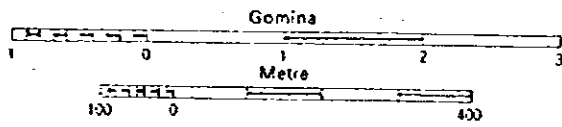
The Municipality is interested in port development because of high convenience of the area for port extension, such as ①distance between the port area and the town, ②500~600m distance between port area and road, which makes the procurement of the land area for expansion easier.

(4)Problems

FIGURE 5.8.3 Layout of Marmara Ereğlisi Port

MARMARA EREĞLİSİ

Ölçek : 1/10 000



Problems of the port are as follows ;

- ① Since old port is located at the depth of inlet, which is about 1.5 km in width and about 1 km in length, no expansion of water area for large vessels is possible,
- ② It is not desirable to expand the old port any more, because coastal zone around the port is utilized as beach, and second houses, residential area.
- ③ Since the coast is surrounded by cliffs at both sides of the cove, where the port is situated, coastal zone expansion is limited.

5.8.5 Port of Gelibolu

(1) Location

It is located on the southern coast of Gelibolu Peninsula of European side, near the mouth of the western side of Dardanelles opening to Sea of Marmara. It is also located close to the Istanbul-Canakkale-Izmir highway. (See Figure 5.8.5)

Gelibolu Municipality, 285 km in distance from Istanbul, is situated at the root of Gelibolu Peninsula which is between the Aegean Sea and the Marmara Sea. Gelibolu is historically famous especially for events which occurred here in World War I, and many foreign tourists visit this place during the year.

Population is 35,000, and 75,000 in summer. Main industry is agriculture and the main products are grain and sunflower. Tekirdag and Edirne provinces which are some 150 km in distance from Gelibolu, produce wheat which is exported. Fishing is conducted in the Aegean Sea and in connection with fishing, food processing factories are found.

(2) Port facility

There is a L-type jetty 10 m in depth belonging to the Municipality, which can accommodate a 9,000 D/W vessel. Since eleven months out of a year, wind blows from east, and from south in November, layout of jetty is effective against east wind. Since this place prospered as a port town, it has old facilities at the depth of the port.

There are two (2) mobile cranes and main cargo handled at the port is sacked bulk cargo. Cargo handling operation is done by the workers prepared by the ship agency. There are no workers belonging to the municipality.

(3) Cargo :

There is a wheat-growing district 120 km from Gelibolu. Wheat is exported from Gelibolu Port and/or Tekirdag Port. Fertilizer is imported from Rumania and Russia. Annual cargo handling volume of Gelibolu Port is about 450,000 tons. There is regular ferry boat service between Gelibolu and Lapseki crossing the Dardanelles Straits, with departures every hour. Annual income of the port is about 12 to 13 billion TL.

(4)Development plan

Construction of a new pier, with capacity of 35,000~40,000D/W cargo vessel is planned and it is included in the governmental investment program of 1996. According to the plan, the hinterland of extended port includes Edirne, and the main cargo will be liquid-bulk. The survey including Canakkale port, has been implemented by the Government, and construction work has already started in Canakkale. In spite of the approval in the governmental investment plan, construction in Gelibolu port has not commenced yet. The Municipality is looking for funds from private financial sources. Moreover, a study to construct a bridge at the narrowest point of the Dardanelles Strait, between Kilitbahir and Canakkale has been started by a private group, comprising Japanese, Spanish and German companies.

5.9 Other Ports in the South Side of Marmara Sea

5.9.1 Port of Canakkale

(1)Location

It is located on the eastern bank, the Anatolian side of the Dardanelles, within the city center and has road connection to Canakkale-Izmir highway. The Dardanelles in front of the port is bent in crank shape and the narrowest point of the Strait.

Population of Canakkale is 60,000, but reaches some 120,000 in summer. Main products are fisheries (fish, canned sea products), mining (cement, ceramics, marble-mine), agriculture (tomato paste, vegetable, tobacco, wine) and leather. Since Truva ruin is 20 km to the south and Bergama is some 120 km from Canakkale, it is bustling with tourists as a base in summer season.

(2)Port Facility

There is a main L-shaped pier, 96 m in length, 5~6 m in depth, which domestic sailing vessels up to 4~5,000 D/W can berth and usually ships up to 2,000 D/W are berthing. It is mainly utilized by ferries. (See Figure 5.8.4)

FIGURE 5.8.4 Layout of Canakkale Port

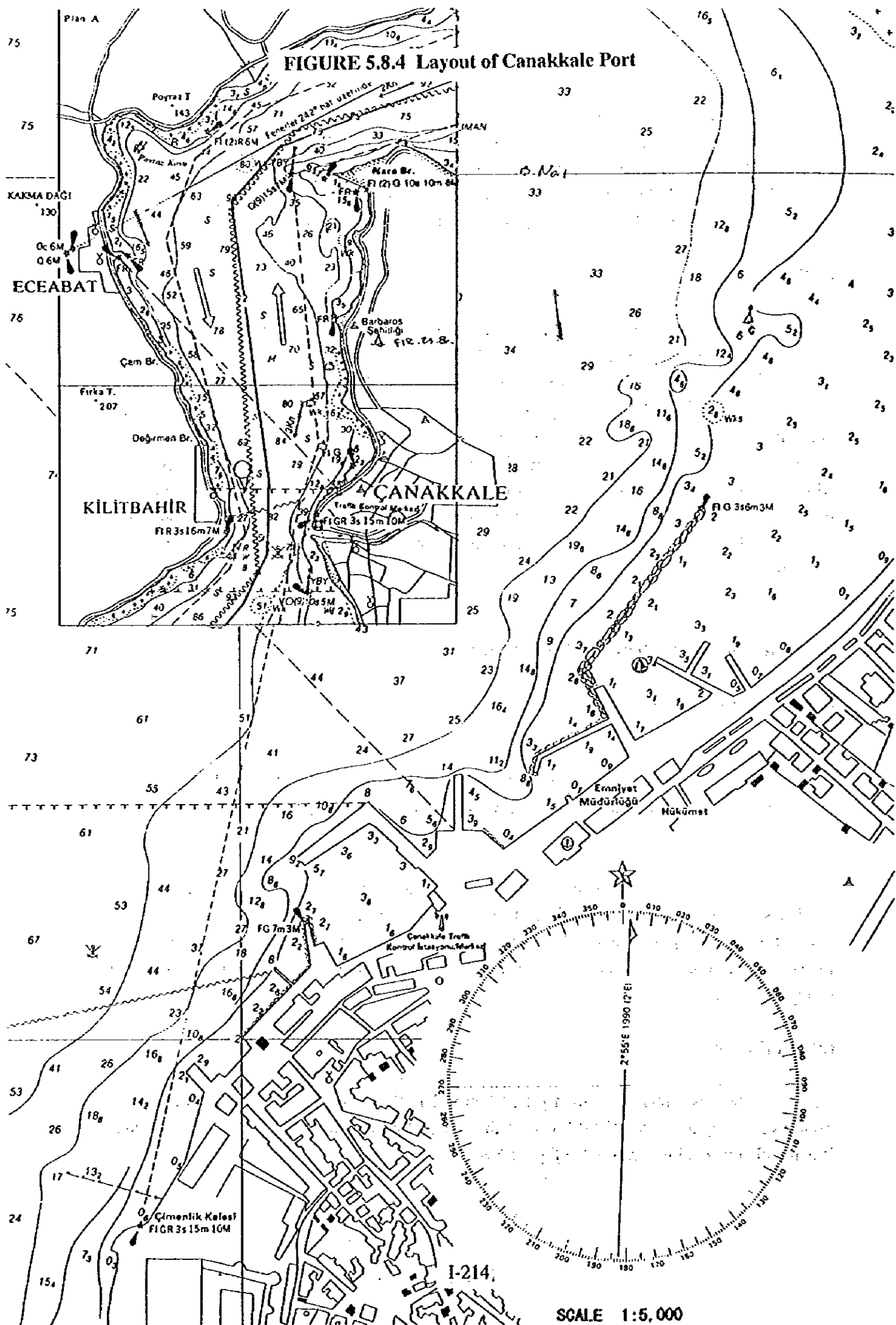


FIGURE 5.8.6 Layout of Canakkale Port (Kepez)

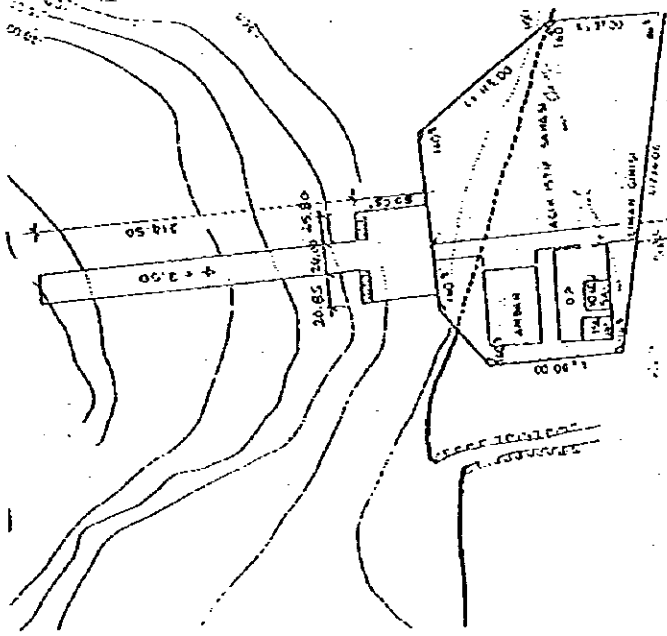


FIGURE 5.8.7 Layout of karabiga Port

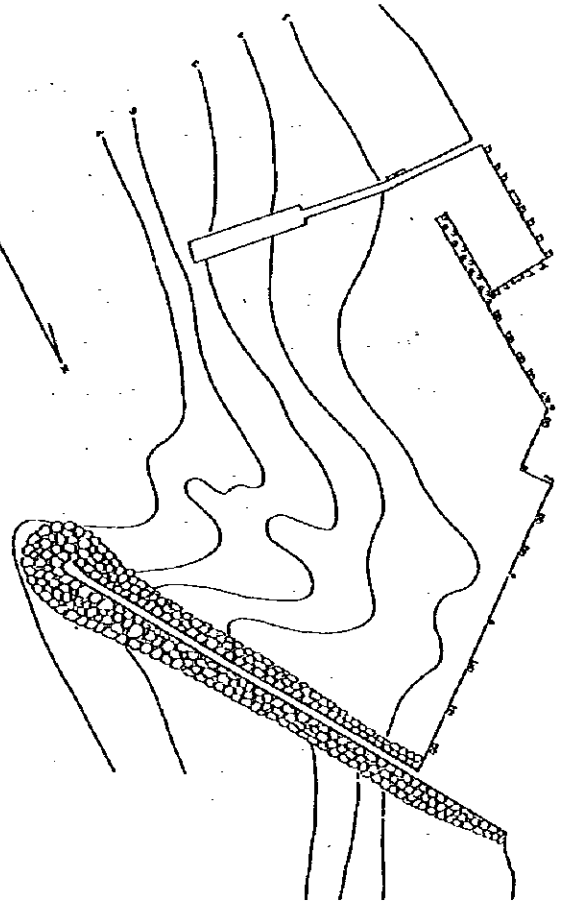
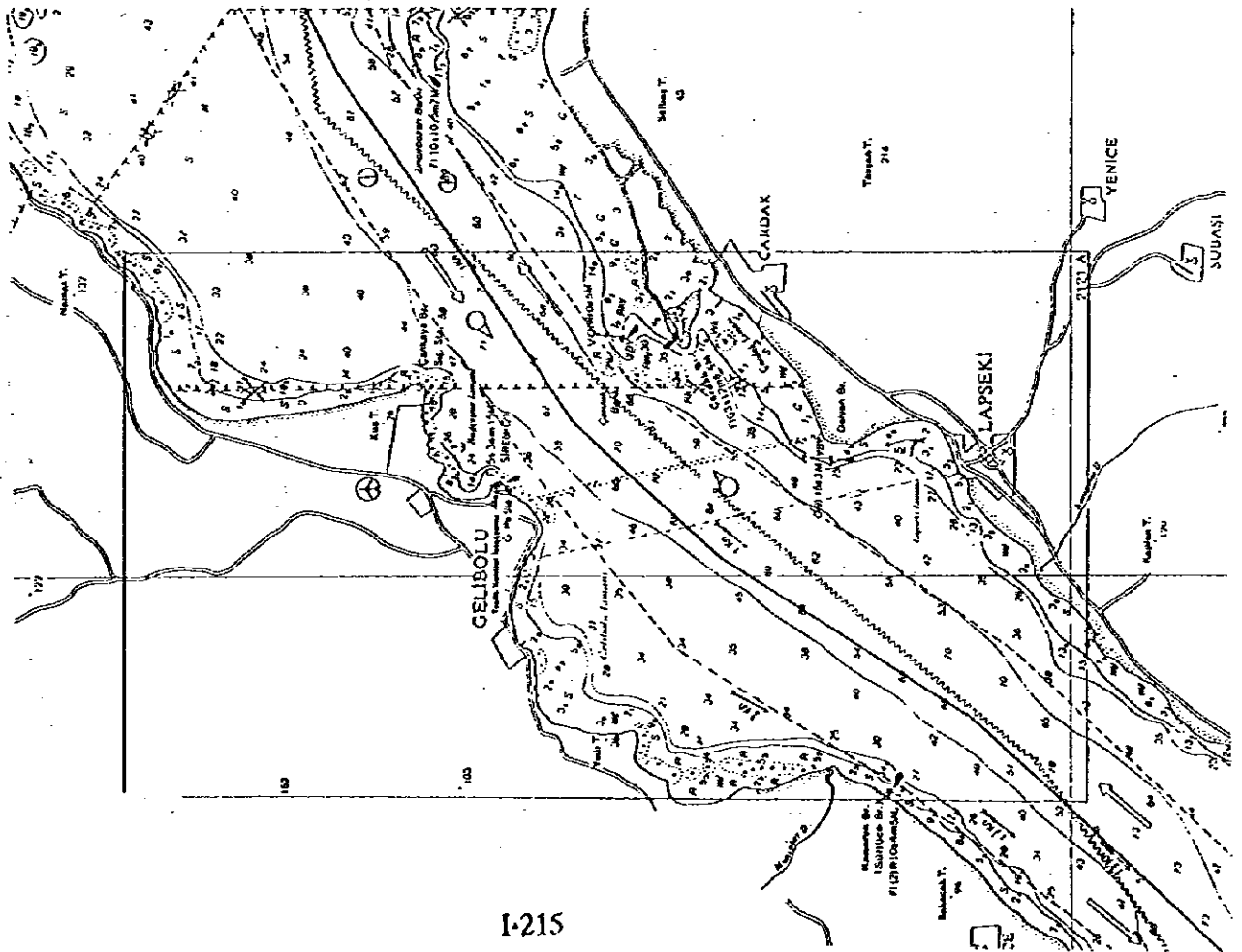


FIGURE 5.8.5 Location of Gelibolu Port & Lapseki Port



Inside of the pier, 4 m in depth, is for small boats. On the north side of main pier, the ferry pier, fishery area and marina are located. There are several buoys outside of the port to moor foreign passenger vessels and can simultaneously accommodate three owing to wind direction. Cruise ship's passengers are landing by boat.

One tugboat and one service boat belonging to TDI are servicing in the Port. Moreover, there are three tugboats belonging to BOTASH on the Aegean side of Gelibolu Peninsula, and they are chartered if necessary.

New pier, 214 m in length, 24 m in width with Ro/Ro facility and mobile crane, is under construction by DLH in Kepez, 8~10km south from the port. Furthermore, private loading port of cement factory is located at Kumburun, 30~35km distance south from the port. Vessels up to 60,000~70,000 D/W can berth at a L-shaped pier, 300 m in length.

(3) Cargo

Annual cargo handling volume of the Canakkale port is 30,000 ton in 1995. Cargo handling volume between 1988 to 1995 is shown in Table 5.9.1 and Figure 5.9.1. Main commodities are frozen fish for import, agriculture products and mine for export. Marble stones are exported to Europe (Denmark), and carried to Bandirma port by ship. Comparing with ocean-going vessel, smaller vessels are used for export. Coal are transported from Bandirma. Number of calling vessel is 53 for trading and 12 for foreign passenger vessel in 1995. Foreign passenger vessels are concentrate on the period from June to September.

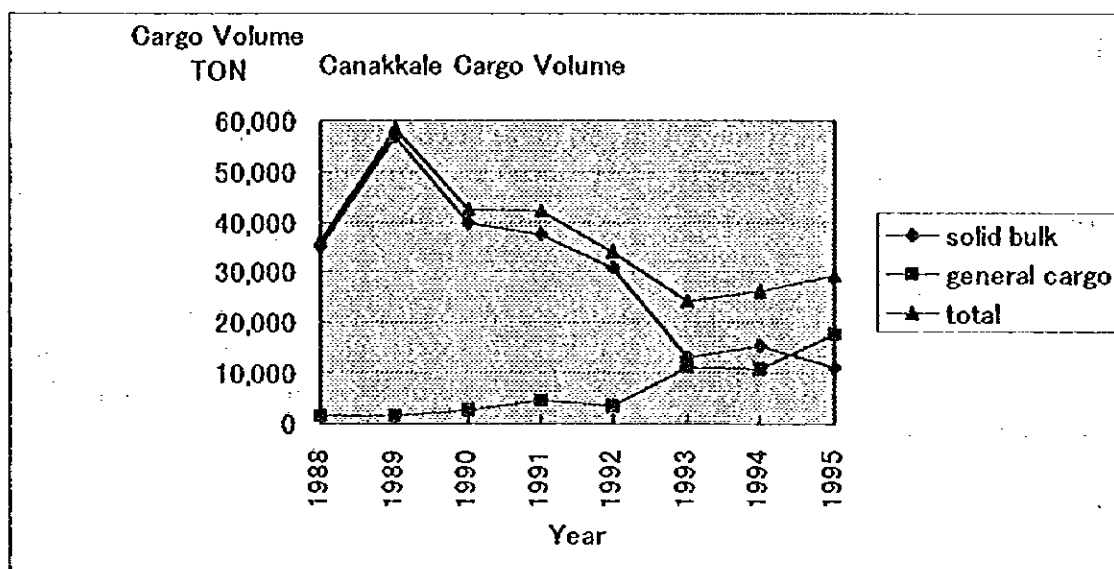
TABLE 5.9.1 Canakkale Port Cargo Handling Volume in 1988 - 1995 unit ton

Year	Load (ton)			Number of Vessel		
	Solid Bulk	General Cargo	Total	Cargo	Passenger	Total
1988	35,075	1,475	36,550			42
1989	57,021	1,569	58,590			70
1990	39,746	2,750	42,496			79
1991	37,599	4,663	42,012			70
1992	30,820	3,373	34,193			42
1993	13,070	11,170	24,240			65
1994	15,435	10,910	26,345	42	42	84
1995	11,363	17,911	29,274	53	12	65

90 % of cargo is for international trading

Source: Canakkale port

FIGURE 5.9.1 Cargo Handling Volume of Canakkale Port



Canakkale cement has its own facility for loading and unloading. Annual handling volume is 2.5 million tons for loading and 0.7 million tons for unloading in 1995. Main commodities are cement and clinker. There are 2.1 million tons domestic loading for Ambarli port and Aliaga port. The length of berth is 185 m by 250 m and draft is 14 m. The size of vessel is 10,000 tons for domestic trade and 45 - 55 thousands tons for export. Cargo loaded at private cement pier is carried to Bandirma port and Ambarli port.

(4) Development Plan :

Since Canakkale is more than 200 km from Bandirma port, Haydarpasa port and Izmir port which handle container and is relatively near to industrial cities, Eskisehir or Bursa, container terminal is needed.

Moreover, in order to avoid the congestion of vessels sailing in the Marmara Sea, they have an idea to construct a large commercial port and to link it with Asian side by railways and with European side by bridge crossing the Strait. Black Sea University has examined the railway project. LNG Pipe line will be connected by 1997.

(5) Problems

The problems of the port are as follows;

- ① Development of passenger facilities and marina are not sufficient from a view point of tourism port and port to cross the strait.
- ② Facilities including land transportation network, for a distribution center in the west side of Marmara region, are inadequate.

5.9.2 Port of Karabiga

(1) Location

It is located on the southwestern part of the Sea of Marmara and west of Erdek Bay. It is 20 km to Bandirma-Canakkale Highway and 80 km to Bandirma, connected by railways via Biga.

Population of the Municipality is 1,500~2,000, and 3,500~4,000 in summer. Main industries are agriculture and breeding livestock. There are ceramic factories in Can 40~50km in distance from the port. Road between Biga and Can is under rehabilitation, and it will be completed by this summer.

(2) Port Facility

Port facilities belong to the Municipality. There is one pier 165 m in length (65 m for berth), 4~5m in depth which vessels up to 1,000 D/W can berth, and quay 310 m in length, 4 m in depth. It has a storage yard with some area connected to road.

The port is surrounded by two breakwaters against north wind in summer, north breakwater is 220 m in length and south breakwater is 80 m in length. Dredging works are conducted every 4~5 years.

The port is equipped with two mobile cranes operated by private stevedoring concern.

(3) Cargo

All cargo is domestic cargo. Breakdown of main cargo handled in 1995 is as follows ;

TABLE 5.9.2 Main cargo of Karabiga in 1995

Loading		Unloading	
Commodity	Ton	Commodity	Ton
Sand	1,500	Sand	1,564
Ceramics	16,800	Stone	3,840
Steel pipe	1,730	Clay (Kaolin)	97,600
Chemical materials	9,000	Cement sand	2,640

Ferry is servicing between Istanbul every week and number of passenger is some 8,000 annually. Number of vessels calling the port is 384 in 1995, 171,624 ton in GRT, 86,314 ton in NRT. There are 164 fishing boats registered in the port which is used as a fishery port.

(4) Development Plan

The Municipality intends to enlarge utilization by the industrial sector. They have a plan to make a ferry service to Tekirdag to solve the shortage of shipment in summer.

(5) Problems

There is enough extension area to the south of the port. However, in case of expansion, it is necessary to consider a counter-measure against sand drift, assessing coastal line and wave direction.

5.9.3 Port of Erdek

(1) Location

It is located at the south west coast of the Kapidag Peninsula, northeast of Erdek Bay in the southern part of the Sea of Marmara. It is connected to Bandirma-Balikesir-Canakkale highway.

Erdek Municipality has a population of 20,000 and 100,000 to 150,000 in the summer season. Some 10 % of the tourists, are foreign. Erdek is known as an ancient city, one of the Sea of Marmara's oldest and most famous resort areas. It offers pristine beaches and olive groves cover the land. Historical ruins, 10 km in length, are found near the port.

Main industries are just olive and fishing. The Municipality is preparing infrastructure such as electricity, water service to accommodate 25,000 people in future. Bandirma Airport is now under construction near Erdek, and will be completed soon. Motor way connecting Erdek and new Bandirma Airport is already completed, and it takes only 25 minutes to the Airport. The Municipality is planning to promote tourism utilizing this advantage. There is a 21 km coastline, which is under the jurisdiction of the Municipality. The coastal area is utilized by hotels, residential area and by swimming beach and forest reservation area from the coast line to inland side generously.

(2) Port facility

It has two piers used for ferry to neighboring islands . New pier with 110 m in length, 40 m in width, is constructed by DLH beside the old pier. Existing two marinas are unable to meet the demand.

(3) Cargo

Ferries are operated everyday and daily necessities and other commodities, such as wheat flour, cement, brick, are transported to three islands which have a total population ranging from 15,000 to 20,000.

(4) Development plan

The Municipality intends to develop port facilities for the promotion of tourism, namely marina, rather than developing cargo handling port.

At present , a German company has a plan to construct a five star hotel and marina on the small island in front of the port.

It is important to develop a facility for passenger vessels as well as marina, because the port is located in the famous tourism area. Ferry service is indispensable to transport necessities for people living on islands, therefore, development of the port facility related to ferry is very important.

5.9.4 Port of Mudanya

(1) Location

The port is located on the southeast coast of the Gulf of Gemlik, a famous resort area 28 km from Bursa which is an industrial city.

Mudanya Municipality is long and narrow with 800~1,000 m in width, and road and houses in the town are located along the coast line. Most of area behind the town is mountainous. According to the statistics in 1990, population was 12,000 and is approximately 25,000 at present. Population in summer season expands up to about 60,000. This region is the main area of olive production.

(2) Port facility

The port has two piers belonging to the Municipality. The old pier constructed in 1953 can accept vessels up to 18,000 D/W. L-type new pier was completed three years ago.

Since the port is open to the north and it blows from the north 200 days in a year, vessels less than 5,000 D/W are affected. (See Figure 5.9.2)

The port used as both fishery and yacht harbor is nearly located and half of facility has been completed.

(3) Cargo

Annual cargo handling volume of the Mudanya port is 0.5 million tons in 1995. Port cargo handling volume from 1992 to 1995 is shown in Table 5.9.3.

TABLE 5.9.3 Mudanya Port Cargo Handled Volume in 1992 - 1995 unit : ton

year	Loading		Unloading		
	Dry bulk	General Cargo	Dry bulk	General Cargo	Car number
1992	102,754	2,046	0	57,826	
1993	119,195	3,820	57,208	117,082	2,738
1994	134,019	2,000	0	66,511	848
1995	218,706	1,660	0	90,661	1,050

Source: Mudanya port Authority

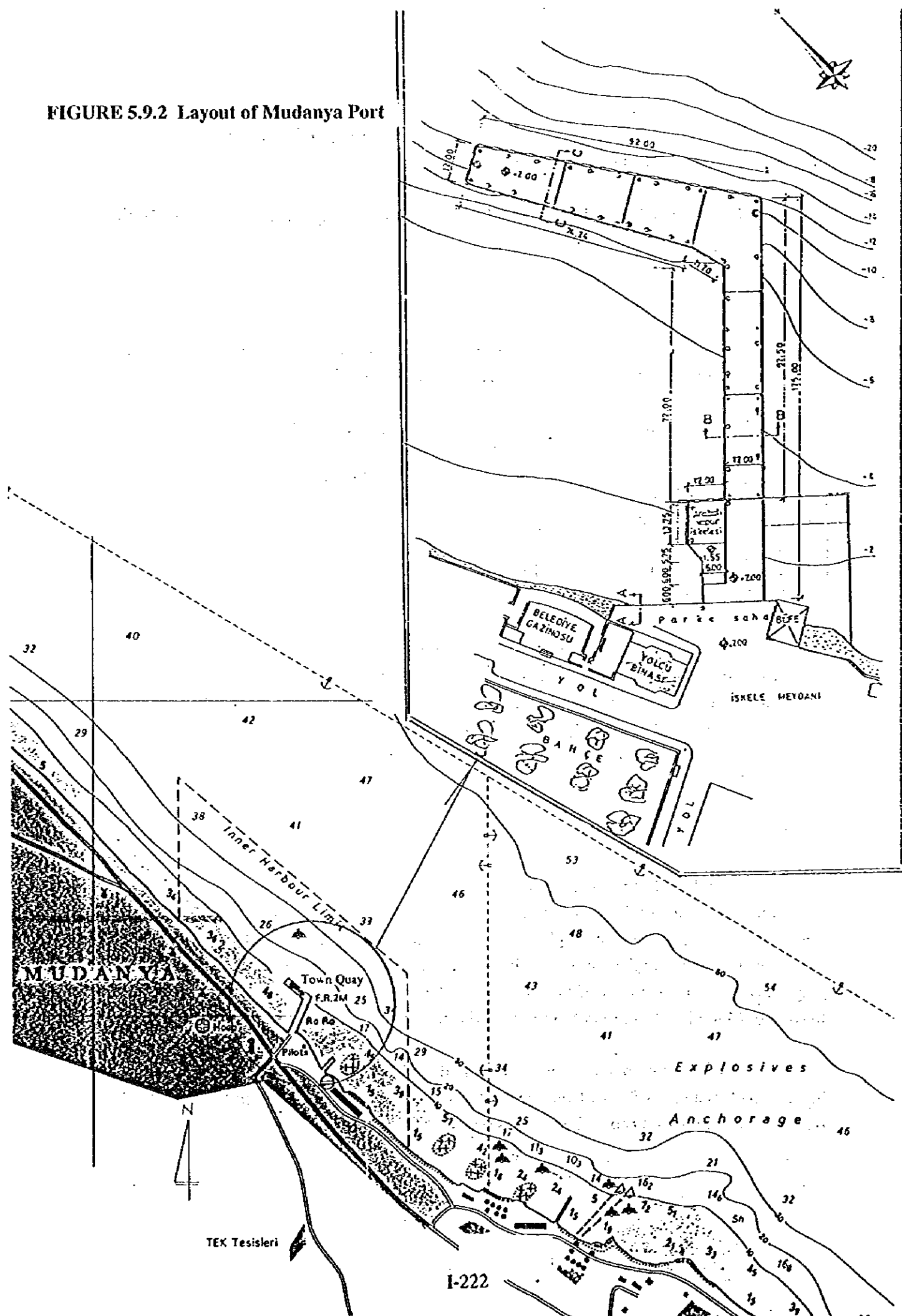
Dry bulk is a main handling cargo which occupies a 45 % share of the total volume. Main commodities are mine ore, timber, steel plate, automobile. Recently timber from Russia is handled. Chrome which had been formally unloaded has been shifted to the Gemport. Ferry is operated everyday to Istanbul. Annual income from port fee is five billion TL, and total budget of the Municipality is 176 billion TL (60% : personnel expense). Number of calling vessels is 412 in 1995.

(4) Development plan

Though a T-type pier which was planned by the previous mayor, there is no intention to implement it. Since hinterland of the port includes Bursa, industrial area, potential for port development might be high. In spite of the high potential, the Municipality doesn't want to develop the port further because the coastal area is narrow in general. (Present mayor is a powerful member of the Marmara Bosphorus Committee which consist of 230 mayors of Municipalities around the Sea of Marmara.)

Since coastal zone is long and cramped, and narrow roads and houses are densely located, reclamation in front of the port is the only way to develop the port. Truck traffic related to the port cargo causes heavy congestion and noise.

FIGURE 5.9.2 Layout of Mudanya Port



5.9.5 Other Ports

(1) Port of Berude & Dem

These two ports are container ports operated by private sector and located at the Izmit Bay. They are planning to handle containers, 50,000~60,000 TEU in two ports. Dem port is already under construction.

5.10 The Bosphorus & the Dardanelles Straits

5.10.1 General

(1) Planning Factors

The owner or manager of large vessels which plan to pass through the Bosphorus, the Dardanelles and the Sea of Marmara (hereinafter referred as "the Straits") shall provide information to the Undersecretariat for Maritime Affairs (hereinafter referred to as "the Administration") on the vessel and its cargo at the planning stage of the passage. Large vessel means a vessel 150 meters or more in length.

All vessels, except for military vessels, that shall pass through the Straits shall be seaworthy in accordance with international rules and the legislation of the State whose flag they fly, and shall establish the technical conformity of their vessel with the conditions and make an entry to this effect in the log book.

(2) General rules

Vessels entering the area to transit through the Turkish Straits or enter a port in the area will comply with the reporting system established by the administration.

The speed for vessels in the Straits is 10 NM/h over the ground. This speed may be exceeded if steerage way speed cannot be reached, by informing the traffic control stations and taking care to avoid collision and creating waves harmful to the surroundings. In consideration of the limited maneuverability of vessels having deep draught, during the passage of such vessels through the Straits, sufficient space for maneuver and navigation will be provided. Deep draught vessel means a vessel with a maximum draught of 10 meters or more.

The passage of large vessels whose length exceeds 200 meter or having a draught greater than 15 meters, due to the adverse morphological, oceanographic and meteorological characteristics and physical constraints of the Straits, is advised to take place in day-time.

(3) Overtaking

Vessels navigating in the Straits shall not overtake vessels proceeding before them except due to necessity. Vessels passing through the Straits shall maintain a distance of at least 8 cables (1600 yards) between each other. Overtaking will not take place between Vanikoy and Kanlica in the Bosphorus, and between Cape Nara and Cape Kilibahir in the Dardanelles.

(4) Special Rules

Inter-city ferries and other shuttle boats crossing between the two sides of the Straits shall keep out of the way of vessels proceeding from north to south and from south to north in the traffic separation lanes, as much as possible by avoiding crossing situations.

(5) Turkish Straits Reporting System (TUBRAP)

Master, Owner, or Agent of vessels carrying dangerous cargo or which are 500 gross tons and more, at least 24 hours before entering the entrance of the Strait shall give Sailing Plan I. Masters who have given Sailing Plan I and established that their vessel is in conformity with the conditions prescribed shall give Sailing Plan II two hours before arriving at the entrance to the Straits, or at a distance of 20 NM from the entrance to the Straits, whichever comes first.

(6) Current and Limited Visibility

When the surface current speed in the Straits exceeds 4 NM/hr or when no surface currents are caused by southerly winds, then large vessels and deep draught vessels a speed of 10 NM/hr or less will not enter the Straits and will wait until current speed are 4 NM/hr or less, or the northerly currents have stopped.

(7) Pilotage services

Turkish vessels 150 meters or more in length passing through the straits shall take a pilot.

5.10.2 The Bosphorus and the Dardanelles Strait

The dimensions of the Bosphorus the Dardanelles Strait are as shown in Table 5.10.1 as follows.

TABLE 5.10.1 Dimensions of the Bosphorus and the Dardanelles Strait

	Bosphorus	Dardanelles
Length	29 Km	62 Km
Width (Maximum)	3,500m	8,725m
width (Narrowest)	760m	1,375m
Average Depth	55m	65m

The Bosphorus separates the Continents of Europe and Asia. On the Bosphorus are the BOSPHERUS and FATIH SULTAN bridges connecting the two Continents.

It is said that the number of vessels passing through the Dardanelles Strait is 100 to 150 vessels a day and 35,500 vessels in 1995. Out of these vessels, 25% of the total are large vessels 150m or more in length and 90% of the total are over 500 GRT. Tankers represent 15 ~20% of the total.

The number of sea accidents in the sea of Canakkale (between the Suluca and the mouth of the Strait) was 17 in 1995 and has been 6 until May in 1996. Eighty percent of sea accidents are perils, and others are collisions, sunk and fire. 50% of total are caused by Turkey's flag vessels. According to a person in charge, the cause in most cases seems to be drinking.

Concerning navigation aids, tender for two years' contract to introduce a radar system for vessel safety is scheduled. Russia and Greece are against this system.