7.4.2 Siltation problems (An overview)

Although the overall rate of siltation is not very high, localized siltation especially in the approach channels to Prince's & Victoria docks, Indira dock entrance, Ballard pier extension, Indira dock harbour wall berths and ferry terminal, is very high. The main approach to the harbour is by relatively deep water with the depths being maintained by the action of tidal currents and certain amount of dredging. The seabed deposit is mainly fine silt and marine clay with the density of the material varying between 1.2 to 1.35 ton/m^3. The major amount of siltation seems to occur during the monsoon months, i.e. June to September every year. The approach channel to Prince's and Victoria dock is aligned across the direction of mean ebb and flood tidal currents and hence susceptible to heavy siltation. Another probable reason for the locally heavy siltation of this channel is due to the bed level being appreciably lower (about 4 m deeper) than the surrounding natural bed level. Siltation in the dock is due to density currents caused when gates are open and/or by the deposition of suspended silt during the period the gates are closed.

During flood tides, an extensive slow moving eddy induced by the Ballard pier results in high siltation at the Indira dock entrance, alongside Ballard pier. It is observed that the rate of siltation here is accentuated during monsoon. Siltation at the ferry wharf and Pir Pau Pier is mainly attributed to the existence of high flanks in the proximity from where the silt gets transported by the tidal action or gets washed in to the harbour during monsoon and settles down close to the structures and or deeper depths.

There has been no long term systematic study carried out to assess the annual rate of siltation in the harbour. However based on their experience over the years, MBPT formulated a dredging guide in 1984, which indicates the probable average rate of siltation for different areas and the periodicity of surveys to be carried out so as to keep a check on the availability of minimum navigable depths in the port. Based on these survey results, dredging is carried out in the respective areas which reveal siltation beyond permissible limits. Table 7.4.2 summarizes the assumed rate of siltation and periodicity of survey for the respective areas. Although every effort is made by MBPT to adhere to the survey periodicity as given in Table 7.4.2, there are instances when due to certain unavoidable circumstances such as inclement weather condition,

Table 7.4.2 Average Assumed Rate of Siltation and Periodicity of Soundings

Sl. No.	Location	Average Assumed Rate of Siltation (Metre/Year)	Periodicity of Soundings
1	Tanker Anchorages	0.30	Yearly
2	Emergency Anchorages	0.30	Yearly
3	Indira Dock Approach Channel	0.50	Monthly
4	Indira Dock Entrance Channel	1.50	Monthly
5	Ballard Pier South Face	0.30	As Required
6	Ballard Pier Extension	3.00	Monthly
7	Mail Berth	3.00	Monthly
8	East Mole	2.50	Monthly
9	Indira Dock Entrance Lock	0.30	Quarterly
10	Indira Dock	0.30	Quarterly
11	Indira Dock Harbour Wall Channel	1.80	Monthly
12	Indira Dock Harbour Wall BerthNo.18 To 22	3.00	Monthly
13	Indira Dock Harbour Wall Tug Berth	1.50	Monthly
14	Indira Dock Harbour Wall Launch Berth	1.50	Monthly
15	Barge Berth No.1	2.00	Monthly
16	Barge Berth No.2	1.50	Monthly
17	Dredger Berth	2.00	Monthly
18	P. & V. Docks Channel	2.00	Monthly
19	Victoria Dock	1.00	Quarterly
20	Victoria Dock Harbour Wall Berth No.15	2.00	Monthly
21	Prince's Dock	1.00	Quarterly
22	Prince's Dock Harbour Wall Berths K & M	2.00	Monthly
23	Ferry Terminal Jetty Berths 1 To 4	2.70	Monthly
24	Pir Pau Pier-Head	0.60	Quarterly
25	Pir Pau Turning Circle	0.40	Quarterly
26	Pir Pau Access Channel Including Neck	0.25	Quarterly
27	M. O. T. Butcher Island BerthNo.1 & 3	0.30	Quarterly
28	M. O. T. Butcher Island BerthNo.2	0.30	Quarterly
29	M. O. T. Butcher Island BerthNo.4	-	Quarterly
30	Bunders	-	Yearly
31	Main Harbour Channel Section 1	-	Half Yearly
32	Main Harbour Channel Section 2	-	Half Yearly
33	Main Harbour Channel Section 3	-	Half Yearly
34	Main Harbour Channel Section 4	-	Half Yearly
35	Main Harbour Channel Section 5	-	Half Yearly
36	New Pir Pau Channel & Berth	-	Half Yearly

Source : MBPT

non-availability of access to the area, equipment repair etc. surveys are not carried out as scheduled.

The results of earlier analysis indicate that there has been fluctuations in the depth within the harbour. With a strong diurnal component of tide in Mumbai harbour, there is a variation in the rate of rise or fall during parts of the tidal cycle during different seasons in any one year. Earlier studies have shown that although the greatest changes of level occurred during flood tides, the mean rate of rise for a given range was consistently greater during ebb tide indicating that this trend could result in cyclic deterioration and improvement of main harbour channels. A number of siltation studies of Mumbai harbour have been carried out by various organizations in the past. The outcome of the studies has been detailed in Chapter 2.

7.4.3 Maintenance Dredging

Annual maintenance dredging is a requirement for most of the navigable areas in Mumbai harbour. Except for the main channel which needs to be dredged about once every 3 years, the remaining areas normally need to be dredged once a year, just after the south west monsoon period is over. For areas within the docks and at shallow berths in the harbour, dredging is carried out on an "as and when required" basis all round the year, depending on the results of periodic hydrographic surveys. As already mentioned above, until 1986, all the maintenance dredging in the harbour was carried out by MBPT with the help of their own dredgers. In 1986, MBPT decided to supplement their dredgers by utilizing the services of DCI. Between 1986 to 1994 DCI were directly authorized to carry out maintenance dredging of the channels and charter their dredgers for dredging some of the other areas in the harbour. Payment for dredging the main channel was based on rate per cubic metre dredged by calculating the volume from results of pre and post dredging surveys. Cost for chartering the dredger was on the basis of daily hire charge for the dredger plus cost per number of hopper loads transported. The dredgers used by DCI were of Trailer hopper suction type with varying hopper capacities of 2800 m^3, 3300 m^3, and 8000 m^3, respectively.

In 1994, for the first time, open tenders were floated for maintenance dredging works. During that year, dredging was carried out by the selected contractor Ham, for some of the areas in the harbour in addition to ongoing dredging activities by DCI. The annual volume

dredged by these agencies and the corresponding costs for the period 1992 to 1996 is given in Table 7.4.3.

Table 7.4.3 Volume and Cost of Maintenance Dredging carried out by Other Agencies

Sl. No.	Year	Name of Agency	Volume Dredged (Million m^3)	Cost (Rs. Million)
1	1991-92	DCI	0.66	32.00
2	1992-93	DCI	3.60	126.00
3	1993-94	DCI	1.36	54.00
4	1994-95	DCI HAM	1.45 5.05	201.00
5	1995-96	HAM	1.14	81.00

Source : MBPT

There is no ready information available on area wise dredging carried out by DCI, for the period 1986 to 1993. In addition, on analyzing the available survey records it appears that there is lack of coordination between dredging activities and pre & post dredging surveys for the areas dredged by MBPT's own dredgers. A regular record of annual volume dredged area wise for the above period would have helped in better understanding on the rate of siltation. However, information on annual dredging for at least 4 consecutive years was identified for few areas. This has been presented in Table 7.4.4. From Table 7.4.4 it is quite clear that the annual rate of siltation in the areas listed is consistent for the last four years. During the course of this study, analysis on the aspects of siltation using existing data and fresh information collected at site for different areas in the harbour, shall be made.

In 1996, MBPT floated tenders for maintenance dredging for a consolidated two year period. Based on their experience over the years, a dredging program was formulated and incorporated in the tender. Table 7.4.5 depicts the schedule for dredging. The first phase of dredging i.e. for the period 1996 - 97 has since been completed. The volume dredged by Ham in different areas and their respective costs, for the above period, is given in Table 7.4.6. Since no detailed survey was carried out by MBPT prior to tendering and the volumes estimated were based on whatever latest survey records were available at that time, MBPT had stated in their tender that the quantities provided in the bill of quantities (BOQ) were approximate and expected to hold good within $\pm$25 percent of the estimated quantity.

Table 7.4.4 Comparison of Annual Volume Dredged for Different Years

Si.No.	Location	Volume of Maintenance Dredging (Million m^3)				Remarks
		1994	1995	Early 1996	1996-97*	
1	I. Dock Approach Channel	0.76	-	0.73	-	a. 1994 Dredging carried out upto full tolerance b. 1996 Dredging carried out upto required level
2	I. Dock Entrance Channel	0.22	-	0.24	0.26	a. Includes a small quantity dredged in I. Dock Approach Channel.
3	BPX, BPS & East Mole	0.08	-	0.07	0.09	
4	I. Dock Harbour Wall & Channel	0.30	-	0.18	0.16	a. 1994 Dredging carried out upto 120m from berth face b. 1996 & 1997 Dredging carried upto 90 m from berth face
5	P & V Approach Channel	0.67	-	0.37	0.44	a. 1994 Dredged volume includes backlog
6	Pir Pau Channel, T Circle and Berth	1.08	-	0.14	0.87	a. 1996 Very small area in front of berth & channel neck dredged

* New contract with Ham for one year.

Source : MBPT

Table 7.4.5 Tentative Dredging Programme for the Period 1996-97

Location	To be Dredged Below CD	1996 -1997							1997 -1998											
		SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JULY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
B.P.X. B.P.S. East Mole	10.7, 10.0, 8.5	4							4					4						
I.Dock Entrance Channel	8.2	10												10						
I.Dock Approach Channel	8.2		20												20					
I.Dock Harbour Wall Channel	7.3	7												7						
I.Dock Harbour Wall Berths	7.6	7												7						
Prince's & Victoria Dock Channel	5.2	20												20						
Pir Pau T.Circle & Channel (Old)	6.7, 6.10		15																	
Pir Pau T.Circle & Channel (New)	9		12																	
Pir Pau Berth (New)	12			3												3				
Main Channel	11.5					120														
Prince's Dock	5.2		20													5				
Victoria Dock	5.8			20												5				
F.Wharf & Dredger Berth	5.2				20										20					
Pir Pau Berth (Old)	8.8	3																		
Workshop Slipway	2		5											4						
Gateway of India Steps	2.5	5												4						
Channel Opposite J.D (MOT 1,2,3)	10	5							15					4						

Note : Depth to be dredged in metres

Legend : 4 Period Allotted for Dredging in Days

Source : MBPT

Table 7.4.6 Volume of Material Dredged by HAM During the Period 1996-97

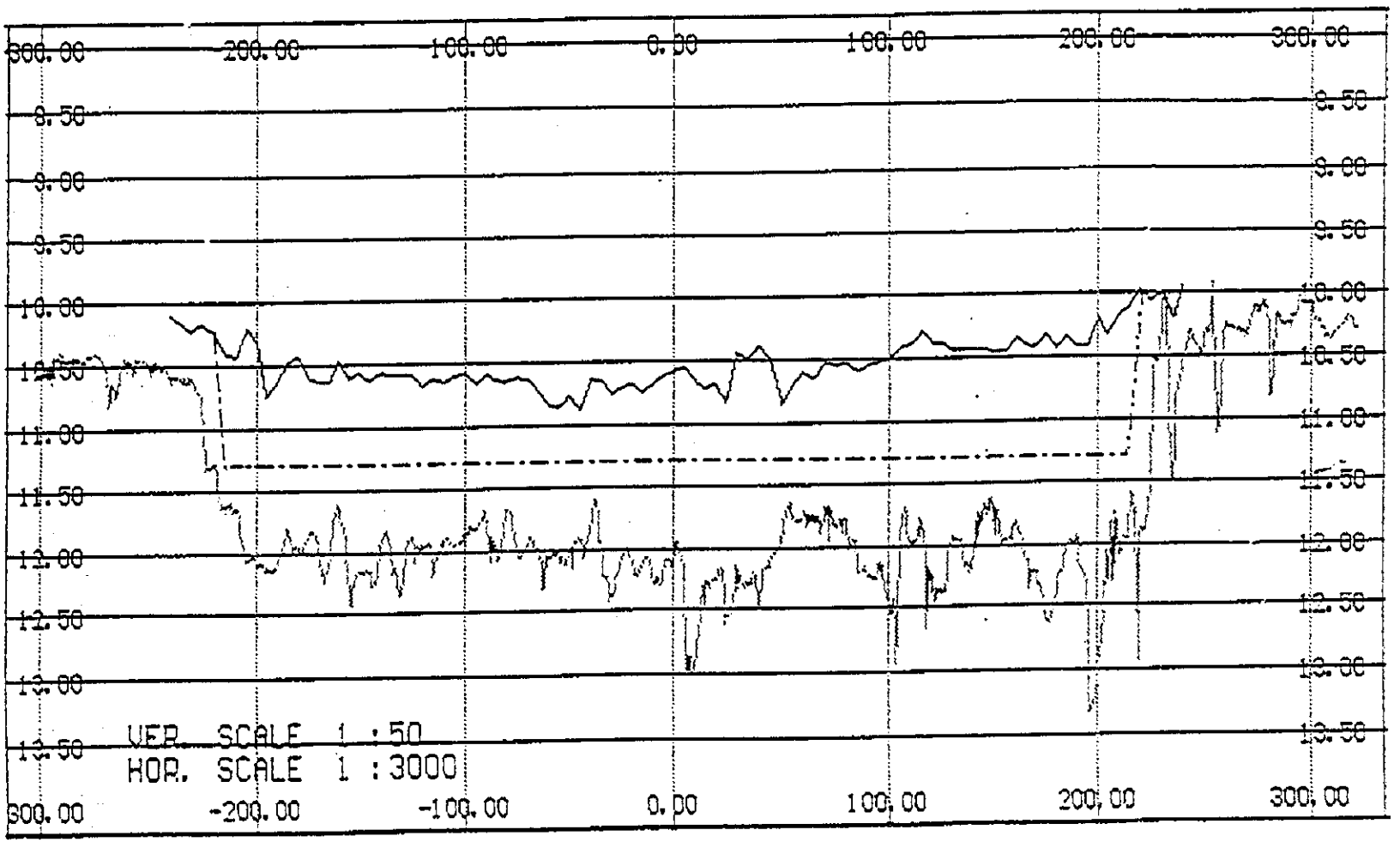
Sl. No.	Location	Volume dredged (000' m^3)	Rate (Rs./m^3)	Cost (Rs. Million)
1	Indira Dock A Channel	733	40.00	29.3
2	Indira Dock B Channel	255	45.00	11.5
3	BPX, BPS & East Mole	88	45.00	4.0
4	L. Dock H. Wall, T and L Berth	194	45.00	8.7
5	L. Dock Entrance Lock	3	80.00	0.2
6	Prince's Dock	149	80.00	11.9
7	Victoria Dock	171	80.00	13.7
8	Ferry Wharf Berth & FT Jetty	92	35.00	3.2
9	P&V Channel	442	35.00	15.5
10	Dredger and Barge Berth	90	35.00	3.2
11	Workshop Slipway (Near MDL)	16	35.00	0.6
12	Appolo Bunder	110	35.00	3.9
13	Pir Pau Channel (old), T.C & Berth	870	35.00	30.5
14	Pir Pau New. T C, Channel & Berth	50	35.00	1.8
15	Channel Opp. J D.	82	43.40	3.6
16	Main Channel Sec III	999	26.25	26.2
17	" Sec IV - A	728	33.50	24.4
18	" Sec IV - B	1085	33.50	36.3
19	" Sec IV - C	1223	33.50	41.0
20	" Sec V - 1	846	43.25	36.6
21	" Sec V - 2	266	45.00	12.0

Note: Volumes and costs have been rounded off. Source : MBPT

After awarding the work, the entire area to be dredged was surveyed and recorded by Ham under the supervision of MBPT. On completion of dredging, the dredged areas were again surveyed by Ham. The volume dredged was based on the quantities estimated from pre and post dredge survey results. It was observed that the volume dredged during the first phase is about 15 percent more than that provided in the BOQ which is well within the additional volume anticipated by MBPT.

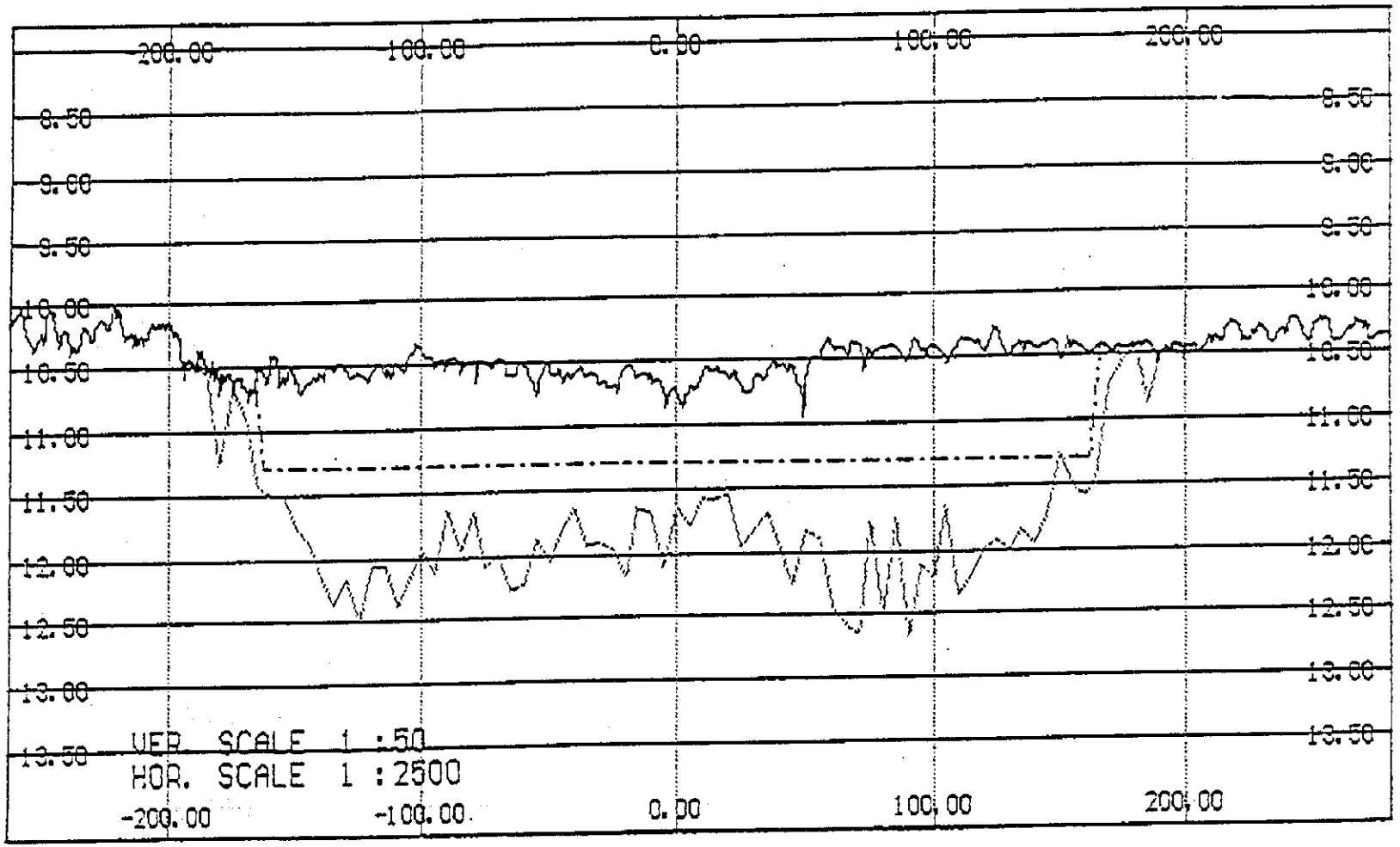
If the dredging program adopted in Table 7.4.5 is strictly adhered to, it will provide some very useful information on the rate of annual siltation in different areas in the harbour. It is understandable that the results will not necessarily indicate that the annual siltation will be the same each year, since the parameters responsible for the process of siltation can vary. However, the results will give a fairly good indication of the amount of annual siltation and or at least confirm the rate of siltation presently being adopted by MBPT. The survey results of recent dredging carried out by Ham for some of the areas namely, Main channel, Indira Dock channel and P&Vchannel are presented in Figure 7.4.1 to 7.4.4.

Since 1986, MBPT's own dredgers have been catering to the requirement of dredging in the docks and to limited areas beyond the docks. The annual volume of maintenance dredging carried out by MBPT's dredgers and corresponding cost incurred during the last 5 years is presented in Table 7.4.7 and 7.4.8 respectively. From Table 7.4.7 and 7.4.8 it can be inferred that although for the years 1994 and 1995 there is a sudden drop in the volume dredged, the rate per cubic metre has more than doubled when compared to 1993. The reason for this can be attributed to either long period layoff or inefficiency of the dredgers.



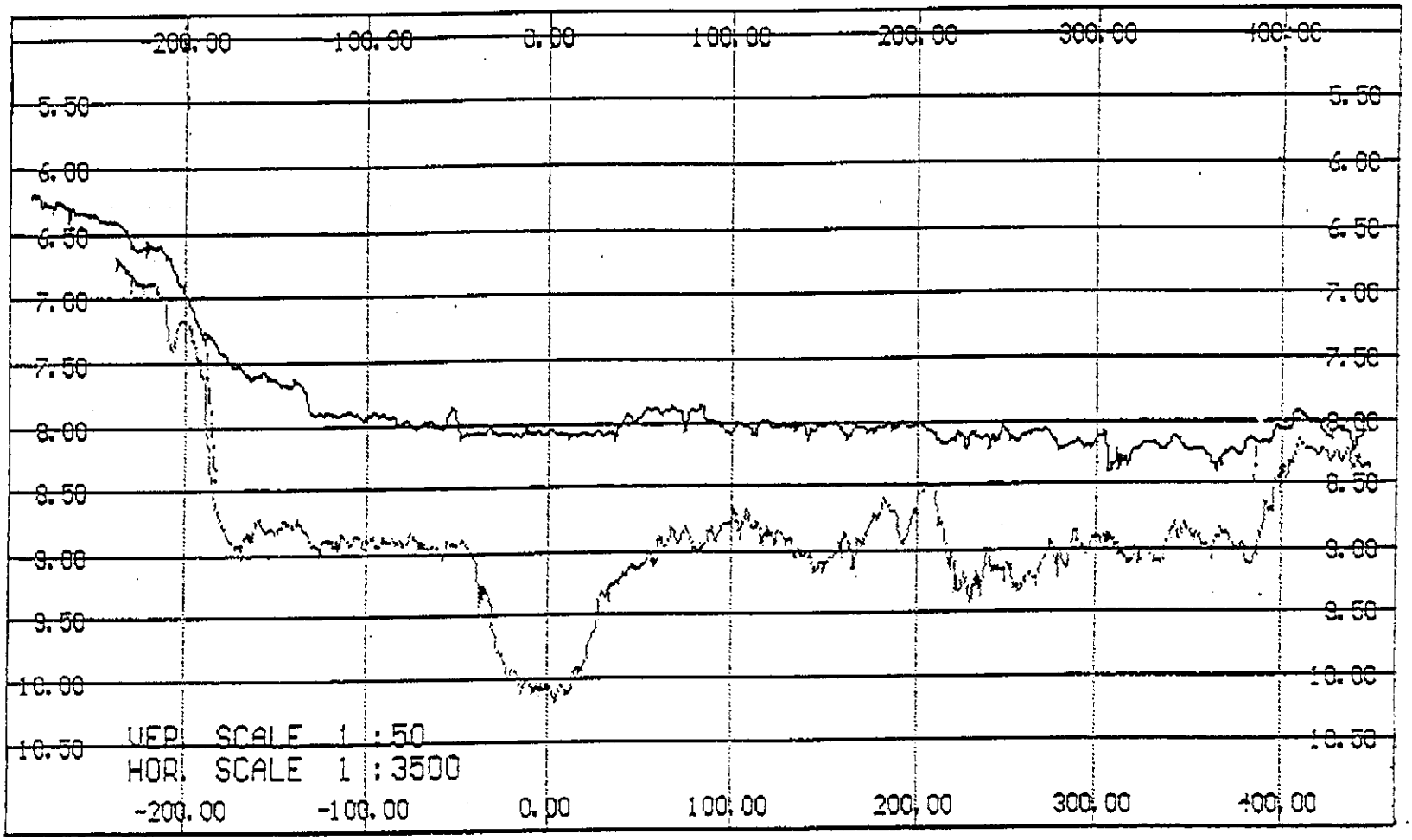
Source : MBPT

Figure 7.4.1 Typical Cross Section of Main Channel (Section 4A)



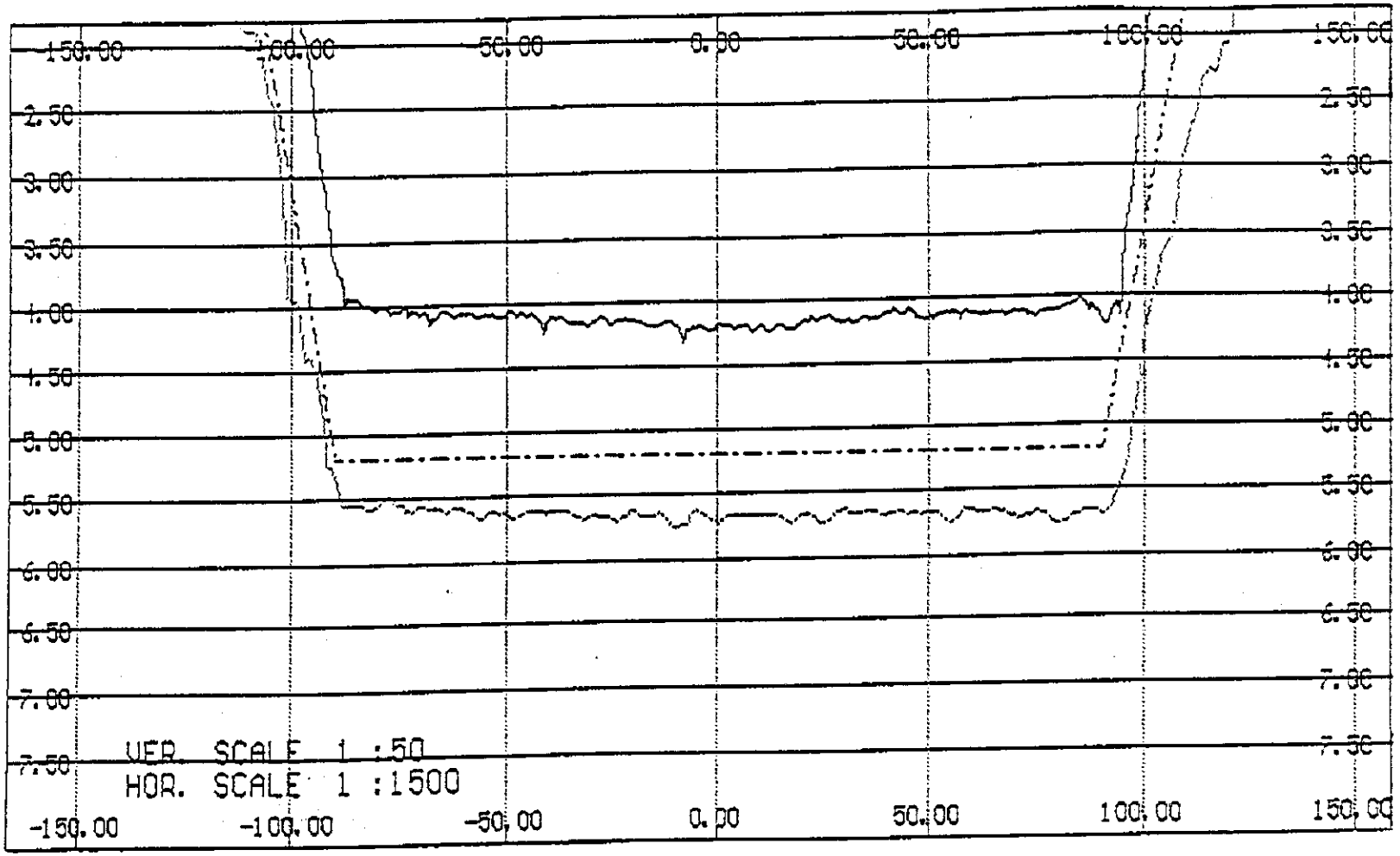
Source : MBPT

Figure 7.4.2 Typical Cross Section of Main Channel (Section 4C)



Source : MBPT

Figure 7.4.3 Typical Cross Section of Indira Dock Channel



Source : MBPT

Figure 7.4.4 Typical Cross Section of P & V Docks Channel

Table 7.4.7 Volume of Annual Maintenance Dredging by MBPT Dredgers

(Volume in m3)

Sl. No.	Location	1991-92	1992-93	1993-94	1994-95	1995-96
1	Indira Dock	74,601	29,250	66,977	59,180	49,653
2	Indira Dock Entrance	21,817	5,111	109,737	3,044	
3	B.P.S. B.P.X. &East Mole	29,142	3,026			11,405
4	Indira Dock Harbour Walls	21,827	4,077			9,723
5	Prince's Dock	82,255	64,612	52,395	21,910	73,027
6	Prince's Dock Entrance	42,384	12,461	25,202	14,302	2,900
7	P.DK. H. Wall and its Approaches	12,044	12,730	27,849	3,188	9,100
8	Victoria Dock	63,519	27,030	29,753	21,196	48,343
9	Victoria Dock Entrance	15,911	27,852	23,494		9,263
10	V.DK. H. Walls Barge Berth/Tug Berth etc.	34,649	40,968	40,476	8,111	42,587
11	M.O.T. Jawahar Island Berth	3,524	6,510	4,384	2,694	15,508
12	Pir Pau Pier Head/ Jetty	5,251	14,880	34,503	70,660	36,508
13	Ferry Wharf Terminal	76,743	22,646	55,350	126,294	87,301
14	Bunder Basins and Miscellaneous	77,202	3,646	51,614	11,160	
15	Indira Dock Entrance Channel	391520				
16	Indira Dock Approach Channel	367,339	359,432	52,543	2,790	
17	Indira Dock Harbour Wall Channel	-	165,071			18,627
18	P&V. Channel	274,599	127,362	165,789	19,484	9,273
19	Pir Pau Channel Including T.Circle	25,109	93,527	63,739	498	6,648
20	O.N.G.C. Channel		649			22,177
21	O.N.G.C. Jetty				1,356	3,616
22	Tanker Anchorage		10,230	1,860	151,585	
	Total	1,619,436	1,031,070	805,665	517,452	455,659

Source : MBPT

Table 7.4.8 Cost of Annual Maintenance Dredging by MBPT Dredgers

Sl. No.	Year	Total Volume Dredged (Million m^3)	Total Cost (Rs. Million)	Rate (Rs./m^3)
1	1991-92	1.62	65.20	40.25
2	1992-93	1.06	70.00	65.80
3	1993-94	0.80	45.00	55.90
4	1994-95	0.52	81.30	157.10
5	1995-96	0.46	71.60	156.10

Note: Volumes and costs have been rounded off.

Source : MBPT

7.4.4 Capital Dredging

There had been no capital dredging carried out since 1982 after deepening the main channel to - 11m CD until recently in 1994, i.e. during construction of New Pir Pau oil and chemical berth, when the approach channel including turning circle and area in front of the proposed berth were dredged to - 9m CD. The total cost incurred for the dredging was Rs.166.63 Million. The volume of material dredged and rate of dredging for both soft and hard/ rock are given in Table 7.4.9.

Table 7.4.9 Volume Dredged and Rate of Soft and Hard Material Dredged

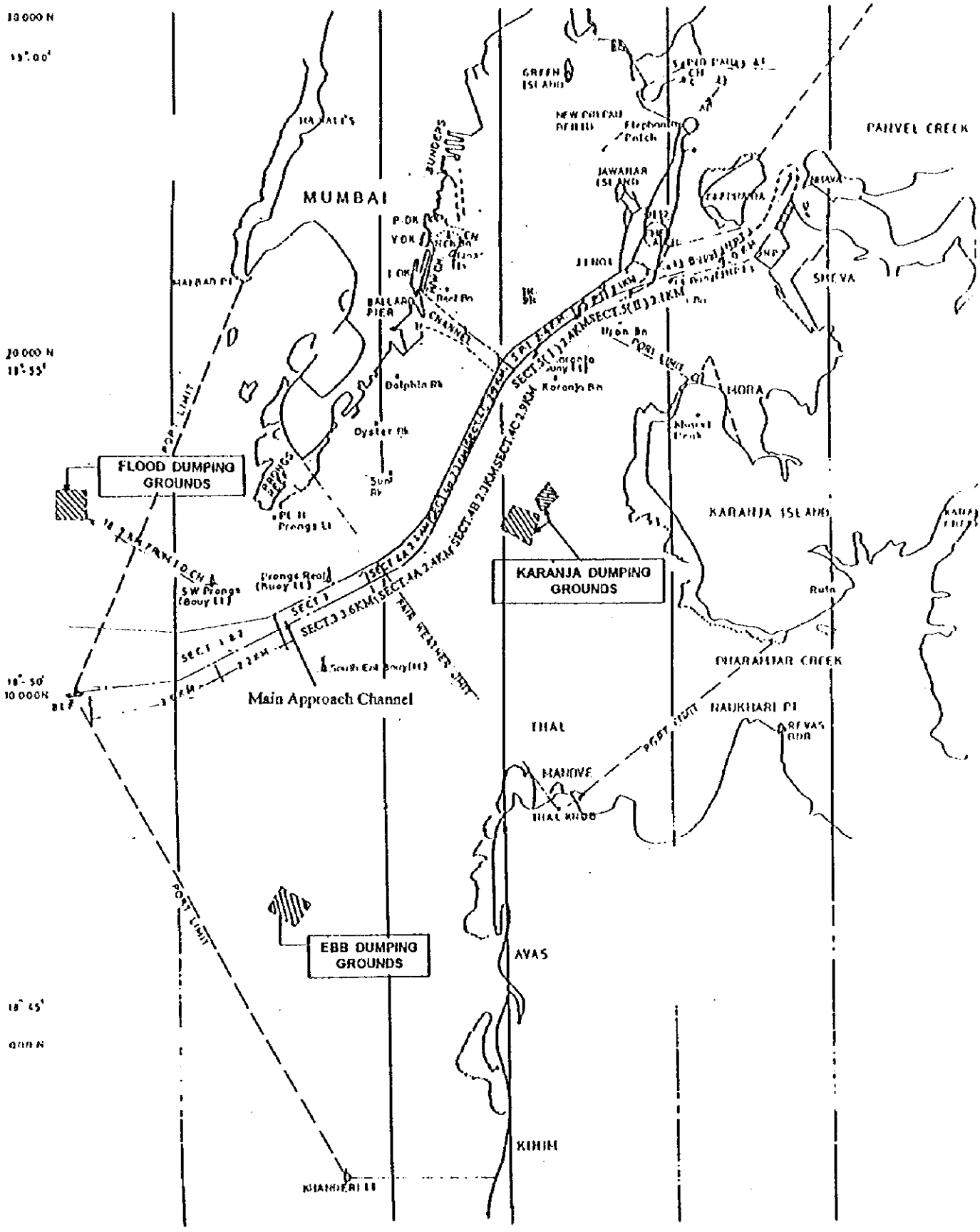
Type	Volume (m^3)	Rate Rs./m^3
Soft	757,155	69
Hard / Rock	24,406	2,060

7.4.5 Dumping Grounds

There are three dumping grounds identified by MBPT where the dredge spoil is presently being discharged. The dumping ground located south of Karanja Buoy and east of main channel is being used for disposal of material dredged by the Navy from around Karanja jetty area and small quantities dredged by MBPT in the port area.

With the ebb and flood tide being quite active in the Mumbai harbour, two more dumping grounds at a distance of about 18.7 km from the Indira dock channel have been earmarked.

The ebb dumping ground is located at the south of the south entrance buoy light within the port limits. The flood dumping ground is located just beyond the port limits to the north west of the south west Prongs buoy light. The two dumping grounds cover an area of one Square km each. The major quantities dredged from the harbour are dumped either at the ebb or flood dumping grounds depending on the prevailing tide condition. The location of the ebb and flood dumping grounds are indicated in Figure 7.4.5.



Source : MBPT

Figure 7.4.5 Location of Dredge Spoil Dumping Grounds

7.5 Dredging Vessels

MBPT owns four dredgers at present, i.e. 3 Nos. of grab-bucket dredger and 1 No. of backhoe dredger, of which hull dimensions and dredging capacity are shown in Table 7.5.1. Due to the dredging mechanism their dredging capacity is not so big, but they are suitable for dredging at small and/or narrow dredging areas, areas along and/or near wharves and marine structures, etc. As seen in Table 7.4.7, locations where maintenance dredging was carried out by them are inside of Indira Dock, Prince's Dock and Victoria Dock, their entrances, dock harbour wall berths for ships, tugs and barges, oil jetties, entrance/approach channels, etc.

Table 7.5.2 shows the performance of these dredgers for the latest two years. Non-working days occupied about 36% to 61% of the annual workable days, or maximum availability (Gross) during the year, resulting from the fact that some of the dredgers spent many days for major and minor repairs. Usually dredging days are limited because of ships' berthing schedule. Therefore, it is required that they must shift quickly, carry out dredging with high efficiency by minimizing non-working days.

Table 7.5.1 Dredgers owned by MBPT

Name of vessel	Type of dredger	Hull dimensions (m)				Main engine	Speed (kt)	Max. dredging depth (m)	Hopper capacity (m^3)	Rated dredging capacity (m^3/h)	Year of built
		Length	Breadth	Depth	Draft						
VIRAT	Grab	65.90	14.00	6.00	4.15	1,275HP x 2	11.5	20.0	890.00	---	1978
VISHWAMITRA	Grab	21.00	9.50	2.00	1.00	ditto		20.0	890.00	2.23	1983
VALMIKI	Grab	21.00	9.50	2.00	1.00	ditto		20.0	890.00	2.23	1984
B.D.VASANT	Backhoe	25.00	9.50	2.00	1.40	ditto		12.0	---	Bucket 2.0m3	1986

(Source : MBPT)

Table 7.5.2 Performance of Dredgers of MBPT

SR No.	Description		Virat		Valmiki		Vishwamitra		Vasanth	
			1994-95	1995-96	1994-95	1995-96	1994-95	1995-96	1994-95	1995-96
1	Quantity dredged	(m^3)	82,413	221,112	118,759	92,821	130,886	94,134	12,428	50,592
2	Working days	(day)	82.5	223.5	246.5	219	247.5	233	36	114
3	Non-working days	(day)	282.5	142.5	118.5	147	117.5	133	329	222
	(1) Weekly offs and holidays		61	65	61	65	61	65	61	65
	(2) Annual overhaul		204	0	0	0	0	0	0	0
	a) Dry docking		204	0	0	0	0	0	0	0
	b) Repair berth		0	0	0	0	0	0	0	0
	(3) Major and minor repairs		11.5	59	33.5	38.5	21	20	257.5	90.5
	(4) Shortage of officers/crew		3.5	10.5	5	1.5	1	0.5	2	5.5
	(5) Bad weather		0.5	0	0	0	0	0	0	0
	(6) Shortage of empty hopper barges		0	0.5	11	20	26	30.5	7	38
	(7) Shortage of tugs		0	0	2	3	0	8	0	15
	(8) Other reasons		2	7.5	6	19	8.5	9	1.5	8
	(9) Strike		0	0	0	0	0	0	0	0
4	Quantity dredged per working day	(m^3)	4,042	12,013	5,758	5,088	6,281	4,795	1,577	4,256
5	Direct cost per cubic meter of dredging	(Rs.)	247.73	110.57	29.33	145.96	30.44	142.33	308.79	257.79

(Source : Administration Report of MBPT)

Note : Quantity dredged is on the basis of Hopper volume.

7.6 Dredging Implementation

7.6.1 General

Based on the dredging guide, which was formulated by MBPT in 1984 and indicates the probable average rate of siltation for different areas and periodicity of surveys to be carried out so as to keep a check on the availability of minimum working depths in the port, maintenance dredging has been carried out in the respective areas which reveal siltation beyond permissible limits.

Until 1986, maintenance dredging was being carried out exclusively by MBPT's own dredgers. Between 1986 to 1994, Dredging Corporation of India (DCI) was directly authorized by MBPT to carry out the major part of maintenance dredging, especially in the main channels. From 1994 MBPT adopted the procedure of selecting contractors based on open tenders for supplementing the dredging. Presently dredging is carried out by the selected contractor for some of the areas in the harbour, in addition to ongoing dredging activities by DCI.

Main channels need to be dredged about once every 3 year, and the remaining areas normally need to be dredged once a year, just after the south west monsoon period is over. For areas within the docks and at shallow berths in the harbour, maintenance dredging is carried out on an "as and when required" basis all around the year, depending on the results of periodic hydrographic surveys. Based on the Port's experience over the years, a dredging program was formulated and incorporated in the tender. Table 7.4.5 shows the tentative schedule for maintenance dredging.

7.6.2 Dredging implementation

There are strict restrictions on dredging, including possible days to facilitate dredging of the areas and securing least influence to movement of the vessels. The tender specifications provided by MBPT define the frequency of dredging, considering siltation during the contract period. The estimate of the quantity to be dredged during each operation is estimated by (Area to be dredged) x (Original deepened level - Level to be maintained) and hence the quantity provided in the B.O.Q. are inherently approximate and are expected to hold good within ±

25%.

Payment for dredging, the main channel was based on rate per cubic meter dredged by calculating the volume from results of pre and post dredging surveys. Cost for chartering the dredger was on the basis of daily hire charge for the dredger plus cost per number of hopper loads transported.

The followings are a part of directions with respect to frequency of dredging, written in the Specifications of MBPT.

Main harbour channel : The major amount of siltation seems to occur during the monsoon months of June to September every year. But the tidal currents have a fairly strong flushing action. If the channel is dredged to the levels indicated, after a monsoon, (i.e. after December/ January) the declared depths are likely to be available for a period of 3 years.

The bidder may, therefore, assume that this channel would require a single dredging operation to originally deepened level during December/January to March/April.

The Indira, Prince's & Victoria Dock approach channels : These channels are across the tidal currents and are therefore susceptible to siltation more often. In addition, the flanks of the Prince's & Victoria Dock channel are fairly high and sustained siltation throughout the year and more intensively during the monsoon months is observed.

The bidder may assume that Indira Dock Approach Channel and P. & V. Dock Channel require one dredging operations respectively to originally deepened levels in a year.

Indira Dock entrance, East Mole, BPS &BPX, Indira Dock harbour wall berths and Indira Dock harbour wall channels : The areas are susceptible to sustained siltation basically because of an eddy and the rate of siltation is accentuated during monsoon.

The bidder may assume that these areas would require at least one dredging operation to originally deepened levels just after the monsoon.

Impounded basins of Indira, Prince's & Victoria Dock : The siltation is generally caused by density currents which are caused when the gates are fully open and/or by deposition of suspended silt during the period the gates are closed. The siltation in the flanks of the turning circles within the basin is accentuated by the disturbances caused by the turning of the vessels.

The bidder may assume that these areas could need after monsoon one dredging operation to about 0.3 m below the depths required to be maintained.

Pir Pau Pier (New) & Channel : These are in natural deep waters except that the berth and

turning circle of the new Pier are deepened by about 1 m to 2 m below their original natural level.

The bidder may assume that the channel would require one dredging operation every two years after monsoon and that the berth would need one dredging operations each year immediately after monsoon of each year.

Chapter VIII Present Management and Administration of the Port of Mumbai (MBP) and Jawaharlal Nehru Port (JNP)

8.1 Outline of the Port Trusts

8.1.1 Mumbai Port Trust (MBPT)

The Bombay Port Trust was constituted in 1873 under the Bombay Port Trust Act of 1873 with power to levy wharfage, port dues, pilotage fees, etc. The activities of the port are regulated by the Major Port Trust Act, 1963 with effect from 1st February 1975.

On 8th January 1996 the name of Bombay Port Trust was changed to Mumbai Port Trust in accordance with renaming the surrounding city Mumbai in 1995.

The Trust is administrated by the Board of 21 Trustees. The Chairman of the Board of Trustees is the Chief Executive of the Port. He exercises supervision and control over the day-to-day activities of the Port. He functions as the administrative head for all the Port employees. Other Trustees are officials and non-officials representing the principal chambers of commerce, customs, railways, civic body, labor employed in the Port etc. Figure 8.1.1 shows the organization structure of the MBPT. Table 8.1.1 shows staff strength of the MBPT by sector as of June 1996. Table 8.1.2 and Figure 8.1.2 show the trend of number of staff and workers.

The Mumbai Port Trust administration comprises 16 departments. Each department's responsibility is as follows.

(1) Manager (Services and O&M)	Administrative policy matters
(2) Secretary	Convening of meeting of the Board & Standing committees and coordination
(3) Chief Personnel and Industrial Relations Manager	Matters pertaining to industrial relations
(4) Accounts	Accounts and finance
(5) Civil Engineering	All civil engineering works
(6) Mechanical Engineering	Mechanical and electrical works

(7) Docks	Traffic
(8) Port	Marine operations
(9) Stores	Purchase of stores
(10) Estate	Management of port estates
(11) Medical	Management of hospital and medical care of port employees
(12) Labour	Staff welfare and dock safety
(13) Planning & Research	Maintenance of port statistics, carrying out research and investigations on problems relating to port working, computerization of port activities and providing telecommunication facilities
(14) Vigilance	Vigilance matters
(15) Legal	Advice on legal matters, filing of suits, etc.
(16) Railways	Railway operations

8.1.2 Jawaharlal Nehru Port Trust (JNPT)

The Nava Sheva Port Trust was established in 1982. In May 1989 the port began to operate and the port was named Jawaharlal Nehru Port. The name of the Port Trust was also changed to Jawaharlal Nehru Port Trust. Figure 8.1.3 shows the organization structure of the JNPT. The number of staff is 1778 as of 31st March 1997.

8.1.3 Personnel Management of MBPT

(1) Recruitment of employees

Recruitment for all the posts is done by open advertisement. For officers, applications are invited from all over the country. Recruitment of Class III and IV employees are restricted generally to those who are domiciled in Maharashtra State, preferably registered in local Employment Exchanges. During recruitment, the Port administration follows the reservation policy of the Government of India whereby the disadvantaged sections of the population such as

Scheduled Castes, Scheduled Tribes, Other Backward Communities, physically handicapped, ex-servicemen, etc. are given a specified percentage of positions (not exceeding 50%). In addition, dependents of employees who are medically incapacitated or have died in service are given preference for certain categories of Class III and IV positions.

(2) Transfer, job rotation

Transfer is generally confined within the department to which an employee is initially posted. Rotation within the department is generally conducted every three years.

(3) Job evaluation

Annual Confidential Reports (ACR) in respect of all the employees except Class IV staff are maintained. ACRs contain a broad evaluation of the performance of an employee throughout the year by his/her immediate superior as well as the Head of Department or/and Chairman/Deputy Chairman. Orders relating to any commentary or disciplinary action are also kept in the employees' ACR folder.

(4) Training plan or system for employees

On joining, all the employees have to participate in a two-day induction training program. Furthermore, employees of the operational/maintenance departments join training courses periodically in their respective areas. Before being promoted to higher grades in semi-skilled/skilled categories, employees have to take relevant skill-tests. Office staff also join training courses periodically in specific areas such as computer operations, income tax computing, reservation in services, establishment matters, etc. Mumbai Port Trust has training facilities at the Management Training Center. Officers are often assigned to join the training courses at Indian Institute of Port Management, Calcutta and National Institute of Port Management, Chennai. A few officers are also dispatched abroad for specialized training programs under the Colombo Plan or conducted by UNDP, IMO etc.

(5) Promotion

Promotion at every level is subject to vacancy. Among the class III and IV categories, promotions are based on seniority-cum-suitability. Whereas, promotions among officers are

broadly based on selection/ranking i.e. officers ranked "Outstanding" or "Very Good" may supersede a senior who is ranked "Good" or "Very good", respectively.

(6) Retirement age

Retirement age is 58 years. This may be extended to 60 if the Government takes a policy decision on the basis of the recommendation made by the Fifth Pay Commission.

(7) Early retirement program

Under the regular scheme, employees who are 50 years old or have completed 20 years of service are entitled to retire voluntarily by giving three months' notice. A Special Voluntary Retirement Scheme introduced in 1992 provided for payment of special compensation @ 1 1/2 months' wages (Basic + Dearness Allowance) for every year of completed service or full wages for the balance services, whichever is less.

Abolition of posts with equal financial implications were a precondition under this scheme. Under the scheme about 1,800 employees of Mumbai Port Trust and 1,650 employees of Dock Labour Board retired prematurely.

(8) Leave

All employees are entitled to 30 days Paid Leave and 20 days Half Pay Leave (which could be commuted to 10 days' full pay leave, on medical grounds) every year of completed service. Paid Leave could be encashed during the service as well as on superannuation/retirement (up to 240 days). In addition all employees are granted 20 days Casual Leave every year. Moreover, indoor employees are granted holidays declared by the State Government (around 20 days every year). While outdoor categories of employees (generally, those attached to port operations and maintenance) are entitled to 13 holidays, marine officers/employees are being granted only 12 holidays in a year. Similarly, while indoor staff have a seven-hour working day (inclusive of half-an-hour recess), outdoor staff has an eight-hour working day (exclusive of recess). Also, while indoor offices are closed on second and fourth Saturdays, outdoor employees have a six-day week.

(9) Fringe benefit, welfare

The administration has provided residential accommodation as shown below as of 31st March 1997.

Class I & II officers	Class III-A	Class III-B	Class III-C	Class IV	Total
281	48	838	1732	4230	7129

The administration goal is to provide housing for 40% of its workers in each class. At present, 20.15% of Class IV workers enjoy this benefit while the rate is 25.02% for Class III workers.

Standard Rent for Residence

1) Pay in the scale effective from 1 Jan.93 if less than Rs. 2,220 per month.
   Standard rent or 7.5% of pay, whichever is less.
2) Pay in the scale effective from 1 Jan.93 is Rs. 2,220 or more per month.
   Standard rent or 10% of pay, whichever is less.

Fixed Standard Rent sanctioned under T.R. No. 678 of 22nd December 1994 with effect from 1st July 1993 is as follows:

Type of Quarters	Standard Rent per month
Class IV	Rs.37
Class III-C	Rs.47
Class III-B	Rs.85
Class III-A	Rs.108

Free quarters are provided to certain categories of Port Trust employees.

(10) Pension Scheme

The administration has introduced a Pension Scheme from 5 Oct. 1965. The Mumbai Port Trust Pension Scheme is based on the Central Government Liberalized Pension Scheme. It

provides for

(a) Superannuation Compensation pension,

(b) Retiring Pension,

(c) Compensation/Invalid Pension,

(d) Death-cum-Retirement/Service Gratuity in lieu of Pension,

(e) Family Pension

and (f) Ex-gratia payment.

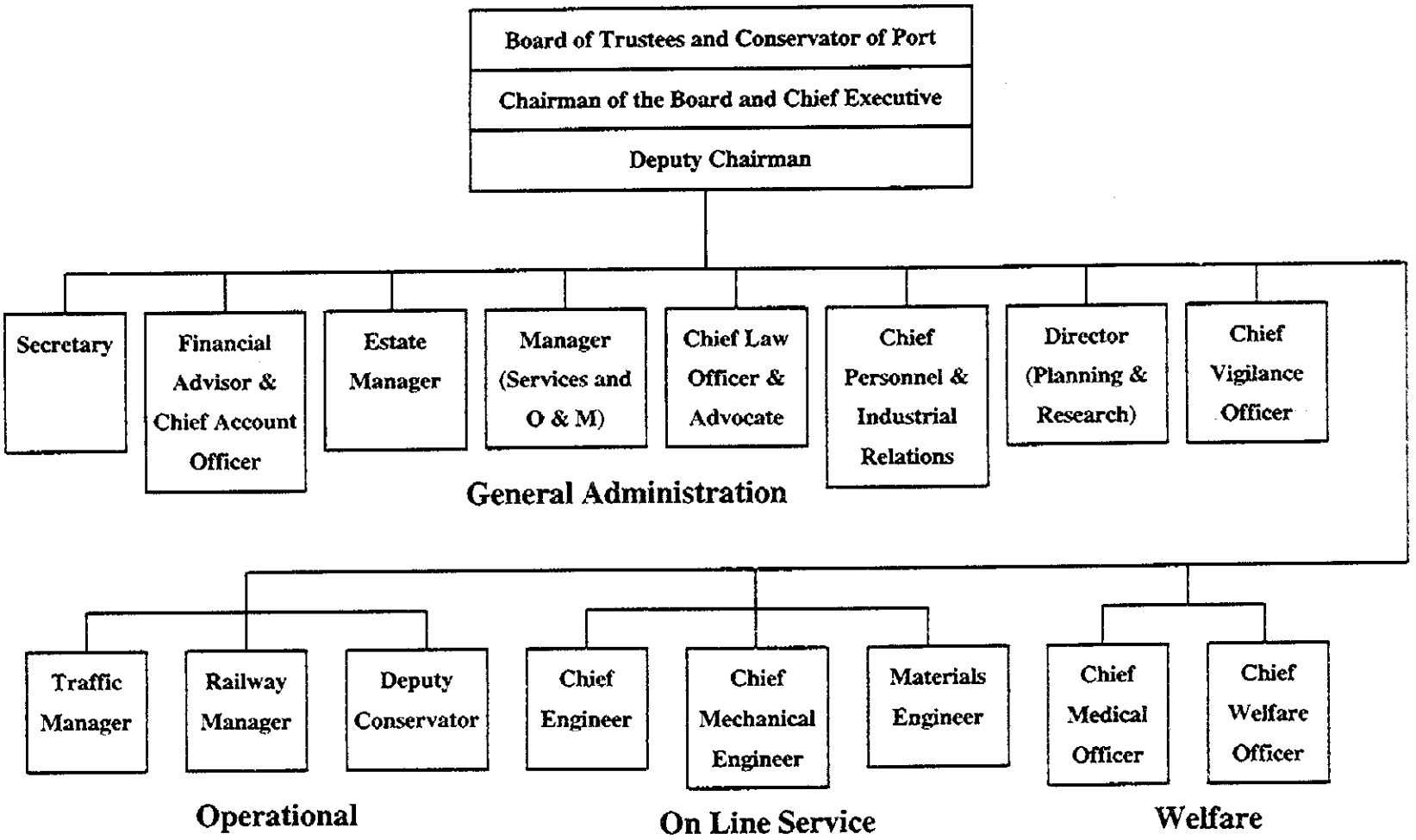


Figure 8.1.1 Organization Structure of MBPT

Source : MBPT Brochure

Table 8.1.1 Staff Strength of MBPT

As of June 1996

Department	Class 1	Class 3	Class 4	Total
Accounts	31	512	110	653
Legal	7	15	12	34
Estate	7	99	80	186
Stores	17	196	210	423
Secretary *	149	406	54	609
Labour	17	183	556	756
Medical	83	343	786	1,212
Port	95	859	1,543	2,497
Docks	47	2,997	1,168	4,212
Railway	5	351	544	900
Chief Engineer	55	677	1,657	2,389
Chief Mechanical Engineer	93	2,459	2,059	4,611
Security	13	32	766	811
Total	619	9,129	9,545	19,293
Shore Labour				6,083
Total				25,376

* Includes staff of CPIRM, Vigilance, D(P&R) and M(SOM)

Source : MBPT

Table 8.1.2 Trend of Number of Staff and Workers

As of 31March	Staff	On Shore Workers	On Board Workers	Total
1991	23,478	6,707	8,645	38,830
1992	23,338	6,565	8,198	38,101
1993	20,255	6,359	7,696	34,310
1994	20,292	6,260	7,948	34,500
1995	19,577	6,206	7,870	33,653
1996	18,927	6,109	7,412	32,448
1997	19,282	5,990	7543*	32,815

* As of 1st Jan.

Source : MBPT 112th-118th Administration Report,
Port of Mumbai Brochure, 1997

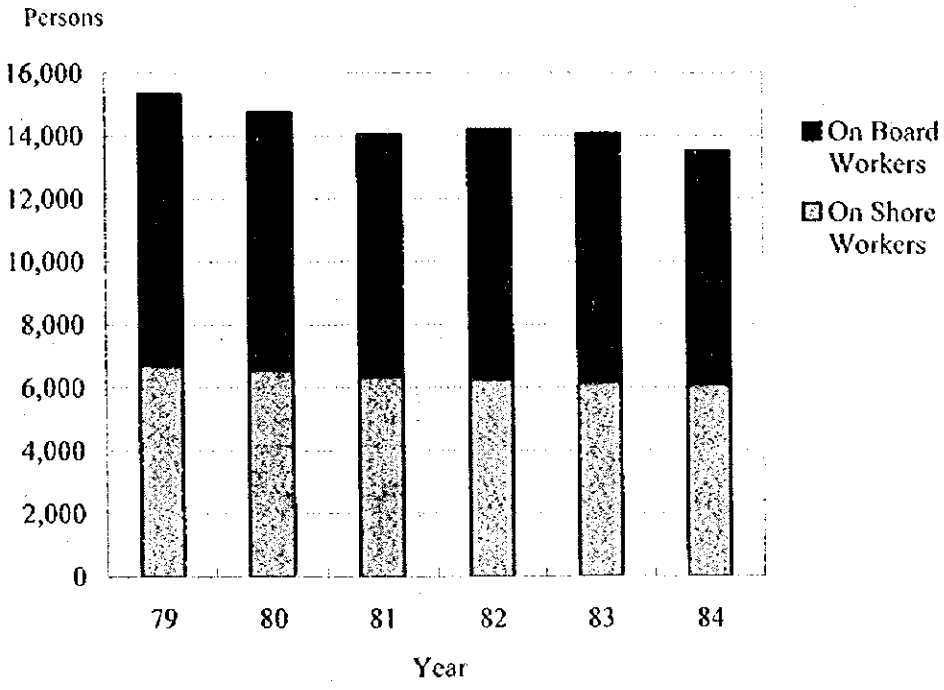


Figure 8.1.2 Trend of Number of On-Board and On-shore Workers

Source : MBPT 112th-118th Administration Report,
Port of Mumbai Brochure, 1997

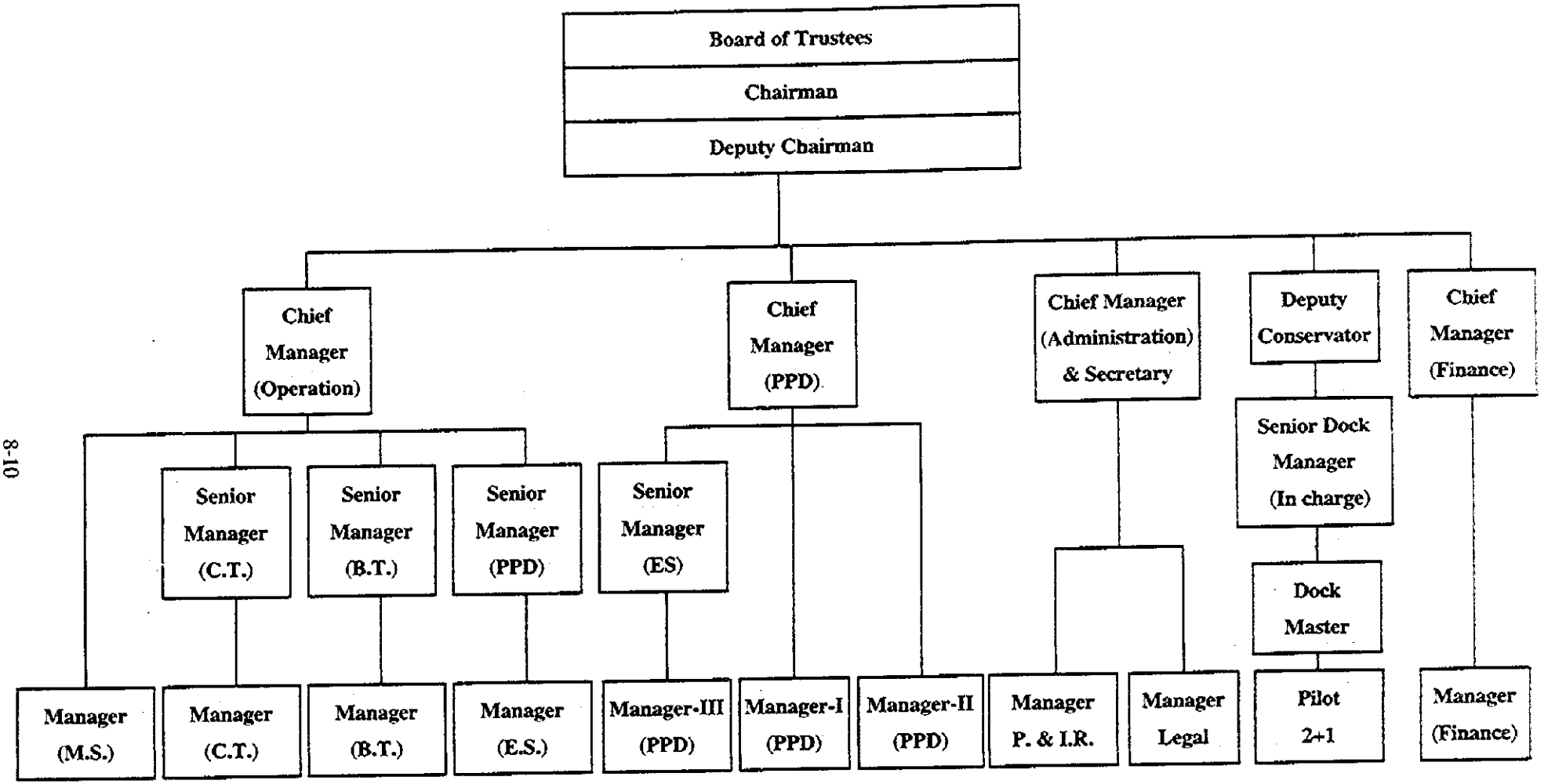


Figure 8.1.3 Organization Structure of JNPT

Source : JNPT

8.2 Present Port Tariff, Charges and Dues (MBPT)

8.2.1 General

MBPT renders services concerning cargoes and vessels to port users especially shipping companies and agents. These services are divided into two principal activities, 'Cargo handling and Storage' and 'Port & Dock Facilities to Shipping'. These two principal activities comprise the following main services:

(1) Cargo handling and storage
   (a) Handling and storage charges on general cargo
   (b) Storage charge in warehouses
   (c) Container handling
   (d) Handling POL

(2) Port & Dock facilities to shipping
   (a) Pilotage, Towage
   (b) Berthing facilities
   (c) Port services
   (d) Dry docking facilities
   (e) Water supply to shipping

Besides above-mentioned services, MBPT leases its own real estate and runs its own railway.

8.2.2 Port Dues

	Rate per GRT		
Size of vessel (GRT)	Foreign-going	Coasting	How often Payable
3,000t and upwards	US$ 0.17	Rs. 1.6	Once in the same month
Under 3,000t	US$ 0.12	Rs. 1.1	Once in the same month

Foreign-going vessel means a vessel employed in trading between any port or place in India and any other port or place or between ports or places outside India.

Coasting vessel means a vessel engaged in the carriage by sea of passenger or goods from any port or place in India to any other port or place in India.

8.2.3 Berth Hire

	Rate for GRT per day or part thereof	
Vessels berthed at	Coasting	Foreign going
Indira Dock, its harbor wall, Ballard Pier, Ballard Pier Extension, Prince's Dock, Victoria Docks and its harbor wall	Rs. 2.2	US$ 0.14

Minimum chargeable 1,000 GRT

8.2.4 Pilotage, Tug Assistance, Towage

(1) Vessels maneuvering with main engines

	Rate per GRT per day	
Nature of Movement	Coasting (Rs.)	Foreign Going(US$)
Sea to Dock & Dock to Sea with tug assistance	3.5	0.24
Sea to Stream & Stream to Sea without tug assistance	0.55	0.04
Stream to Dock & Dock to Stream		
(1) Vessels not requiring tug assistance	0.55	0.04
(2) Vessels requiring tug assistance	3.35	0.23
One Dock to another Dock with tug assistance	1.6	0.11
Stream to Stream without tug assistance	0.2	0.02
Dock to Jawahar Dweep / Pir Pau or vice versa with tug assistance	2.3	0.16

(2) Vessels maneuvering without engines (towage charges payable in addition to above charges)

From Dock Entrance to any moorings / anchorage berth or from one anchorage to another in the harbor South of Sunk Rock (A line of anchorages) up to Mumbai Floating Light or vice versa	3.35	0.23
From Dock Entrance to any moorings / anchorage berth or from one anchorage to another in the harbor North of Sunk Rock (A line of anchorages) or vice versa Or From one anchorage berth in the South of	1.6	0.11

Sunk Rock to another anchorage berth in the North of Sunk Rock or vice versa	1.4	0.1

(3)Charges for Harbor Tug for mooring a Vessel which has dragged her anchors

Coastal	Foreign going
Rs. 1	US$ 0.07

(4)

1) For the movement of offshore supply vessels from Nhava consisting maximum of six movements viz. Sea to barge berth, barge berth to channel, channel to Nhava and vice versa	2.8	0.19
2) For every additional movement	0.55	0.04

(5) For tugs and self propelled barges

Sea to Dock and Dock to Sea	1.05	0.08
Sea to Stream and Stream to Sea	0.7	0.05
Stream to Dock and Dock to Stream	0.7	0.05

8.2.5 Mooring Fees (Rate per day or part thereof)

Unit Coasting : Rs., Foreign going : US$

Vessel's GRT		First 30 days	From 31st to 60th day	From 61st to 90th day	Beyond 90 days
Up to 4,999	Coasting	385	581	770	1,155
	Foreign going	26.5	39.5	52.5	78.5
5,000 to 9,999	Coasting	504	756	1,001	1,505
	Foreign going	34.5	51.5	68	102.5
10,000 to 14,999	Coasting	581	868	1,155	1,736
	Foreign going	39.5	59	78.5	118
15,000 to 19,999	Coasting	770	1,155	1,540	2,310
	Foreign going	52.2	78.5	104.5	157
20,000 to 24,999	Coasting	966	1,442	1,925	2,891
	Foreign going	66	98	131	196.5
25,000 to 29,999	Coasting	1,155	1,736	2,310	3,456
	Foreign going	78.5	118	157	235.5
30,000 and above	Coasting	1,351	2,030	2,695	4,046
	Foreign going	92	138	183	275

8.2.6 Attendance/Cancellation/Detention for Harbor Tug

	Coasting	Foreign going
Attendance by tug for a vessels on fire	Rs.7,700 for every 24 hours	US$ 523 for every 24 hours
Detention charges for cancellation of a tug	Rs.1,400 for every half an hour	US$ 95 for every half an hour
Attendance of a tug on a vessels at Jawahar Dweep/Pir Pau	Rs.17,500 for every 24 hours	US$ 1,188 for every 24 hours

8.2.7 Anchorage Fees

If a vessel remains at an anchorage for a period of 10 days from the day following the completion of its anchoring, anchorage fee will be levied as under.

Unit Coasting : Rs., Foreign going : US$

Vessel's GRT		First 10 days to 20th day	From 21st to 30th day	From 31st to 45th day	Beyond 45 days
Up to 4,999	Coasting	250	375	500	750
	Foreign going	24	36	48	72
5,000 to 9,999	Coasting	325	488	650	975
	Foreign going	31	47	62	93
10,000 to 14,999	Coasting	375	563	750	1,125
	Foreign going	36	54	72	108
15,000 to 19,999	Coasting	500	750	1,000	1,500
	Foreign going	48	72	95	143
20,000 to 24,999	Coasting	625	938	1,250	1,875
	Foreign going	60	90	119	179
25,000 to 29,999	Coasting	750	1,125	1,500	2,250
	Foreign going	72	107	143	214
30,000 and above	Coasting	875	1,313	1,750	2,625
	Foreign going	84	125	167	250

8.2.8 Charges on Cargo Containers, Containerized Cargo and Container Equipment

(1)Charges on cargo containers

Wharfage on cargo containers unloaded from/loaded into container vessels/other vessels

cargo container having a length up to 20 feet Rs.200 per unit

cargo container having over 20 feet and up to 40 feet Rs.300 per unit

(2) Charges on cargo containers and containerized cargo destined to / received from ICD payable by combined transport operators / agents of vessels

(a) Charges on cargo containers railed to the Docks/dispatched by rail to ICD

Loaded/empty containers having a length up to 20 feet Rs.1300 per unit

Loaded/empty containers having over 20 feet and up to 40 feet Rs.1950 per unit

(b) Charges on cargo containers received from/removed to ICD by road

Loaded/empty containers having a length up to 20 feet Rs.1300 per unit

Loaded/empty containers having over 20 feet and up to 40 feet Rs.1950 per unit

(c) Consolidated wharfage on cargo containers stuffed at factories

Containers having a length up to 20 feet Rs.1000 per unit

Containers having over 20 feet and up to 40 feet Rs.2000 per unit

(d) Consolidated wharfage on transhipment cargo in containers

Containers having a length up to 20 feet Rs.1200 per unit

Containers having over 20 feet and up to 40 feet Rs.2400 per unit

(3) Charges on container handling equipment

	Up to 20 feet	Over 20 feet up to 40 feet
Portainer	Rs.400 per move	Rs.800 per move
Transtainer/TLT	Rs.100 per move	Rs.150 per move
Trailer	Rs.300 per shift	Rs.600 per shift

(4) Charges for miscellaneous handling by portainer

(a) For opening hatch cover and placing it

by placing it on the quay (full cycle) Rs.1600

without placing on the quay Rs.800

(b) For discharging/loading heavy lifts per operation/move Rs.3200

8.2.9 License (storage) Fees on Containers for the Period of Storage of Containers

Except containers destined to or received from ICD and transhipped, demurrage on cargo in container shall not accrue for seven working days in respect of FCLs and ten working days in respect of LCLs following the GLD of the vessel.

(1) Rate per day or part thereof from the day prior to the day of shipment

(i.e. excluding the date of shipment)

	Up to 20 feet	Over 20 feet up to 40 feet
Loaded/empty container landed and stored or brought for export and stored anywhere in the declared customs areas of the port	US$2.5	US$5

(2) Rate per day or part thereof from the day following the GLD of the vessels or following the date of receipt whichever is later till the date of its removal.

	Up to 20 feet	Over 20 feet up to 40 feet
Empty container stored in the area other than the declared customs areas of the Port	US$0.5	US$1

(3) Rate per day or part thereof after the expiration of two days from the day following the GLD till the date of their loading on wagons or from two days following date of receipt of containers at RCD from the upcountry ICDs or storage yards till the date prior to the date of shipment (i.e. excluding date of shipment).

	Up to 20 feet	Over 20 feet up to 40 feet
Empty or loaded containers received from/dispatched to ICD by rail	US$2.5	US$5

In case a container is not removed / shipped within 10 days from the day following the GLD (import), or from the date of receipt (export)

	Up to 20 feet	Over 20 feet up to 40 feet
Per day or part thereof from 11thday	US$5	US$10

(4) Charges for Reefer Points Rs.800 per day for every reefer plug point allotted

8.2.10 Charges for Port Trust Labor for Stuffing or Destuffing of Cargo

	Per container
Container up to 20 feet	Rs.600
Container over 20 feet up to 40 feet	Rs.1200

8.2.11 Cranage

(1) Charges for use of crane vessels

	Per ton for each operation (Rs.)
For packages individually weighing up to 30t	440
For packages over 30t but not exceeding 60t	620
For packages over 60t but not exceeding 90t	960
For packages over 90t	1130

(2) Charges for fixed crane (60t) at Jetty end, Indira Dock

Rs.40 per ton per operation Minimum Rs.500

Charge for cancellation Rs.500

(3) Charges for Tata 'P & H' cranes (30t)

Rs.200 per ton Minimum Rs.1500

Cancellation charge is Rs.1500 unless 4 hours notice of cancellation is given.

8.2.12 Wharfage

Rate No.	Description of goods	Basis of charges	Import Rs.	Export Rs.
1	i) Animals, birds, reptiles, etc. ii) Animal products - bone, bone meal, hides and skins	Each ton	25 24	20 14
2	Arms, ammunitions, explosives and defense stores	ton	93	86
3	i) Asbestos ii) Construction materials, sand iii) Fruits, nuts including raw cashew, tapioca, coconut, copra, tamarind seeds iv) Molasses v) Waste paper, newsprint vi) Wood, timber, bamboo	ton	24	14
4	i) Cement clinker ii) Coal & fire wood	ton	24	14

	iii) Fertilizers & fertilizer materials sulphur regardless of end use will be included under fertilizer raw materials iv) Food grains, oilseeds, cereals & pulses v) Oil cake and fodder vi) Sugar	ton ton	30 24	6 6
5	i) Cotton including cotton waste (also includes cotton twist and yarn) ii) Jute and jute products, coir and coir products	ton	24	14
6	i) Granites and marbles ii) Ores, ore pellets and minerals	ton	24	14
7	Metals (ferrous, non-ferrous) in the form of ingots, billets and unmanufactured and metal-scrap	ton	24	14
8	Other liquid bulk including acid and fatty acid	ton	24	14
9	POL and POL products i) Crude oil ii) Kerosene and light diesel oil iii) All other POL products	 ton ton ton	 30 25 35	 30 25 35
10	Salt	ton	3	3
11	Synthetic resin (including moulding powder) and wood pulp	ton	56	51
12	Wines, sprits(potable) & alcoholic beverages	five liters	24	14
13	Iron & steel materials (excluding scrap, dross & ores)	ad valorem	0.5% of CIF value	0.11% of FOB value
14	All items other than those specified above	ad valorem	0.2% of CIF value	0.11% of FOB value

8.2.13 General Landing Date (GLD)

General Landing Date is calculated as the date on which two third of cargo tonnage is discharged. For this purpose, quantity of cargo discharged after 5:00 p.m. on that day shall be omitted. If the GLD falls on a Sunday or on Dock holiday, the next working day shall be declared as GLD of the vessel. This date is important for importers and Customs House Agent (CHA) for payment of cargo related charges.

8.2.14 Free Days and Demurrage on Import Cargo

Free days are the period following the GLD for which discharged cargoes are stored in the Docks free of demurrage. In computing free days, Sundays and Dock holidays will be omitted Free days are as follows:

	Free days from GLD
Break Bulk Cargo	3 working days
Containerized Cargo (FCL)	7 working days
Containerized Cargo (LCL)	10 working days

On expiry of free days, demurrage will be charged for the period of storage on all import goods remaining uncleared at the following rates.

	Per ton per day or part thereof
For first 30 days	Rs. 25
For 31st to 60th days	Rs. 37.5
From 61st day onwards	Rs. 50

8.2.15 Free Days and Demurrage on Export Cargo

The free period in respect of export cargoes is calculated from the date of receipt of cargoes in the docks including the date of receipt. In computing free days, Sundays and Dock holidays will be omitted. Free period of is as shown under:

Place of storage	Free Period
Open yards	10 days
Transit shed	7 days

A demurrage fee is calculated at the rate of 20% of the wharfage fee applicable per day or part thereof.

In case of containerized cargo, demurrage is payable from the date of receipt up to the date of staffing of cargoes into containers. If the cargo is stuffed within the free period mentioned above, only wharfage is payable. Once cargoes are stuffed in the containers, no demurrage is payable on the cargo.

8.2.16 Scale of Rates Charged at Marine Oil Terminal and Pir Pau

(1) Wharfage Charges

Description of Goods	Basis of charges	Import	Export
1) Crude oil	Ton	Rs.38	Rs.38
2) Kerosene & Light diesel oil	Ton	Rs.25	Rs.25
3) All other POL products viz. Naptha & Solvent, Fluxing & Lubricating Tupentine & Vapourising Grease, Bitumen, Petroleum Jelly, Motor Gasoline, Motor sprit, Liquified Petroleum Gas	Ton	Rs.44	Rs.44
Chemicals viz. Ammonia, EDC, Ethyle, Benzene, Paraxylene M.E.S., N.Paraffin, Orthoxylene, etc. not covered under 3) above.	Ton	Rs.88	Rs.88

(2) Pier Dues

Vessel Chargeable	Coasting	Foreign going
1) On every steam & other mechanically propelled & square rigged vessels berthed at or using the bulk oil piers at Jawahar Dweep and Pir Pau	Rs. 3.50 per GRT per day or part thereof (subject to minimum charge Rs.3500)	24 cents per GRT per day or part thereof (subject to minimum charge of US$240)
2) On every boat, barge or country craft (not square rigged)	Rs.70 per day or part thereof	US$4.75 per day part thereof

The charges prescribed for Foreign going vessels in this section will be collected from Foreign as well as Indian Lines / Agents in equivalent India Rupees at the rate notified by Reserve Bank of India on the date of arrival of vessel.

(3) Pilotage, tug assistance and towage

1) Tankers maneuvering with main engines

Sea/Stream to Jawahar Dweep/Pir Pau and Jawahar Dweep/Pir Pau to Sea/Stream with tug assistance	7.2	0.49
Sea to Stream and Stream to Sea without tug assistance	0.55	0.04
Jawahar Dweep/Pir Pau to Dock or vice versa Jawahar Dweep to Pir Pau or vice versa	2.3	0.16
Stream to Stream without tug assistance	0.2	0.02

2) Tankers maneuvering without main engines (towage charges payable in addition to above)

From Jawahar Dweep/Pir Pau to any moorings or anchorage berth or from one anchorage to another in the harbor South of Suck Rock (A line of anchorages) up to Mumbai Floating Light or vice versa	4.2	0.29
From Jawahar Dweep/Pir Pau to any moorings or anchorage berths or from one anchorage to another in the harbor North of Suck Rock (A line of anchorages) or vice versa	2.1	0.15
Charges per harbor tug for mooring a tanker which has dragged her anchors	1.05	0.08

8.2.17 Collecting Port Charges

Shipping agents are required to pay advanced deposit. Shipping agents calculate the amount of deposit based on the rate of scales (tariff) and request necessary services with application forms. (Self Assessment) After services rendered by MBPT, the amount of port charges are fixed. If there is shortage of deposit, MBPT claims the difference between deposit and actual port charges to shipping agents. Shipping agents pay the difference. If there is excess of deposit, MBPT refunds the balance to the shipping agent.

8.2.18 Revision of Tariff

MBPT knows the operating result after closure of financial year. After that the cost and receipt relationship of a particular service is ascertained to find out remunerativeness of the service. If any service is indicating deficit, the proposals for revision of those rates are formulated on the basis of its deficit. And the rate of the particular service is raised to make the service self-supporting.

The following elements of the cost are considered at present for computing the tariff rates

(1) Total cost with depreciation on historical depreciation

(2) Contribution of 3% of capital employed to each of the two reserves, Reserves for replacement, rehabilitation and Modernization of Capital Assets and Reserve for

development, repayment of loan and contingencies.

(3) Interest of 12.5% on capital

(4) Escalation in cost during the next three years

MOST's sanction was necessary for revision of tariffs after the approval of the Board. But after the amendment of Major Port Trust Act in January 1997, the proposal has to be approved by the Tariff authority for Major Ports after approval of the Board, and later the proposal is published and notified in the Gazette to be made effective.

The Board of Trustees themselves decides the rates of rentals for estates given on lease. On the other hand, the Railway Board approves the rates of railway.

8.2.19 Recent Case of Tariff Revision (before the amendment of the Act in Jan. 1997)

MBPT has revised the tariff structure of Pier dues and wharfage on POL and POL products. The proposal was formulated in 30 days and approved by the Board in May 1996. After the Government sanction and Notification in Official Gazette, the revised rates came into effect from 14 November 1996.

8.3 Present Port Tariff, Charges and Dues (JNPT)

8.3.1 Port Dues

Rate per GRT	Foreign vessels (US$)	Coasting vessels (Rs.)
Bulk vessels	0.22	3.65
Container vessels	0.17	2.90
Car carrier vessels (RO-RO)	0.11	1.75
Vessels of 10 tons and upwards other than those covered above (except fishing boat)	0.17	2.90

8.3.2 Fees for Pilotage-cum-towage

Rate per GRT	Foreign vessels (US$)	Coasting vessels(Rs.)
Up to 60,000 GRT	0.42	7.20
60,001-100,000 GRT	0.44	7.50
100,001 and above GRT	0.49	8.20
Pilotage fee for vessels not requiring tug assistance	0.14	2.90
Minimum charge per vessel		
a) Requiring tug assistance	300	7,200
b) Not requiring tug assistance	200	5,000

8.3.3 Berth Hire Charge

Rate for GRT per day or part thereof	Foreign vessels (US$)	Coasting vessels (Rs.)
Container Berth	0.14	2.35
Bulk Berth	0.14	2.35
Multipurpose Berth	0.14	2.35
Landing Jetty	0.14	2.35
Anchorage Berth	0.07	1.18

8.3.4 Charges for Handling and Movement of Containers

(1) Normal containers

Rate for TEU (Rs.)	Loaded	Empty
From ship to CY or vice versa	2,600	2,100
From CY to CFS or vice versa	925	925
From CY to Railway flat or vice versa	1,300	1,300
From CY to Truck or vice versa	400	400

(2) Reefer containers

Rate for TEU (Rs.)	Loaded	Empty
From ship to CY or vice versa	2,600	2,100
From CY to CFS or vice versa	925	925
From CY to Railway flat or vice versa	1,300	1,300
From CY to Truck or vice versa	400	400

(3) Hazardous containers

Rate for TEU (Rs.)	Loaded
From ship to CY or vice versa	3,000
From CY to CFS or vice versa	1,000
From CY to Railway flat or vice versa	1,500
From CY to Truck or vice versa	500

(4) Shutout containers — Rate for TEU (Loaded or Empty)

(a) Shutout charges — Rs.2,000

(b) Transportation of shutout container from any place in the Port to quay and back to the designated area irrespective of location inside the terminal — Rs.1,500

(5) Transhipment containers

Receiving containers from the vessel, storing them in CY and re-transporting them for export. Rate is based on total TEUs brought by the shipping lines or agents in the same financial

year.

Rate for TEU (Rs.)	Loaded	Empty
1-3,000 TEUs	3,000	2,600
3,001-6,000TEUs	2,800	2,400
6,001-9,000TEUs	2,600	2,200
Thereafter	2,400	2,000

(6) Over dimensional cargo containers

Rate for TEU (Rs.)	Loaded	Empty
From ship to CY or vice versa	5,200	4,200
From CY to CFS or vice versa	1,850	1,850
From CY to Railway flat or vice versa	2,600	2,600
From CY to Truck or vice versa	800	800

(7) Other services

(a) Shifting containers from one yard to another yard within the terminal for customs inspection or any other purpose and subsequent loading of containers for delivery

Rate for TEU (Rs.) loaded or empty 1,700

(b) Additional charge per calendar day for electricity consumption and monitoring of reefer containers

Rate for TEU (Rs.) loaded or empty 1,200

(c) Additional service charges for stacking containers in designated yard for custom examination or for any other purpose by prior arrangement

Rate for TEU (Rs.) loaded or empty 200

(8) Rebates

Any vessel performing more than 1,000 TEUs in a single call, shall qualify for a rebate amounting to the following percentage of the total handling charges applicable for the vessel.

More than 1,000 TEUs but up to 1,200 TEUs	2 per cent
More than 1,200 TEUs but up to 1,500 TEUs	3 per cent
More than 1,500 TEUs but up to 1,800 TEUs	4 per cent

More than 1,800 TEUs	5 per cent

8.3.5 Storage Fees

(1) Loaded import container lying in the port premises

Rate per day	Up to 20' (US$)	Over 20' (US$)
First three days	Free	Free
4-15 days	3.25	6.50
16-30 days	6.50	13.00
Thereafter	13.00	26.00

(2) Loaded export container stored in the port premises

Rate per day	Up to 20' (US$)	Over 20' (US$)
First seven days	Free	Free
8-15 days	2.86	5.72
16-30 days	5.72	11.44
Thereafter	11.44	22.88

(3) Empty import or export container stored in the port premises

Rate per day	Up to 20' (US$)	Over 20' (US$)
First 15 days	3.25	6.50
16-30 days	6.50	13.00
Thereafter	13.00	26.00

(4) ICD container moved by rail

Rate per day	Up to 20' (US$)	Over 20' (US$)
First 15 days	Free	Free
16-30 days	2.86	5.72
31-45 days	5.72	11.44
Thereafter	11.44	22.88

(5) Transhipment container stored in the port premises

	Rate per day	
(Loaded)	Up to 20' (US$)	Over 20' (US$)
First 30 days	Free	Free
31-45 days	3.25	6.50
Thereafter	6.50	13.00
(Empty)	Up to 20' (US$)	Over 20' (US$)
1-15 days	3.25	6.50
16-30 days	6.50	13.00
Thereafter	13.00	26.00

(6) Shutout container stored in CY	Rate per day	
(Loaded or empty)	Up to 20' (US$)	Over 20' (US$)
1-15 days	3.25	6.50
16-30 days	6.50	13.00
Thereafter	13.00	26.00

(7) Back to town containers (*)	Rate per day	
(Loaded or empty)	Up to 20' (US$)	Over 20' (US$)
First three days	Free	Free
4-15 days	3.25	6.50
16-30 days	6.50	13.00
Thereafter	13.00	26.00

(*) Containers entering the port for export but unable to be exported for whatever reason and taken back to town

8.3.6 Charges for Miscellaneous Services Rendered to the Container Vessels

(1) Opening of hatch cover and replacing it

Charges per hatch cover

When placing it on the quay Rs.3,000

Without placing it on the quay	Rs.1,200

(2) Shifting of containers from one hatch to another hatch or within the same hatch

(Loaded or empty)	Rate per TEU
(a) Hatch to hatch shifting (involving one move only)	Rs.1,000
(b) Other than a) mentioned above	Rs.4,000

8.3.7 Charges for Dry Bulk Cargo at Mechanized Berths

(1) Wharfage	Rate per MT
Finished fertilizer	Rs.35
Fertilizer raw materials	Rs.35
Food grains	Rs.35

(2) Bulk cargo handling charges

Bulk cargo handling charges per metric tonne for handling the commodity from the vessels at the berth to delivery point

(Delivered in Bulk)	Rate for per MT
Finished fertilizer	Rs.220
Fertilizer raw materials	Rs.220
Food grains	Rs.220

(3) Bagging charges	Rate for per MT	
	50kg bags	100kg bags
Finished fertilizers and food grains	Rs.100	Rs.120

(4) Storage charge (finished fertilizer, fertilizer raw materials and food grains)

Rate for per MT per day or part thereof

(a) First 12 days following the day of completion of vessel discharge for vessels carrying less than 35,000 MT	Free

as per manifest	
(b) First 14 days following the day of completion of vessel discharge for vessels carrying 35,000 MT and above as per manifest	Free
(c) For next 5 days	Rs.15
(d) For next 10 days	Rs.25
(e) For next 30 days	Rs.40
(f) Thereafter	Rs.60

8.3.8 Charges for Other Dry Bulk and General Cargo

(1) Wharfage	Rate (Rs.)		
Classification	Import	Export	Unit
Cereals/pulses/oilseeds	35	30	per MT
Food grains	35	30	per MT
Oil cakes	35	30	per MT
Sugar	45	30	per MT
Salt	35	30	per MT
Pig Iron	105	90	per MT
Steel and metal scrap	70	60	per MT
Steel pipes			
a) length less than 12m	120	115	per MT
b) length 12m or more	140	130	per MT
Steel coils	115	100	per MT
Iron ore pellets	60	55	per MT
Iron ore fines and lumps	40	35	per MT
Direct reduced iron / Hot briquetted Iron	60	55	per MT
Sized coal having not more than 10mm diameter	40	35	per MT
Asbestos	80	70	per MT
Arms and ammunition	130	120	per MT

Over dimensional cargo	650	600 per MT
Break bulk	115	100 per MT
Machinery parts	115	100 per MT
Limestone	60	50 per MT
Cement	45	40 per MT
Wood pulp	45	40 per MT
Paper rolls	45	40 per MT
Timber/wood/bamboo	80	70 per MT (*)
	70	60 per CUM (*)
	(*) whichever is beneficial to the Port	
Unenumerated items	140	130 per MT
Cargo abandoned/excess landed /confiscated by customs, unclaimed /uncleared/condemned by Port Health Authority and ultimately destroyed by JNPT/salvaged	50	50 per MT

(2) Storage charge — Per MT per day or part thereof

Import		Export	
1- 7 days	Free	1-15 days	Free
8-14 days	Rs.8	Thereafter	Rs.8
15-21 days	Rs.16		
Thereafter	Rs.32		

8.3.9 Charges on Motor Vehicles or Any Other Equipment Passing through the Port

(1) Stevedore and Wharfage charges

	Stevedore charges	Wharfage charges
Import	Rs.35 per vehicle/equipment	0.5% of CIF value
Export	Rs.35 per vehicle/equipment	0.5% of FOB value
Transhipment	Rs.40 per vehicle/equipment	0.65% of FOB/CIF value

(2) Storage charges

Per day/per vehicle or equipment irrespective of storage in leased area or anywhere inside the port

(a) Import/export/transhipment

	Gross weight of the motor vehicle/equipment in MT			
Days	G<1.0	1.0≦G<5.0	5.0≦G<10.0	10.0≦G
1-15 days	Free	Free	Free	Free
16-30 days	Rs.25	Rs.50	Rs.100	Rs.200
Thereafter	Rs.50	Rs.100	Rs.200	Rs.400

(b) Back to town

	Gross weight of the motor vehicle/equipment in MT			
Days	G<1.0	1.0≦G<5.0	5.0≦G<10.0	10.0≦G
0-3 days	Free	Free	Free	Free
4-14 days	Rs.25	Rs.50	Rs.100	Rs.200
15-21 days	Rs.50	Rs.100	Rs.200	Rs.400
Thereafter	Rs.100	Rs.200	Rs.400	Rs.800

8.4 Present Port Finance

8.4.1 MBPT

(1) Income statement

Table 8.4.1. shows the income statements of MBPT between 1992-93 and 1996-97. (Fiscal year in India begins on 1st April and ends on 31st March.) Port Trusts do not pay income tax on their commercial activities. About 74% of total revenue is derived from cargo handling and storage in 1996-97. Contributions of railway and real estate revenue are very low.

Personnel cost (salaries and wages) is a major component of operating expenditures. Its proportion to operating expenses has been more than 63% since 1992-93. The ratio of depreciation to the total expenses is 5% in 1996-97. It is very low. This implies that MBPT continues to use very old fixed assets exceeding their useful lives.

Judging from the net surplus, the income statement seems to indicate good performance. MBPT reserves substantial amount of funds for future capital investment from its surplus.

Working ratio, the proportion of operating expenses excluding depreciation to operating income, is 60% in 1996-97. Working ratio is required to be lower than 50-60% to keep sound operational efficiency.

(2) Balance sheet

Table 8.4.2 shows the balance sheets of MBPT between 1993 and 1997. The amount of financial investment (securities and fixed deposit) is almost the same as net worth. The percentage of financial investment to total assets is 70%. MBPT invests in securities instead of having its own capital assets. The rate of return on fixed assets is 72%. This is extremely high. This implies an inadequate level of capital investment on the part of the MBPT.

(3) Budget

Under the terms of Section 98 of the Major Port Trust Act 1963, the Budget Estimates for the following year have to be approved by the Board at a special meeting to be held on or before 31st January every year. To hold the meeting of the Board, 10 working days statutory notice to the Trustees has to be given. Thereafter the Estimates have to be forwarded to the Government before 10th February for sanction under section 98 of Major Port Trust Act 1963.

(4) Method of depreciation of fixed assets

MBPT adopts the straight-line method for depreciation of fixed assets. Life spans of main port assets are as follows:

Capital dredging	50 years
Transit sheds	30
Warehouses	40
Dock walls, piers, jetties	
Gravity type	60
Pile structure	25
Wharf crane	15
Quay side gantry crane	15
Rubber tired gantry crane	15
Vehicles, trailers, forklift trucks, top lift truck	10

8.4.2 JNPT

(1) Income statement

Table 8.4.3 shows the income statements of JNPT between 1992-93 and 1996-97. Net surplus increased considerably in 1995-96. It is attributable to the increase of operating revenue, especially container handling charge. Since 1992-93 working ratio has indicated favorable level, which is less than 60%. The ratio of personnel cost (salaries, wages and benefits) to operating expenses is about 10% in fiscal year 1996-97. This is much lower than that of MBPT.

(2) Balance sheet

Table 8.4.4 shows the balance sheets of JNPT between 1993 and 1997. The percentage of long term debt to total liabilities has been more than 90% since 1993. Capital debt was much larger than net worth. But a debt to equity ratio was improved to 59/41 in 1997 from 86/14 in 1993. Until 1995 rate of return on net fixed assets was below 7%, the minimum requirement. But it exceeded in 1996.

Table 8.4.1 MBPT Income Statement

(Rs. in crores)

	1992/93	1993/94	1994/95	1995/96	1996/97
Operating Revenues	364.52	416.68	475.14	581.88	592.58
Cargo Handling and Storage Charges	261.24	296.10	349.68	423.18	435.70
Port and Dock Charges	83.94	101.15	105.74	136.20	133.62
Railway Earnings	3.27	3.39	4.48	6.10	4.91
Estate Rentals	16.07	16.04	15.24	16.40	18.35
Operating Expenses	219.16	239.94	300.62	313.58	374.43
Salaries and Wage	142.59	153.49	199.71	215.62	238.89
Stores	16.52	20.72	18.85	20.33	21.34
General Expenses	2.25	2.79	2.52	3.49	3.50
New Minor Works	1.13	0.85	0.68	0.57	1.10
Sundry Expenses	44.65	48.98	64.81	59.51	89.98
Inter-departmental charges and transfers	0.13	0.09	0.13	0.01	0.57
Depreciation of Fixed Assets	11.89	13.02	13.92	14.05	19.05
Net Operating Income (NOI)	145.36	176.74	174.52	268.30	218.15
NOI before Depreciation	157.25	189.76	188.44	282.35	237.20
Other Income & Expenses					
Finance & Other Income	72.71	68.14	83.37	100.55	95.94
Fund Management Income	52.49	54.07	68.45	85.31	79.08
Others	20.22	14.07	14.92	15.24	16.86
Finance & Other Expense	86.10	66.63	114.52	114.50	122.17
Interest on loans from ADB				1.48	1.51
Others	86.10	66.63	114.52	113.02	120.66
Net Surplus	131.97	178.25	143.37	254.35	191.92
Operating ratio	60%	58%	63%	54%	63%
Working ratio	57%	54%	60%	51%	60%

(Source : MBPT Annual Account)

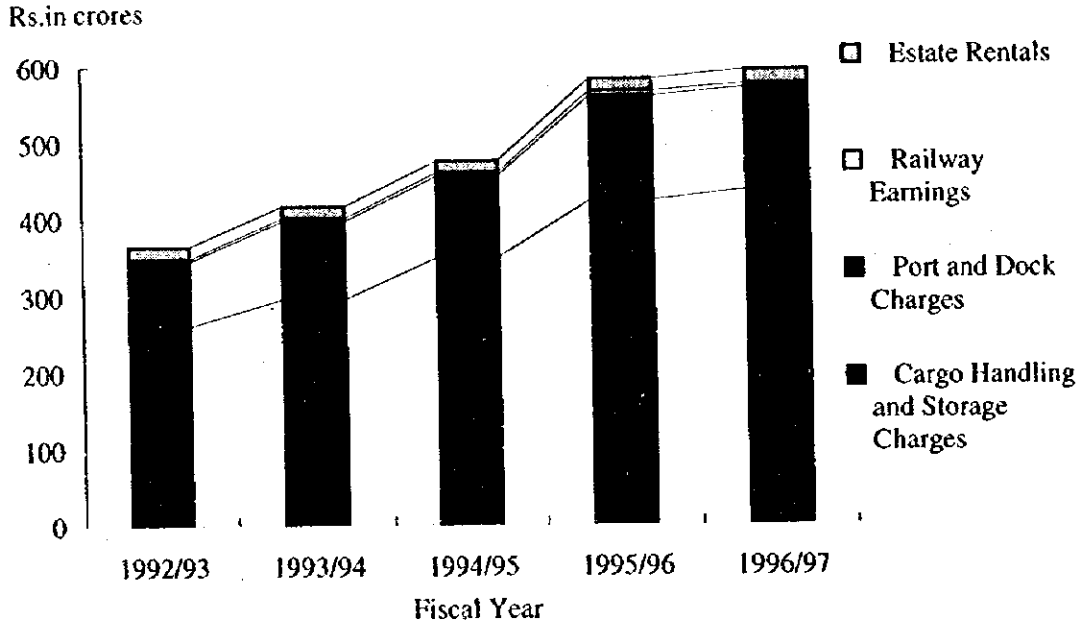


Figure8.4.1 Operating Revenue

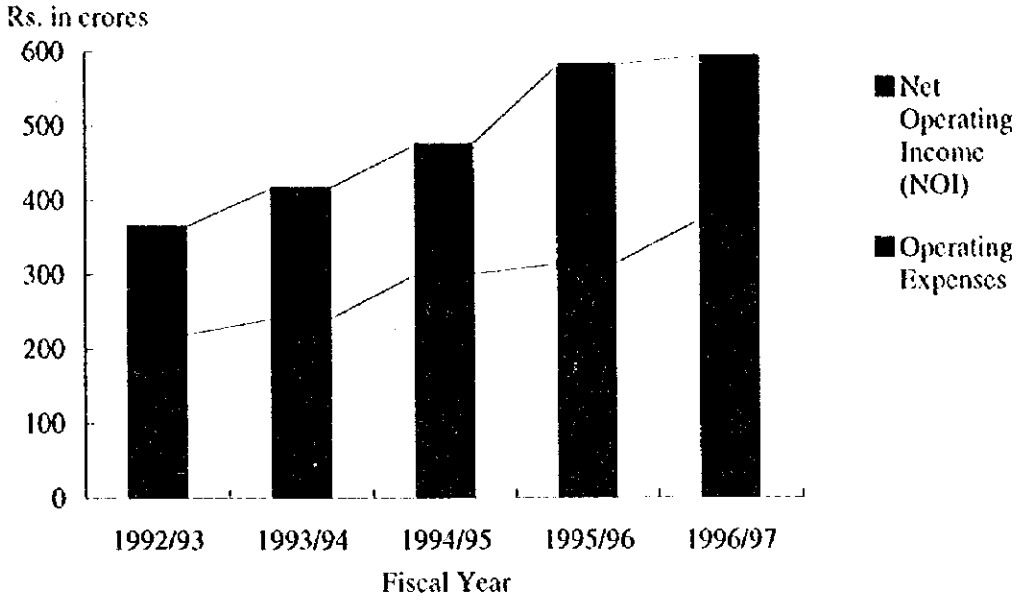


Figure 8.4.2 Operating Expenses and Net Operating Income

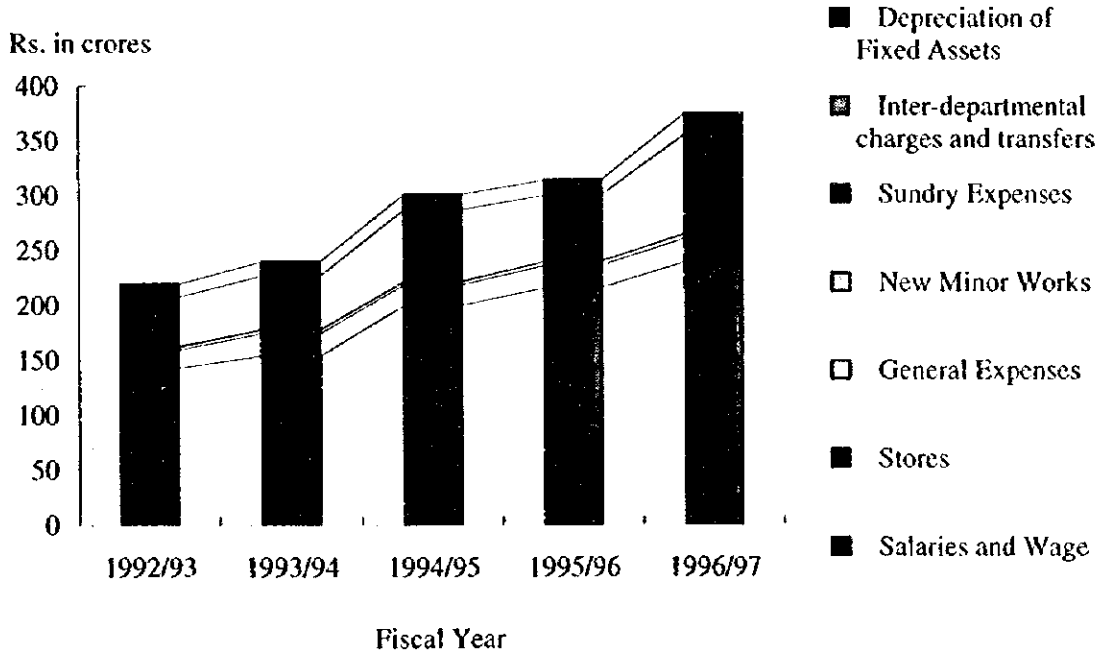


Figure 8.4.3 Particulars of Operating Expenses

Table 8.4.2 MBPT Balance Sheet

(Rs. in crores)

As of 31st March	1993	1994	1995	1996	1997
Assets					
Fixed Assets	194.46	231.38	269.83	304.84	373.76
Investment	1,387.89	1,717.65	2,045.59	2,534.17	3063.04
Current Assets	417.47	485.50	640.66	775.78	915.82
Cash & Deposit	10.38	9.72	58.63	63.09	70.70
Others	407.09	475.78	582.03	712.69	845.12
Total Assets	1,999.82	2,434.53	2,956.08	3,614.79	4,352.62
Liabilities					
Current Liabilities	129.22	164.13	230.35	276.80	337.31
Loan from Government	5.63	16.81	31.10	35.77	53.47
Provision for Unrecovered Estate Rental	219.69	265.21	320.54	370.18	433.61
Pension Fund	66.65	87.90	126.81	180.21	243.48
Provident Fund	181.70	198.76	246.49	293.75	356.00
Total Liabilities	602.89	732.81	955.29	1,156.71	1,423.87
Net Worth					
Capital Reserve	194.46	214.57	238.73	269.07	320.29
Revenue Reserves	533.39	546.97	545.37	549.90	560.87
Fund for Replacement, Rehabilitation and Modernisation of Capital Assets	544.52	731.57	936.40	1,177.86	1432.37
Fund for Development, Repayment of loans and Contingencies	123.56	207.61	279.29	460.25	614.22
MBPT Centenary Commemoration Fund	1.00	1.00	1.00	1.00	1.00
Total Net Worth	1,396.93	1,701.72	2,000.79	2,458.08	2,928.75
Liabilities & Net Worth	1,999.82	2,434.53	2,956.08	3,614.79	4,352.62

(Source : MBPT Annual Account)

Rate of return on net fixed assets	75%	76%	65%	88%	72%

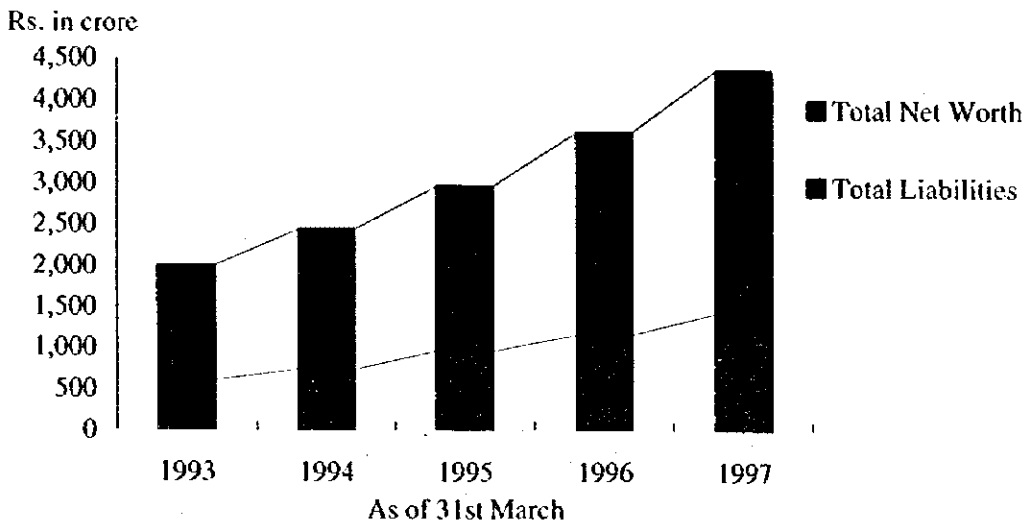


Figure 8.4.4 Liabilities and Net Worth

Table 8.4.3 JNPT Income Statement

(Rs. in crores)

	1992/93	1993/94	1994/95	1995/96	1996/97
Operating Revenues	85.52	102.68	153.26	233.67	246.08
Cargo Handling and Storage Charges	27.32	24.63	33.13	52.26	40.68
Container Handling Charges	39.29	51.62	82.78	131.64	144.51
Port and Dock Charges	14.93	22.01	30.08	35.79	42.52
Estate Rentals	3.98	4.42	7.27	13.99	18.36
Operating Expenses	62.11	78.09	87.18	115.63	139.83
Salaries & Wages excluding bonus	6.58	8.71	10.15	12.93	14.40
Other Employee Related Benefit	1.39	2.07	2.52	3.12	3.67
Port Operations Related Expenses	16.76	22.86	34.07	55.49	70.50
Dredging Expenditure	1.69	7.02	1.43	5.34	9.90
Management of Port Computer Facilities	0.54	0.40	0.41	0.53	0.48
Depreciation	31.27	32.15	32.57	32.61	33.74
Administration & General Expenses	3.88	4.88	6.03	5.61	7.14
Net Operating Income (NOI)	23.41	24.59	66.08	118.04	106.25
NOI before Depreciation	54.68	56.74	98.65	150.65	139.99
Other Income & Expenses					
Finance & Other Income	17.97	21.59	25.81	45.16	71.42
Finance & Other Expense	25.32	34.89	29.70	37.77	35.14
Interest on Loans	21.04	28.94	26.82	33.51	30.65
Others	4.28	5.95	2.88	4.26	4.49
Net Surplus	16.06	11.29	62.19	125.43	142.53
Operating ratio	73%	76%	57%	49%	57%
Working ratio	36%	45%	36%	36%	43%

(Source : JNPT Annual Accounts)

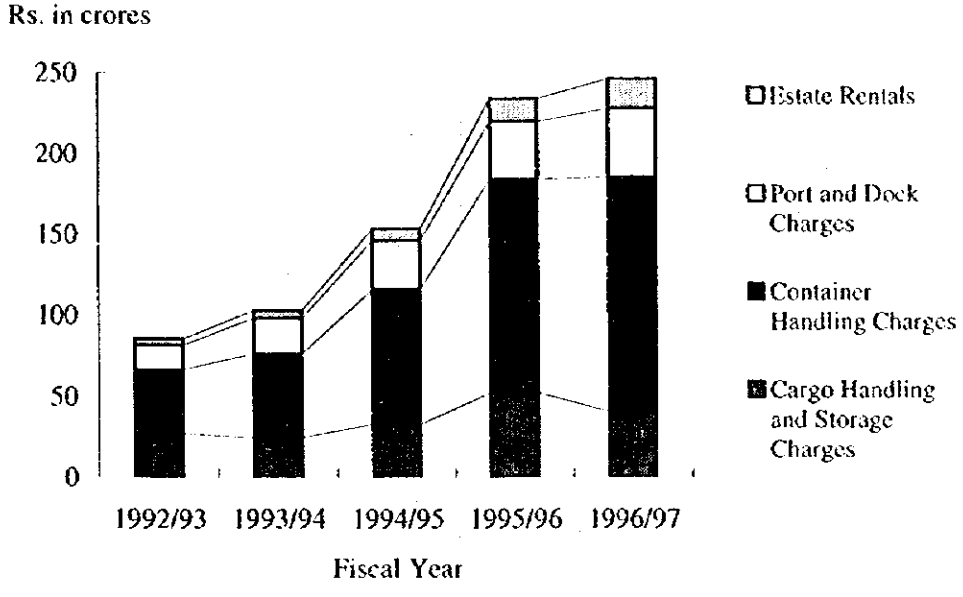


Figure 8.4.5 Operating Revenues

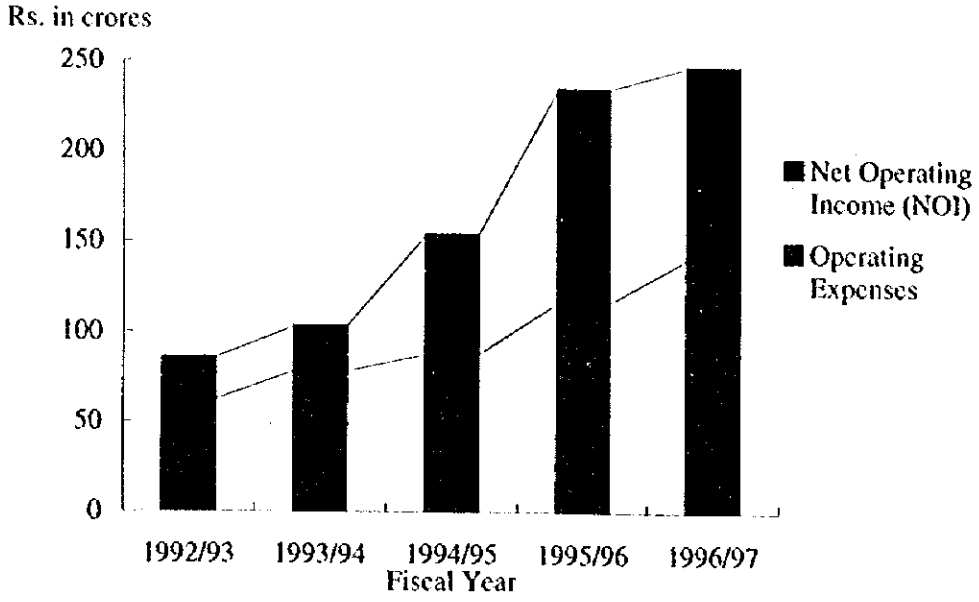


Figure 8.4.6 Operating Expenses and Net Operating Income

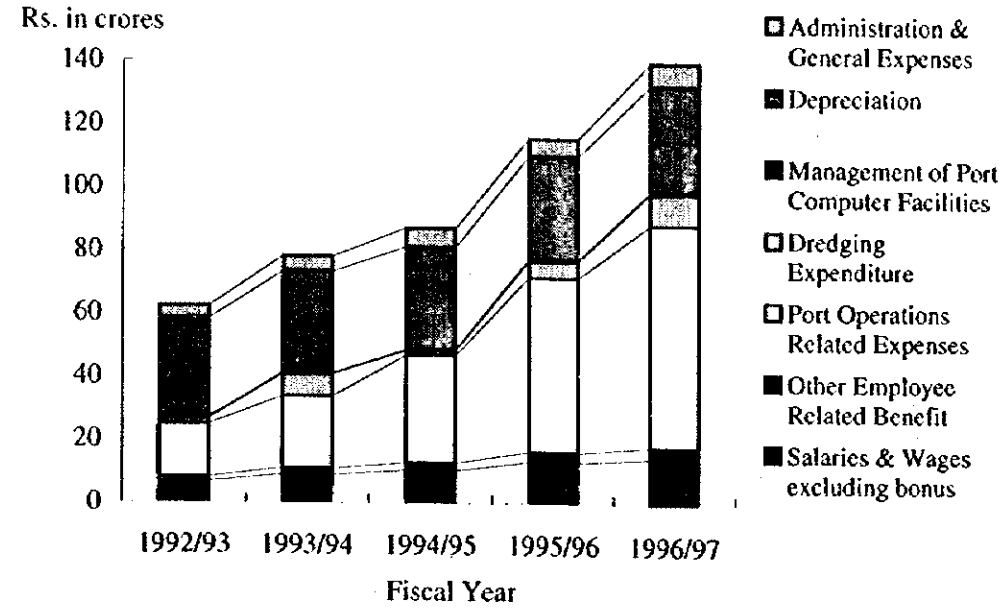


Figure 8.4.7 Particulars of Operating Expenses

Table 8.4.4 JNPT Balance Sheet

(Rs. in crores)

As of 31st March	1993	1994	1995	1996	1997
Assets					
Fixed Assets	990.16	1,006.22	1,034.20	1,076.55	1134.61
Investment	126.46	153.90	206.39	327.08	444.12
Current Assets	63.16	68.98	73.69	104.89	92.60
Total Assets	1,179.78	1,229.10	1,314.28	1,508.52	1,671.33
Liabilities					
Current Liabilities	26.11	35.24	40.19	63.56	68.23
Capital Debt	992.08	987.52	968.85	973.15	944.89
Loan from Government	554.83	567.83	572.17	581.79	581.37
Loan from Mumbai Port Trus	384.76	367.20	344.18	318.87	291.02
Loan from Kandra Port Trust	52.49	52.49	52.49	52.49	52.49
Loan from Chennai Port Trust				20.00	20.00
Pension and Provident Funds	1.81	2.93	5.03	7.11	10.40
Total Liabilities	1,020.00	1,025.69	1,014.07	1,043.82	1,023.52
Net Worth					
Reserves	50.95	62.43	125.91	257.48	406.85
Provisions	108.83	140.98	174.30	207.22	240.96
Total Net Worth	159.78	203.41	300.21	464.70	647.81
Liabilities & Net Worth	1,179.78	1,229.10	1,314.28	1,508.52	1,671.33
Rate of Return Net Fixed Assets	2.36%	2.44%	6.39%	10.97%	9.36%

(Source : JNPT Annual Account)

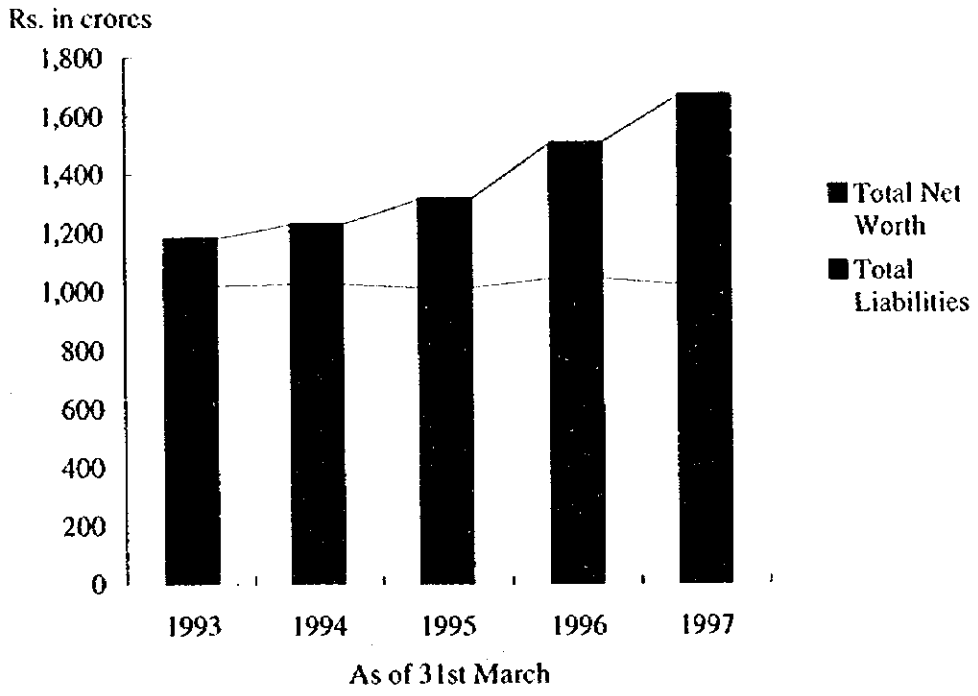


Figure 8.4.8 Liabilities and Net Worth

8.5 Computerization in MBPT

MBPT is introducing a Management Information System, consisting of Vessel Traffic Management System (VTMS), Cargo Management and Information System (CARMINS), Container Traffic and Control System (CTCS), Financial Management System (FMS) and Executive Information System (EIS). These systems are currently being implemented and some are already in operation.

8.5.1 VTMS

Please refer to 7.3.6 Traffic Control of the Vessel in the Port.

8.5.2 CARMINS

CARMINS covers functions concerning billing, import/export document handling, berth allocation, cargo handling progress monitoring, resource allocation, shed/warehouse management, sale of uncleared cargo and generation of MIS report.

8.5.3 CTCS

CTCS covers following activities.

(1) Yard and vessel planning

(2) Yard and vessel operation

(3) Container tracking and inventory

(4) Billing

(5) Management information and statistics

CTCS records all the container movements during their stay within the port. It also records stuffing and destuffing activities within the port area. Therefore MBPT knows all the information about a container, including its location during its stay in the port. MBPT can use this information for operational planning and recovery of handling charges.

8.5.4 FMS

The major functions covered by FMS are accounting, budgeting, asset management and costing.

(1) Accounting

Operational departments in MBPT collect the major port charges. The information regarding charges generated at sites are electronically transferred to FMS. The information regarding expenditure is available centrally in the FA & CAO's cash Office and the Pay roll system. Based on this information ledgers and journals will be maintained for taking care of all accounting requirements.

(2) Budgeting

FMS covers budget preparation, budget analysis against real revenue and expenses, budget revision and budgetary control. In addition to preparing financial budget covering all categories of income and expenditure, FMS provides required information for performance budget covering traffic handled and resource utilization.

(3) Asset management

MBPT manages capital assets (estates, buildings, dock structures and equipment), investments and various funds. MBPT invests surplus cash regularly in financial schemes. The monitoring of these investments and drawing a reinvestment plan are included.

(4) Costing

This includes performance analysis, activity-wise costing and making available necessary information to revise port tariff.

8.5.5 EIS

EIS relates to the integrated management information regarding the port and port related operations and activities of MBPT. It is a common database for senior executives who retrieve information from other sub-systems. The objective of the EIS is to meet the short and medium term information requirements of top management to help them to plan and control the functional activities under their responsibility effectively.

8.5.6 Data Communication Network

All systems mentioned above will be connected in a broadband data communication network consisting of optical fiber cable.

8.6 Port Workers, Trade Unions and Labor Practices in MBP

8.6.1 Port Workers

Port workers in the port of Mumbai are divided into two categories, on-board workers and on-shore workers. On-shore workers belong to MBPT, while on-board workers primarily once belonged to Bombay Dock Labour Board (BDLB). In 1994 BDLB was merged into Bombay Port Trust because of financial problems. After the merger, on-board workers gained the status of MBPT monthly rated employees. Although stevedore companies have to hire cargo handling workers from MBPT for on-shore and on-board work, they also have approximately 1,200 employees of their own (supervisors, assistant supervisors, chargemen, foremen and dock clerks). Transporters too have their own employees to operate cargo handling equipment such as fork lift trucks, top lifters, reach stackers and truck trailers.

(1) Categories of On-Board Workers

1) Tindel — supervisor of a gang who directs them on the deck
2) Hatchman — senior worker to open and close hatches and work in a hold
3) Hatch Foreman — worker to signal a winch driver
4) Winch driver — crane operator
5) Filler* — worker to fill loose cargo like food grain in sacks and weigh the filled sacks
6) Stitcher* — worker to stitch the filled up sacks with a stitching machine
7) Loader* — worker to load/unload the stitched sacks to/from trucks
8) General Purpose Mazdoor (GPM) — worker to do sundry work and replace absentees
9) Tally and Sorting Clerk — worker to note the following on tally sheets
   a) number of slings loaded/unloaded during a shift
   b) description of cargo
   c) damages to the cargo if any
   d) number and weight of each package discharged from a ship

(*) These workers were primarily employed by the Food Corporation of India in the late 1950s to handle food grain import from United States. After India's food grain crisis was over in the 1960s, these workers became part of BDLB.

(2) Categories of On-Shore Workers

1) Morpia head of a gang of on-shore workers who collects attendance cards of his gang members and gets the booking done for all of them for a particular shift

2) Shore Worker worker to load or unload the cargo from shore to hatch or from shore to sheds.

3) Baroot worker to stack bagged or unitized cargoes in an orderly manner inside sheds.

4) Cart/Wagon Unloader (CWU) worker to unload cargoes from carts/trucks in sheds

8.6.2 Trade Unions

Five national level federations of unions represent the workers of the major ports in India. They negotiate periodically with the Government regarding matters related to dock work such as basic wages, dearness allowance, house rent allowance, transport reimbursement, washing allowance, incentive/piece rate system, productivity norm (datum), productivity linked bonus and manning scales.

At MBPT there are four trade unions of the port workers. Among them, Transport and Dock Workers Union and MBPT Dock and General Employees Union are the major unions. Presidents of both unions are members of the Board of Trustees. Transport and Dock Workers Union, which was established in 1954, has around 80 percent of the dock workers as union members. On the other hand, MBPT Dock and General Employees Union has only about 15-20 percent of dock workers as union members. However 80 percent of the technically skilled workers in the engineering department or working on tugs and launches are members.

Both these unions are very strong because their workers' membership are large and their presidents as trustees of the Board can get up-to-date knowledge on the Indian port sector. These unions are well aware of the Port and their workers and open to support the various policies of the

management to make the Port competitive, but not at the cost of job losses. They also strongly believe in sharing the gains from the productivity increases with workers.

8.6.3 Manning Scale

The strength and composition of gangs engaged in cargo handling is as follows:

(1) Conventional cargo (per hatch)

On board : One Tindel + seven workers

On shore : One Morpia + 12 shore workers

(2) At BPS gantry berth (per gantry)

On board : One Hatch Foreman + four GPMs

On shore : One Tally clerk + four shore workers

(3) At a ship when ship's gantry is used (per gantry)

On board : One Hatch Foreman + four GPMs

On shore : One Tally clerk + four shore workers including Morpia

(4) At a ship when ship's crane is used (per crane)

On board : Four workers including Tindel + four GPMs,
Two Winch drivers and one Reliever + one Hatch Foreman

On shore : One Tally clerk + six shore workers including Morpia + four GPMs

(5) Stuffing and destuffing containers

On board : One Tindel + seven workers
(In case of 40 foot container, four additional workers are added.)

On shore : One Morpia + 12 shore workers

GPM : two workers to keep ramp at the door of the container

One carpenter

Normally two on-shore workers stand in the shed to lift the bags/boxes from stacking and load them on the handcarts brought by two other on-shore workers. Four more on-shore workers stand near the entry of the container to unload them from the handcarts. However they often bring handcarts into the inside of the container.

8.6.4 Absenteeism

Since all of workers have been paid on monthly basis since the merger, many workers are often absent to avoid hard, dirty, unpleasant and dangerous work. When on-board workers know at 'the booking window' that the type of cargo is unattractive to handle, for example sulphur, some of them disappear and remain absent without wages for the day. The percentage of absenteeism varies from 20% during normal times to 50% during the festival or holiday seasons.

8.6.5 Wage System

Wages of all the dock workers are based on a combination of time rate and piece rate. Dock workers can get piece rate earning if their gang achieves a 'datum' (a sort of minimum productivity norm). One can earn one's normal wages including various perquisites without touching the datum line. Besides time rate and piece rate earnings, dock workers get the following benefits.

(1) On-Board Worker

1) All dearness allowance (including variable dearness allowance)
2) House rent allowance
3) Weekly off wages
4) Holiday work wages
5) Washing allowance
6) Transport Allowance
7) Children's education allowance
8) Miscellaneous allowance

(2) On-Shore Worker

1) Personal pay
2) House rent allowance
3) Dearness allowance
4) Special dearness allowance
5) City compensatory allowance
6) Transport allowance
7) Washing allowance
8) Equation allowance

8.6.6 Rates of Piece Rate/Incentives

The following rates of piece rate/incentives were revised on 25th Jan.1994. They are effective from 1st Jan. 1994 to 31st Dec. 1997.

(1) On-Board Workers

Cargo category	Shift	Datum (in metric tonne)	Rate of Incentive (Rs. per metric tonne) 101% to 150% of datum	151% to 185% of datum	above 185% of datum
Palletized	Day	100	1.52	1.77	2.03
	Night	75	2.03	2.35	2.70
Break Bulk	Day	80	2.12	2.47	2.83
	Night	60	2.83	3.30	3.75
Iron & Steel	Day	135	1.22	1.42	1.63
	Night	102	1.63	1.90	2.15
Bagged	Day	80	1.92	2.22	2.53
	Night	60	2.53	2.95	3.35
Dry Bulk	Day	100	1.52	1.77	2.03
	Night	75	2.03	2.35	2.70
Scrap					
(a) Mechanical	Day	135	1.22	1.42	1.63
handling	Night	102	1.63	1.90	2.15
(b) Manual	Day	80	1.92	2.22	2.53
handling	Night	60	2.53	2.95	3.35

(2) On-Shore Workers

Cargo category	Shift	Datum (in metric tonne)	Rate of Incentive (Rs. per metric tonne) 101% to 150% of datum	151% to 185% of datum	above 185% of datum
Palletized	Day	100	1.50	1.75	2.00
	Night	75	2.00	2.30	2.65
Break Bulk	Day	80	2.10	2.45	2.80
	Night	60	2.80	3.25	3.70
Iron & Steel	Day	135	1.20	1.40	1.60
	Night	102	1.60	1.85	2.10
Bagged	Day	80	1.90	2.20	2.50
	Night	60	2.50	2.90	3.30

(3) Shore Crane Driver

Cargo category	Shift	Datum (in metric tonne)	Rate of Incentive (Rs. per metric tonne) 101% to 150% of datum	151% to 185% of datum	above 185% of datum
Palletized	Day	100	1.60	1.85	2.10
	Night	75	2.10	2.40	2.80
Break Bulk	Day	80	2.20	2.60	2.95
	Night	60	2.95	3.40	3.90
Iron & Steel	Day	135	1.25	1.50	1.70
	Night	102	1.70	1.95	2.20
Bagged	Day	80	2.00	2.30	2.60
	Night	60	2.60	3.00	3.35
Dry Bulk	Day	100	1.60	1.85	2.10
	Night	75	2.10	2.40	2.80
Scrap					
(a) Mechanical	Day	135	1.25	1.50	1.70
handling	Night	102	1.70	1.95	2.20
(b) Manual	Day	80	2.00	2.30	2.60
handling	Night	60	2.60	3.00	3.35

(4) Container Loading/Unloading

Shift	Datum (No. of boxes)	Rate of Incentive (Rs. per box) 101% to 150% of datum	151% to 185% of datum	above 185% of datum
A) On-Shore Workers				
Gantry Day	65	2.00	2.50	3.00
Night	48	2.65	3.30	4.00
Ship crane Day	50	2.00	2.50	3.00
Night	38	2.65	3.30	4.00
B) On-Board Workers				
Gantry Day	65	2.02	2.52	3.03
Night	48	2.68	3.35	4.05
Ship crane Day	50	2.02	2.52	3.03
Night	38	2.68	3.35	4.05
C) Quayside Gantry Operators/Technicians				
Gantry Day	65	2.70	3.40	4.00
Night	48	3.60	4.50	5.30
D) Tradesmen				
Gantry Day	65	2.20	2.75	3.30
Night	48	2.90	3.65	4.40

8.6.7 Other Labor Practices

(1) Speed Money

Speed money refers to an informal and illegal incentive employers of stevedore companies give the dock workers to increase the productivity of cargo handling and complete the expected official work.

(2) Ghost Money

Although only registered workers can perform dock works legally, employers engage unregistered underprivileged cheap labour unofficially at the dock. The employer hires unregistered casual workers on piece rate only (no time rate) and pays directly these unregistered workers. The work performed by the unregistered workers is added to the registered workers' performance. If the datum line is crossed, registered workers can get piece rate earnings.

At times the full gang strength is not allotted to an employer due to shortage of labor. Under this situation, the less-strength gang gives output equivalent to the full gang and gets paid for the absentees' unofficially directly by the employers.

(3) Job Selling

The job of hatchmen in handling sulphur is hard, dirty, unpleasant and dangerous. Most workers try to skip the work when they come to know that the day's work is handling sulphur. Since they want to be absent without losing their pay, they pass this job to an outside person (unregistered casual worker) and pay the outside person about Rs. 100 in cash for the work per shift and get paid from the work done by the outside person.

(4) Others

Workers have developed informal work practices to achieve 'datum line' very fast. For example, in case of container stuffing and destuffing, a total of 24 workers are required in a shift, but there is no place for all of them to work together in a container. Therefore the gang strength is divided into two and work is done on two containers simultaneously. In case of bulk cargo, the use of extra slings by the gangs also increases the speed of the work to overtake the 'datum line' fast.

The management of MBPT has not been able to change the manning scales for conventional cargo handling even though modern cargo handling equipment has been introduced in the last 15 years. Many members of these gangs have developed an informal agreement among themselves to

divide the shift time into a series of 'spells' and during each of these 'spells', some men are working while the remainder are relaxing.

APPENDIX

Appendix 1

A.1 Containerization Trend of Import Cargoes by Commodity Handled in MBP from 1986 to 1995 (1)

Commodity	1986-87				1987-88				1988-89				1989-90				1990-91				1991-92				1992-93				1993-91			
	Container	Non-C	Sub	Cont. %	Total	Container	Non-C	Sub	Cont. %	Total	Container	Non-C	Sub	Cont. %	Total	Container	Non-Cont	Cont. %	Total	Container	Non-Cont	Cont. %	Total	Container	Non-Cont	Cont. %	Total	Container	Non-Cont	Cont. %	Total
Agricultural, Fishery & Forest Products	29		29		58	20	0		20	30	0		30	30	0		30	52	16		68	30	10		40	44	26		70	67	26		
Fruits, NOS	5	6		45.5%	11		0											9	4	69.2%	13	7	5	58.3%	12	16	20	44.4%	36	13	20	39.4%
Raw Rubber	17	6		73.9%	23	20	0	100.0%	20	20		100.0%	29	30		100.0%	30	40	4	90.9%	44	21	3	87.5%	24	24	4	85.7%	28	45	5	90.0%	
Spices Others	4	2		66.7%	6		0			10		100.0%	10					1		100.0%	1	1	1	50.0%	2	2	1	66.7%	3	5	1	83.3%	
Wooden Products, NOS	3	3		50.0%	6		0																									
Tea		12		0.0%	12		0											2	8	20.0%	10	1	1	50.0%	2	2	1	66.7%	3	4		100.0%	
Foodstuffs	17	25			42	50	30	1	80	50	20	1	70	10	0	1	10	14	7	1	21	6	20	0	26	12	18	0	30	4	7	0	
Foodstuff, NOS	17	25		40.5%	42	50	30	62.5%	80	50	20	71.4%	70	10		100.0%	10	14	7	66.7%	21	6	20	23.1%	26	12	18	40.0%	30	4	7	36.4%	
Raw Materials of Metals	27	99			126	10	90	0	100	10	40	1	50	40	60	1	100	35	30	2	65	24	19	3	43	17	15	2	32	34	9	3	
Ores, NOS					0													3	7	30.0%	10	3	1	75.0%	4	2	3	40.0%	5	3		100.0%	
Ingots Aluminum	9	60		13.0%	69	10	40	20.0%	50									5	3	62.5%	8	4	2	66.7%	6	3	2	60.0%	5	11	1	91.7%	
Ingots lead	1	13		7.1%	14		0											6	4	60.0%	10	4	1	80.0%	5	2	4	33.3%	6	6	3	66.7%	
Ingot Zinc	3	14		17.6%	17		40	0.0%	40		30	0.0%	30		30	0.0%	30	14	20	41.2%	34	11	14	44.0%	25	9	6	60.0%	15	9	4	69.2%	
Ingots Others	14	12		53.8%	26		10	0.0%	10	10	10	50.0%	20	10	10	50.0%	20	10	3	76.9%	13	5	2	71.4%	7	3	3	50.0%	6	8	1	88.9%	
Metal and Metal Products	62	446			508	60	400	0	460	30	120	0	150	50	110	1	160	61	87	1	148	37	34	1	71	54	49	1	103	95	56	1	
Wire and Cables	3	29		9.4%	32		20	0.0%	20		20	0.0%	26	10	20	33.3%	30	7	10	41.2%	17	6	5	54.5%	11	2	4	33.3%	6	5	4	55.6%	
Metal and Metal Products, NOS	59	417		12.4%	476	60	380	13.6%	440	30	100	23.1%	130	40	90	30.8%	130	54	77	41.2%	131	31	29	51.7%	60	52	45	53.6%	97	90	52	63.4%	
Non-metal	21	39			60	0	60	0	60	0	80	0	80	10	60	0	70	18	61	1	79	22	51	2	73	33	38	2	71	90	23	3	
Asbestos and Asbestos material	12	38		24.0%	50		60	0.0%	60		80	0.0%	80	10	60	14.3%	70	10	60	14.3%	70	13	50	20.6%	63	11	34	24.4%	45	40	19	67.8%	
Carbon Black					0						0							8	1	88.9%	9	4		100.0%	4	11	2	84.6%	13	33	2	93.3%	
Moulding Powder	8			100.0%	8		0																									
Rubber Manufactures	1	1		50.0%	2		0																									
Light Industry Products	76	50			126	100	50	4	150	150	50	5	200	140	50	4	190	142	40	4	182	115	21	4	136	129	26	4	155	161	14	4	
Earth and Earthenware	3	28		9.7%	31	10	30	25.0%	40		30	0.0%	30	10	30	25.0%	40	18	22	45.0%	40	7	3	70.0%	10	7	7	50.0%	14	9	3	75.0%	
Glass and Glass Products	11	2		84.6%	13	10	0	100.0%	10	10		100.0%	10	10		100.0%	10	11	1	91.7%	12	12	1	92.3%	13	10	1	90.9%	11	8	1	88.9%	
Hair and Wool	24	1		96.0%	25	30	0	100.0%	30	30		100.0%	30	30		100.0%	30	30	3	90.9%	33	30	3	90.9%	33	40	4	90.9%	44	61	3	95.3%	
Instruments etc.	22	6		78.6%	28	30	10	75.0%	40	50	10	83.3%	60	40	10	80.0%	50	31	5	86.1%	36	47	7	70.8%	54	15	7	68.2%	22	20	3	87.0%	
Textiles: Cotton, Silk Woollen Synthetic etc	16	13		55.2%	29	20	10	66.7%	30	30	10	75.0%	40	50	10	83.3%	60	52	9	85.2%	61	49	7	87.5%	56	57	7	89.1%	64	63	4	94.0%	
Twist & Yarn					0					30	0	100.0%	30																			
Machinery	42	99			141	40	70	1	110	40	70	1	110	60	70	1	130	51	52	1	103	30	51	1	81	40	56	1	96	100	59	1	
Machinery, NOS	29	79		26.9%	108	30	60	33.3%	90	30	50	37.5%	80	40	50	44.4%	90	42	47	47.2%	89	27	50	35.1%	77	36	54	40.0%	90	98	57	63.2%	
Motor Vehicle Parts	13	20		39.4%	33	10	10	50.0%	20	10	20	33.3%	30	20	20	50.0%	40	9	5	64.3%	14	3	1	75.0%	4	4	2	66.7%	6	2	2	50.0%	
Chemical Products	419	317			736	500	290	5	790	440	210	6	650	360	150	5	510	431	157	7	588	203	100	6	303	407	212	6	619	588	117	7	
Chemical, NOS	168	94		64.1%	262	220	50	81.5%	270	220	70	75.9%	290	240	70	77.4%	310	275	88	75.8%	363	141	51	73.4%	192	198	113	63.7%	311	220	63	81.1%	
Drugs and Medicines	13	5		72.2%	18	10	0	100.0%	10	10		100.0%	10	10		100.0%	10	8	2	80.0%	10	4	1	80.0%	5	5	1	83.3%	6	7	1	63.6%	
Dyes and Colores	33	8		80.5%	41	20	0	100.0%	20	10		100.0%	10	20		100.0%	20	17	2	89.5%	19	9	3	75.0%	12	8	2	80.0%	10	10	2	83.3%	
Fibers-Synthetics	25	16		61.0%	41	20	0	100.0%	20	30		100.0%	30	40	10	80.0%	50	67	6	91.8%	73	20	3	87.0%	23	30	8	78.9%	38	70	5	93.3%	
Industrial Alcohols and Spirits	14	50		21.9%	64	10	50	16.7%	60	20	50	28.6%	70	20	60	25.0%	80	12	42	22.2%	54	5	32	13.5%	37	1	16	5.9%	17	3	15	16.7%	
Lac, Gum, Resins	9	6		60.0%	15	20	10	66.7%	30	20		100.0%	20	20	10	66.7%	30	35	10	77.8%	45	10	3	76.9%	13	12	7	63.2%	19	22	4	84.6%	
Paints and Painters' Material	1	10		9.1%	11		10	0.0%	10									4	6	40.0%	10	5		100.0%	5	3	0	100.0%	3	1		100.0%	
Plastic & Plastic Manufactures	151	127		54.3%	278	200	170	54.1%	370	130	90	59.1%	220	10		100.0%	10	9	1	90.0%	10	8	4	66.7%	12	149	61	71.0%	210	192	23	89.3%	
Synthetic Resins	5	1		83.3%	6		0											4		100.0%	4	1	3	25.0%	4	1	4	20.0%	5	13	1	92.9%	
Paper	204	144			348	160	170	0	330	160	180	0	340	230	200	1	430	274	184	1	458	135	170	0	305	185	213	0	398	377	169	1	
Paper and Paper Product	204	144		58.6%	348	160	170	48.5%	330	160	180	47.1%	340	230	200	53.5%	430	274	184	59.8%	458	135	170	44.3%	305	185	213	46.5%	398	377	169	69.0%	
Others	399	0			399	720	0	2	720	520	0	1	520	520	0	1	520	491	0	2	491	448	0	2	448	230	1	2	231	354	0	2	
Passenger's Baggage					0					0								5		100.0%	5	3		100.0%	3	4	1	80.0%	5	4		100.0%	
Containers Carga Commodity Unknown	310				310	530	0	100.0%	530	280			280	50			50	66			66											
Miscellaneous	89			100.0%	89	190		100.0%	190	240		100.0%	240	420		100.0%	420	420		100.0%	420	445		100.0%	445	226		100.0%	226	350		100.0%	
Containerizable Subtotal	1,296	1,248		50.9%	2,544	1,660	1,160	58.9%	2,820	1,430	770	65.0%	2,200	1,450	700	67.4%	2,150	1,572	641	71.0%	2,213	1,053	477	68.8%	1,530	1,153	657	63.7%	1,810	1,873	480	79.6%	
Agricultural, Fishery & Forest Products	152	684			836	120	700	0	820	150	850	0	1,000	120	420	1	540	169	691	1	860	84	315	1	399	142	477	1	619	344	396	2	
Rice	1			100.0%	1		20	0.0%	20		60	0.0%	60	10	40	20.0%	50		1	0.0%	1											
Foodgrains, NOS	142	295		32.5%	437	120	370	24.5%	490	120	630	16.2%	750	70	190	26.9%	260	126	448	22.0%	574	64	189	25.3%	253	118	329	26.4%	447	212	263	44.6%	
Vegetables & Dates		48		0.0%	48		70	0.0%	70		50	0.0%	50		80	0.0%	80		25	0.0%	25	1	35	2.8%	36	1	22	4.3%	23	8	23	25.8%	
Sugar		173		0.0%	173		100	0.0%	100						40	0.0%	40					1		100.0%	1							
Wood Pulp	7	151		4.4%	158		130	0.0%	130	30	120	20.0%	150	30	70	30.4%	110	42	166	20.2%	208	18	83	17.8%	101	20	121	14.2%	141	119	105	53.1%	
Wood and Timber Other sorts	2	17		10.5%	19		10	0.0%	10									1	1	50.0%	2		8	0.0%	8	3	5	37.5%	8	5	5	50.0%	
Fodder					0																											
Fodder (incl. oil cakes)					0													1		100.0%	1											
Fertilizers and their Raw Materials	97	1,231			1,328	0	1,130	0	1,130	110	1,300	0	1,410	220	970	0	1,190	97	571	0	668	117	375	1	492	246	720	1	966	336	564	1	
Rock Phosphate	21	555		3.6%	576		540	0.0%	540	40	620	6.1%	660	100	430	18.9%	530	52	295	15.0%	347	64	217	22.8%	281	115	327	26.0%	442	80	195	29.1%	
Fertilizers, NOS	44	214		17.1%	258		160	0.0%	160		140	0.0%	140	0	120	0.0%	120	3	44	6.4%	47	11	25	30.6%	36	6	33	15.4%	39	1	55	1.8%	
Sulfur	32	462		6.5%	494		430	0.0%	430	70	540	11.5%	610	120	420	22.2%	540	42	232	15.3%	274	42	133	24.0%	175	125	360	25.8%	485	255	314	44.8%	
Oil and Fats	34	589			623	30	770		800	60	450		510	30	190		220	29	226		255	15	84		99	12	69		81	56	90		
Oil and Fats, NOS	34	589		5.5%	623	30	770	3.8%	800	60	450	11.8%	510	30	190	13.6%	220	29	226	11.4%	255	15	84	15.2%	99	12	69	14.8%	81	56	90	38.4%	
Salt		37			37		20		20						10		10		10		10		8		8	19	1		20				
Salt		37		0.0%	37		20	0.0%	20						10	0.0%	10		10	0.0%	10		8	0.0%	8	19	1	95.0%	20				
Metals and Metal Products	123	1,721			1,844	220	1,530	0	1,750	290	1,850	0	2,140	530	1,490	1	2,020	584	1,596	1	2,180	282	1,057	1	1,339	455	1,438	1	1,893	732	903	2	
Iron and Steel Material	32	845		3.6%	877	80	820	8.9%	900	100	1,180	7.8%	1,280	150	960	13.5%	1,110	190	931	16.9%	1,121	144	700	17.1%	844	184	858	17.7%	1,042	524	725	42.0%	
Scrap and Dross	80	791		9.2%	871	140	610	18.7%	750	180	580	23.7%	760	370	450	45.1%	820	393	637	38.0%	1,028	137	344	28.5%	481	270	561	32.5%	831	207	178	53.8%	
Tin Plates	11	85		11.5%	96		100	0.0%	100	10	90	10.0%	100	10	80	11.1%	90	3	28	9.2%	31	1	13	7.1%	14	1	19	5.0%	20	1		100.0%	
Vehicles		6			6	0	0	0	0	0	0	0	0	0	0	0	0	3	2	1	5	0	0	0	0	0	0	0	0	0	0	0
Motor Vehicles weighing 1 Ton or more		6		0.0%	6		0											3	2	60.0%	5											
Miscellaneous		220			220	0	270	0	270	0	310	0	310	0	0	0	0	0	282	0	282	0	227	0	227	0	256	0	256	0	83	0	
Miscellaneous		220		28.7%	220		270	0.0%	270		310	0.0%	310			0.0%			282	0.0%	282		227	0.0%	227		256	0.0%	256		83	0.0%	
Mixture Sub total	406	4,488		8.3%	4,894	370	4,430	7.7%	4,790	610	4,760	11.4%	5,370	900	3,080	22.6%	3,980	883	3,378	20.7%	4,261	398	2,066	19.4%	2,564	874	2,961	22.8%	3,835	1,468	2,036	41.9%	
Agricultural, Fishery & Forest Products					66	0	70	0	70	0	80	0	80	0	90	0	90	7	121	0	128	2	72	0	74	3	81	0	84	0	0	0	
Fresh Fish		38		0.0%	38		30	0.0%	30		30	0.0%	30		40	0.0%	40		65	0.0%	65		51	0.0%	51		51	0.0%	51				
Timber in Logs	1	27		3.6%	28		40	0.0%	40		50	0.0%	50	7	50	0.0%	50	7	56	11.1%	63	2	21	8.3%	23	3	30	9.1%	33				
Building Materials					79	0	100	0	100	30	90	0	120	0	110	0	110	0	90	0	90	0	84	0	84	0	26	0	26	6	12	0	
Cement		37		0.0%	37		60	0.0%	60	30	70	30.0%	100		70	0.0%	70		90	0.0%	90		39	0.0%	39		26	0.0%	26				
Lime Stone & Sand		42		0.0%	42		40	0.0%	40		20	0.0%	20		40	0.0%	40		50	0.0%	50		45	0.0%	45		0		0	6	12	33.3%	
Raw Materials of Metals					12	0	0	0	0	0	20	0	20	0	40	0	40	1	4	0	5	0	45	0	45	0	22	0	22	0	0	0	
Iron ore					0																		45	0.0%	45		22	0.0%	22				
Pig Iron		12		0.0%	12		0				20	0.0%	20		40	0.0%	40	1	4	20.0%	5											
Coal,Coke,Charcoal																																
Coal,Coke,Charcoal etc.					0																											
Railway Wagons					28	0	90	0	90	0	50	0	50	0	30	0	30	1	3	25.0%	4											
Railway Wagons ,Carriages etc.		28		0.0%	28		90	0.0%	90		50	0.0%	50		30	0.0%	30	1	22	4.3%	23		17	0.0%	17	0	32	0	32	2	4	0	
Non-containerizable Sub-total	1	184			185		360		360	30	250		280		220		220	10	230		230	2	218		220	3	161		164	8	16		
Sub-total excep. Petroleum	1,703	5,920		22.3%	7,623	2,030	5,800	25.8%	7,830	2,020	5,780	26.4%	7,850	2,350	4,050	36.7%	6,400	2,465	4,250	36.7%	6,721	1,553	2,761	36.0%	4,314	2,030	3,779	34.9%	5,809	3,349	2,532	56.9%	
Laden Containers in TEU'ES	103					111				120				130				138				91				109				152			
Petroleum (POL)																																
Crude Oil		3,559		0.0%	3,559		3,728	0.0%	3,728		3,980	0.0%	3,980		4,706	0.0%	4,706		5,463	0.0%	5,463		5,531	0.0%	5,531		7,278	0.0%	7,278		8,891	0.0%	
Refined petroleum products		1,176		0.0%	1,176		965	0.0%	965		1,739	0.0%	1,739		2,157	0.0%	2,157		1,533	0.0%	1,533		1,663	0.0%	1,663		1,628	0.0%	1,628		2,089	0.0%	
Petroleum Sub-total					4,735				5,693				5,729				6,863				6,995				7,192				8,906				
Total	1,703	10,655			12,358	2,030			13,563	2,070	11,509		13,579	2,350	10,913		13,263	2,465	11,254		13,719	1,553	9,953		11,506	2,030	12,685		14,715	3,349	13,512		16,861

(Source: Administration report of MBPT)

A.1 Containerization Trend of Import Cargoes by Commodity Handled in MBP from 1986 to 1995 (1)

(Unit: thousand tons)

1987 88					1988 89				1989 90				1990 91				1991 92				1992 93				1993 94				1994 95				1995 96			
Total	Container	Non C Sol	Cont %	Total	Container	Non C Sol	Cont %	Total	Container	Non Cont	Cont %	Total	Container	Non Cont	Cont %	Total	Container	Non Cont	Cont %	Total	Container	Non Cont	Cont %	Total	Container	Non Cont	Cont %	Total	Container	Non Cont	Cont %	Total	Container	Non Cont	Cont %	Total
58	20	0		20	30	0		30	30	0		30	52	16		68	30	10		40	44	26		70	67	26		93	97	34		131	129	49		178
11		0											9	4	69.2%	13	7	5	58.3%	12	16	20	44.4%	36	13	20	39.4%	33	18	6	75.0%	24	17	5	77.3%	22
23	20	0	100.0%	20	20		100.0%	20	30		100.0%	30	90	4	90.9%	44	21	3	87.5%	24	24	4	85.7%	28	45	5	90.0%	50	35	1	97.2%	36	40	1	97.6%	41
6		0			10		100.0%	10					1		100.0%	1	1	1	50.0%	2	2	1	66.7%	3	5	1	83.3%	6	3	1	75.0%	4	5	1	83.3%	6
4		0											2	8	20.0%	10	1	1	50.0%	2	2	1	66.7%	3	4		100.0%	4	41	26	61.2%	67	67	42	61.5%	109
12		0																																		
42	50	30	1	80	50	20	1	70	10	0	1	10	14	7	1	21	6	20	0	26	12	18	0	30	4	7	0	11	11	2	1	13	7	7	1	14
42	50	30	62.5%	80	50	20	71.4%	70	10		100.0%	10	14	7	66.7%	21	6	20	23.1%	26	12	18	40.0%	30	4	7	36.4%	11	11	2	84.6%	13	7	7	50.0%	14
126	10	90	0	100	10	40	1	50	40	60	1	100	35	30	2	65	24	19	3	43	17	15	2	32	34	9	3	43	115	18	3	133	88	20	3	111
		0											3	7	30.0%	10	3	1	75.0%	4	2	3	40.0%	5	3		100.0%	3	27	16	62.8%	43	21	15	58.3%	36
69	10	40	20.0%	50					30	20	60.0%	50	5	3	62.5%	8	4	2	66.7%	6	3	2	60.0%	5	11	1	91.7%	12	19	9	67.9%	28	25	6	80.6%	31
14		0											6	4	60.0%	10	4	1	80.0%	5	2	4	33.3%	6	6	3	66.7%	9	39	4	90.7%	43	13	5	72.2%	18
17		30	0.0%	30	30	0	0.0%	30		30	0.0%	30	14	20	41.2%	34	11	14	44.0%	25	9	6	60.0%	15	9	4	69.2%	13	30	3	90.9%	33	28	7	80.0%	35
26		10	0.0%	10	10	10	50.0%	20	10	10	50.0%	20	10	3	76.9%	13	5	2	71.4%	7	3	3	50.0%	6	8	1	88.9%	9	27	2	93.1%	29	22	2	91.7%	24
508	60	400	0	460	30	120	0	150	50	110	1	160	61	87	1	148	37	34	1	71	54	49	1	103	95	56	1	151	438	219	2	657	175	121	1	296
33		20	0.0%	20		20	0.0%	20	10	20	33.3%	30	7	10	41.2%	17	6	5	54.5%	11	2	4	33.3%	6	5	4	55.6%	9	7	1	87.5%	8	2	1	66.7%	3
476	60	380	13.6%	440	30	100	23.1%	130	40	90	30.8%	130	54	77	41.2%	131	31	29	51.7%	60	52	45	53.6%	97	90	52	63.4%	142	431	218	66.4%	649	133	120	59.0%	253
60	0	60	0	60	0	80	0	80	10	60	0	70	18	61	1	79	22	51	2	73	33	38	2	71	90	23	3	113	89	13	5	102	106	17	3	123
50		60	0.0%	60		80	0.0%	80	10	60	14.3%	70	10	60	14.3%	70	13	50	20.6%	63	11	34	24.4%	45	40	19	67.8%	59	48	12	80.0%	60	46	14	76.7%	60
		0				0							8	1	88.9%	9	4		100.0%	4	11	2	84.6%	13	33	2	94.3%	35	19		100.0%	19	33	1	97.1%	34
8		0																																		
2		0																																		
136	100	50	4	150	150	50	5	200	140	50	4	190	142	40	4	182	135	21	4	156	129	26	4	155	161	14	4	175	116	60	4	176	198	19	4	217
31	10	30	25.0%	40		30	0.0%	30	10	30	25.0%	40	18	22	45.0%	40	7	3	70.0%	10	7	7	50.0%	14	9	3	75.0%	12	20	3	87.0%	23	32	8	80.0%	40
13	10	0	100.0%	10	10		100.0%	10	10		100.0%	10	11	1	91.7%	12	12	1	92.3%	13	10	1	90.9%	11	8	1	88.9%	9	10		100.0%	10	9		100.0%	9
25	30	0	100.0%	30	30		100.0%	30	30		100.0%	30	30	3	90.9%	33	30	3	90.9%	33	40	4	90.9%	44	61	3	95.3%	64	3		100.0%	3				
28	30	10	75.0%	40	50	10	83.3%	60	40	10	80.0%	50	31	5	86.1%	36	17	7	70.8%	24	15	7	68.2%	22	20	3	87.0%	23	32	5	86.5%	37	62	9	87.3%	71
29	20	10	66.7%	30	30	10	75.0%	40	50	10	83.3%	60	52	9	85.2%	61	49	7	87.5%	56	57	7	89.1%	64	63	4	94.0%	67	51	52	49.5%	103	95	2	92.9%	97
		0			30	0	100.0%	30																												
141	40	70	1	110	40	70	1	110	60	70	1	130	51	52	1	103	30	51	1	81	40	56	1	96	100	59	1	159	103	92	1	195	152	100	1	252
108	30	60	33.3%	90	30	50	37.5%	80	40	50	44.4%	90	42	47	47.2%	89	27	50	35.1%	77	36	54	40.0%	90	98	57	63.2%	155	83	86	49.1%	169	133	85	61.0%	218
33	10	10	50.0%	20	10	20	33.3%	30	20	20	50.0%	40	9	5	64.3%	14	3	1	75.0%	4	4	2	66.7%	6	2	2	50.0%	4	20	6	76.9%	26	19	15	55.9%	34
736	500	290	5	790	440	210	6	650	360	150	5	510	431	157	7	588	203	100	6	303	407	212	6	619	588	117	7	705	906	89	8	995	836	65	9	901
262	230	50	81.5%	280	220	70	75.9%	290	240	70	77.4%	310	275	88	75.8%	363	141	51	73.4%	192	198	113	63.7%	311	270	63	81.1%	333	395	51	88.6%	446	379	48	88.8%	427
18	10	0	100.0%	10	10		100.0%	10	10		100.0%	10	8	2	80.0%	10	4	1	80.0%	5	5	1	83.3%	6	7	4	63.6%	11	16	3	84.2%	19	5		100.0%	5
41	20	0	100.0%	20	10		100.0%	10	20		100.0%	20	17	2	89.5%	19	9	3	75.0%	12	8	2	80.0%	10	10	2	83.3%	12	15		100.0%	15	13		100.0%	13
41	20	0	100.0%	20	30		100.0%	30	30	10	80.0%	50	67	6	91.8%	73	20	3	87.0%	23	30	8	78.9%	38	70	5	93.3%	75	106	3	97.2%	109	76	3	96.2%	79
64	10	50	16.7%	60	20	50	28.6%	70	20	60	25.0%	80	12	42	22.2%	54	5	32	13.5%	37	1	16	5.9%	17	3	15	16.7%	18	2	6	25.0%	8	1		100.0%	1
15	20	10	66.7%	30	20		100.0%	20	20	10	66.7%	30	35	10	77.8%	45	10	3	76.9%	13	12	7	63.2%	19	22	4	84.6%	26	30	2	93.8%	32	24	1	96.0%	25
18		10	0.0%	10									4	6	40.0%	10	5		100.0%	5	3	0	100.0%	3	1		100.0%	1	8	1	88.9%	9	16	1	94.1%	17
228	200	170	54.1%	370	130	90	59.1%	220	10		100.0%	10	9	1	90.0%	10	8	4	66.7%	12	149	61	71.0%	210	192	23	89.3%	215	287	17	94.4%	304	294	11	96.4%	305
6		0											4		100.0%	4	1	3	25.0%	4	1	4	20.0%	5	13	1	92.9%	14	47	6	88.7%	53	28	1	96.6%	29
348	160	170	0	330	160	180	0	340	230	200	1	430	274	184	1	458	135	170	0	305	185	213	0	398	377	169	1	546	283	291	0	574	361	219	1	580
348	160	170	48.5%	330	160	180	47.1%	340	230	200	53.5%	430	274	184	59.8%	458	135	170	44.3%	305	185	213	46.5%	398	377	169	69.0%	546	283	291	49.3%	574	361	219	62.2%	580
399	720	0	2	720	520	0	1	520	520	0	1	520	491	0	2	491	448	0	2	448	230	1	1	231	354	0	2	354	216	0	1	216	356	0	1	320
		0			0								5		100.0%	5	3		100.0%	3	4	1	80.0%	5	4		100.0%	4								
310	530	0	100.0%	530	280			280	50			50	66			66																				
89	190		100.0%	190	240		100.0%	240	470		100.0%	470	420		100.0%	420	445		100.0%	445	226		100.0%	226	350		100.0%	350	216		100.0%	216	356		100.0%	320
2,544	1,660	1,160	58.9%	2,820	1,430	770	65.0%	2,200	1,450	700	67.4%	2,150	1,572	641	71.0%	2,213	1,053	477	68.8%	1,530	1,153	657	63.7%	1,810	1,873	480	79.6%	2,353	2,401	834	74.2%	3,235	2,429	632	79.3%	3,061
836	120	700	0	820	150	850	0	1,000	120	420	1	540	169	691	1	860	84	315	1	399	142	477	1	619	344	396	2	740	163	899	1	1,062	266	462	1	728
1		20	0.0%	20		60	0.0%	60	10	40	20.0%	50		1	0.0%	1																				
437	130	370	24.5%	500	120	620	16.2%	740	70	190	26.9%	260	126	448	22.0%	574	64	189	25.3%	253	118	329	26.4%	447	212	263	44.6%	475	85	353	19.4%	438	167	279	37.4%	446
48		20	0.0%	20		80	0.0%	80		75	0.0%	75	1	35	2.8%	36	1	22	4.3%	23	8	23	25.8%	31	14	57	19.7%	71	13	54	19.4%	67
173		100	0.0%	100						30	0.0%	30		1	100.0%	1													43	355	10.8%	398	45	30	33.3%	45
155		130	0.0%	130	30	120	20.0%	150	30	70	30.4%	130	42	166	20.2%	208	18	83	17.8%	101	20	121	14.2%	141	119	105	53.1%	224	18	133	11.9%	151	71	99	41.8%	170
19		10	0.0%	10									1	1	50.0%	2		8	0.0%	8	3	5	37.5%	8	5	5	50.0%	10	3	1	75.0%	4				
0																																				
		0											1		100.0%	1																				
1,328	0	1,130	0	1,130	110	1,300	0	1,410	220	970	0	1,190	97	571	0	668	132	375	1	492	246	720	1	966	336	564	1	900	12	948	0	960	295	543	1	838
576		540	0.0%	540	90	630	6.1%	660	100	430	18.9%	530	52	295	15.0%	347	64	217	22.8%	281	115	327	26.0%	442	80	195	29.1%	275		366	0.0%	366	120	242	33.1%	362
258		160	0.0%	160		140	0.0%	140	0	120	0.0%	120	3	44	6.4%	47	11	25	30.6%	36	6	33	15.4%	39	1	55	1.8%	56	12	37	17.4%	69	34	70	32.7%	104
494		430	0.0%	430	70	540	11.5%	610	120	430	22.2%	550	42	232	15.3%	274	42	133	24.0%	175	125	360	25.8%	485	255	314	44.8%	569		525	0.0%	525	141	231	37.9%	372
623	30	770		800	60	450		510	30	190		220	29	226		255	15	84		99	12	69		81	56	90		146	12	182		194	72	503		575
623	30	770	3.8%	800	60	450	11.8%	510	30	190	13.6%	220	29	226	11.4%	255	15	84	15.2%	99	12	69	14.8%	81	56	90	38.4%	146	12	182	6.2%	194	72	503	12.5%	575
37		20		20						10		10		10		10		8		8	19	1		20					5	13		18	1	47		48
37		20	0.0%	20						10	0.0%	10		10	0.0%	10		8	0.0%	8	19	1	95.0%	20					5	13	27.8%	18	1	47	2.1%	48
1,844	220	1,530	0	1,750	290	1,850	0	2,140	530	1,490	1	2,020	584	1,596	1	2,180	282	1,057	1	1,339	455	1,438	1	1,893	732	903	2	1,635	682	1,451	1	2,133	643	1,401	1	2,044
877	80	820	8.9%	900	100	1,180	7.8%	1,280	150	960	13.5%	1,110	190	931	16.9%	1,121	143	700	17.1%	844	184	858	17.7%	1,042	524	725	42.0%	1,249	616	1,206	33.8%	1,822	519	1,217	29.9%	1,736
871	140	610	18.7%	750	180	580	23.7%	760	370	450	45.1%	820	391	637	38.0%	1,028	137	344	28.5%	481	220	561	32.5%	781	207	178	53.8%	385	10	172	5.5%	182	76	97	43.9%	173
96		100	0.0%	100	10	90	10.0%	100	10	80	11.1%	90	3	28	9.7%	31	1	13	7.1%	14	1	19	5.0%	20	1		100.0%	1	56	73	43.4%	129	48	87	35.6%	135
0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6		0												2	50.0%	5																				
220	0	270	0	270	0	310	0	310	0	0	0	0	0	282	0	282	0	227	0	227	0	256	0	256	0	83	0	83	0	55	0	55	0	45	0	45
220		270	0.0%	270		310	0.0%	310			0.0%			282	0.0%	282		227	0.0%	227		256	0.0%	256		83	0.0%	83		55	0.0%	55		45	0.0%	45
4,894	370	4,420	7.7%	4,790	610	4,760	11.4%	5,370	900	3,080	22.6%	3,980	803	3,378	20.7%	4,261	498	2,066	19.3%	2,564	874	2,961	22.8%	3,835	1,468	2,036	41.9%	3,504	874	3,548	19.8%	4,422	1,237	3,001	29.9%	4,228
66	0	70	0	70	0	80	0	80	0	90	0	90	7	121	0	128	2	72	0	74	3	81	0	84	0	0	0	0	0	0	0	0	0	0	0	0
38		70	0.0%	70		30	0.0%	30		80	0.0%	80		65	0.0%	65		51	0.0%	51		51	0.0%	51												
28		30	0.0%	30		50	0.0%	50		50	0.0%	50	7	56	11.1%	63	2	71	8.7%	23	3	30	9.1%	33												
79	0	100	0	100	30	90	0	120	0	110	0	110	0	90	0	90	0	84	0	84	0	26	0	26	6	12	0	18	5	20	0	25	0	43	0	43
37		60	0.0%	60	30	70	30.0%	100		70	0.0%	70		40	0.0%	40		39	0.0%	39		26	0.0%	26					5	20	20.0%	25		43	0.0%	43
42		30	0.0%	30		20	0.0%	20		40	0.0%	40		50	0.0%	50		45	0.0%	45	1	0		0	6	12	33.3%	18								
22	0	0	0	0	0	20	0	20	0	40	0	40	1	4	0	5	0	45	0	45	0	22	0	22	0	0	0	0	4	2	1	6	1	42	0	43
		0																45	0.0%	45		22	0.0%	22												
12		0				20	0.0%	20		30	0.0%	30	1	3	20.0%	5													4	2	66.7%	6	1	42	2.3%	43
		0				10	0.0%	10					1	3	25.0%	4																				
28	0	90	0	90	0	50	0	50	0	30	0	30	1	22	0	23	0	17	0	17	0	32	0	32	2	4	0	6	1	0	1	1	1	2	0	3
28		90	0.0%	90		50	0.0%	50		30	0.0%	30	1	22	4.3%	23		17	0.0%	17		32	0.0%	32	2	4	33.3%	6	1		100.0%	1	1	2	33.3%	3
185		260		260	30	250		280		270		270	10	240		250	2	218		220	3	161		164	8	16		24	10	22		32	2	87		89
7,623	2,030	5,830	25.8%	7,870	2,070	5,780	26.4%	7,850	2,350	4,050	36.7%	6,400	2,465	4,259	36.7%	6,723	1,553	2,761	36.0%	4,314	2,030	3,779	34.9%	5,809	3,349	2,532	56.9%	5,881	3,285	4,304	42.7%	7,589	3,708	3,720	49.9%	7,428
	111				120				130				138				91				109				152				191				210			
3,559		3,728	0.0%	3,728		3,980	0.0%	3,980		4,706	0.0%	4,706		5,463	0.0%	5,463		5,531	0.0%	5,531		7,228	0.0%	7,228		8,891	0.0%	8,891		4,918	0.0%	4,918		4,554	0.0%	4,554
1,176		965	0.0%	965		1,749	0.0%	1,749		2,157	0.0%	2,157		1,332	0.0%	1,332		1,661	0.0%	1,661		1,628	0.0%	1,628		2,089	0.0%	2,089		2,982	0.0%	2,982		4,815	0.0%	4,815
4,735				5,693				5,729				6,863				6,795				7,192				8,906				10,980				7,900				9,369
12,358	2,030			13,563	2,070	11,509		13,579	2,350	10,913		13,263	2,465	11,254		13,719	1,553	9,953		11,506	2,030	12,685		14,715	3,349	13,512		16,861	3,285	12,304		15,589	3,708	13,089		16,797

A.1Containerization Trend of Export Cargoes by CommodityHandled in MBP from 1986 to 1995 (2)

Year / Commodity	1986-87				1987-88				1988-89				1989-90				1990-91				1991-92				1992-93				1993-94			
	Container	Non C'Sub	Cont.%	Total	Container	Non C'Sub	Cont.%	Total	Container	Non C'Sub	Cont.%	Total	Container	Non Cont	Cont.%	Total	Container	Non Cont	Cont.%	Total	Container	Non Cont	Cont.%	Total	Container	Non Cont	Cont.%	Total	Container	Non Cont	Cont.%	
Agricultural,Fishery & Forest Products	240	83		323	160	20	6	180	90	90	4	180	200	200	5	400	290	316	6	606	200	280	6	480	100	150	5	250	240	90	6	
Raw Cotton	132	52	71.7%	184	50	20	71.4%	70					20	10	66.7%	30	172	78	70.8%	243	50	19	72.5%	69	33	2	84.1%	41	93	6	93.8%	
Cotton Twist Yarn	13	2	86.7%	15	40		100.0%	40	20		100.0%	20	30		100.0%	30	28	10	73.7%	38	23	12	65.7%	35	14	6	70.0%	20	36	3	92.3%	
Fruits Fresh & Dried	11	0	100.0%	11	10		100.0%	10					10	20	33.3%	30	11	17	39.3%	28	12		100.0%	12	5	19	20.8%	24	4	12	25.0%	
Hides and Skin																	6	1	85.7%	7	4	2	66.7%	6	1	1	50.0%	2	3	1	75.0%	
Molasses									60	0	0.0%	60	20	110	15.4%	130		151	0.0%	151	50	170	22.7%	220	12	56	17.6%	68				
Oil Seeds	6	2	75.0%	8					20		100.0%	20	60	30	66.7%	90	22	26	45.8%	48	15	24	38.5%	39	7	20	25.9%	27	65	26	71.1%	
Seeds of all kinds																	4	1	80.0%	5	5	6	45.5%	11	3	3	50.0%	6	4	2	66.7%	
Spices including pepper	37	12	75.5%	49	20	0	100.0%	20	20	20	50.0%	40	20	20	50.0%	40	14	13	51.9%	27	10	21	32.3%	31	8	30	21.1%	38	21	22	48.8%	
Tea	11	2	84.6%	13	10	0	100.0%	10	10		100.0%	10	10	0	100.0%	10	9	3	75.0%	12	5	4	55.6%	9	9	11	90.0%	10	14	6	70.0%	
Raw Tobacco (County)	3	9	25.0%	12													1	12	7.7%	13	1	6	14.3%	7		4	0.0%	4	1	3	25.0%	
Fesh Fish	24	3	88.9%	27	30		100.0%	30	20	10	66.7%	30	30	10	75.0%	40	23	11	67.6%	34	25	16	61.0%	41	5	2	71.4%	7	2	9	18.2%	
Wooden Products N.O.S.	3	1	75.0%	4																												
Building Materials	10	7		17	10	10	1	20	20	0	1	20	20	10	1	30	18	6	1	24	12	17	0	29	7	20	0	27	24	10		11
Building Materials N.O.S	10	7	58.8%	17	10	10	50.0%	20	20		100.0%	20	20	10	66.7%	30	18	6	75.0%	24	12	17	41.4%	29	7	20	25.9%	27	24	10	70.6%	
Foodstuffs	89	15		104	100	10	1	110	90	40	1	130	100	40	1	140	69	42	1	111	71	57	1	128	26	34	0	60	36	21	1	
Foodstuff,N.O.S	89	15	85.6%	104	100	10	90.9%	110	90	40	69.2%	130	100	40	71.4%	140	69	42	62.2%	111	71	57	55.5%	128	26	34	43.3%	60	36	21	63.2%	
Raw Materials of Metal Products	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	1	6	1	1	1	2	3	0	1	
Ingots-Aluminium																					5	1	83.3%	6	1	1	50.0%	2	3		100.0%	
Other Ores				0																				0								
Metal and Metal Products	71	29		100	70	30	1	100	60	50	1	110	60	40	1	100	63	36	1	99	36	40	1	76	22	54	1	76	87	71	1	
Wire and Cables	10	9	52.6%	19	10	10	50.0%	20	10	20	33.3%	30	20	20	50.0%	40	19	15	55.9%	34	12	9	57.1%	21	3	1	25.0%	4	6	6	50.0%	
Metal and Metal Products,N.O.S	61	20	75.3%	81	60	20	75.0%	80	50	30	62.5%	80	40	20	66.7%	60	44	21	67.7%	65	24	33	43.6%	55	19	53	26.4%	72	81	65	55.5%	
Light Industry Products	228	28		256	290	20	7	310	300	80	7	380	330	80	8	410	280	125	7	405	186	209	5	395	78	277	3	355	316	134		8
Antiques & Artware	16	2	88.9%	18	20		100.0%	20	30		100.0%	30	20		100.0%	20	18	8	69.2%	26	10	11	47.6%	21	2	16	11.1%	18	10	6	62.5%	
Earth and Earthenware	12	3	80.0%	15	10	10	50.0%	20	20	10	66.7%	30	20	10	66.7%	30	21	9	70.0%	30	13	8	61.9%	21	8	18	30.8%	26	19	8	70.4%	
Glass and Glass Products	6	1	85.7%	7	10		100.0%	10	10		100.0%	10	10	0	100.0%	10	8	1	88.9%	9	8	4	66.7%	12	6	3	66.7%	9	27	3	90.0%	
Hoisery, Millinery, Haber Dashery etc.	50	4	92.6%	54	40		100.0%	40	50	10	83.3%	60	60	10	85.7%	70	55	19	74.3%	74	26	27	49.1%	53	6	38	13.6%	44	46	27	63.0%	
Instruments	11	2	84.6%	13	20		100.0%	20	30	10	75.0%	40	30	10	75.0%	40	23	14	62.2%	37	13	19	40.6%	32	6	21	22.2%	27	27	14	65.9%	
Leather and Leather Manufactures	6	0	100.0%	6	10		100.0%	10				0	10	0	100.0%	10	4	3	57.1%	7	2	4	33.3%	6	1	7	12.5%	8	8	5	61.5%	
Rubber Manufactures	6	1	85.7%	7													6	5	54.5%	11	3	6	33.3%	9	6	21	22.2%	27	21	9	70.0%	
Textiles: Cotton ,Silk,Woollen Synthetic etc	75	6	92.6%	81	130	10	92.9%	140	120	40	75.0%	160	130	40	76.5%	170	117	46	71.8%	163	86	85	50.3%	171	31	112	21.7%	143	114	45	71.7%	
Tobacco-Manufactures	9	3	75.0%	12													2	3	40.0%	5	2	6	25.0%	8	1	6	14.3%	7	5	2	71.4%	
Toilet Preparation and Perfumes									10		100.0%	10	20		100.0%	20	6	4	60.0%	10	6	16	27.3%	22	2	9	18.2%	11	14	3	82.4%	
Beverages and Drinks non-alchelic,NOS	5	2	71.4%	7																												
Bicycles and bycycles Parts	32	4	88.9%	36	50		100.0%	50	30	10	75.0%	40	30	10	75.0%	40	20	13	60.6%	33	17	23	42.5%	40	9	26	25.7%	35	25	12	67.6%	
Machinery	58	24		82	50	40	1	90	80	50	1	130	80	70	1	150	79	67	1	146	50	71	1	121	19	92	0	111	74	53		2
Machinery, N.O.S	20	8	71.4%	28	10	10	50.0%	20	30	20	60.0%	50	30	20	60.0%	50	37	27	57.8%	64	25	40	37.5%	64	12	56	17.6%	68	45	34	57.0%	
Moter Vehicles weighing 1.5 tonnes or more	1	6	14.3%	7		10	0.0%	10		10	0.0%	10	0	20	0.0%	20	3	10	23.1%	13	1	11	8.3%	12		10	0.0%	10	4	3	57.1%	
Moter Vehicle Parts	37	10	78.7%	47	40	20	66.7%	60	50	20	71.4%	70	50	30	62.5%	80	39	30	56.5%	69	25	20	55.6%	45	7	26	21.2%	33	25	16	61.0%	
Chemicals	99	37		136	130	60	5	190	150	90		240	210	110		320	173	95		268	128	120		248	112	130		242	234	70		
Chemicals, N.O.S	25	3	89.3%	28	40	20	66.7%	60	40	20	66.7%	60	50	20	71.4%	70	60	17	77.9%	77	46	38	54.8%	84	36	26	58.1%	62	84	13	86.6%	
Drugs and Medicines	33	23	58.9%	56	30	30	50.0%	60	30	30	50.0%	60	50	50	50.0%	100	42	48	46.7%	90	28	33	45.9%	61	17	42	28.8%	59	34	23	59.6%	
Dyes and Colores	25	5	83.3%	30	30	10	75.0%	40	40	10	80.0%	50	50	10	83.3%	60	35	11	76.1%	46	29	30	49.2%	59	16	44	26.7%	60	58	22	72.5%	
Synthetic Fibres					10		100.0%	10	20	10	66.7%	30	30	10	75.0%	40	21	2	91.3%	23	16	9	64.0%	25	23	8	74.2%	31	20	3	87.0%	
Paints and Painters' Material	8	3	72.7%	11	10	0	100.0%	10	10	10	50.0%	20	10	10	50.0%	20	4	6	40.0%	10	2	3	40.0%	5					1		100.0%	
Plastic & Plastic Manufacutures	5	1	83.3%	6	10	0	100.0%	10	10	10	50.0%	20	20	10	66.7%	30	11	11	50.0%	22	7	7	50.0%	14	20	10	66.7%	30	37	9	80.4%	
Lac, Gums and Resins	3	2	60.0%	5																												
Others	354	0		354	630	0	2	630	490	0	2	490	270	0	2	270	256	0	1	256	159	0	1	159	33	0	1	33	323	0	1	
Containers Cargo Commodity Unknown	299		100.0%	299	560	0	100.0%	560	390		100.0%	390	190		100.0%	190															
Miscellaneous	55		100.0%	55	70		100.0%	70	100		100.0%	100	80		100.0%	80	256		100.0%	256	159		100.0%	159	33		100.0%	33	323		100.0%	
Containerizable Sub-total	1,149	223	83.7%	1,372	1,440	190	88.3%	1,630	1,280	400	76.2%	1,680	1,270	550	69.8%	1,820	1,228	687	64.1%	1,915	847	795	51.6%	1,642	399	757	34.5%	1,156	1,337	449	74.9%	
Agricultural Products	135	178		313	80	130	1	210	50	160	1	210	80	160	1	240	60	180	1	240	62	343	1	405	18	304	0	322	214	345		1
Vegitables Dried and Fresh	84	150	35.9%	234	50	80	38.5%	130	30	130	18.8%	160	40	100	28.6%	140	36	131	21.6%	167	24	192	11.1%	216	6	193	3.0%	199	76	158	32.5%	
Rice	27	13	67.5%	40	20	20	50.0%	40	10	20	33.3%	30	30	30	50.0%	60	12	7	63.2%	19	12	31	27.9%	43	7	43	14.0%	50	15	9	62.5%	
Foodgrains,N.O.S	12	5	70.6%	17	10	10	50.0%	20	10	10	50.0%	20	10	20	33.3%	30	12	20	37.5%	32	13	32	28.9%	45	5	52	8.8%	57	123	141	46.6%	
Sugar	12	10	54.5%	22		20	0.0%	20					0	10	0.0%	10	0	22	0.0%	22	13	88	12.9%	101		16	0.0%	16		37	0.0%	
Fodder	103	190		293	70	150	0	220	70	270	0	340	70	170	0	240	66	100	0	166	31	120	0	151	18	159	0	177	94	163		0
Fodder incl. oilcakes	103	190	35.2%	293	70	150	31.8%	220	70	270	20.6%	340	70	170	29.2%	240	66	100	39.8%	166	31	120	20.5%	151	18	159	10.2%	177	94	163	36.6%	
Fertilizer	19	4		23	20	0	1	20	10	0	1	10	10	0	1	10	8	5	1	13	5	7	0	12	3	8	0	11	8	163		0
Bones and Boormeal	19	4	82.6%	23	20		100.0%	20	10		100.0%	10	10	0	100.0%	10	8	5	61.5%	13	5	7	41.7%	12	3	8	27.3%	11	8	163	4.7%	
Oil & Fats	7	35		42	0	30	0	30	10	30	0	40	10	10	1	20	7	14	0	21	8	18	0	26	1	14	0	15	11	28		0
Oil & Fats, N.O.S	7	35	16.7%	42		30	0.0%	30	10	30	25.0%	40	10	10	50.0%	20	7	14	33.3%	21	8	18	30.8%	26	1	14	6.7%	15	11	28	28.2%	
Metal and Metal Products				30				50				70				120	1			94				110					138			
Iron and Steel Material	11	10	52.4%	21	10	30	25.0%	40	40	30	57.1%	70	60	60	50.0%	120	54	40	57.4%	94	46	64	41.8%	110	27	111	19.6%	138	86	90	48.9%	
Scrap & Dross		9	0.0%	9		10	0.0%	10																								
Miscellaneous	0	74		74	0	130	0	130	0	90	0	90	0	74	0	74	0	58	0	58	0	89	0	89	0	75	0	75	0	109		0
Miscellaneous		74	0.0%	74		130	0.0%	130		90	0.0%	90		74	0.0%	74		58	0.0%	58		89	64.1%	89		75	0.0%	75		109	0.0%	
Mixture Sub-total	275	500	35.5%	775	180	480	27.3%	660	180	580	23.7%	760	230	474	32.7%	704	195	397	32.9%	592	152	641	19.2%	793	67	671	9.1%	738	413	898	31.5%	
Sub-total excl Petroleum	1,424	723	66.3%	2,147	1,620	670	70.7%	2,290	1,460	980	59.8%	2,440	1,500	1,024	59.4%	2,524	1,423	1,084	56.8%	2,507	999	1,436	41.0%	2,435	466	1,428	24.6%	1,894	1,750	1,347	56.5%	
Taken Containers in '000TEUs	90				101				126				126				136				126				138				186			
Petroleum (POL)																																
Crude Oil				8,431				9,629				10,443		8703		8,703		9917		9,917		9,981		9,981		8161		8,161		6,940		
Refined petroleum products				3,149				4,061				2,892		3103		3,103		2756		2,756		2,339		2,339		3433		3,433		2,730		
Miscellaneous																										107		107				
Petroleum Sub-total				11,580				13,690				13,334		11,806		11,806		12,673		12,673		12,320		12,320		11,701		11,701		9,670		
Total	1,424			13,729	1,620			15,980	1,460			15,774	1,500	12,830		14,330	1,423	13,757		15,180	999	13,756		14,755	466	13,129		13,595	1,750	11,017		

(Source: Administration report of MBPT)

A.1Containerization Trend of Export Cargoes by CommodityHandled in MBP from 1986 to 1995 (2)

(Unit: thousand tons)

1987-88				1988-89				1989-90				1990-91				1991-92				1992-93				1993-94				1994-95				1995-96			
ntainer	Non C'Sub	Cont.%	Total	Container	Non C'Sub	Cont.%	Total	Container	Non Cont.	Cont.%	Total	Container	Non Cont.	Cont.%	Total	Container	Non Cont.	Cont.%	Total	Container	Non Cont.	Cont.%	Total	Container	Non Cont.	Cont.%	Total	Container	Non Cont.	Cont.%	Total	Container	Non Cont.	Cont.%	Total
160	20	6	180	90	90	4	180	200	200	5	400	290	316	6	606	200	280	6	480	101	149	5	250	240	90	6	330	183	31	9	214	430	172	9	602
50	20	71.4%	70					20	10	66.7%	30	172	71	70.8%	243	50	19	72.5%	69	37	7	84.1%	44	91	6	93.8%	97	15	1	93.8%	16	8		100.0%	8
40		100.0%	40	20		100.0%	20	30		100.0%	30	28	10	73.7%	38	23	12	65.7%	35	14	6	70.0%	20	36	3	92.3%	39	51	2	96.2%	53	80	1	98.8%	81
10		100.0%	10					10	20	33.3%	30	11	17	39.3%	28	12		100.0%	12	5	19	20.8%	24	4	12	25.0%	16	23	10	69.7%	33	152	111	57.8%	263
												6	1	85.7%	7	4	2	66.7%	6	1	1	50.0%	2	3	1	75.0%	4	2		100.0%	2	1		100.0%	1
					60	0.0%	60	20	110	15.4%	130		151	0.0%	151	50	170	22.7%	220	12	56	17.6%	68									89	41	68.5%	130
				20		100.0%	20	60	30	66.7%	90	22	26	45.8%	48	15	24	38.5%	39	7	20	25.9%	27	64	26	71.1%	90	29	7	80.6%	36	5	1	83.3%	6
												4	1	80.0%	5	5	6	45.5%	11	3	3	50.0%	6	4	2	66.7%	6	15	2	88.2%	17	24	4	85.7%	28
20	0	100.0%	20	20	20	50.0%	40	20	20	50.0%	40	14	13	51.9%	27	10	21	32.3%	31	8	30	21.1%	38	21	22	48.8%	43	31	7	81.6%	38	40	12	76.9%	52
10	0	100.0%	10	10		100.0%	10	10	0	100.0%	10	9	3	75.0%	12	5	4	55.6%	9	9	1	90.0%	10	18	6	70.0%	20	12	1	92.3%	13	24	0	100.0%	24
												1	12	7.7%	13	1	6	14.3%	7		4	0.0%	4	1	3	25.0%	4	3	1	75.0%	4	4	2	66.7%	6
30		100.0%	30	20	10	66.7%	30	30	10	75.0%	40	23	11	67.6%	34	25	16	61.0%	41	5	2	71.4%	7	2	9	18.2%	11	2		100.0%	2	3		100.0%	3
10	10	1	20	20	0	1	20	20	10	1	30	18	6	1	24	12	17	0	29	7	20	0	27	24	10	1	34	33	3	1	40	25	2	1	27
10	10	50.0%	20	20		100.0%	20	20	10	66.7%	30	18	6	75.0%	24	12	17	41.4%	29	7	20	25.9%	27	24	10	70.6%	34	37	3	92.5%	40	25	2	92.6%	27
100	10	1	110	90	40	1	130	100	40	1	140	69	42	1	111	71	57	1	128	26	34	0	60	36	21	1	57	65	4	1	69	203	40	1	243
100	10	90.9%	110	90	40	69.2%	130	100	40	71.4%	140	69	42	62.2%	111	71	57	55.5%	128	26	34	43.3%	60	36	21	63.2%	57	65	4	94.2%	69	203	40	83.5%	243
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	1	6	1	1	1	2	3	0	1	3	11	1	2	12	11	0	2	13
																5	1	83.3%	6	1	1	50.0%	2	3		100.0%	3	4	0	100.0%	4	6	0	100.0%	6
			0																0									7	1	87.5%	8	7	0	100.0%	7
70	30	1	100	60	50	1	110	60	40	1	100	63	36	1	99	36	40	1	76	22	54	1	76	87	71	1	158	185	12	2	199	181	41	2	222
10	10	50.0%	20	10	20	33.3%	30	20	20	50.0%	40	19	15	55.9%	34	12	9	57.1%	21	3	1	75.0%	4	6	6	50.0%	12	5	1	100.0%	5	2		100.0%	2
60	20	75.0%	80	50	30	62.5%	80	40	20	66.7%	60	44	21	67.7%	65	24	31	43.6%	55	19	53	26.4%	72	81	65	55.5%	146	180	12	93.8%	192	179	41	81.4%	220
290	20	7	310	300	80	7	380	330	80	8	410	280	125	7	405	186	209	5	395	78	277	3	355	316	134	8	450	440	45	10	485	431	23	10	454
20		100.0%	20	30		100.0%	30	20		100.0%	20	18	8	69.2%	26	10	11	47.6%	21	2	16	11.1%	18	10	6	62.5%	16	18	3	85.7%	21	17	1	94.4%	18
10	10	50.0%	20	20	10	66.7%	30	20	10	66.7%	30	21	9	70.0%	30	13	8	61.9%	21	8	18	30.8%	26	19	8	70.4%	27	18	2	90.0%	20	23	1	95.8%	24
10		100.0%	10	10		100.0%	10	10	0	100.0%	10	8	1	88.9%	9	8	4	66.7%	12	6	3	66.7%	9	27	3	90.0%	30	22	1	95.7%	23	63		100.0%	63
40		100.0%	40	50	10	83.3%	60	60	10	85.7%	70	55	19	74.3%	74	26	27	49.1%	53	6	38	13.6%	44	46	27	63.0%	73	96	13	88.1%	109	100	6	94.3%	106
20		100.0%	20	30	10	75.0%	40	30	10	75.0%	40	23	14	62.2%	37	13	19	40.6%	32	6	21	22.2%	27	27	14	65.9%	41	37	3	92.5%	40	34	3	91.9%	37
10		100.0%	10				0	10	0	100.0%	10	4	3	57.1%	7	2	4	33.3%	6	1	7	12.5%	8	8	5	61.5%	13	9	1	90.0%	10	11	1	91.7%	12
												6	5	54.5%	11	3	6	33.3%	9	6	21	22.2%	27	21	9	70.0%	30	33	2	94.4%	36	38	1	97.4%	39
130	10	92.9%	140	120	40	75.0%	160	130	40	76.5%	170	117	46	71.8%	163	86	85	50.3%	171	31	112	21.7%	143	114	45	71.7%	159	138	14	90.8%	152	94	8	92.2%	102
												2	3	40.0%	5	2	6	25.0%	8	1	6	14.3%	7	5	2	71.4%	7	3	1	75.0%	4	2		100.0%	2
				10		100.0%	10	20		100.0%	20	6	4	60.0%	10	6	16	27.3%	22	2	9	18.2%	11	14	3	82.4%	17	32	2	94.1%	34	23	1	95.8%	24
50		100.0%	50	30	10	75.0%	40	30	10	75.0%	40	20	13	60.6%	33	17	23	42.5%	40	9	26	25.7%	35	25	12	67.6%	37	33	3	91.7%	36	26	1	96.3%	27
50	40	1	90	80	50	1	130	80	70	1	150	79	67	1	146	50	71	1	121	19	92	0	111	74	53	2	127	108	14	3	122	100	10	3	110
10	10	50.0%	20	30	20	60.0%	50	30	20	60.0%	50	37	27	57.8%	64	24	40	37.5%	64	12	56	17.6%	68	45	34	57.0%	79	63	8	88.6%	70	56	4	93.3%	60
	10	0.0%	10		10	0.0%	10	0	20	0.0%	20	3	10	23.1%	13	1	11	8.3%	12		10	0.0%	10	4	3	57.1%	7	34	4	89.5%	38	23	5	82.1%	28
40	20	66.7%	60	50	20	71.4%	70	50	30	62.5%	80	39	30	56.5%	69	25	20	55.6%	45	7	26	21.2%	33	25	16	61.0%	41	12	2	85.7%	14	21	1	95.5%	22
130	60	5	190	150	90		240	210	110		320	173	95		268	128	120		248	112	130		242	234	70		304	353	34		387	381	18		399
40	20	66.7%	60	40	20	66.7%	60	50	20	71.4%	70	60	17	77.9%	77	46	38	54.8%	84	36	26	58.1%	62	84	13	86.6%	97	140	10	93.3%	150	164	10	94.3%	174
30	30	50.0%	60	30	30	50.0%	60	50	50	50.0%	100	42	48	46.7%	90	28	33	45.9%	61	17	42	28.8%	59	34	23	59.6%	57	49	6	89.1%	55	51	2	96.2%	53
30	10	75.0%	40	40	10	80.0%	50	50	10	83.3%	60	35	11	76.1%	46	29	30	49.2%	59	16	44	26.7%	60	58	22	72.5%	80	52	4	92.9%	56	40	2	95.2%	42
10		100.0%	10	20	10	66.7%	30	30	10	75.0%	40	21	2	91.3%	23	16	9	64.0%	25	23	8	74.2%	31	20	3	87.0%	23	24	2	92.3%	26	25	1	96.2%	26
10	0	100.0%	10	10	10	50.0%	20	10	10	50.0%	20	4	6	40.0%	10	2	3	40.0%	5					1		100.0%	1	23	4	85.2%	27	35	2	94.6%	37
10	0	100.0%	10	10	10	50.0%	20	20	10	66.7%	30	11	11	50.0%	22	7	7	50.0%	14	20	10	66.7%	30	37	9	80.4%	46	65	8	89.0%	73	66	1	98.5%	67
630	0	2	630	490	0	2	490	270	0	2	270	256	0	1	256	159	0	1	159	33	0	1	33	323	0	1	323	585	0	1	585	601	0	1	301
560	0	100.0%	560	390		100.0%	390	190		100.0%	190																								
70		100.0%	70	100		100.0%	100	80		100.0%	80	256		100.0%	256	159		100.0%	159	33		100.0%	33	323		100.0%	323	585		100.0%	585	301		100.0%	301
1,440	190	88.3%	1,630	1,280	400	76.2%	1,680	1,270	550	69.8%	1,820	1,228	687	64.1%	1,915	847	795	51.6%	1,642	399	757	34.5%	1,156	1,337	449	74.9%	1,786	1,967	144	93.2%	2,111	2,065	306	87.1%	2,371
80	130	1	210	50	160	1	210	80	160	1	240	60	180	1	240	62	343	1	405	18	304	0	322	214	345	1	559	388	146	3	534	404	441	3	845
50	80	38.5%	130	30	130	18.8%	160	40	100	28.6%	140	36	131	21.6%	167	24	192	11.1%	216	6	193	3.0%	199	76	158	32.5%	234	208	122	63.0%	330	31	11	73.8%	42
20	20	50.0%	40	10	20	33.3%	30	30	30	50.0%	60	12	7	63.2%	19	12	31	27.9%	43	7	43	14.0%	50	15	9	62.5%	24	17	3	85.0%	20	268	377	41.6%	645
10	10	50.0%	20	10	10	50.0%	20	10	20	33.3%	30	12	20	37.5%	32	13	32	28.9%	45	5	52	8.8%	57	123	141	46.6%	264	151	8	95.0%	159	73	44	62.4%	117
	20	0.0%	20					0	10	0.0%	10	0	22	0.0%	22	13	88	12.9%	101		16	0.0%	16		37	0.0%	37	12	13	48.0%	25	32	9	78.0%	41
70	150	0	220	70	270	0	340	70	170	0	240	66	100	0	166	31	120	0	151	18	159	0	177	93	163	0	257	142	111	1	253	220	238	0	458
70	150	31.8%	220	70	270	20.6%	340	70	170	29.2%	240	66	100	39.8%	166	31	120	20.5%	151	18	159	10.2%	177	94	163	36.6%	257	142	111	56.1%	253	220	238	48.0%	458
20	0	1	20	10	0	1	10	10	0	1	10	8	5	1	13	5	7	0	12	3	8	0	11	8	163	0	171	10	1	1	61	14	1	1	15
20		100.0%	20	10		100.0%	10	10	0	100.0%	10	8	5	61.5%	13	5	7	41.7%	12	3	8	27.3%	11	8	163	4.7%	171	10	1	90.9%	11	14	1	93.3%	15
0	30	0	30	10	30	0	40	10	10	1	20	7	14	0	21	8	18	0	26	1	14	0	15	11	28	0	39	32	9	1	41	41	35	1	76
	30	0.0%	30	10	30	25.0%	40	10	10	50.0%	20	7	14	33.3%	21	8	18	30.8%	26	1	14	6.7%	15	11	28	28.2%	39	32	9	78.0%	41	41	35	53.9%	76
			50				70				120				94				110					138			176				112				191
10	30	25.0%	40	40	30	57.1%	70	60	60	50.0%	120	54	40	57.4%	94	46	64	41.8%	110	27	111	19.6%	138	86	90	48.9%	176	96	16	85.7%	112	113	78	59.2%	191
	10	0.0%	10																																
0	130	0	130	0	90	0	90	0	74	0	74	0	58	0	58	0	89	1	89	0	75	0	75	0	109	0	109	0	60	0	60	0	85	0	85
	130	0.0%	130		90	0.0%	90		74	0.0%	74		58	0.0%	58		89	64.1%	89		75	0.0%	75		109	0.0%	109		60	0.0%	60		85	0.0%	85
180	480	27.3%	660	180	580	23.7%	760	230	474	32.7%	704	195	397	32.9%	592	152	641	19.2%	793	67	671	9.1%	738	413	898	31.5%	1,311	668	343	66.1%	1,011	792	878	47.4%	1,670
1,630	670	70.7%	2,290	1,460	980	59.8%	2,440	1,500	1,024	59.4%	2,524	1,423	1,084	56.8%	2,507	999	1,436	41.0%	2,435	466	1,428	24.6%	1,894	1,750	1,347	56.5%	3,097	2,635	487	84.4%	3,122	2,857	1,184	70.7%	4,041
101				126				126				136				126				138				186				201				213			
			9,629				10,412		8703		8,703		9917		9,917		9,981		9,981		8161		8,161		6,940		6,940		8,975		8,975		9,991		9,991
			4,061				2,892		3103		3,103		2756		2,756		2,339		2,339		3433		3,433		2,730		2,730		1,955		1,955		1,607		1,607
																					107		107										390		390
			13,690				13,334		11,806		11,806		12,673		12,673		12,320		12,320		11,701		11,701		9,670		9,670		10,930		10,930		11,991		11,991
1,620			15,980	1,460			15,774	1,500	12,830		14,330	1,423	13,757		15,180	999	13,756		14,755	466	13,129		13,595	1,750	11,017		12,767	2,635	11,417		14,052	2,857	13,175		16,032