DEVELOPMENT OF CONTAINER SERVICES FOR THE BANGLADESH RAILWAY

BY

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Department of Industrial and Production Engineering

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ABSTRACT

Bangladesh Railway(BR) is playing a vital role in the national economy and communication sector of the country. In this project work BR's network, resources and performance indicators were studied and found that BR's network is old and facing tough competition with road transportation in respect of speed, time, and quality of services. The waterways are also in the competition on cost consideration. After the privatization of the transportation of food and fertilizer(50% of the total cargo of BR), BR's share has been decreased considerably. From the study it was revealed that recently introduced(in 1986) containerized cargo is the most effective or profitable by which BR could overcome the above crisis and strengthen the efficiency of import and export sector communication.

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ABBREVIATION

ADB	-	Asian Development Bank
AECS	-	Australia/Europe Container Services
BADC	-	Bangladesh Agricultural Development Corporation
BCIC	-	Bangladesh Chemical Industries Corporation
BD	-	Bangladesh
BG	-	Broad Gauge
BIWTA	-	Bangladesh Inland Water Transport Authority
BJMC	-	Bangladesh Jute Mills Corporation
BPGS	-	Board of Post Graduate Studies
BR	-	Bangladesh Railway
BRTC	-	Bangladesh Road Transport Corporation
BSEC	-	Bangladesh Steel & Engineering Corporation
BTB	-	Bangladesh Tea Board
CBD	-	Central Business District
CFS	-	Container Freight Station
CPA	-	Chittagong Port Authority
CRTC	-	Central Road Transport Corporation
CSD	-	Central Storage Depot
CSM	-	Chittagong Steel Mills
CTG.	-	Chittagong
DBCC	-	Divisional Boat Carrying Contractors
DRTC	-	Divisional Road Transport Contractors
EEC	-	European Economic Country
ERL	-	Eastern Refinery Limited
EZ.	-	East Zone, BR
FAO	-	Food & Agricultural Organization
FCL	-	Full Container Load
FY	-	Financial Year
GOB	-	Government of Bangladesh
IBRD	-	International Bank for Reconstruction and Development
ICD	-	Inland Container Depot

ABBREVIATION (Contd.)

IMV	-	Internal Movement Vehicle
IR	-	Indian Railway
ISO	-	International Standards Organization
IWT	-	Inland Water Transport
JMBA	-	Jamuna Multipurpose Bridge Authority
LCL	-	Less than Container Load
LCI	-	Load Classification Index
LSD	-	Local Storage Depot
MG	-	Metre Gauge
MPA	-	Mongla Port Authority
MIS	-	Management Information System
NCC	-	National Container Company
OIS	-	Operation Information System
P.a	-	Per annum
PDP	-	Primary Distribution Point
Rly.	-	Railway
SAFTA	-	South Asian Free Trade Association
Silo.	-	A pit or airtight chamber for storing grains
TAPP	-	Technical Assistant Project Paper
TCB	-	Trading Corporation of Bangladesh
TCIB	-	Transport of Containers in Bangladesh
TEU	-	Twenty foot Equivalent Unit
TDP	-	Transit Distribution Point
TSP	-	Triple Super Phosphate
UNDP	-	United Nations Development Programme
USSR	-	Union of Soviet Socialist Republic
WZ	-	West Zone,BR

Chapter – 1
INTRODUCTION

Transportation plays an important role in the national development. Out of the three modes of transports such as the rail, the road and the water ways, the Bangladesh Railway primarily transports general and special commodities as well as imported and exported cargoes.

1.1 A SHORT HISTORY OF BANGLADESH RAILWAY

The Bangladesh Railway at present has got 2,745.65 route kilometers. It required sustained efforts for over a century to build this network. The story dates back to 1862, when the first section of 53.11 kilometers of broad gauge line was opened to traffic on 15th November between Darsana and Jagati. The next railway connection open to traffic was between Dhaka and Narayanganj, a distance of 14.98 kilometers on the 4th January, 1885. In 1891, the construction of the then Assam-Bengal Railway was taken up with British Government assistance. This was later on taken over by the Assam Bengal Railway Company. On 1st July, 1895, two sections of metre gauge lines were opened between Chittagong and Comilla, a length of 149.89 kilometres and between Laksam and Chandpur, a length of 50.89 km.

The construction and operation of these sections in the middle and late 19th Century was taken up by Railway Companies formed in England. Their primary objective was to operate these sections purely on commercial considerations but later on, when the various sections were linked up, the British Government of the then India found them quite important from their

strategic, political and economic points of views and, therefore, the Government also came in the picture with statutory control and regulations for operation and management of the Railway.

On the 1st January, 1942, the Assam Bengal Railway was amalgamated with the Eastern Bengal Railway under the name "Bengal and Assam Railway". At the time of partition of India in 1947, Bengal and Assam Railway was split up and the portion of the system about 2,603.92 kilimetres long which fell within the boundary of erstwhile Eastern part of Pakistan namely East Pakistan was named as Eastern Bengal Railway, the control remained with the central Government of Pakistan. Later, with effect from 1st February, 1961, Eastern Bengal Railway was renamed as Pakistan Eastern Railway.

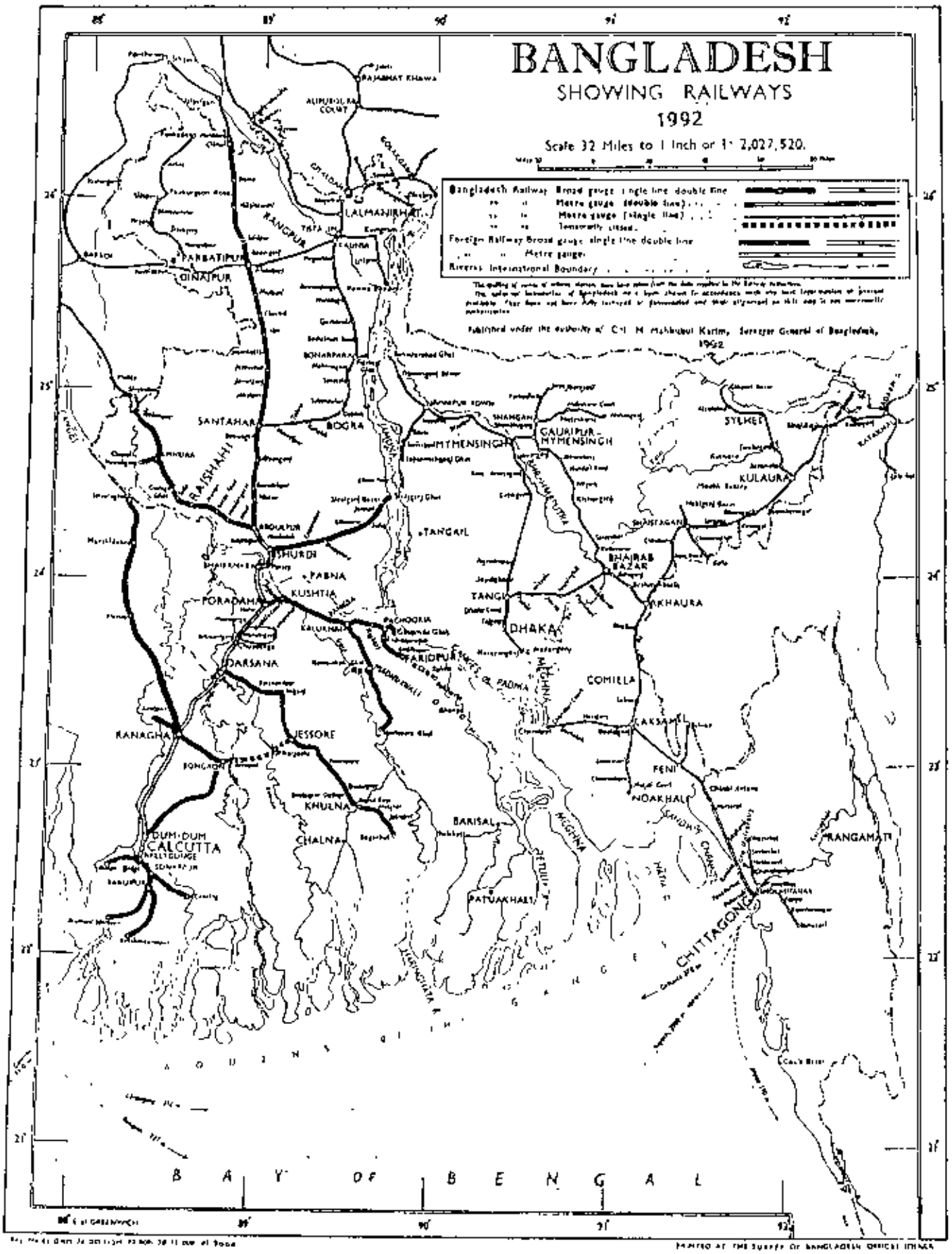
In the year 1962, the control of Pakistan Eastern Railway was transferred from the Central Government by the Presidential Order of 9th June, 1962, to the Government of the then East Pakistan and placed under the management of a Railway Board with effect from the financial year 1962-63. With the liberation of Bangladesh on 16th December, 1971, Pakistan Eastern Railway renamed as Bangladesh Railway.

At the end of 1988-89, Bangladesh Railway had a total of 502 stations comprising 255 in the Eastern Zone and 247 in the Western Zone spread over 2745.65 route kilometres consisting of two gauges i.e. Broad Gauge (West Zone)/(1676 mm), 923.53 kilometres and Metre gauge (East & West zone)/(1000 mm) 1,279.09 kilometres and 543.03 kilometres respectively. A map route of existing railway is shown in Figure-1.1. Other information like operating income, revenue per passenger, revenue per passenger kilometer,

number of employee, cost of employee, etc. In the year 1991-92 are shown in Table-1.1.

Table-1.1: Basic information of the BR in 1992

Route Kilometres	2,746
Track Kilometres	4,440
Number of stations	489
Passengers carried(million)	52.3
Passenger-Kilometres(billion)	5.35
Average lead of a Passenger(Kilometres)	102.3
Tonnes carried(million)	2.51
Tonne Kilometres (million)	718
Average lead of a tonne of freight (kilometres)	286.7
Number of Passenger trains daily	280
Number of freight trains daily	50
Total operating revenue(million Tk)	2603.6
Total operating expenses(million Tk)	3397.8
Net operating income(million Tk) (-)	794.1
Operating Ratio (%)	130.5
Revenue per passenger(Tk).	21.53
Revenue per passenger Kilometre(poisha)	22.15
Revenue per tonne(Tk)	428.26
Revenue per tonne Kilometre (poisha)	129.8
Number of employees	55,413
Cost of employees (million Tk.)	2024.0


BANGLADESH
SHOWING RAILWAYS
1992
Scale 32 Miles to 1 Inch or 1: 2,027,520.
Bangladesh Railway Broad gauge single line double line
Metre gauge (double line)
Metre gauge (single line)
Temporarily closed
Foreign Railway Broad gauge single line double line
Metre gauge
Rivers International Boundary
Published under the authority of Col. M. Mahbubul Karim, Surveyor General of Bangladesh, 1992
PARBATIPUR
DINAJPUR
LALMANIRHAT
RANGPUR
SANTAHAR
BOGRA
RAJSHAHI
ISHURDI
PABNA
KUSHTIA
POARADAHA
DARSANA
JESSORE
KHULNA
CHALNA
RANAGHA
DUM-DUM
CALCUTTA
BARISAL
PATUAKHALI
MYMENSINGH
GAURIPUR-MYMENSINGH
SYLHET
KULAURA
TANGAIL
BHAIRAB BAZAR
DHAKA
NARAYANGANJ
FARIDPUR
COMILLA
LAKSAM
FENI
NOAKHALI
CHITTAGONG
RANGAMATI
B A Y OF B E N G A L

In 1991-92 the operating revenue of Tk.112030 thousand by passenger, Tk.122411 thousand by other coaching, Tk.1139660 thousand by freight earning and Tk.215523 thousand from miscellaneous. This is shown in Figure-1.2. The operating revenue from 1969-70 to 1991-92 are shown in a tabular form in Table-1.2. From Table-1.2 the year-wise total revenue is shown in Figure-1.3.

Table-1. 2 : Operating revenue (Tk. figure in '000)

Year	Passenger Earnings		Other coaching Earnings		Freight earnings		Miscellaneous Earnings		Total
	Tk.	%	Tk.	%	Tk.	%	Tk.	%	Tk.
1969-70	101711	33.6	25737	8.49	169422	55.9	61.69	2.04	303039
1982-83	494313	33.1	130142	8.71	794759	53.2	75393	5.04	1494607
1983-84	4893478	34.1	149194	10.3	735346	50.9	68032	4.70	1446050
1984-85	575802	34.2	186590	9.88	853837	50.6	9.0088	5.34	1686317
1985-86	630982	39.6	159975	10.0	721000	45.3	80997	5.08	1592822
1986-87	718542	44.9	149875	9.36	604952	37.8	127689	7.97	1601058
1987-88	667703	39.0	151887	8.87	803358	46.9	89069	5.20	1712017
1988-89	686889	39.0	148400	8.31	794760	45.1	133475	7.58	1761324
1989-90	831517	41.0	136355	6.72	878121	43.3	184063	9.07	2030050
199091	808363	38.1	128711	5.40	1052335	44.2	293243	12.3	2382672
1991-92	1126030	43.3	122411	4.70	1139660	43.8	215523	8.28	2603624

Figure-1.2 : Operating Revenue of BR
In 1991-92

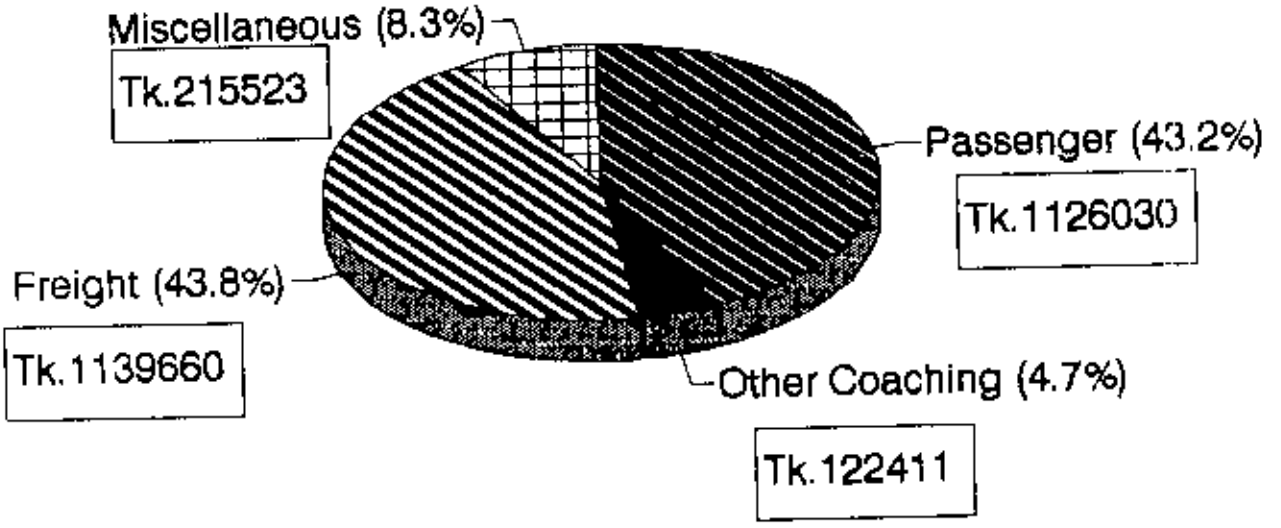
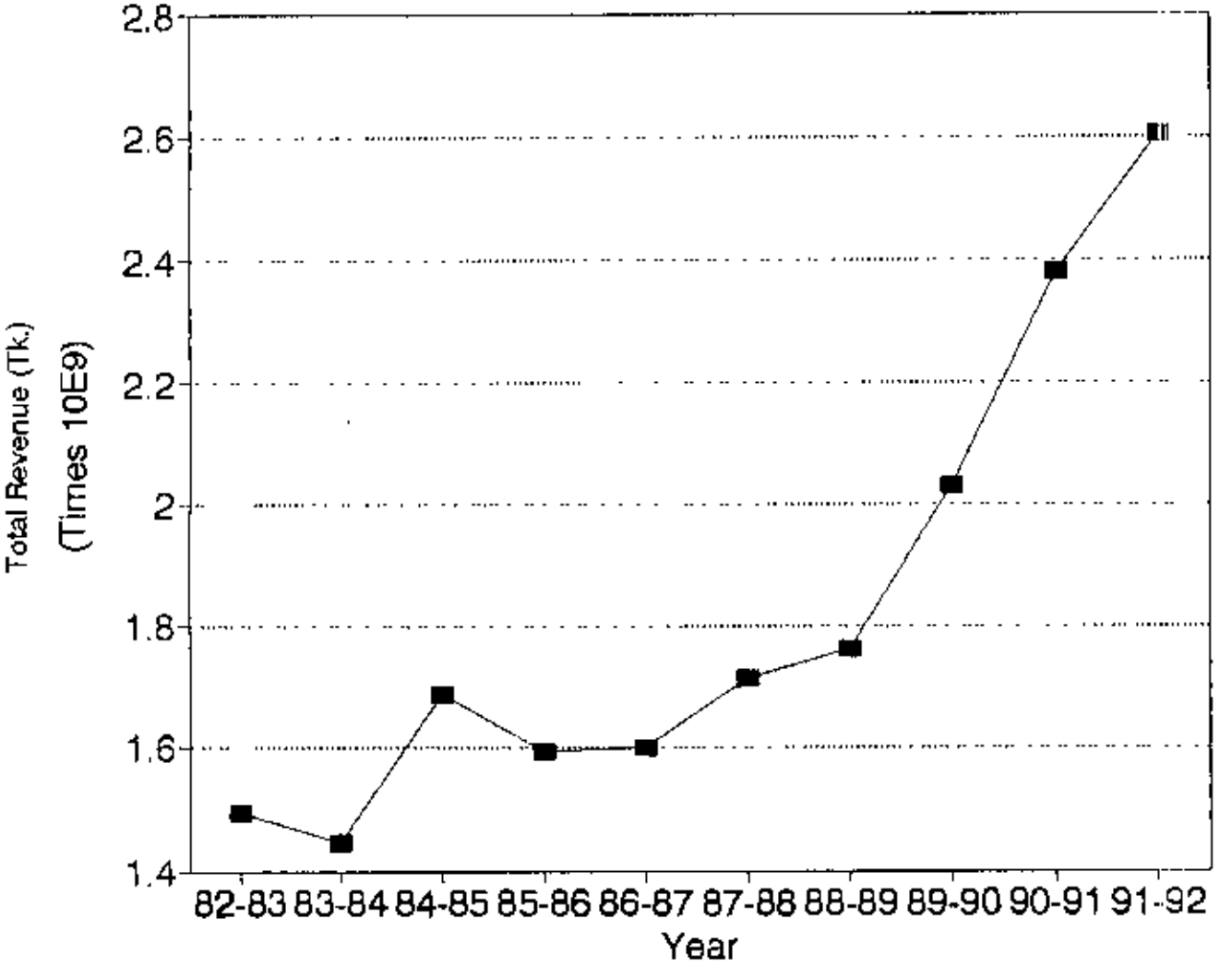


Figure-1.3 : Operating Revenue of BR



The operating expenses of BR from 1969-70 to 1991-92 are shown in Table-1.3. From the table in 1991-92, the break-down of expenses could be found as the operating expenses Tk.5,90,633 thousand by administration, Tk.10,94,549 thousand by repairs and maintenance, Tk.5,15,982 thousand by operation staff, Tk.5,80,432 thousand by operation fuel, Tk. 2,77,501 thousand by operation other than staff and fuel and Tk. 3,38,667 thousand from miscellaneous expenses. These expenses in 1991-92 is shown in Figure-1.3 and year-wise expenses is also shown in Figure1.4.

Table-1.3: Operating expenses of BR (In thousand Tk.)

Year	Administration	Repairs and maintenance	operation staff	Opteration fuel	operation other than staff and fuel	miscellaneous expenses	Depreciation	Total
	Taka	Taka	Taka	Taka	Taka	Taka	Taka	Taka
1969-70	39285	78461	39333	43155	9345	13093	30059	252751
1982-83	192420	541659	151519	433730	81360	102230	-	1502918
1983-84	221064	751083	161371	408722	116602	123331	-	1782173
1984-85	271389	817156	207955	397814	144063	127751	36991	2003229
1985-86	380129	1088891	305497	382965	173849	167841	11070	2510242
1986-87	376183	1016505	332518	381239	189523	195945	-	25043013
1987-88	473953	1196057	372803	424870	239871	207479	-	2915243
1988-89	481638	979302	385157	405232	251342	240997	-	2743666
1989-90	541708	1179248	465833	388116	293216	285239	-	313360
1990-91	555236	1164237	461987	615894	280304	286849	-	3364507
1991-92	590633	1094548	515982	580432	277501	338667	-	3397764

Figure 1.4 : Operating Expenses of BR
in 1991-92 (Thousand Taka)

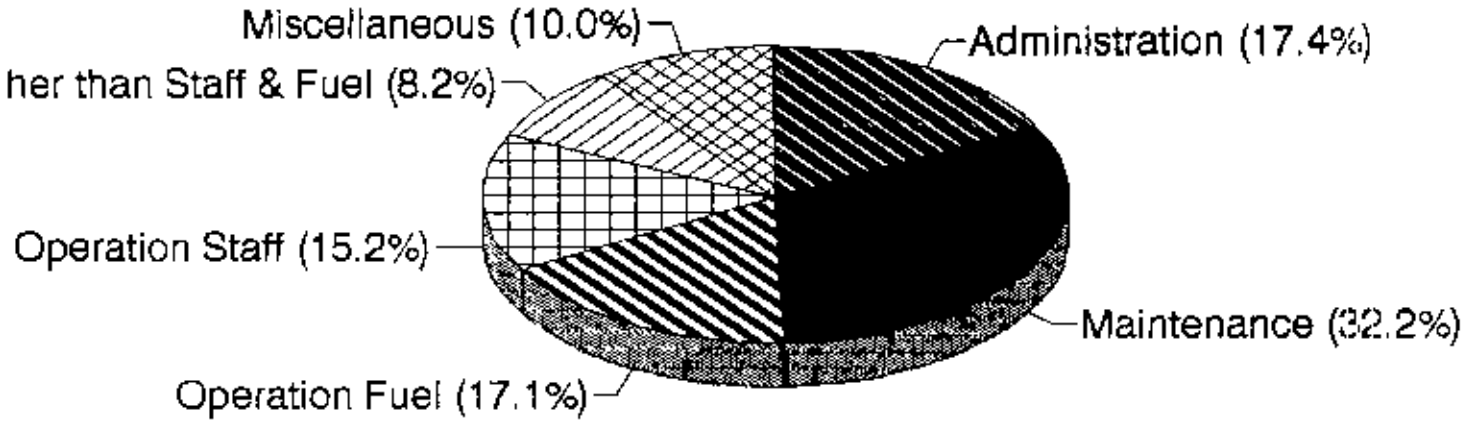
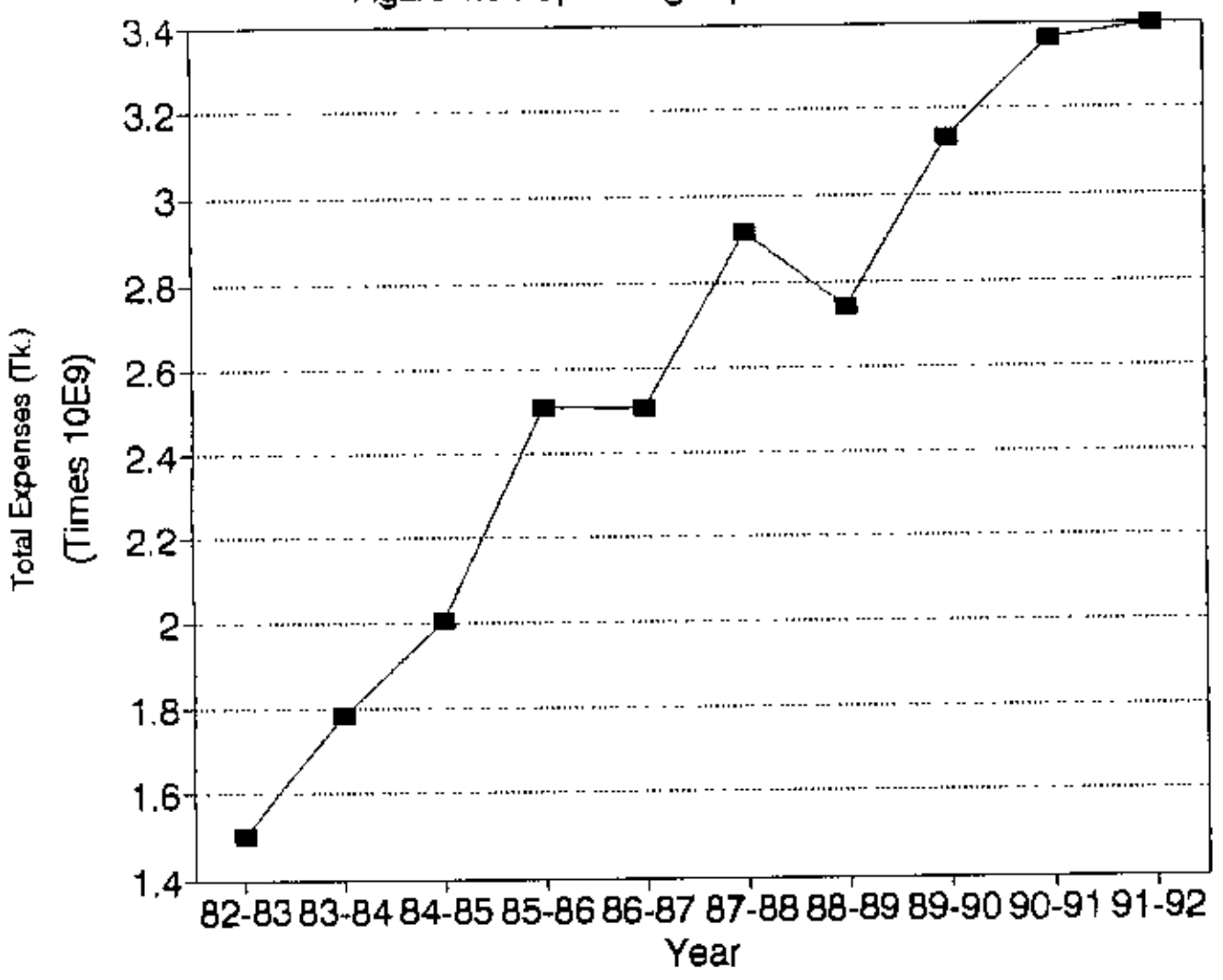


Figure-1.5 : Operating Expenses of BR



The resources of Bangladesh Railway are Railway stations, Route kilometers, locomotive owned, coaching vehicle owned, type-wise breakdown of passenger carriages owned, type-wise breakdown of other coaching vehicles owned. Freight wagons owned, type-wise breakdown of freight wagons owned etc, as shown in Appendix-I.

The performance indicators such as passengers carried, passengers kilometers and average lead of passengers, freight wagon loaded, freight tonnes carried of principal commodotles, freight earnings of principal commodities, freight traffic, fuel consumption, total number and total cost of employee etc. are also shown in Appendix-I.

1.2 ORGANIZATION OF THE BR

The management and development of the railway was vested with a Railway Board upto june 2, 1982. The Board comprised of a Chairman and four member. But, for administrative convenience and operational reasons, this Railway Board was abolished with effect from June 3, 1982 and the function of the Railway Board was vested with a Director General who is also the ex-officio secretary of the railway. At that time, Railway was bifurcated into two zones - East & West, under the administrative control of two General Managers who are responsible/accountable to the Director General of Railway. In addition another General Manager was appointed for implementation of the major development projects of the railway, specially the foreign aided project. The Secretary, Railway Division, Ministry of Communication performs the task of policy making on behalf of the

Government. The Director General is assisted by three Additional Director General having ex-officio status of Additional Secretaries to the Government, four Joint Director Generals having ex-officio status of Joint Secretary to the Government and eight Directors having ex-officio status of Deputy Secretary to the Government.

The General Managers of the two zones are assisted by the heads of various specialized departments who are responsible for operation, maintenance and financial management. Each zone is again divided into two Divisions, which form the basic unit of operation. The division is headed by a Divisional Railway Manager who is assisted by Divisional Officers of various specialized Departments such as Personnel, Transportation. Commercial, Finance, Mechanical, Way & Works, Signalling, Electrical, Medical, Nirapatta Bahini, etc. Besides there are two workshops Divisions - one in each zone located at Pahartali and Saidpur, each being headed by a Divisional Superintendent.

Railway Division has also got attached departments such as the Railway Prashikkhan Academy headed by a Rector; a planning Department headed by a Chief Planning Officer; a safety Inspectorate, headed by a Government Inspector of Railways; a Stores Department headed by a Chief Controller of Stores and an Accounts Department headed by a Joint Director General for co-ordinating the financial management activities of the two zones. The organization chart of BR is given in Appendix-II.

1.3 PURPOSE OF THE PRESENT WORK

Introduction of railway communication, railway services facilities for goods transportation developed in phases. In case of special types of cargoes like petroleum fuel, baggage, boulder, wooden logs, bulk wheat, sophisticated goods etc., appropriate wagons were introduced. The introduction of new technology also change the system in most of the cases. The railway had a long vital role to cope up with the international material handling system for imports and exports purposes of goods. In the recent year the most efficient and effective container system has been introduced in the world trade. In this circumstance the Bangladesh Railway has to introduce the system at its ports. It has been becoming necessary for the Bangladesh to introduce containerization in its internal railway system also.

The GOB has planned to convert and to equip its trade linkage that is the inland, seaport, rail port etc. with the container handling facilities. At the same time arrangements are also necessary for transportation of their containers direct to the consumers/users.

The export cargo also needs the container facilities. Garments, tea, leather, goods etc. which are shipped (from the port export processing zone or land export processing zone, in country factories, industries etc.) through containers. Therefore the container handling facilities for inland traffic movement are also to be available for all rail, road,river communication.

As part of the Import Manifest Survey, a random sample of containers

imported at Chittagong port suggested that nearly all containers are unstuffed at Chittagong and transported inland by road in break bulk form. The proportion carried by rail is low and for IWT appears to be negligible. The main reasons identified for choosing road were speed and reliability whilst use of rail and Inland Water Transport (IWT) was broadly confined to specific semi-bulk cargoes.The inland transport mode for Chittagong container imports and exports in percentage, Rail - 15% Road - 81% IWT - 4%.

Out of three modes of transports river transportation is the cheapest. But it needs the river ports to be updated and developed with modern jetties, cranes, container handling equipments. It is envisaged that the investment would be high and it will take considerable amount of time in development. The railway transportation cost lies in between the by road and by river costs; by road cost is the highest. To convert the energy efficient railways for handling container would be the cheapest. Moreover, it has the required linkage to the import and export ports and the existing loading and unloading facilities.

The rail being the most energy efficient transport could enter the container traffic market with its versatile facilities for the exporters and importers. Such as main ICD facilities, ICD site selection, etc., this will have to be by offering an attractive alternative to road, particularly in terms of quality of service. Since IWT is not a significant carrier of containerizable freight, it does not seem to be represent a major additional competitor. But considering the water ways freight, there is scope for

future development of this sector also.

In the west zone of Bangladesh Railway, there is no container facilities. Mongla ports mainly use to export commodities like, jute and jute goods, frozen foods. Refrigerated containers are used to export frozen foods. However,some jute goods exporters has stated the use containers.

1.4 AIMS AND OBJECTIVES OF THE PRESENT WORK

The objective of this research project is to analyze the existing goods transportation of Bangladesh Railway including container services and their future scope of development in handling of goods to cope up the import and export requirements of Bangladesh.

The methodology adapted in the study includes collection of data, logistic support facilities and other related matters through questionnaire, interview etc. from the port and Bangladesh Railway. By appropriate forecasting method the system to cope up for future handling along with the economical analysis.

Chapter – 2

EXPORT AND IMPORT CARGO ANALYSIS

Growth of a country depends on the development of transportation system of export and import cargoes. Export and import of principal commodities, principal exporters and importers, routes of transportation etc. are discussed in this chapter to evaluate the feasibility of containerization in BR.

2.1 IMPORT ANALYSIS

Almost all the trades including air cargo are maintained through ports. Only a part of the country's trade is maintained through the land route with India.

Table 2.1, shows the values of imports of the country during the period financial year(FY) 1986-87 and FY 1990-91. There was a sharp increase in growth in FY 1986-87 to FY 1989-90, except FY 1988-89. The import in FY 1990-91 decreases by 1.55% of the previous year.These values of imports is shown in Figure-2.1. Due to political instability of the country, the import decreases in FY1990-91 and in FY1988-89 decreases for natural calamities, flood etc.

Table 2.1 : Import values FY 1986-87 to FY 1990-91

Year →	FY 1986-87	FY 1987-88	FY 1988-89	FY 1989-90	FY 1990-91
Value in million (Taka)	68496.09	91588.20	95075.17	113305.05	111550.60
Annual Growth rate (percentage)	28.23	33.7	3.8	19.17	-1.55

Source : Monthly Statistical Bulletin of Bangladesh, Feb. 1993

In value terms, private sectors import maximum amount. Comparatively these are shown year wise in Table-2.2.

Table 2.2 :Import by Accounts (Million Taka)
[According to the import sector]

	FY 1986-87	FY 1987-88	FY 1988-89	FY 1989-90	FY 1990-91
Private	49485.16	73361.65	65906.80	74709.22	83094.67
TCB	328.58	70.02	1446.49	298.21	163.51
Govt.	4884.02	7678.13	6414.56	8728.21	6490.60
Semi-Govt	5018.47	3882.37	6893.65	10568.70	8542.97
Nationalized industries	8736.83	6588.22	14339.36	18839.75	13249.64
Others	16.03	7.81	74.36	160.96	9.21
TOTAL	68496.09	91588.20	95075.17	113305.05	111550.6

Source : Monthly Statistical Bulletin of Bangladesh, Feb.'93

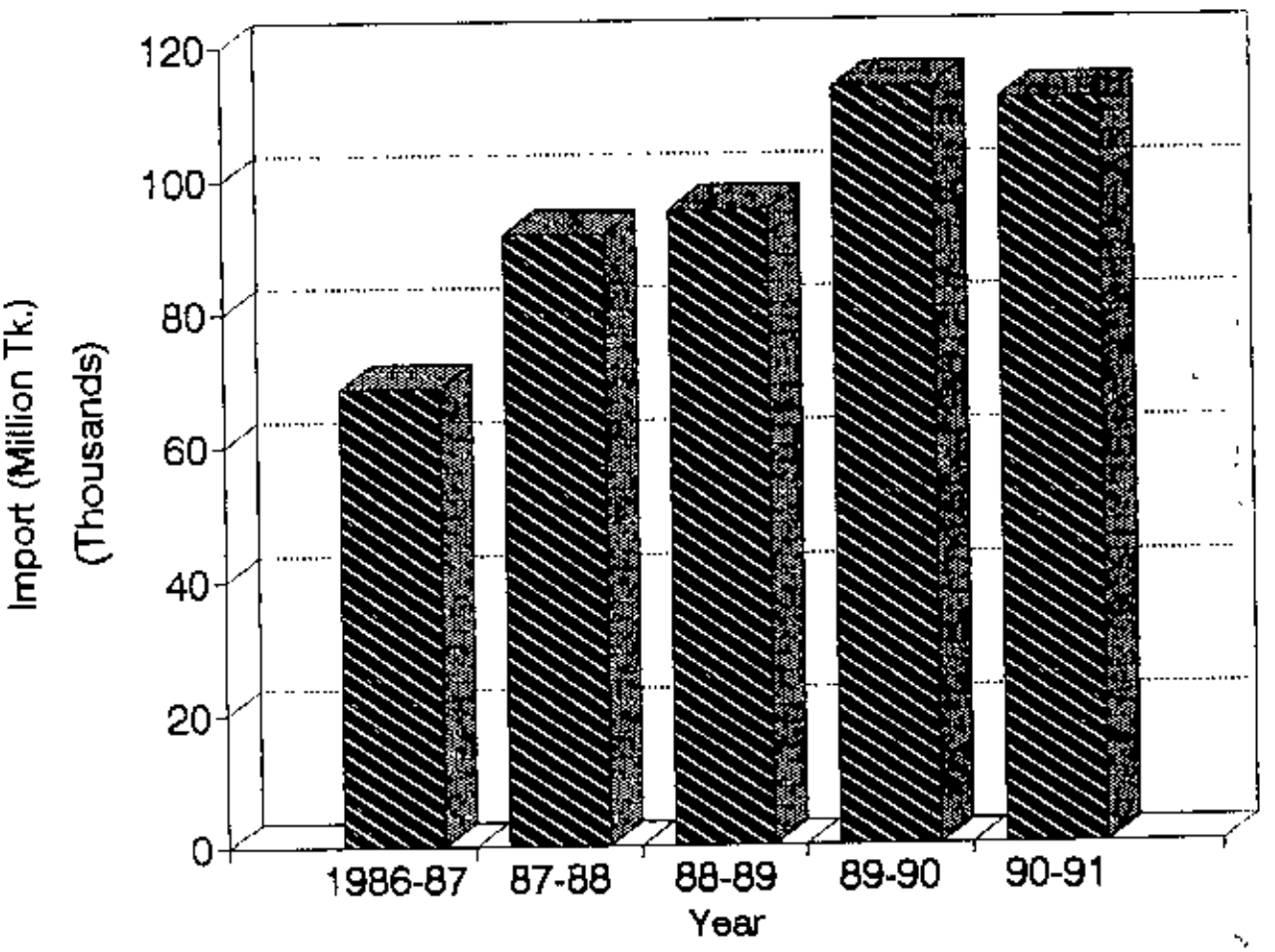
Most of imports are bulk commodities with food grains, cement, fertilizer, petrol and oil typically accounting for around 75 percent of the total tonnage. Import of principal commodities are shown in the Table-2.3 in million taka and the percentage of increase in every year are in the parenthesis.

Table-2.3 : Import of Principal Commodities
[in bracket % of increase]

(Million Taka)

	FY 86-87	FY 87-88	FY 88-89	FY 89-90	FY 90-91
Milk cream	2106	2283 (8.4)	3298 (44.95)	2906 (-11.88)	2788 (4.7)
Wheat	6078	9712 (59.78)	9105 (-6.25)	4924 (-45.9)	7233 (46.89)
Edible oil	3512	5473 (55.8)	4417 (-19.29)	3770 (-14.6)	4183 (10.95)
Cement	1950	2081 (6.7)	2635 (26.6)	3129 (18.7)	3819 (22)
Crude petroleum	4161	6993 (68)	4461 (-36)	10500 (135)	7316 (-30)
Organic & organic chemicals	2282	2384 (4.46)	2904 (21.8)	2863 (-1.4)	3173 (10.8)
Pharmaceu-ticals	903	590 (-3.46)	610 (3.3)	910 (49)	949 (4.2)
Fertilizer	794	1718 (116)	2694 (56.8)	1708 (-36.5)	1589 (-6.9)
Pesticides	272	364 (33.8)	377 (3.6)	443 (17.5)	638 (44)
Raw cotton	1199	2103 (75)	2489 (18.3)	3845 (54.4)	3311 (13.88)
Cotton yarn	872	841 (3.5)	1099 (30.6)	1202 (9.3)	612 (-49)
Iron or steel	3306	4859 (46.9)	7019 (44.4)	5835 (-16.8)	4424 (-24)
Machinery & parts	6753	6320 (-6.4)	6978 (10.4)	10236 (46.6)	11569 (13)
Electrical machinery equipments & parts	3613	4856 (34.4)	3270 (-32.6)	5905 (80.5)	6861 (16)
Vehicles & parts	2806	2901 (3.3)	2824 (-2.6)	3103 (9.8)	2517 (-18.8)

Figure-2.1 : Import in Bangladesh
(Million Taka)



The sources of country's volume of imports worldwide are shown in Table-2.4.

Table-2.4 : Import from Principal Countries

(Million Taka)

	FY 86-87	FY 87-88	FY 88-89	FY 89-90	FY 90-91
Japan	9052	10098	10219	10440	11736
Korea	3387	5493	5605	7532	10538
USA	5278	8161	11208	13874	7766
Hong Kong	1268	4271	3473	5681	7633
Singapore	5583	6327	5140	6677	7321
India	3633	4106	5426	7038	6981
China	3151	3476	3939	5001	6491
U.A.E	5579	6590	6721	8254	4375
Germany	3415	2437	3044	4224	3944
UK	2929	4197	4040	4209	3273
Canada	3315	2986	2666	2761	2904
Pakistan	1712	2400	2416	2883	2555
Italy	378	465	518	1325	1881
Brazil	447	555	600	1572	1921
Others	19369	30026	30060	31834	32231

Source : Monthly Statistical Bulletin of Bangladesh, Feb. '93

In the list of country's volume of imports Japan and Korea are in top positions. Because most of the machineries, electronic goods, spare parts etc. were imported from these countries. Moreover, Japan stands in top position because quality of their goods and cost consideration in respect of other countries.

The routes of imports and percentage of share in bracket shown in the tabular form in table 2.5. From this table imports by routes for the year 1989-90 and 1990-91 are shown in Fig. 2.2.

Table-2.5 : Imports by Routes

(Million Taka)

	Sea	Air	Land	Total
FY 1986-87	63360.55 (92.5)	2343.29 (3.42)	2792.25 (4.08)	68496.09 (100)
FY 1987-88	86541.07 (94.49)	1877.64 (2.05)	3169.49 (3.46)	91588.20 (100)
FY 1988-89	85997.09 (90.45)	4992.66 (5.25)	4085.43 (4.30)	95075.17 (100)
FY 1989-90	104306.38 (92.06)	3819.30 (3.37)	5179.37 (4.57)	113305.05 (100)
FY 1990-91	102730.11 (92.09)	4870.24 (4.37)	3950.25 (3.54)	111550.60 (100)

Source : Monthly Statistical Bulletin of Bangladesh, Feb. '93

Sea is the main route for importing goods in the country. Transportation cost by sea is low and safety. Percentage of imports by land route is low. India is the only neighboring country. Land route mainly used to import goods from India. Transportation by air route is costly. Importing emergency items air route is used.

Figure 2.2 : Imports by Routes
in 19989-90 (in Million Taka)

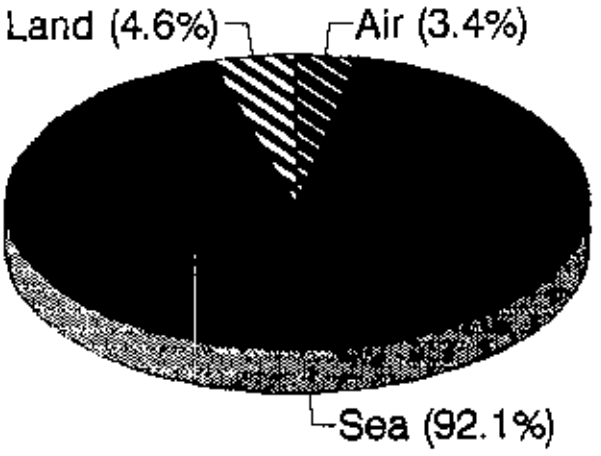
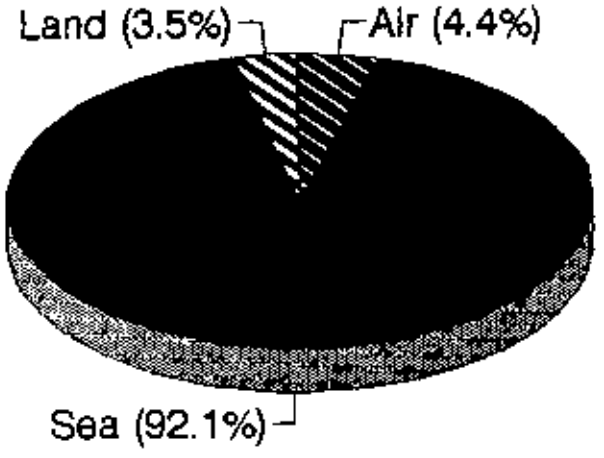


Figure 2.3 : Imports by Routes
in 1990-91 (in Million Taka)



2.2 EXPORT ANALYSIS

An analysis of the exports from the country has been for the past five years from 1986-87 to 1990-91. Table 2.6 shows the value of Bangladesh's export, in taka, that has increased by about 100% on current price during the period FY 86-87 to FY 90-91. The average annual growth is found to lie between 15-20%.

Table-2.6 : Bangladesh Export : FY 86-87 to FY 90-91

	FY 86-87	FY 87-88	FY 88-89	FY 89-90	FY 90-91
Value in Million Taka	33682.13	41161.11	42686.14	51415.21	60271.11
Annual growth rate (percentage)	23.8	22.2	3.7	20.45	17.22

Source : Monthly Statistical Bulletin of Bangladesh, Feb. '93

Table 2.7 showed that most of the exports are carried by sea (about 90%). The export percentage by air is reduced from about 12% of 86-87 to 9% in the year 90-91. This is because of increase in cost of air freight and scarcity in space provision.

Table-2.7 : Export by routes;
[In bracket percentage of share]

(Million Taka)

	Sea	Air	Land	Total
FY 1986-87	29637.55 (87.99)	4032.89 (11.97)	11.69 (0.04)	33682.13 (100)
FY 1987-88	36183.99 (87.91)	4918.46 (11.95)	58.66 (0.14)	41161.11 (100)
FY 1988-89	39062.24 (91.51)	3610.77 (8.46)	13.13 (0.03)	42686.14 (100)
FY 1989-90	47057.01 (91.52)	4356.93 (8.47)	1.27 (0.002)	51415.21 (100)
FY 1990-91	54879.12 (91.05)	5391.99 (8.95)	-	60271.11 (100)

Source : Monthly Statistical Bulletin of Bangladesh, Feb.'93

Table-2.8 : Export of Principal Commodities

	FY 86-87	FY 87-88	FY 88-89	FY 89-90	FY 90-91
Raw jute	2754	2486	2813	3444	3231
Jute goods	8943	9422	9261	10915	9995
Tea	903	1293	1208	1201	1544
Naphtha & furnace oil	232	334	514	617	1189
Leather & leather products	3653	4588	4534	5969	4440
Ready made garments	10173	14842	14448	21239	29941
Fish	638	642	502	524	665
Shrimps & prawns	3803	4422	4730	5036	5017

Source : Monthly Statistical Bulletin of Bangladesh, Feb.'93

Table 2.8 gives the commodity wise exports for the principal commodities like Jute, Jute goods, Tea, Garments, Frozen foods etc.. This shows an increase in garments and frozen foods almost 3 times to 1.3 times.

Figure 2.4 : Exports by Routes
in 1989-90 (in Million Taka)

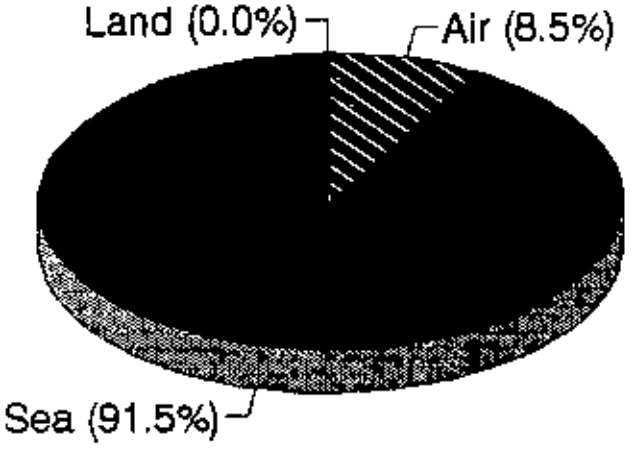
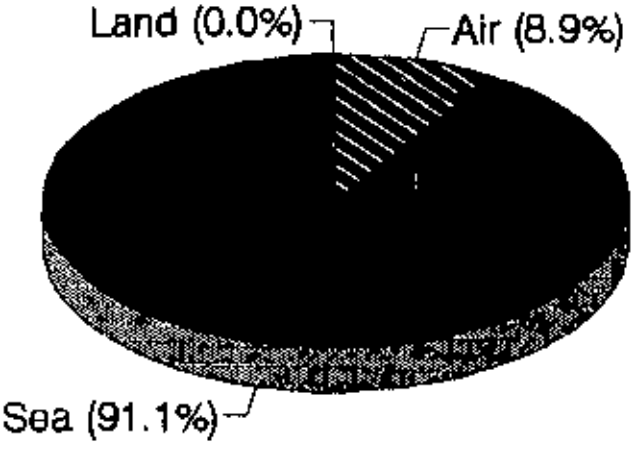


Figure 2.5 : Exports by Routes
in 1990-91 (in Million Taka)



Exports are readily categorized as raw jute, jute goods, tea, leather, frozen foods, garments and a small category of others. Generally most of the exporting commodities like, jute, jute goods, shrimps etc. are exported through the Mongla port. Other commodities like tea, garments etc. are exported through the Chittagong port.

The industries of Bangladesh developed mostly in and around Dhaka and Chittagong city for various reasons. The location of entrepreneurs, banking facilities, ease of access for foreign buyers, suitability of the work force and relatively good access to Chittagong port are some of the factors. The network of branch offices, agencies and transport operators necessary to facilitate export such as garments and other non-jute export industries are now firmly established in the Chittagong port city.

Mongla has been developed as a traditional port for handling of jute exports and for sharing import cargo handling with the Chittagong. Jute exporters believe that Mongla provides a better and cheaper service than Chittagong. Jute is a relatively low unit value commodity, less susceptible to damage than non-jute export; and there is less incentive to change the existing method of transportation. Furthermore, the supporting infrastructure is well established around Mongla. Finished jute goods are now being handle through container. Mongla port has started handling of containers both in import and export purposes. But in absence of having the railway linkages at Mongla port most of the cargoes specially from the northern districts are now handled by the Chittagong port instead of the Mongla port.

Section wise exports for the private, government,semigovernment,TCB etc. have been shown in Table 2.9. Table 2.10 also shows the exports by destination countries. It reveals that most of the exports of Bangladesh are going to the highly developed and high-tech countries of the world. As a result the packaging, shipment etc. are to be done in accordance with the receiving country's choice and facilities. This factor is also predominant in deciding on the containerization. Table-2.9 shows that private sector is in top position to export by accounts. The main exporting commodities of the country are garments, frozen foods, leather, tea, jute goods etc. And maximum of these exporting commodities are exported by private sectors. For this the private sectors stand in top positions in export by account. Export to principal countries is shown in Table-2.10.

Table-2.9 : Export by Account

(Million Taka)

	FY 86-87	FY 87-88	FY 88-89	FY 89-90	FY 90-91
Private	28677.71	36620.62	38854.19	46705.25	57055.15
TCB	3.39	14.8	33.32	34.13	15.59
Govt.	4.25	2.74	5.14	3.19	7.76
Semi-Govt.	472.67	550.36	584.47	754.52	222.82
Nationalized Industries	4521.68	3985.91	3208.30	3905.81	2969.32
Others	2.43	-	0.72	12.31	0.47
Total	33682.12	41161.11	42686.14	51415.21	60271.11

Source : Monthly Statistical Bulletin of Bangladesh, Feb.'93

Table-2.10 : Export to Principal Countries

(Million Taka)

	FY 86-87	FY 87-88	FY 88-89	FY 89-90	FY 90-91
USA	10479	12044	11200	16284	17408
Germany	1404	2306	2238	2769	5778
UK	1914	2433	2636	3179	4647
Italy	2897	3677	3290	4165	3286
France	375	867	1194	2076	3237
Belgium	1234	1432	1777	2131	2729
Singapore	1576	1667	2702	2172	2276
Japan	2150	2292	2134	2162	2057
Netherlands	614	801	821	1073	1952
Canada	577	739	494	808	1006

Source : Monthly Statistical Bulletin of Bangladesh, Feb.'93

From the detailed analyses of imports and exports, use of ports and routes it has been found that the sea is the principal route of exports and imports of Bangladesh. These exporting commodities are carried by road and rail to the sea ports and also from the sea ports the importing commodities are carried by road and rail.

Chapter-3

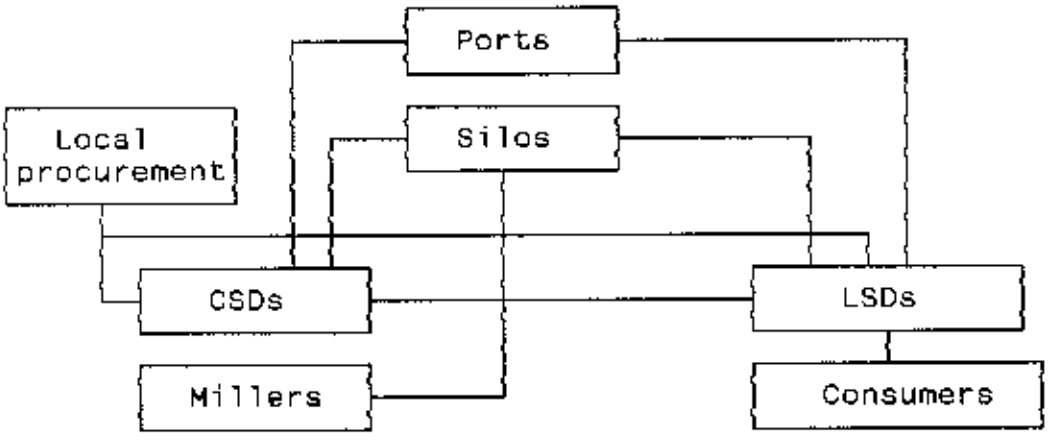
TRANSPORT FLOW OF COMMODITIES

Bangladesh has a weak industrial base and as such a large portion of the country's transport demand originates from agricultural products. Nevertheless, industrial development and production growth pursuant to long run policy changes have some effect on volume of traffic in the country.

The modes of transportation of different commoditles of our the country are rail, road and water. The transportation for few selected commoditles are given below.

3.1 TRANSPORTATION OF FOODGRAINS

Bangladesh being an agro-based country and the people being mostly rice consumer yet because of change in dietary habit of the people wheat production has found an important priority. However, with the increase in population growth top prioritles are given to the agriculture productions. As a result, foodgrain production will be increased in the country in the future years and import of food grains will found to decrease. The public food distribution system (PFDS) is shown below.



Natural calamities, Tornado and Cyclone are common in the country causing serious damages to the crops frequently. Therefore, for security reason food stock build up is necessary in the public sector. The food movements will continue even if self-sufficiency on foodgrains is achieved. Because the movement of foodgrains from surplus area would have to be pushed to the deficit area. Hence, the railway share of the transport market will not decrease dramatically rather will fluctuate.

The production of foodgrains has been increasing on average of 2.3 lacs of tons per year. But with the present wheat production of only one million tons annually, it can not supplement the demand of wheat of three million tons. As a result the wheat import will have to be done in exchange of rice export.

The transportation share of the imported foodgrains through CPA of BR was 39.9% against of 40.1% and 20% by road and river respectively in the fiscal year 1991-92. BR could improve this share if marketing activities are

improved in the port area. In view of the above situation BR's transport market share decrease by 0.25% in comparison with the FY90-91 for increasing internal stock. The foodgrains movement by different modes is shown in Table-3.1.

Table-3.1 : Foodgrains movement by different modes ('000 MT)

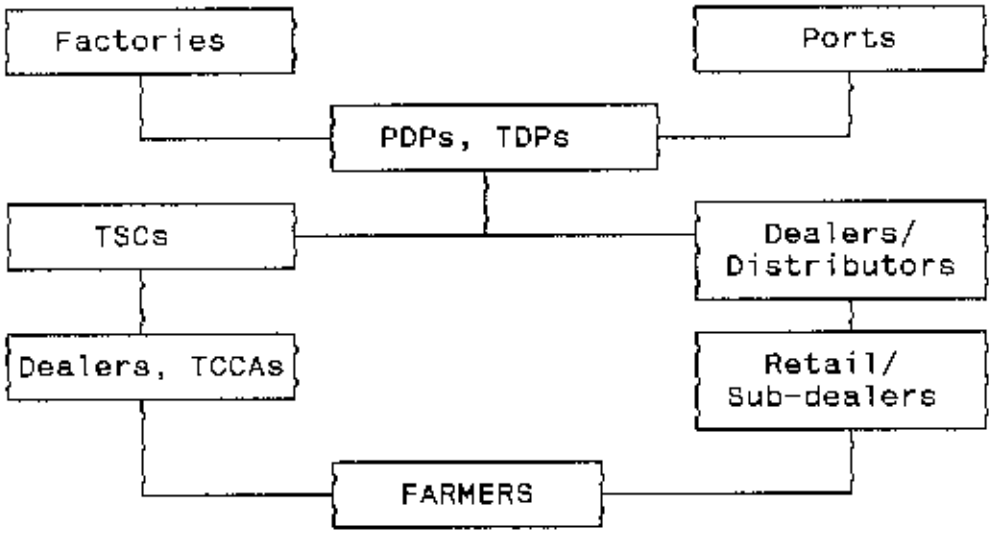
Year	Total movement	Modes used		
		Rail	Water	Road
1987-88	3679.8	736 (20)	368 (10)	2575.5 (70)
1988-89	2585.9	775.7(30)	387.9(15)	1422.1 (55)
1989-90	1675.0	586.3(35)	251.2(15)	837.5 (50)
1990-91	1663.7	665.5(40)	332.7(20)	665.5 (40)
1991-92	1547.6	618.2(39.9)	309.2(20)	620.2 (40.1)

3.2 FERTILIZER TRANSPORTATION

The uses of fertilizer is growing with the increase of foodgrain production in the country. Apart from 2.4 million tons of country's own demand, 0.50 to 0.60 million tons of fertilizer are being imported annually.

In the export sector of fertilizer, Bangladesh has got a good market at Nepal. India is also considering imports of fertilizer from Bangladesh. About thirty thousand tons of fertilizer were transported to Nepal by the BR in the year 1990-91.

Fertilizer collection and distribution system is shown below:



BR experienced a sharp decline in its transport share in recent time due to the government decision to shift the distribution of fertilizer (Urea/TSP) products to the private transport sector. To overcome this situation BR had introduced the freight forwarder system with some benefits in the East zone. BR is trying to further improve the freight forwarder system.

Transport modewise fertilizer movement (1990-92) in percentages is shown in Table-3.2 and the domestic production, import and total availability of fertilizer is given Table-3.3.

Table-3.2 : Fertilizer movement by Transport mode (1990-92)

Model	Average	Range
Rail	18.5	17 - 20
Water	69.0	65 - 73
Road	12.5	10 - 15

Table-3.3 : Domestic production Import and total availability of fertilizer

('000 MT)

Year	Domestic production	Import	Total availability
1985-86	874	775	1649
1986-87	878	152	1030
1987-88	1409	293	1702
1988-89	1599	535	2134
1989-90	1621	376	1997
1990-91	1533	296	1829
1991-92	1737	608	2345

3.3 JUTE AND JUTE PRODUCTS TRANSPORTATION

In the country, seventy four jute mills are manufacturing jute goods. Out of these mills, thirty three mills are under BJMC. These mills are situated in various geographical location of the country as shown in Table-3.4.

Table-3.4 : Geographical location of the 74 jute mills

Region	No. of mills
Dhaka	20
Chittagong	17
Khulna	15
Mymensingh	7
Jessore	4
Pabna	3
Faridpur	3
Comilla	2
Rajshahi	2
Chuadanga	1

The country's jute products are facing fierce competition in the international Jute market specially from India. Efforts are being given to

improve the export of jute goods. The export of raw jute had varied from 13.45 to 22.44 lacs of bales. The movement of jute and jute products depends on production and export. The production and export of jute goods are shown in Table-3.5.

Table-3.5 : Production and Export of Jute goods

('000 MT)

Year	Domestic Production	Export	Export as % of Total production
1981-82	609	537	88.17
1982-83	605	514	84.96
1983-84	594	475	79.97
1984-85	569	438	76.97
1985-86	495	465	93.94
1986-87	608	484	79.61
1987-88	606	425	70.13
1988-89	591	428	72.42
1989-90	611	531	86.91
1990-91	518	446	86.10
1991-92	514	491	95.53

Jute goods exported through the sea ports in the form of hessian and sacking, carpet backing materials and yarns, carpets are normally moved in varying quantities by roads, rail and water transport. In the year 1991-92 road transportation of jute goods was nearly 80 percent of jute products while IWTC and Rail carried together the remaining 20 percent.

3.4 CEMENT TRANSPORTATION

The production from cement factories in the country was 0.40 million tonnes as against the demand of 2.0 million tonnes. As a result 1.6 million tons of cement were imported in the year 1991-92. The domestic production and total availability of cement is shown in Table-3.6.

Table-3.6 : Domestic production and total availability of cement ('000 MT)

Year	Domestic production	Import	Total availability
1985-86	284	1437	1724
1986-87	310	1601	1911
1987-88	310	1563	1873
1988-89	344	1629	1973
1989-90	337	1606	1943
1990-91	275	1611	1986
1991-92	400	1650	2050

TCB imported 0.8 million tonnes of cement by the year 1990-91. The rest 0.8 million tons of cement were imported through the private importers. BR had the highest share of transportation of the imported cement from India.

In the coming years in the country, large projects such as the construction of the Jamuna bridge, construction of office buildings, fertilizer factory, coastal cyclone rehabilitation project and large industrial units would be taken up. Under this situation the importation of cement would increase and the load to railways for such transportation would also increase.

3.5 TRANSPORTATION OF PETROLEUM PRODUCTS

Petroleum products of Bangladesh are produced in the country's lone refinery having an annual capacity of 1.5 million tons located at Chittagong. Imported crude oil are refined in the Chittagong refinery(Eastern Refinery Limited,ERL). The volume of annual production, as may be seen in the following Table-3.7, can not meet the total requirement of the country. Therefore, a portion of the total requirement of petroleum products is met through imports. These imports are made through the Chittagong port.

BR had the major share in transporting the petroleum products in the country. It had been losing its share due to increased competition from the road transport sector, longer transit time and pilferage.The regional consumption of petroleum fuel is given in table-3.8

Table-3.7 : Domestic production and import of petroleum
(1984-85 to 1991-92)

('000 MT)

Year	Domestic production	Import	Total availability
1984-85	943.14	617	1560.14
1985-86	949.37	785	1734.37
1986-87	974.32	732	1706.32
1987-88	950.15	761	1711.15
1988-89	1048.46	901	1949.46
1989-90	983.39	979	1962.39
1990-91	1086.19	716	1802.19
1991-92	1100.00	700	1800.00

Bangladesh has started extraction of petroleum products in its Sylhet gas and oil fields; it is expected that production will increase in future. The quantity of petroleum import will also be increased due to increase in population growth and growth of the country.

Table-3.8 : Regional consumption of petroleum products

('000 MT)

Region	Consumption		
	1985-86	1986-87	1991-92
Dhaka	385.30	380.20	490.00
Chittagong	373.00	367.90	445.00
Khulna/Barisal	586.80	578.90	590.00
Rajshahi	223.90	220.90	275.00
Total	1569.00	1547.90	1800.00

3.6 SUGAR TRANSPORTATION

Out of sixteen sugar mills thirteen are located in the north-western region. This is the main sugarcane growing area of the country. However local production is not enough to meet domestic demand. Therefore,from the FY1983-84 sugar imports by private traders have been allowed. The domestic productions, imports and total availability of sugar have been presented in the Table-3.9.

Table-3.9 : Domestic production, import and total availability of sugar

('000 MT)

Year	Domestic production	Import	Total availability
1984-85	87	333	420
1985-86	81	135	216
1986-87	182	135	317
1987-88	178	121	299
1988-89	110	155	265
1989-90	184	91	275
1990-91	246	138	380
1991-92	247	143	390

Due to increasing demand, the domestic production of sugar has increased from FY1986-87. But in the FY1988-89 suddenly fall this production. The main reason of this fall of production is natural calamities. Similarly, for political instability, import of sugar decreased in FY1989-90. The primary transportation of domestically produced sugar is between the sugar mills and the regions such as Dhaka, Chittagong, Khulna and Rajshahi. Imported

sugar through the Chittagong port is transported to the transit in Dhaka for transhipment to other districts end areas in the country.

This commodity is meinly transported to the primary and secondary destinations by road. BR carries a small portion of total sugar movement in the country. In 1986-87, railway carried 26 thousand tons of sugar. But in 1990-91 movement of sugar by railway stood 17 thousend tons only. The remaining portion of the total sugar supply (384 thousand tons) in 1990-91 was carried almost entirely by the road transport with the IWTA sharing only 7-8 thousand tons.

3.7 TEA TRANSPORTATION

Tea is one of the important export earning products and generates moderate to high demand in the country. After meeting the total domestic demand (0.14 Kg per capita/year), Bangladesh traditionally exports nearly 70% of its tea production annually. Thus, the ratio of total internal consumption and export of tea stands at around 30 percent to 70 percent annually. Annual production, consumption and exports of tea have been shown in Table-3.10. Due to political instability and other factors the export of tea reduces in FY1988-87 and FY1989-90. Presently there are 156 tea gardens located in Sylhet, Moulavibazar and Chittagong district (Table-3.11).

Table-3.10 : Domestic production, consumption and exports of tea.

('000 MT)

Year	Domestic production	Export	Domestic consumption
1984-85	43	26	17
1985-86	43	30	13
1986-87	37.5	21	16.5
1987-88	41	28	13
1988-89	43.5	30	13.5
1989-90	39	23	16
1990-91	46	31	15
1991-92	46	31	15

Table-3.11 : Location of Tea gardens

Location	No. of gardens
Sylhet	20
Moulavibazar	89
Habigonj	23
Chittagong	22
Rangamati	1
Bramhanbaria	1

Tea is sold to the private traders through auction from the Chittagong tea auction centres. The private wholesale traders carry tea to their respective primary destination mostly by road transport and thereafter the retail traders carry them by different modes of transport. The major primary distribution of tea for both export and domestic consumption takes place between tea gardens and Chittagong. For domestic market primary distribution takes place between Chittagong and Dhaka. For export, tea is moved to Chittagong port by road transport. At present most of tea is

exported containing in containers. If container facilities could be made available at the production centres, exportable tea can be packed at the production centre from where it will be carried to the port by rail road. This will reduce the rehandling and repacking.

3.8 TRANSPORTATION OF IRON AND STEEL

The main source of domestic production of iron and steel products is the Chittagong Steel Mills (CSM). The Chittagong steel making plant has an installed capacity of 175 thousand tons of finished steel and 250 thousand tons of in got per year. But its output is much lower than the capacity. Apart from the Chittagong Steel Mill there are 50 open hearth furnace/rerolling mills producing steel products from scrap, steel ingots and billets. These plants are located in Dhaka, Khulna and Chittagong. These mills primarily produce mild steel (MS) rod, beams, bar and sheets. Total domestic production, import and total availability of iron and steel products are presented in Table-3.12. Due to installation of new rerolling mills, the domestic production of iron and steel increased from FY1987-88. For this import decreases from that fiscal year.

Table-3.12 : Production, import and availability of Iron and Steel

('000 MT)

Year	Domestic production	Import	Total availability
1984-85	56	104	160
1985-86	100	102	202
1986-87	132	98	230
1987-88	320	54	374
1988-89	458	27	485
1989-90	495	79	574
1990-91	554	26	580
1991-92	573	22	595

The major movements of iron and steel products are between chittagong and Dhaka and between Chittagong and Khulna. The BSEC machine tools factory at Gazipur and the National Tube Ltd., the pipe making factory in Tongi and the largest number of rerolling mills are located in Dhaka. The major primary shipment of iron and steel takes place between Chittagong and Dhaka and transhipment takes place from Dhaka to the north western region of the country. Consignment from Chittagong are sent directly to Narayangonj and shipyard at Mongla.

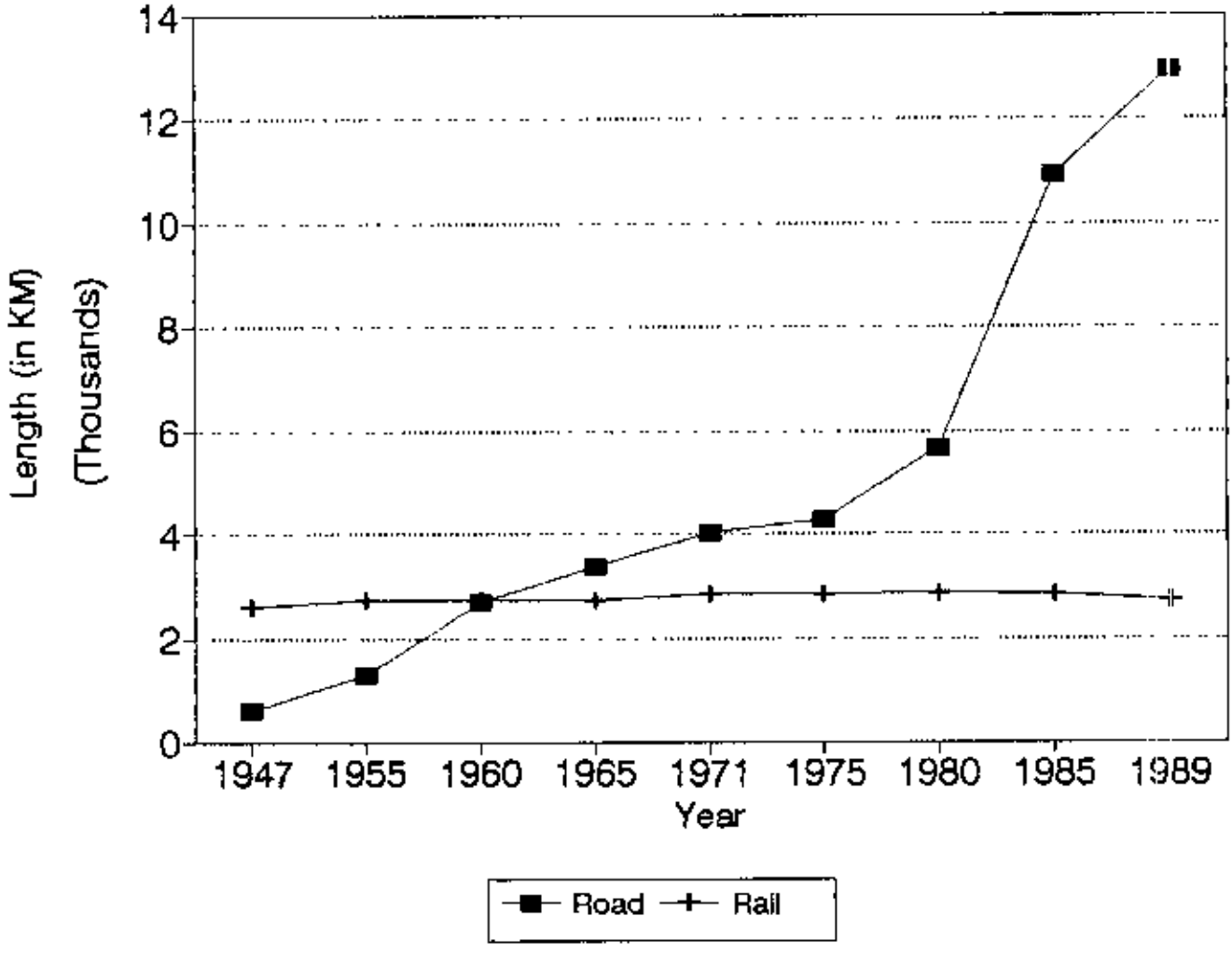
The movement of iron and steel takes place predominantly by road transport. In 1991-92 railway carried 49 thousand tons of iron and steel product while the road and water transport sector carried over 134 thousand tons.

Most of the imported commodities are transported by road transport from the port. Similarly most of the exported commodities are gathered to sea port from all over the country by road transport. Thus BR has a very small share. At present BR's share of transportation is increasing with the introduction of the container facilities. But the development of rail is in static condition. For example, in 1947 the total length of road (including high type and low type) was 600 KM and in 1989 total road length was 12960 KM. But the railway line in 1947 and 1989 are 2611 and 2745 KM, respectively. The comparative analysis of road and rail length are shown ia a tabular and graphical form in Table-3.13 and Fig-3.1 respectively. The road length growth is more and more comparative to rail length. But in 1985 and 1989 the rail length decreases that is rail length cut off from the existing track.

Table-3.13 : Road and Rail length in KM.

Year	Road	Rail
1947	600	2611.42
1955	1260	2749.17
1960	2725	2760.29
1965	3402	2757.21
1971	4025	2859.39
1975	4300	2875.49
1980	5695	2885.07
1985	10913	2871.41
1989	12960	2745.65

Figure-3.1 : Comparison of Road and Rail Length (in KM)



CHAPTER – 4

ANALYSIS FOR CONTAINERIZATION OF COMMODITIES

The principal exportable commodities of the country are Garments, Raw jute, Jute goods, Tea, Leather, Frozen foods, etc. Except jute and jute goods, the most of the commodities are exported through the Chittagong port. Jute goods like carpets, carpet backing and sacking which had been exported through the Mongla port entirely are currently being exported through the Chittagong port. The purpose of this chapter is to ascertain the scope of containerization of various major commodities of Bangladesh. The discussion about container is given Appendix-III.

4.1 CONTAINERIZATION OF TEA

Mention has been made in chapter-3 that there are one hundred and fifty six tea gardens in Bangladesh. One hundred and thirty tea estates in Sylhet dominate the market and these are located within 10 to 15 miles of Srimangal. Which is the centre of the trade. It is estimated that Sylhet produces nearly 90 percent of total production. Volume of tea export through the Chittagong port amounts to 50-60% that is 25,000 tonnes to 30,000 tonnes.

Tea rehabilitation programmes were being funded by the EEC and the ODA and these were aiming to produce substantial increase in yields. These increased yields when achieved would increase exports. Other factors such as quality, price and the state of the world market are to be considered.

Overall increase in export tonnage for the purposes of this study were projected to be modest. Year-wise production of tea is shown in Table-4.1.

Table-4.1 : Year-wise Tea Production,Metric tonnes

Period	Production in M.Ton				Total
	Chittagong	Sylhet	Ctg. H.T	Comilla	
1980-81	1414	40388	4	-	41806
1981-82	1252	37522	-	-	38774
1982-83	1532	39234	-	-	40766
1983-84	2002	37199	-	-	39201
1984-85	1026	42178	-	-	43204
1985-86	1819	41462	5	-	43286
1986-87	1485	36105	2	5	37597
1987-88	1608	38996	3	2	40609
1988-89	1732	41831	18	-	43581
1989-90	1585	37470	20	-	39075
1990-91	1990	43880	10	-	45880

Bangladesh tea accounts for only 1-2 per cent of the world exports. Pakistan, the Middle East (Egypt) and Europe (UK and former USSR) takes about 90 per cent of Bangladesh tea. It is estimated that currently only about 60 per cent of Bangladesh tea is exported through containers. This is because a large proportion is exported to containers (Pakistan, Egypt, former USSR and China) where break-bulk shipping system is used.

Tea has to be processed as close as possible to the tea garden. Thus most of the tea gardens have their own factories. A very small quantity of tea is sold directly from the tea garden premises. Otherwise, the entire tea

crop usually goes to Chittagong for auction or, in some cases, for other forms of export sale.

The main processing season for tea is May to November having peak in July. Most of the tea is exported through the port between December and February (average 15 per cent of annual export tonnage per month), peaking sharply in January.

4.1.1 Establishing of an ICD

Srimangal Inland container depot(ICD) is a small but related project that can readily be added to the larger corridor project, if considered worthwhile. There is much support, within the tea trade, for an ICD at Srimangal and its development is considered to be urgently required. The nature of rail services and use of surplus empty containers from Dhaka ICD would make relatively easy integration with the main project.

Srimangal is located at the centre between two important and major tea producing areas such as Moulvibazar and Hobigonj which are not far from Sylhet. Therefore Srimangal is considered to be the most suitable location for an ICD. It is also considered that only one ICD would serve the present purpose and a second ICD would not be required.

If the individual factory goes for container packing of the exportable tea they can use 6-8 ton truck for transporting the same to the ICD terminals. They would not be suitable for trucks carrying containers.

The benefits to use containers at the production area includes;

a) increase payload

b) reduce moisture intake through packing of containers at ICD, rather than movement of tea in open truck to the port.

c) reduce tainting of tea that generally results from use of chests.

4.1.2 Exports, Sales and Auctions of Tea

About 10% of exports are either sold directly to overseas buyers or in the London auctions. It is assumed that this percentage would remain constant for some time. Decisions as to whether to sell at London or Chittagong auctions are made on levels of perceived sale prices.

Tea is transported currently to Chittagong, mostly by road, and stored in one of four bonded wherehouses. It usually arrives between 11 and 21 days before the auctions.

There have been various views and differing opinions on containerization at Srimangal. Most views are that tea could be sold by container load to the larger buyers. The sterling companies, one of the leading tea exporters, exports about 50%. One big producer prefers to containerize the tea at the production centre. It is thought that containers would arrive in Chittagong upto 4 days before auctions. Auctions would take place for each lot or container load. Smaller lots would continue to arrive in loose form in Chittagong; they would be packed afterward.

Containerization at Srimangal would reduce damage, loss and transport costs. This would make the country's tea more competitive in price; producers, brokers and merchants would progressively adapt the new system when financial benefits and advantages would be established.

4.2 CONTAINERIZATION OF LEATHER

The leather industry in Bangladesh is well established and is a major foreign exchange earner. It comprises two principal sectors such as production of unfinished and finished leather. The unfinished leather sector mainly produces what is described as "wet blue", of cowhides and goatskins treated for preservation and further processing. The second sector produces crust and finished leather. Finished leather goods, including the footwears, are also produced in the country. It is estimated that no more than ten per cent of finished leather is consumed in such and other domestic industry. Many of the leather product manufacturers own small cottage type units.

The interests of the finished leather producers have been shown by the Finished Leather Export Association, and the "wet blue" producers of the Bangladesh Tanners Association. Reports indicate that twelve tanneries are producing crust and finished leathers. Eight or possibly nine such tanneries are located in Hazaribagh area of Dhaka, the remaining in Chittagong. The wet blue leather industry is mostly located in the Hazaribagh area.

The leather industry being one of the leading exportable industries, the World Bank and other financial agencies had suggested to set up modern tanneries for quality leathers. The government had also earmarked special area for future development of the tannery industry.

In the late 1970s the government offered incentives to the industry for finished leather production. Demand from overseas importers has moved also in a similar direction. Thus market share for finished leather has been increasing. In value terms, finished leather probably accounts for more than 60 per cent of exports. In volume terms, the proportion will be very much less since the value per unit volume of wet blue is only a fraction of that of finished leather.

It was found that about 75 per cent of leather exports in 1985 were made in containers. Since then container penetration has increased, with 90-100 per cent of finished leather exported by sea now containerized, together with 70-80 per cent of wet blue. Overall container penetration is currently about 85 per cent.

Presently, eighty five percent of leather exports originate from Dhaka (15 per cent from Chittagong). It may be assumed that this share would remain similar in the future. Accordingly the Dhaka ICD terminal will be more effective for container handling .

The leather industry in the country is a significant importer. It imports most of the chemicals required for processing. Door-to-door container

transport is particularly attractive to the industry because of the relatively high value and vulnerability to damage and also ease of operation. In this regard the Dhaka ICD terminal would be more effective in providing container handling service.

4.3 CONTAINERIZATION OF JUTE

Jute, either in the form of raw jute or jute goods, is the country's major export commodity. Jute and jute goods account for more than 80 per cent of the total volume and more than 50 per cent in value terms of total exports.

Marketing and distribution of jute from the several million jute growing land units scattered throughout the country to the two ports is a highly complex activity. However, the principal stages in the distribution process are as follows:

a) Local market: There are about 1,500 act as local collection points unsorted and unprocessed jute is usually supplied to these markets by country boat, bullock cart or head load;

b) Secondary market: About 250 to 300 secondary markets are operating daily. They collect jute from the local markets and the bulk of the jute is sorted to "Kutcha" standard and pressed into low density Kutcha bales.

c) Terminal market: Terminal markets located mostly at Dhaka/Narayangonj, Khulna/Daulatpur and Chittagong, are supplied directly from the secondary markets by road, rail or IWT. At this stage most processing takes place.

In the case of raw jute, the processing which takes place at the terminal markets is the pressing of jute into high density "pucca" bales, mainly for export. There are 55 full press pucca baling presses operating in the country at present. Production is split roughly as follows:

- Dhaka/Narayangonj, 46 per cent.
- Khulna/Daulatpur, 47 per cent;
- elsewhere, 7 per cent.

Around 98 per cent of raw jute is exported through Mongla and 2 per cent through Chittagong. It may be assumed for planning purposes that this trend would remain for the foreseeable future. However, the export of jute goods through the Chittagong port is increasing. Presently about 26% of the jute goods are exported through the Chittagong port (Table 4.2).

Table-4.2 : Distribution of Raw Jute and Jute goods Export

	Mode	Raw Jute from Baling Presses	Jute goods from mills
To Mongla, from			
Dhaka	IWT	46	40
Khulna	IWT(a)	47	26
Jessore, Kushtia	Road/		
Faridpur	Rail	-	5
North Bengal	Road/		
	Rail	5	3
Total		98	74
To Chittagong, from			
Dhaka	Road/Rail	(b)	3
Tangail/Mymensingh			
Jamalpur	Road/Rail	1	2
Comilla, Noakhali	Road	1	3
Chittagong	Road	-	18
Total		2	26
Overall		100	100

At present some 5 to 7 percent of raw jute exports are containerized, which is a much lower proportion than in the case of other commodities. This is partly because raw jute is a low value commodity often more economically transported in break- bulk. The possible other reason is that more than 60 per cent is exported to countries not usually served by containerized shipping services. This pattern is changing with the gradual conversion and adaption of container services by the importing countries.

4.4 CONTAINERIZATION OF JUTE GOODS

The world market for jute goods is stagnant and Bangladesh's export volume has remained fairly static. There is no clear pattern of seasonal variation in the export of jute goods.

The two main components of jute goods exports are hessian and sacking and carpet backing cloth (CBC) and carpets. Most of the processing of raw jute for export is carried out in the Dhaka/Narayangonj, Khulna/Daulatpur, and 'Chittaogng areas.

The average export tonnage per mill is about 7000. However, the Adamjee jute mill exports more than 50,000 tonnes a year and is by far the world's largest. Most of the mills in Dhaka export to Mongla by IWT; export through Chittagong is usually carried out only when the overseas buyer nominates Chittagong or when speed is essential. The mills also receive most of their raw jute from the purchasing centres by IWT/road/rail. The major exception is Adamjee which is supplied mostly by rail.

The reasons given by the jute mill owners for preferring Mongla Port to Chittagong were as follows:

a) Loading arrangements are more favorable at Mongla. The anchorage at Mongla is well suited to break-bulk loading of jute. In the case of containers stuffed on the jetty, IWT barges can be berthed in the port whereas at Chittagong the IWT jetty is some distance from the port.

b) More free time is allowed at Mongla port before demurrage is payable.

c) Chittagong is primarily an import port. The jute goods exporters consider they get inferior service compared to importers.

d) IWT operators prefer Mongla because vessel going to Mongla do not require Bay-crossing certificates.

e) Bay crossing vessels generally have minimum capacity of 500 tonnes, compared with 150 tonnes for those not bay crossing. Smaller quantities can therefore be transported more economically to Mongla.

f) Port charges in Mongla are less than Chittagong.

As most of the jute and jute goods are exported through Mongla port, so, some ICD could established in west zone of the Bangladesh Railway. The exporters would be attracted to use containers; this would require that the BR could provide adequate facilities to carry the containers.

In Khulna an ICD may be established at Daulatpur and the sites under this ICD will be Nowapara, Jessore, Darsana, Kushtia and Faridpur. These stations will require some infrastructural development to be able to handle the containers, so that 20 ft. and 40 ft. containers can easily move for loading and unloading. This containerization will be helpful to the owners of the mills and also the exporters.

Another ICD may be established at Santahar which is one of the junction point of metre gauge and broad gauge. The sites considered will be Rajshahi, Bonarpara, Ishurdi, Parbatipur and Bogra. When the Jamuna bridge will be completed, the containerized export, commodities could be carried by rail from Jamalpur and Mymensingh through Khulna, then Mongla. Construction of the Rupsa bridge is under consideration. Completion of the bridge would enable the BR may implement their network of rail linkage from Khulna to Mongla.

4.5 CONTAINERIZATION OF FROZEN FOODS

The frozen foods include shrimps and fishes. Shrimps are the most important commodity accounting for at least 70 per cent of exports. Frozen foods is a major growing industry. Income from frozen food exports are almost equal to that of jute.

The country produces both salt water and freshwater shrimps. Saltwater shrimps are either caught by conventional trawler operations in the Bay of Bengal or cultivated in farms on the sea shore, a process known as mariculture. The latest estimate is that 20 to 30 per cent of freshwater shrimps are cultivated by mariculture. About 90 per cent of the shrimp harvest is exported, with export incentives provided by the government. The principal markets for sea water shrimps are in Japan and the United States, with freshwater shrimps destined more for the United States and Europe.

Presently there are about 50 to 60 seafood processing plants with a lone plant is located around Dhaka. The rest of the plants are evenly

divided between Chittagong and Khulna.

Current growth in the volume of exports is estimated at about 15 to 20 per cent per year and this growth is projected to continue. Air freight is becoming an important means of swift transporting exports, possibly accounting for around 10 per cent of the total. Virtually all of the remaining volume is carried transported in refrigerated containers (refers) handled by the two ports.

4.6 CONTAINERIZATION OF GARMENTS

At present substantial growth has taken place in the garment industry OF the country. The Garments Manufacturers' and Exporters' Association represents all garment exporters in Bangladesh. The Association started in 1981 with 37 members and at present they have about 1667 member firms.

Most of the garment factories are located in and around Dhaka(70%) with Chittagong(25%). The industry operates under a system of bank controlled (75% back to back L/C) by the Government. Raw materials are imported duty free, almost exclusively from the South East Asia and the Far East, and are held in bond at each factory's premises. Finished garments are then transported from the manufacturers for export.

Virtually all garment raw materials and finished garments pass through the Chittagong port. The trade is almost exclusively containerized. The Dhaka ICD terminals are being attracted by the garment factories because of the recent introduction of daily container trains from Dhaka to Chittagong.

Chapter – 5

CONTAINER SERVICES IN BANGLADESH RAILWAY

The various merits of containerization have been mentioned in earlier chapters. These may again be mentioned as follows,containerization helps to bring down the expenditure on packing; reduce the number of points in handling cargos at transit, eliminate damage to cargo due to vagaries of nature or operations in transit, prevent pilferage of cargo, facilitate quick transportation, effect door to door movement of cargo, save cost, time and labour.

5.1 CONTAINER PENETRATION IN BR

The container transport of Bangladesh Railway is going to be popular. Container traffic has been considerably increased in BR. Business community prefers to transport their cargoes by container wagons because of its various advantages.

After a relatively slow start in FY 1980-81 maritime containerization has grown rapidly in Bangladesh. Most of the import containers move through the Chittagong port but the Mongla port handles a substantial volume of export containers mostly of jute. Bangladesh Railway handles about 6% of the containers those are available in the Chittagong port.

During the year 1986-87, the container services was introduced and opened to traffic in Bangladesh Railway. The number of containers carried in

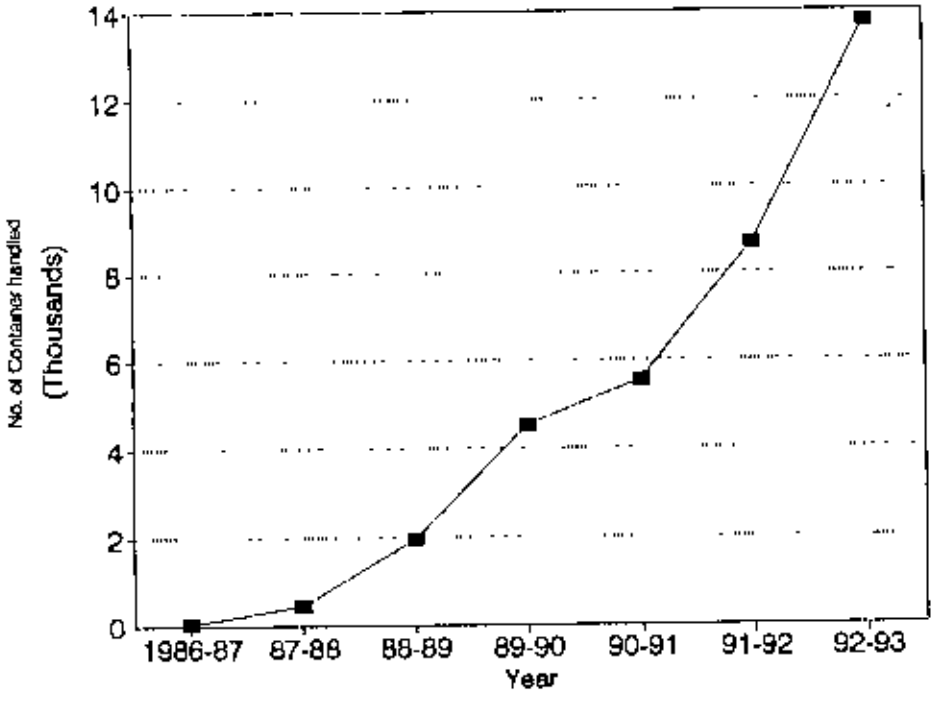
loaded and empty condition in between Chittagong - Dhaka. The year-wise position is given in Table-5.1 and Fig.5.1.

Table-5.1 : Container services in BR

Year	Chittagong port to Dhaka-ICD		Dhaka-ICD to Chittagong port		Total
	Loaded	Empty	Loaded	Empty	
1986-87	10	6	-	21	37
1987-88	178	39	104	120	441
1988-89	649	353	667	298	1958
1989-90	1820	517	1018	1171	4526
1990-91	1950	858	1647	1100	5555
1991-92	2656	1869	3175	968	8668
1992-93	4837	2114	4961	1832	13744

Source : BR Information Book '93

Figure 5.1 : Total Container handled by BR



5.2 PRESENT ROUTE OF CONTAINER TRANSPORTATION BY BANGLADESH RAILWAY

The rail distance between Chittagong and Dhaka is 321 km. This is longer than the road distance because the rail route goes further north than the road in order to bridge Meghna and other rivers.

The most containerized goods are, imported through Chittagong port. Some of these transported by rail to east zone generally in Dhaka. In Dhaka there is an ICD near, Kamalapur Railway Station which is the first and only one ICD introduced by Bangladesh Railway in April 1987. This ICD helps the exporter and importer of the Dhaka region only. Mongla Port also handled the containerized goods, but there is no direct rail communication between Khulna and the Mongla port.

The present traffic network between Dhaka and Chittagong port are composed of three traffic modes: the inland waterways, the railways and the roads. The container transport on this route has been conducted by the railways only. As for container transport by railways, the Kamalapur Inland Container Depot (ICD) was established by the B.R. in 1987. This depot has been equipped for heavy container handling equipments. The area was declared custom bonded and Bank and other necessary facilities were established there. Since the start of transport between Chittagong and Dhaka, the number of containers has increased gradually, but still represents only less than 10% of the total container numbers between Chittagong and Dhaka (7% in 1991/92) due to restriction of the capacities of Kamalapur ICD and shortage of rolling stocks. The existing capacity of

Kamalapur ICD is said to be approximately 12,000 TEUs per annum. It has 100 wagons for the light 20 feet containers, 5 wagons for heavy 20 feet containers and 18 wagons for 40 feet containers. In the fiscal year of 1991-92 ICD handled around 9,000 TEUs whereas the total number of containers handled by Chittagong Port in the same year were 1,21,000 TEUs.

5.3 DESCRIPTION OF AN ICD

Function of an ICD

The function of an ICD is to provide facilities near large industrial and commercial centres where less than container load (LCL) cargo can be received from shippers and consolidated for export and can move under customs control inland from the inland depot to the port terminal for shipment. In the case of imports, the containers move under customs control from the port terminal to the inland depot where the cargo is unpacked. All customs formalities are carried out at the ICD and the individual shipments collected by importers. The complementary function is the provision of facilities for the customs clearance of full container load (FCL) containers. Thus an ICD enables containers to move quickly through port terminals without undergoing customs formalities. In addition they provide for the transfer and storage of loaded and empty containers and a number of other services required by shipping lines.

Facilities Required

The following facilities are required at an ICD:

a) a railhead area where containers can be transferred to and from trains;

b) full container storage area, to accommodate all LCL and FCL traffic without physical segregation. Random access must be available for any particular container;

c) empty container storage to accommodate all empty containers, which should be stored in blocks segregated by owner and type;

d) container freight station (CFS) for packing and unpacking LCL cargo and for customs examination of packages;

e) FCL customs inspection and unloading area;

f) workshops for site machinery and railway wagon maintenance;

g) container repair area;

h) trailer parking area;

i) an external vehicle holding area;

j) an administration building for ICD management, documentation and terminal control staff and to provide office accommodation for representatives of shipping lines or agents;

k) a gatehouse to control access to and from the site.

5.4 DESCRIPTION OF THE DHAKA-ICD

The major development required to operate rail container services on the Dhaka-Chittagong corridor is an Inland Clearance Depot (ICD) in the Dhaka

area. A start has been made by conversion of some existing facilities at Kamalapur station to provide an interim ICD. In conjunction with a small fleet of converted freight wagons, this pilot operation will provide the facilities required to enable the container service to commence. Provided that ICD is operated efficiently and the associated rail services run according to plan, shippers will become acquainted with the benefits of throughout movement by container, and traffic can be expected to increase steadily.

Present area of this ICD is 217000 sft. and yearly handling capacity of 10,000 TEU. Yard capacity only can handle 490 TEU. This capacity can only be increased further by reducing the handling time and by introducing more container trains. Extended yard capacity is 275,000 sft. and handling capacity of extended container yard 15,000 TEU. Total handling capacity (including extended area) is 25,000 TEU/year.

Presently the BR has the following numbers of container wagons:

No. of 20 ft. container wagon	-	100 nos.
No. of 40 ft. container wagon	-	103 nos.
Over weighted 20 ft. container wagon	-	4 nos.

This number are to increased if the other sites are coming to the ICD management.

Dhaka-ICD Management:

CPA is controlling the container handling, labour management, booking documentation and security. According to the requirement of CPA, BR arrange railway wagon and control the train services. At running position of trains, security of container carrying trains depends on Bangladesh Railway.Earning revenue shared by BR and CPA, according to an agreement is shown in Table 5.2 below.

Table - 5.2 : Percentage of earning revenue by CPA and BR

	CPA %	BR %	Total %
Container handling	75	25	100
Ground rent	25	75	100

Average load of container per day in Dhaka-Chittagong route is 5656 TEU. There are only 2 FLT/Top Lifter in Dhaka ICD.

5.5 CONTAINER TRAFFIC

According to the sizes and load carrying capacity the freight rate of container is given below.

a. Freight Rate of Container Traffic

SL	Route	Weight,ton	Length,ft	Freight rate, Tk.
1	Chittagong to Dhaka-ICD	Upto 15 Upto 20 Upto 25 Upto 30 Above 30 upo 44	20 20 20 40 40	6000 8000 9000 2000 14000
2	Dhaka-ICD to Chittagong port	Upto 15 Upto 20 Upto 25 Upto 30 Above 30 upto 44	20 20 20 40 40	3000 4000 4500 5000 7000
3	Both route	Empty Empty	20 40	1000 2000

Year-wise loading position and earning of container traffic by BR is shown in Table-5.3. In figure the tremendous revenue earnings of container by BR is found in the FY1992-93. Because, the facilities to carry containers by BR were increased.

The month-wise handling of container from Chittagong to Dhaka ICD and Dhaka ICD to Chittagong in the year 1991-92 and 1992-93 shown in Table-5.4 and Table-5.5 respectively. Transportation of loaded container is maximum in comparison to transportation of empty container. Table 5.3 gives an strong indication that the container handling by BR would continue its growth in the future years.

Table-5.3 : Year-wise container traffic

Year	No. of container (TEU)	% increase in containers	Revenue Earnings Tk.	% Increase in earnings
1986-87	37	-	84698	0
1987-88	441	1092	1487870	1659
1988-89	1958	344	7810763	425
1989-90	4526	131	21981392	181
1990-91	5555	23	33810733	53
1991-92	8668	56	36875127	9
1992-93	13744	59	68335712	85

Table-5.4 : Container handled in the Dhaka-ICD (1991-92)

Month	From Chittagonng to Dhaka			From Dhaka to Chittagong		
	Load TEU	Empty TEU	Total	Load TEU	Empty TEU	Total
Jul	198	103	301	208	64	272
Aug	146	143	289	238	75	313
Sept	199	141	340	212	35	247
Oct	160	146	306	227	58	258
Nov	143	156	299	239	100	339
Dec	224	160	380	320	49	369
Jan	170	270	440	356	117	473
Feb	226	196	422	328	26	354
Mar	226	219	445	541	72	613
Apr	293	83	376	213	95	308
May	277	117	394	259	120	379
Jun	365	91	456	296	88	384
Total	2656	1869	4525	3175	968	4143

Table-5.5 : Container handled in Dhaka-ICD (1992-93)

Month	From Chittagonng to Dhaka			From Dhaka to Chittagong		
	Load TEU	Empty TEU	Total	Load TEU	Empty TEU	Total
Jul	329	148	477	417	17	434
Aug	420	164	584	365	263	628
Sept	405	275	680	425	194	619
Oct	464	139	603	312	287	599
Nov	331	158	489	373	162	535
Dec	392	160	552	454	77	531
Jan	318	229	547	514	74	588
Feb	318	137	455	377	44	421
Mar	471	245	716	510	123	633
Apr	496	123	619	317	238	555
May	547	146	693	572	148	720
Jun	431	136	567	400	124	524
Total	4837	2114	6951	4961	1832	6793

5.6 CONTAINER HANDLING IN THE CHITTAGONG & MONGLA PORT

Mongla is primarily the export oriented port. Export by using container is more in comparison with imports. This is shown in Table-5.6 and Fig.5.2.

Table-5.6 : Container handled through the Mongla port in TEUS

: Year	Vessel	Import	Export	Total
1983-84	37	1880	1651	3531
1984-85	69	2368	2049	4417
1985-86	142	5342	5555	10897
1986-87	169	7332	6953	14295
1987-88	157	7198	7017	14215
1988-89	149	7053	6903	13956
1989-90	133	8823	8959	17782
1990-91	103	7519	7684	15203
1991-92	144	7801	8295	15496

Source : MPA

The containerized cargo handled by Mongla Port shown in Table-5.7 and cargo handled in tonnes in Table-5.8 respectively. Graphical presentation of containerized cargo handling through Mongla Port also shown in a Figure-5.3.

Table-5.7 : Containerized cargo handled through the Mongla port (TEU)

Year	Import	Export	Total
1983-84	0	20250	20250
1984-85	274	21338	21612
1985-86	7063	47994	55057
1986-87	8216	69294	77510
1987-88	6818	80859	87677
1988-89	4801	79049	83845
1989-90	11211	96442	107633
1990-91	6118	82226	88344
1991-92	7616	95421	102137

Source : MPA

Figure 5.2 : Export and Import
Containers through the Mongla Port

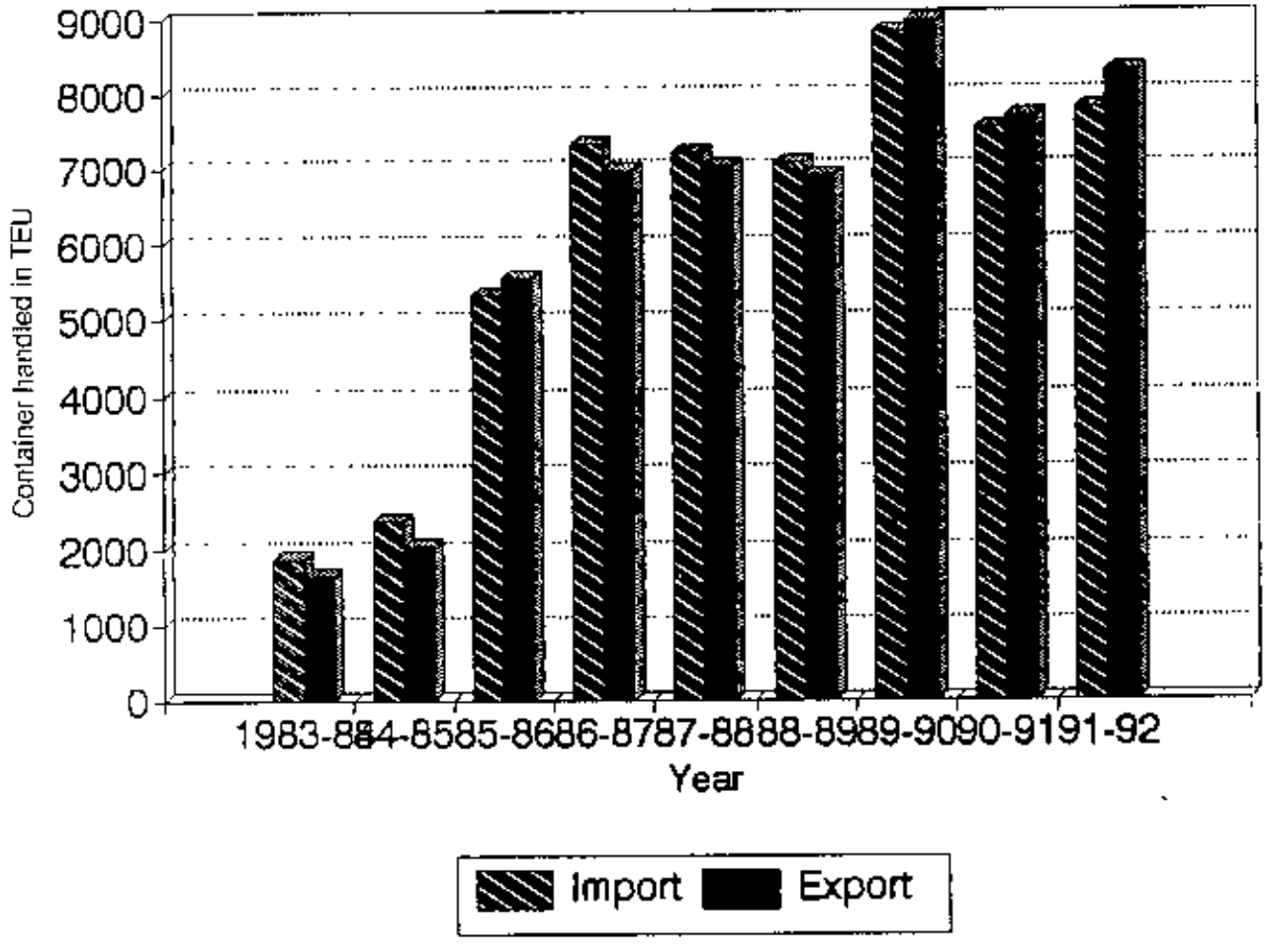
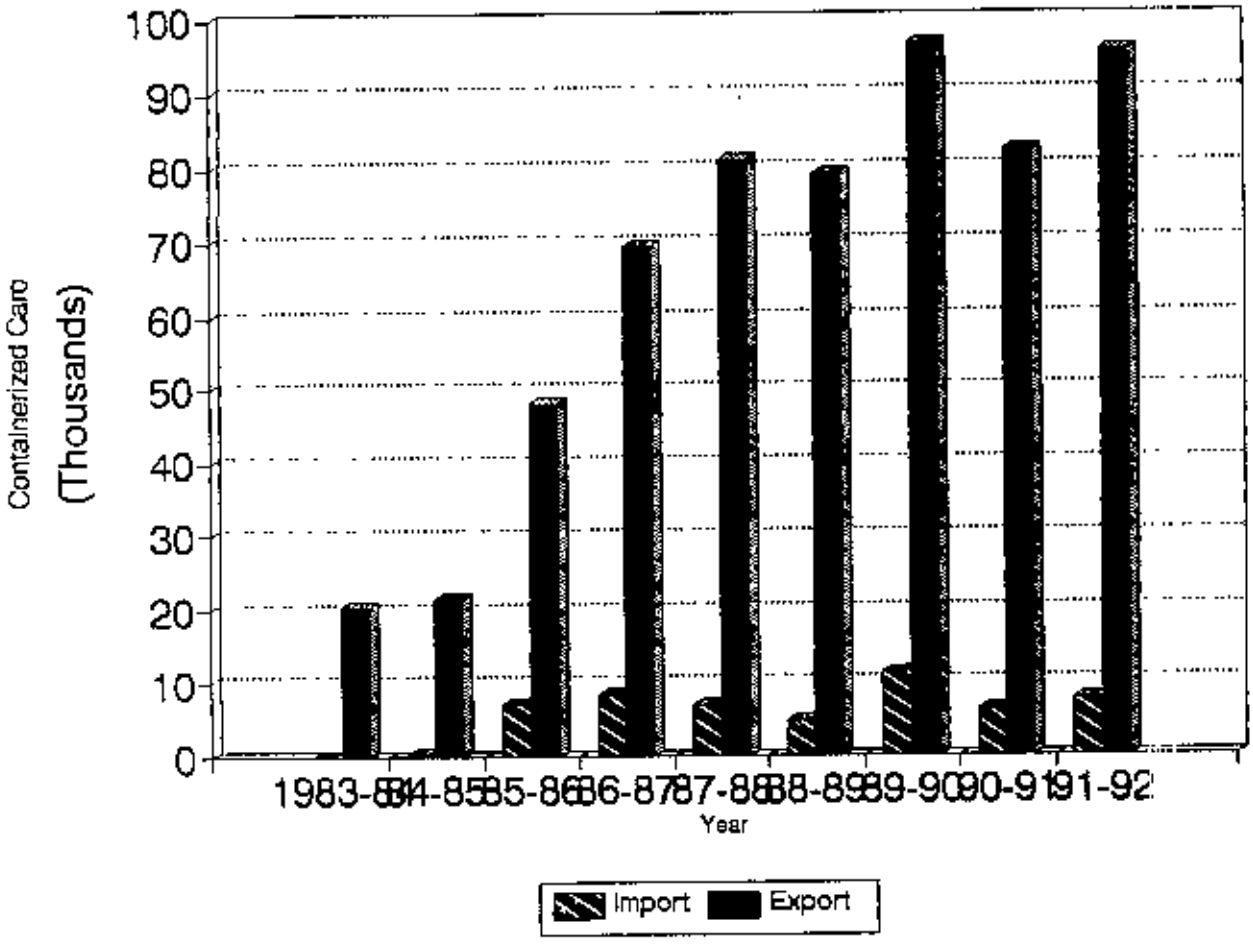


Table-5.8 : Cargo handled by Mongla ports (Thousand tonnes)

Period	Import	Export	Total
1987-88	2228	626	2854
1988-89	1882	637	2519
1989-90	1891	695	2586
1990-91	1905	556	2461
1991-92	2065	673	2738

Source : Monthly Statistical Bulletin

Figure 5.3: Containerized Cargo Handled through the Mongla Port



The export and import analysis of Cargo and Containerized Cargo through Chittagong ports are shown in the table-5.9 and Table-5.10 respectively.

Table 5.9 : Cargo handled by Chittagong port : (thousand tonnes)

Period	Import	Export	Total
1987-88	7108	632	7740
1988-89	7122	835	7957
1989-90	6800	671	7471
1990-91	6283	926	7209
1991-92	5886	673	6559

Table-5.10: Containerized cargo handled through Chittagong port.

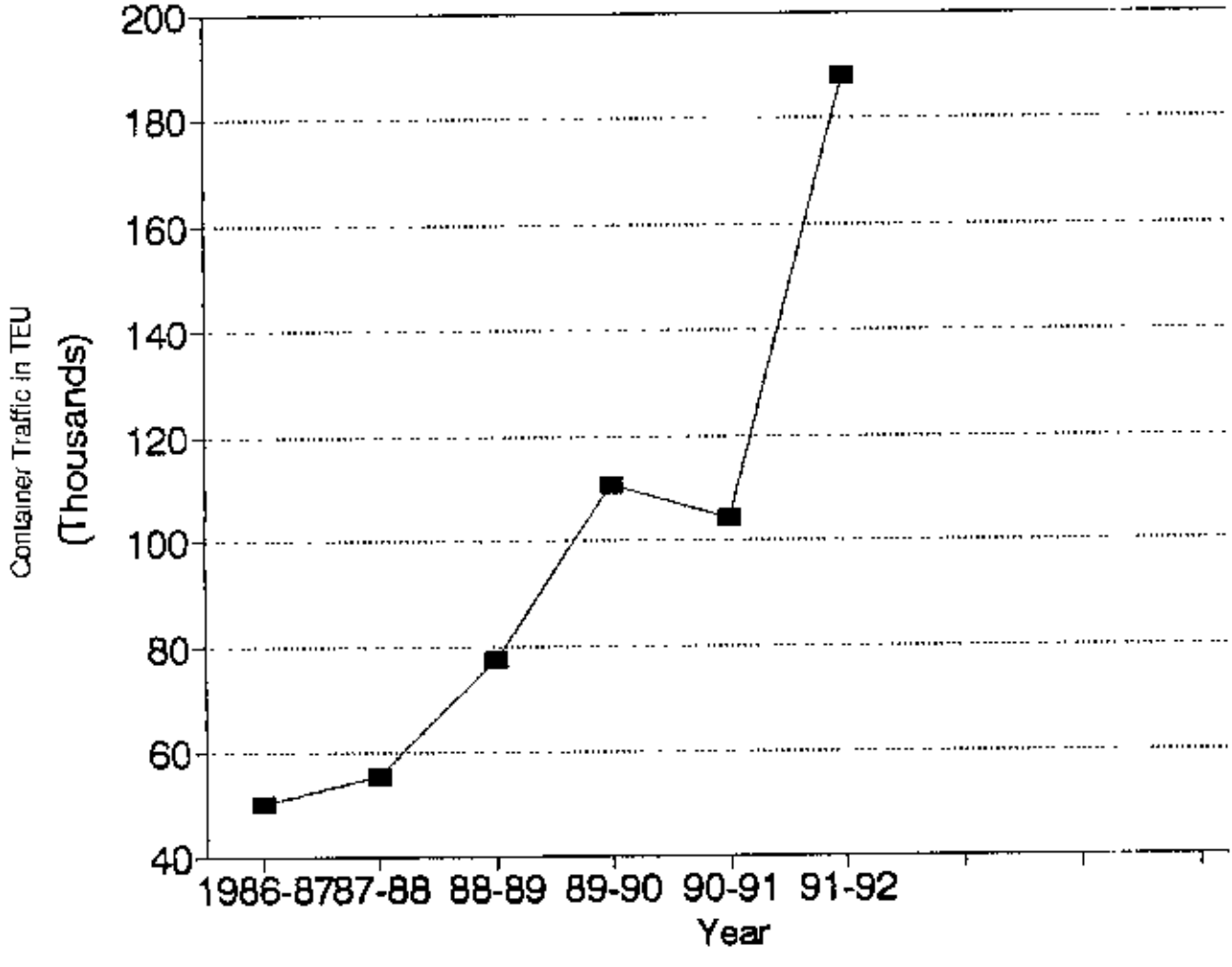
	Import Container		Export Container		Total Containers	
Year	Boxes	Tons	Boxes	Tons	Boxes	Tons
1985-86	17,010	2,27,411	14,799	1,12,509	31,809	3,39,920
1986-87						
1987-88	25,352	3,64,043	17,518	1,84,636	42,870	5,48,679
1988-89	31,077	4,72,554	29,429	2,40,292	60,506	7,12,846
1989-90	44,212	6,67,777	42,204	3,06,424	86,416	9,74,201
1990-91	38,705	5,46,323	38,548	3,42,750	77,253	8,89,073

Growth of container traffic of Chittagong port is shown in Table-5.11 and this growth is also shown in Figure-5.4. Figure shows that the growth of container traffic falls in FY1990-91. The main cause of this is the political instability in that fiscal year.

Table-5.11 : Growth of Container Traffic in the country (Chittagong port)

Year	TEU	% Growth	Total Tonnage	% Growth
1986-87	50019	-	455460	-
1987-88	55392	11	548679	20
1988-89	77522	40	712846	30
1989-90	110644	43	974201	37
1990-91	104281	27	889073	27
1991-92	188024	34	1655518	34

Figure 5.4: Growth of Container Traffic in the Chittagong Port



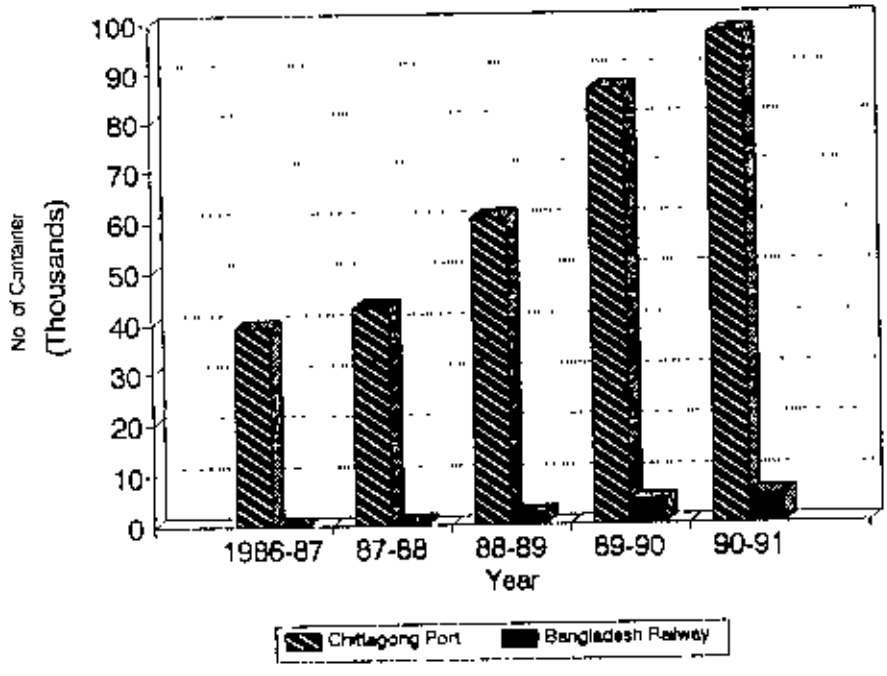
5.7 COMPARISON OF CONTAINER HANDLING BY THE CHITTAGONG PORT AND THE BANGLADESH RAILWAY

From the beginning of containerization by BR, its share of container transport form the Chittagong port has been very low. Table-5.12 and Fig. 5.5 gives the percentage of the share of container handling by the BR in the FY 1986-87 to be 0.095 and in the FY 1990-91 it increased to 5.71%.

Table-5.12 : Railway's share of container Transportation

Year	No. of Containers Handle		Railway share %
	Chittagong port	BR	
1986-87	39136	37	0.095
1987-88	42870	441	1.03
1988-89	60506	1958	3.24
1989-90	86416	4526	5.24
1990-91	97252	5555	5.71

Figure 5.5 : Contained handled through Chittagong Port & BR



5.8 EXISTING PROBLEMS OF THE DHAKA-ICD

1. Loading and unloading in Dhaka-ICD are delayed due to frequent ineffectiveness of valmet for which container train could not run in time and optimum utilization of container wagons could not be ensured.

2. Due to shortage of 40' Container Wagons, demand of 40' containers could not be fulfilled.

3. Due to limited yard capacity, CPA does not allow to bring excess containers to Dhaka. Therefore, availability of empty containers becomes poor in Dhaka which affects the transportation of export goods.

4. Two special locomotives for the container express train are required in order to ensure daily running of the same in time. Presently Railway Authority have failed to provide the same.

5. Railway is using the fork lifts of CPA for stuffing, unstuffing of loads.

6. It has not yet decided whether the management of ICD will be vested on the Railway or CPA. Although temporarily CPA is taking the responsibility but due to lack of clear decision, initiative of CPA for the improvement of ICD is very limited. The situation is not

conducive to proper improvement of the ICD. Lack of integration of activities between BR and CPA is noticeable.

7. There is no workshop near Dhaka-ICD. Therefore, repairing of damaged container wagons are delayed. Moreover the number of container wagons is also limited.

5.9 FORECASTING OF THE CONTAINER TRAFFIC

The forecasting of container traffic has been made using average increasing method, as follows.

a) Year-wise the total number of containers (Loaded and empty) carried by BR are shown in Table-5.13.

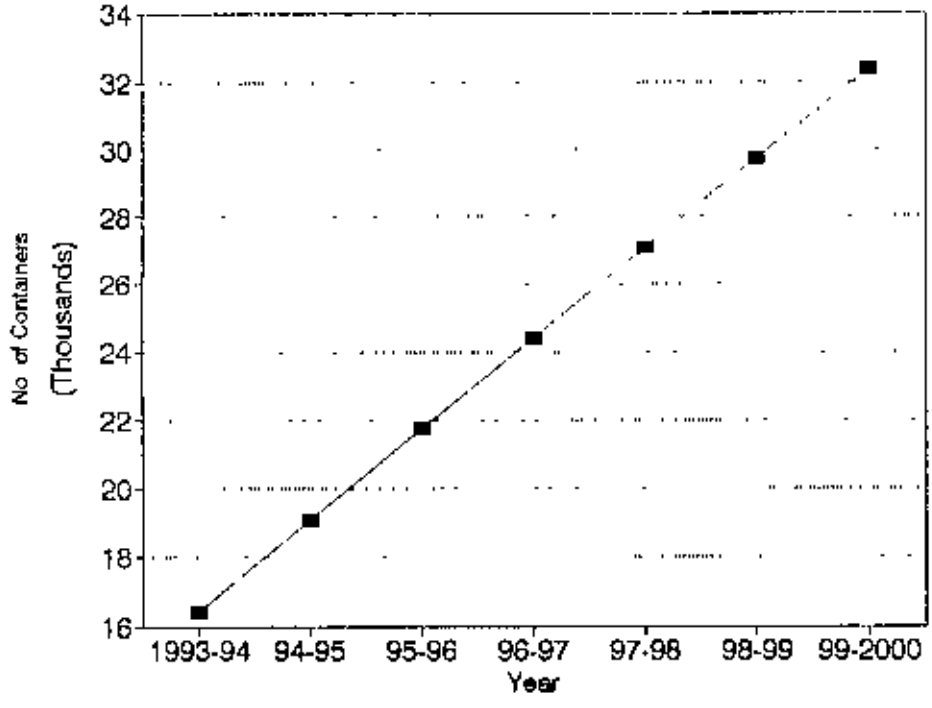
Table-5.13 : Number of containers carried by BR

Year	Total number of containers carried in loaded & empty condition
1987-88	441
1988-89	1958
1989-90	4526
1990-91	5555
1991-92	8668
1992-93	13744

From the table-5.13, the average increase of the number of the container carrying per year is 2661. Therefore, the forecast value are calculated and are given below and shown by a graph in Fig.5.6.

Year	Forecast of Number of containers
1993-94	16405
1994-95	19066
1995-96	21727
1996-97	24388
1997-98	27049
1998-99	29710
1999-2000	32371

Figure 5.6 : Forecast of Containers Carrying by the BR



There is a programme to introduce 80 container wagons in FY 1994-95. It is assumed that with the full commissioning of EPZ of Dhaka the number of container handling of BR will increase 20% every year from 1994-95. But beyond year 2000, with new GATT policy and with the abolition of quota system to USA market, the export situation will completely depend upon market competition. Side by side Government has also taken step to develop the ICD at Pagla (near Narayangonj).

b) Year-wise number of container handled at the Chittagong port are shown in Table-5.14 below.

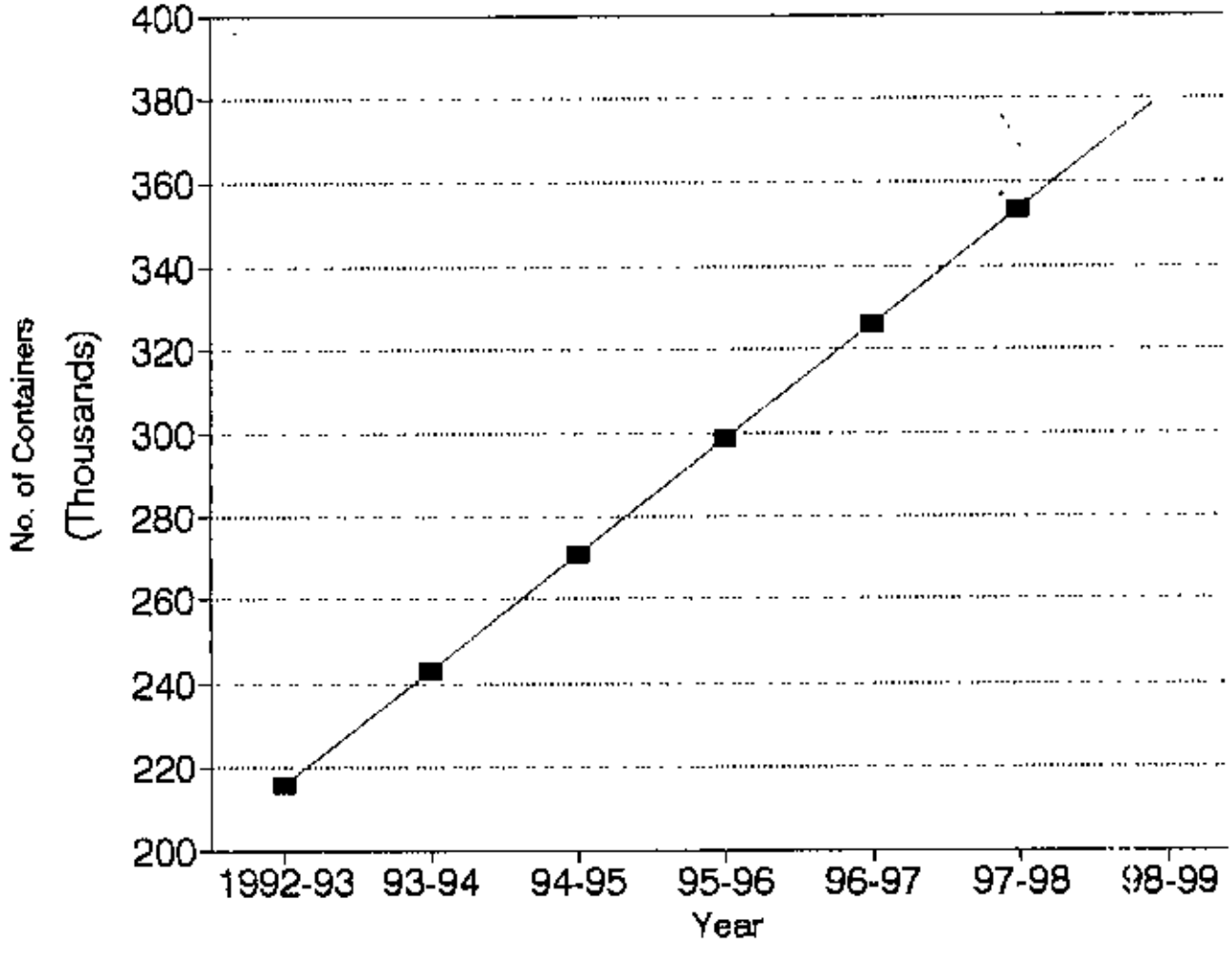
Table 5.14 : Containers handled in the Chittagong port

Year	Container handle TEU
1986-87	50019
1987-88	55392
1988-89	77522
1989-90	110644
1990-91	140281
1991-92	188024

From the table the average increase of the container handle is 27601. Thus the forecasted values were calculated and are shown in tabular form and in Figure 5.7.

Year	No. of containers
1992-93	215625
1993-94	243226
1994-95	270827
1995-96	298428
1996-97	326029
1997-98	353630
1998-99	381231

Figure 5.7 : Forecast of Containers Carrying by the Chittagong Port



Container traffic at the Chittagong port has increased rapidly from 55392 TEUs in 1988 to 188,024 TEUs in 1992 and is estimated to grow nearly 312400 TEU in 1993-94. The growth rate of containers is about 34% per annum during the past four years.

The Dhaka-ICD handled a total of 441 TEUs in 1987-88 and it has increased to 13769 in 1992-93. The growth rate is 30.71%.

It is evident from the above that the growth of containers in the Chittagong port and the growth of handling in the Dhaka-ICD are always in the positive side since its introduction. Therefore, the transportation of containerized cargo in the Dhaka-ICD will be increased more and more in future.Nearly 60% of the container received at Chittagong port are delivered to the Dhaka area.

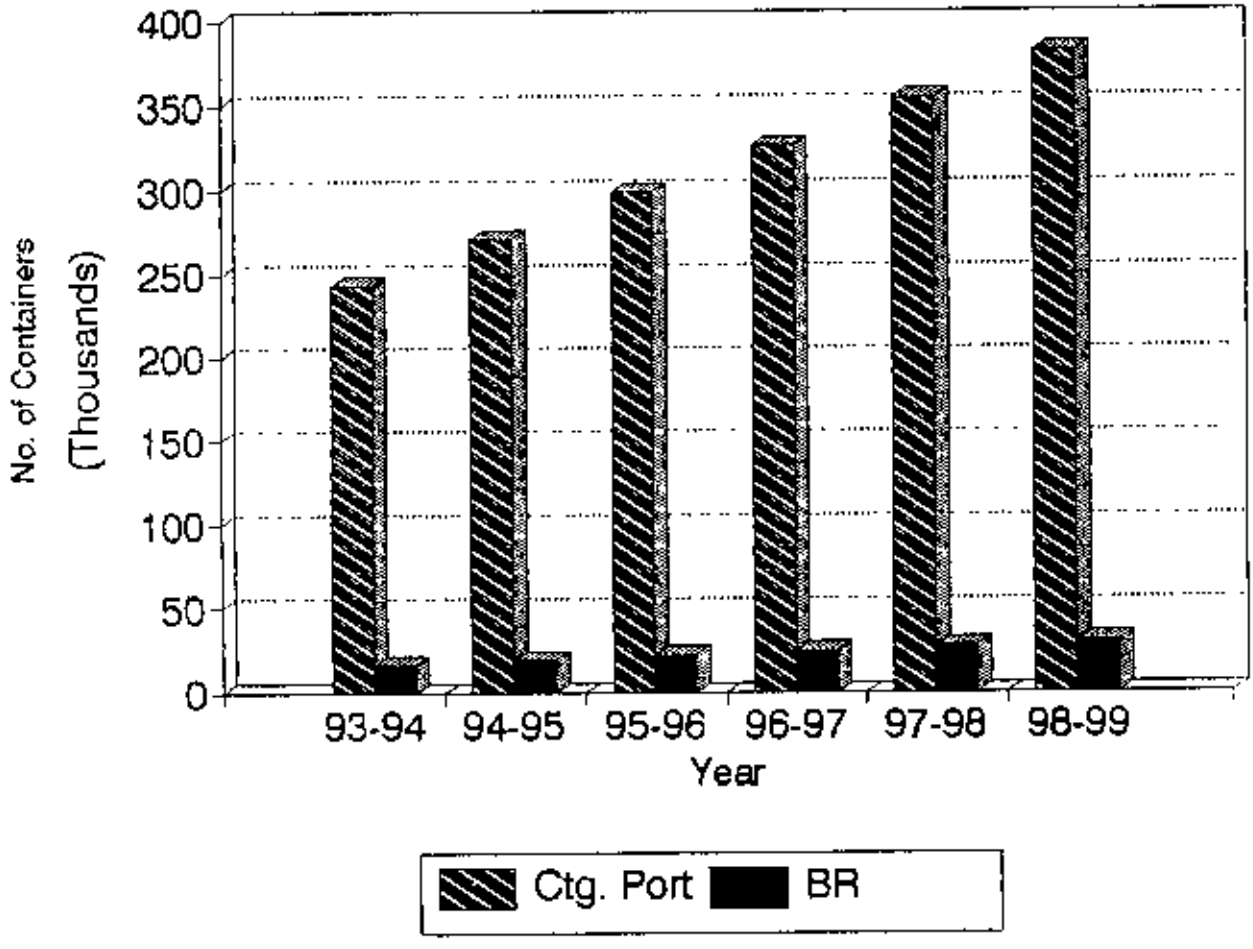
Although there is a good prospect of growth of the Dhaka ICD, Yet at the same time with the completion of the Meghna-Gumati Bridge the road communication to the port with container may increase. In that situation the container carrier lorries will have to be imported. Finally the Dhaka ICD railway container system have to be in competition with Road and River container system. Now, the comparison of the forecasted values between container carried by the BR and container handling through CPA is shown in Table 5.15 and in Figure 5.8.

Table 5.15: Comparison of the forecasts of containers carrying by the BR and CPA

(TEU)

Year	Forecasts of containers	
	Carried by the BR	Handling through CPA
1993-94	16,405	2,43,266
1994-95	19,066	2,70,827
1995-96	21,727	2,98,428
1996-97	24,388	3,26,029
1997-98	27,049	3,53,630
1998-99	29,710	3,81,231

Figure 5.8: Comparison of the Forecasts of Container Carrying



Chapter – 6

C O N C L U S I O N

6.1 CONCLUSION:

In surface transport, BR has been playing an important role in the transport sector like other modes of transports. Upto the recent past BR was a leader in the transport sector of the country and road transport was the follower. But the situation has been reversed as the road transport is presently leading in comparison with BR. Therefore, the road length has increased to about 13000 KMs due to heavy investment,whereas the route length of the BR has reduced to some extent during the period considered.

BR could not compete with road transport for various reasons. Road transport is giving door to door service in addition to the faster speed. In spite of several attempt, BR could not stop the pilferage and theft of freight in its system. So, at present BR is facing tough competition with the road transport in respect of quality of service. Although from energy and cost point of view the long distance railway transportation is the cheapest, but gradually its abandon and use of road transport is adding to the cost of goods and ultimately the consumers are suffering.

Railway invested heavily towards modernization of its signaling system and to procure locomotives and wagons. But it fails to take an integrated approach towards development of the network. As a result with its linked

approach BR is facing tough competition. At present about 57 thousand employees are working in BR. About 75% of BR revenue are spent for the salary of the staff. Such spendings are to be reduced by at least 50%, so that it is at per with the other comparable standards.

On analysis the BR loading, it was seen that BR transported a large quantities of government food grains and fertilizer in the past. Now, the transport of foodgrains and fertilizer have been privatized. The offering of traffic in BR has been reducing and the modal share is also showing downward trends.

Similarly, the offering of Coal, Jute and Sugarcane have decreased. The offering of new traffic in railway is also deem as there is no significance change in the development of industrial sector in the country.

On analysis the loading of container wagon, it is seen that the loading of container have been increasing since its introduction. From the commodity-wise loading analysis it can be seen that the position of container loading was 4th in the year of 1991-92. But the same has been raised to 3rd position in the current year i.e. 1992-93.

The growth of container traffic is 32% per annum. From the growth matrix trend it is seen t hat Chittagong port will handle about 35,3600 TEU per annum in 1997-98 and 60% of those will moved towards Dhaka area. Railway could handle a lion share of the same if the existing services are improved further.

Initially, an interim container depot was started at Dhaka Railway Station in 1986-87 which was expanded during 1990-91 to handle up to 12000 TEUs. Very recently further extension has been done to handle up to 25000 to 30000 TEUs per year. The yard needs further extension to cope with the increasing demands.

It is seen that BR's 50% of the total loading is foodgrains and fertilizer. The lion share of the above volume has transported by Eastzone. Due to privatization of foodgrains and fertilizer transportation, BR is facing a difficult situation in order to survive in the transport sector. BR transported 13,769 loaded container in 1992-93. It is expected that the above figure will be increased to about 16500 TEUs during year 1993-94. If the rising of container traffic continues in the same growth rate, it is expected that BR will be able to handle 20,000 TEU in 1994-95 and so on.

From the above analysis it may be seen that the container traffic will enable the BR to overcome the "offer crisis" which has been raised due to privatization of foodgrains and fertilizer transportation.

Besides these, the following immediate benefit from the container service are possible in addition to the other:

i) Railway is the cheapest mode of transport. It consumes comparatively less quantity of energy. Diversion of Cargo from road to rail will save foreign exchange and reduce import of petroleum oil.

ii) Railway is the only mode of transport, called environment-friendly, and cause a little affect on the environment.

iii) Pilferage and theft will be reduced considerably is containerized cargo are transported by railway wagons.

iv) Packaging expenditure will also be reduced if transported by containers over railway wagons.

v) This container service will divert a good quantity of traffic from trunk road corridors to railway as a result of which heavily congested roads will be off roadbed and under utilized railway corridors will be better utilized. It will reduce the repair cost of roads.

6.1.1 Prospect of Container Traffic in BR

a. Introduction of 5 ton container in BR

The existing transportation system of containerized cargo has got some problems giving rise to artificial high cost in transportation. Smaller quantities of consignments can not be carried by containers, thus smaller traders group are discouraged in this process. In the past few years, some traders jointly book a big container for transportation of their commodities together. In this process, commodities are mixed up and generate artificial scope to pilfer/loss in the transportation. Moreover, it is difficult for the smaller group of consigners to keep their commodities in a place in order

to transport the same in a single container. To overcome these difficulties, BR is planning to capture these groups by offering 5 ton containers for transportation. In this process, the small consigners could use them independently for their own use.

b. New corridor under rail facilities

Mongla port handles about one third of the country's export and 22% of import. Mainly Jute and Jute goods Fertilizer and shrimps are exported through this port. There are versatile facilities for container traffic. If BR could link Mongla port, container services will be developed. For this, at least two container depots, one is at Khulna and the other is at Parbatipur or Shantahar are to be established in the west zone of BR. At present BR is providing the container wagons for container cargoes in between Chittagong port and Dhaka-ICD. This service could be extended upto Srimangal.

c. Adaptation of Modern Technologies

The turn round time of container wagon from Chittagong to Dhaka and vise versa is 3-5 days. There is scope to minimize the turn round time from 3.5 days to 2-days. During the study it was found that due to overload, traffic congestions and unplanned addition of other wagons, some container wagons are detained unduly at different stations and yards. As a result turn-round time increased.

These problems could be overcome by proper planning and computerization of the system. Only a few micro computers would be required to

computerize the movement of container wagon for the two corridors particularly in Chittagong port to Dhaka ICD and Chittagong port to Srimangal. Thus, this proposed system will enable BR to reduce turn round time by optimum utilization of resources. This system will also generate daily, monthly and yearly MIS and OIS for better management and optimum utilization.

d. Extension of Dhaka-ICD upto EPZ at Savar

Recently Bangladesh Government is also developing a large Export Promotion Zone (EPZ) at Savar near Dhaka. As a result Dhaka area will become the centre for generating exportable garments, leather and other miscellaneous products. Hence it is not out of place to expect more containerized cargo in future.

6.2 RECOMMENDATIONS

1. The future of the Dhaka ICD is bright. BR should render all possible services for transporting containerized cargo. It is strongly recommended to increase the existing facility of the Dhaka ICD to improve loading of container wagon.

2. BR has no handling equipments. As a result it is deprived of 75% handling charges at the Dhaka ICD. BR should develop its own handling facility.

3. There is no workshop to repair the container wagons in the Dhaka

ICD. As a result day to day repair works are affected and thus BR could not repair them at time. It is recommended that BR establishes a workshop for repairing container wagons.

4. To cope with the existing traffic movement and situation, BR should change the existing network by connecting important locations.

5. It will be difficult for railway to survive in the competitive market if railway track is not included over the Jamuna bridge.

6. BR should establish an agreement with India to jointly share the railways facilities. This would help serving Nepal in the cargo line. This is possible with the new concept of SAFTA(South Asian Free Trade Association). This arrangement would increase the freight traffic of railway by at least 30%.

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APPENDIX-I

THE RESOURCES AND PERFORMANCE INDICATORS OF THE BR

Table-AI-1: Railway stations

Year	Broad Gauge		Metre Gauge		Total System		
	West zone	East zone	West zone	Total	East zone	West zone	Total
July-June							
1969-70	158			312			470
1982-83	167	259	83	342	259	250	509
1983-84	168	259	83	342	259	251	510
1984-85	162	260	84	344	260	246	506
1985-86	162	256	84	340	256	246	502
1986-87	162	255	84	339	255	246	501
1987-88	162	255	84	339	255	246	501
1988-89*	163	255	84	339	255	247	502
1989-90	163	255	84	339	255	247	502
1990-91	163	255	84	339	255	247	502
1991-92	152	255	82	337	255	234	489

Table-AI-2: Route-Kilometers

Year	Board Gauge (Kilo-metres	Metre gauge			Total system (Kilometres)		
	West zone	East zone	West zone	Total	East zone	West zone	Total
July-June							
1969-70	923.07			1,935.16			2,858.23
1982-83	973.69	1,333.22	559.27	1,892.49	1,333.22	1,532.96	2,866.18
1983-84	978.92	1,333.22	559.27	1,892.49	1,333.22	1,538.19	2,871.41
1984-85	978.92	1,279.09	559.27	1,892.49	1,333.22	1,538.19	2,871.41
1985-86	979.58	1,279.09	543.03	1,838.36	1,279.09	1,538.85	2,817.94
1986-87	969.80	1,279.09	543.03	1,822.12	1,279.09	1,538.83	2,791.92
1987-88	923.53	1,279.09	543.03	1,822.12	1,279.09	1,512.56	2,745.65

1988-89	923.53	1,279.09	543.03	1,822.12	1,279.09	1,466.56	2,745.65
1989-90	923.53	1,279.09	543.03	1,822.12	1,279.09	1,466.56	2,745.65
1990-91	923.53	1,279.09	543.03	1,822.12	1,279.09	1,466.56	2,745.65
1991-92	923.53	1,279.09	543.03	1,822.12	1,279.09	1,466.56	2,745.65

Table-AI-3: Locomotive owned

Year	Broad gauge		Metre gauge		Total System		
	Steam	Diesel	Steam	Diesel	Steam	Diesel	Total
July-June							
1969-70	121	18	222	125	434	143	486
1982-83	22	76	86	226	108	302	410
1983-84	18	76	69	223	87	299	386
1984-85		75		213		288	288
1985-86		75		215		290	290
1986-87		75		216		291	291
1987-88		75		216		291	291
1988-89				232		307	307
1989-90		75		232		307	307
1990-91		75		232		307	307
1991-92		75		233		308	308

Table-AI-4: Coaching vehicles owned

Year	Broad gauge		Metre gauge		Total System		
	Passenger carriages	Other coaching vehicles	Passenger carriages	Other coaching vehicles	Passenger carriages	Other coaching vehicles	Total coaching vehicles
July-June							
1969-70	275	143	890	335	1,165	478	1,643
1982-83	362	81	1,033	256	1,395	337	1,732
1983-84	344	63	1,039	255	1,383	318	1,701
1984-85	341	55	991	250	1,332	305	1,637
1985-86	336	54	1,035	239	1,371	293	1,664
1986-87	336	54	1,112	242	1,448	296	1,744
1987-88	336	54	1,166	238	1,502	292	1,794
1988-89	336	54	1,164	233	1,500	287	1,787
1989-90	336	54	1,132	149	1,468	203	1,671
1990-91	333	45	1,103	146	1,436	191	1,627
1991-92	343	40	1,087	144	1,430	184	1,614

Table-AI-5: Type-wise breakdown of passenger carriages owned

	Type	Broad gauge	Metre gauge
1.	Bogie Carriages - Fully Air-conditioned (WJFC)	-	2
2.	Composite First and Air-conditioned (JFE, JFS, WC)	6	20
3.	Chair Car (WYF/WCC/FCC	-	17
4.	First Class (F)	-	1
5.	First Class (FC)	3	71
6.	Second Class (S)	230	129
7.	Third Class (T/S)	-	552
8.	Composite First and Second Class (FS)	29	-
9.	Composite First, Second and Third Class (FST/FS)	-	6
10.	Composite First and Third Class (ST/S)	-	53
11.	Composite Third Class with Dining,Car (CDT/CDS)	6	15
12.	Composite Third Class with Postal Compartment(TPP/SPP)	8	18
13.	Composite Second Class with luggage and Brake vans(SLR)	-	1
14.	Composite Third Class with luggage and Brake vans(TLR/TLR)	61	181
15.	Composite Power car(TPC,SPC,YPC,EPC) Four Wheeled Carriages	-	20
16.	First Class (EF)	-	-
17.	Third Class (ET)	-	1
18.	Composite First and Second Class (EFS)	-	-
19.	Composite Second and Third Class(EST)		-
20.	Composite Third Class with Postal Compartment(ETPP)	-	-
	Total Passenger Carriages	343	1,087
21.	Rail cars Trailer coaches		7 14

Table-AI-6: Type-wise breakdown of other coaching vehicles owned

Type	Broad gauge	Metre gauge
Boogie vehicles		
Dining Cars(CD,WCD)	1	14
Tourist Cars(CT)	-	4
Luggage Vans (L)	16	65
Motor Vans(VK)	-	10
Miscellaneous including brake vans(VI,VE,VV,VR,LR etc.)	-	5
Railway service vehicles(RA,RH,RS,RT,RR etc)	5	27
Four Wheeled Vehicles		
Luggage Vans(EL)	-	-
Horse Vans(EH)	1	-
Motor Vans (EVK)	-	-
Carriage Truck (EG)	-	
Miscellaneous including break vans(EVG,EVKP,EVE,EVR etc)	2	10
Railway service vehicles(ERB,ERD,ERH,ERT,CE etc)	15	9

Table-AI-7 Freight wagons owned

Year	Broad gauge		Metre gauge		Total	
	Units	Four wheelers	Units	Four wheelers	Units	Four wheelers
July-June						
1969-70	4,464	4,632	12,359	14,984	16,823	19,616
1982-83	4,292	5,045	12,684	15,151	16,976	20,196
1983-84	4,086	4,839	12,597	15,053	16,683	19,892
1984-85	4,080	4,833	12,434	14,886	16,514	19,719
1984-86	4,073	4,826	12,357	14,803	16,430	19,628
1986-87	4,073	4,826	12,283	14,719	16,356	19,545
1987-88	4,073	4,826	12,174	14,598	16,247	19,424
1988-89	4,073	4,826	11,869	14,251	15,942	19,077
1989-90	3,798	4,557	11,738	14,117	15,536	18,674
1990-91	3,757	4,519	11,539	13,917	15,296	18,436
1991-92	3,711	4,466	11,451	13,826	15,162	18,292

Table-AI-8: Freight wagon loaded

Year	Broad gauge		Metre Gauge		
July-June	West Zone	East Zone	West Zone	Total	Total System
1969-70	135,281	-	-	369,612	504,893
1982-83	62,324	109,176	35,411	144,587	206,911
1983-84	65,952	111,405	40,315	151,720	217,672
1984-85	71,115	112,239	29,284	141,523	212,638
1985-86	51,924	89,518	30,365	119,883	171,807
1986-87	46,637	76,556	25,592	102,248	148,885
1987-88	57,023	98,943	25,022	113,578	178,985
1988-89	54,186	98,421	20,157	113,578	172,764
1989-90	50,017	98,535	28,284	122,819	172,836
1990-91	47,537	95,860	29,251	125,111	172,648
1991-92	38255	101,180	27,000	128,180	166,435

Table-AI-9: Freight tonnes carried of principal commodities

	Commodities	1969-70		1990-91		1991-92	
		Tonnes	%	Tonnes	%	Tonnes	%
1.	Cement	292	5.98	114	4.53	108	4.31
2.	Coal	138	2.83	74	2.94	63	2.51
3.	Cotton raw	34	0.67	0.15	0.01	0.11	0.01
4.	Fire wood and other fuel	22	0.46	10	0.04	1	0.04
5.	Fertilizer	213	4.37	248	9.86	403	16.08
6.	Fodder	5	0.10	3	0.12	1	0.04
7.	Fuel for the railway	-	-	16	0.65	8	0.32
8.	Gram & Pulses	54	1.10	3	0.14	2	0.8
9.	Iron and Steel	187	3.83	58	2.30	49	1.96
10.	Jute raw	664	13.60	29	1.14	80	3.19
11.	Jute manufactured	47	0.95	6	0.22	12	0.48
12.	Kerosine oil	194	3.96	32	1.27	26	1.04
13.	Live Stock	1	0.02	0.04	0.00	-	-
14.	Marble & Stone	139	2.85	68	2.71	79	3.15
15.	Military traffic	16	0.33	23	0.91	20	0.80
16.	Molasses	24	0.50	28	1.12	16	0.64
17.	Oil fuel	155	3.17	113	4.45	99	3.95
18.	Oil Seeds	18	0.37	1	0.05	1	0.04
19.	Other grains	-	-	0.85	0.04	0.50	0.02
20.	Provision	56	1.15	3	0.12	2	0.08

21.	Petrol	19	0.40	6	0.23	4	0.16
22.	Paddy	72	1.48	15	0.59	14	0.56
23.	Rice	459	9.41	345	13.72	422	16.84
24.	Railway stores and material other than fuel	369	7.56	97	3.85	-	-
25.	Salt	101	2.04	58	2.30	57	2.27
26.	Sugar Cane	246	5.04	299	11.88	74	2.95
27.	Sugar	86	1.77	17	0.68	19	0.76
28.	Tea	44	0.88	7	0.27	21	0.84
29.	Tobacco	20	0.42	0.27	0.01	0.28	0.01
30.	Vegetable oil	12	0.25	18	0.71	19	0.76
31.	Wheat	623	12.80	571	22.65	593	23.66
32.	Wood unwrought	56	1.15	35	1.37	24	0.96
33.	All other commodities	512	10.56	169	6.72	194	7.74

Table-AI-10: Freight earnings of principal commodities

Commodities		1969-70		1990-91		1991-92	
		Tonnes	%	Tonnes	%	Tonnes	%
1	Cement	81,77	5.00	29219	3.03	26178	2.44
2	Coal	30,60	1.87	14621	1.52	17553	1.64
3.	Cotton raw	15,62	0.95	71	0.01	60	0.01
4	Firewood and other fuel	5,77	0.35	3857	0.04	440	0.04
5	Fertilizer	82,04	5.01	114390	11.85	206585	19.25
6	Fodder	1,30	0.07	1000	0.10	242	0.02
7	Fuel for the railway	-	-	1518	0.16	878	0.08
8	Gram & Pulses	16,66	1.01	1449	0.15	1105	0.10
9.	Iron and Steel	82,84	5.05	21179	2.19	17072	1.59
10	Jute raw	32214	19.69	35886	3.72	34361	3.20
11	Jute manufactured	22,08	1.34	2142	0.22	5737	0.53
12	Kerosin oil	81,31	4.96	14518	1.50	14218	1.32
13	Livestock	67	0.04	11	0.00	-	-
14	Marbel & Stone	29,33	1.79	19197	1.99	22247	2.07
15	Military traffic	487	0.29	4007	0.42	3565	0.33
16	Molasses	853	0.52	10692	1.11	5416	0.50
17	Oil fuel	4152	2.53	47676	4.94	39926	3.72
18	Oil Seed	734	0.44	558	0.06	441	0.04
19	Other grains	-	-	2,36	0.02	235	0.02
20.	Provision	44,30	2.74	14,58	0.15	11,46	0.11
21	Petrol	12,94	0.78	33,19	0.34	27,72	0.26
22	Paddy	13,21	0.80	55,23	0.57	45,93	0.43

23	Rice	15588	9.54	198115	20.53	243575	22.70
24	Railway Stores and Materials other than fuel	5,23	0.31	92,32	0.96	99,80	0.93
25	Salt	4923	3,00	33198	3.43	27890	2.60
26	Sugar cane	1626	0.99	41756	4,33	11912	1.11
27	Sugar	2662	1.62	7896	0.82	12932	1.20
28	Tea	2583	1.59	2401	0.25	86,27	0.80
29	Tobacco	11,94	0.72	1,76	0.02	1,62	0.02
30	Vegetable Oil	4,17	0.25	84,94	0.88	10251	0.96
31	Wheat	18906	11,54	251391	26.05	269807	25,14
32	Wood unwrought	20,00	1,22	15883	1.65	99,32	0.93
33	All other commodities	22925	14.01	63980	6.63	63390	5.91
	Total	163831	-	965049	-	1073228	-

Table-AI-11: Freight traffic in descending order of tonnes carried during 1991-92.

Commodities		1969-70		1990-91		1991-92	
		Tonnes	%	Tonnes Kilometres	%	Earnings (Taka)	%
1	Wheat	593	23.66	177,116	24.66	269807	25.14
2	Rice	422	16.84	155624	21,66	243575	22.76
3	Fertilizer	403	16.08	149680	20.84	206585	19.25
4	Cement	108	4.31	16992	2.37	26178	2.44
5	Oil fuel	99	3.95	28825	4.01	39926	3.72
6	Railway stores	94	3.75	11733	1.63	9980	0.93
7	Jute raw	80	3.19	24039	3.35	34361	3.20
8	Marble & Stone	79	3.15	14383	2.00	2247	2.07
9	Sugar cane	74	2.95	1884	0.26	11912	1.11
10	Coal	63	2.51	12026	1.67	17553	1.64
11	Salt	57	2.27	19026	2.65	27890	2.60
12	Iron & steel	49	1.96	10192	1.42	17072	1.59
13	Kerosine Oil	26	1.04	8843	1.23	14218	1.32
14	Wood unwarought	24	0.96	5505	0.77	9932	0.93
15	Tea	21	0.84	6081	0.85	8627	0.80
16	Military traffic	20	0.80	4112	0.57	3565	0.33
17	Sugar	19	0.76	9398	1.31	12932	1.20

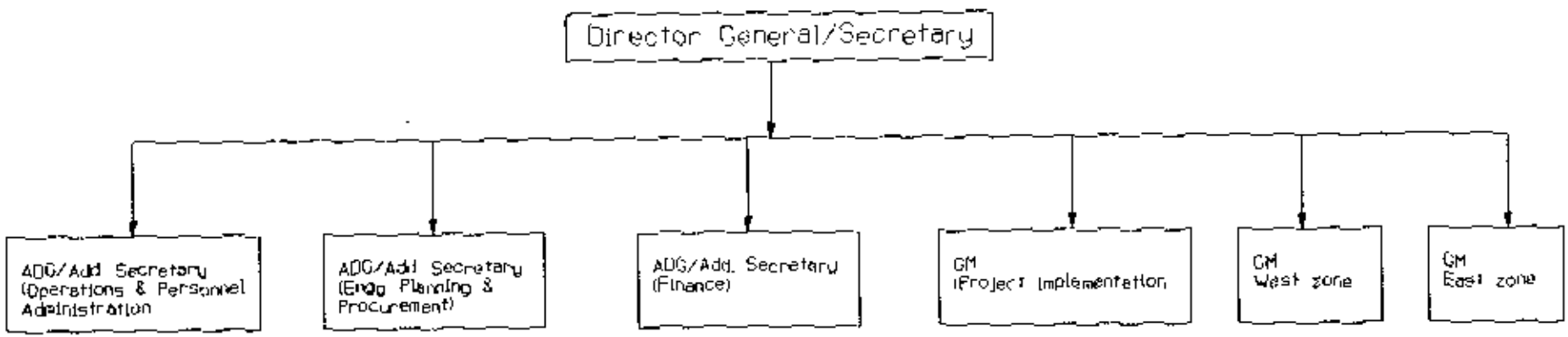
18	Vegetable oil	19	0.76	6653	0.93	10251	0.96
19	Molasses	16	0.64	2932	0.41	5416	0.50
20	Paddy	14	0.56	3402	0.47	4593	0.43
21	Jute manufactured	12	0.48	4182	0.58	5737	0.53
22	Fuel for the Railway	8	0.32	1287	0.18	878	0.08
23	Petrol	4	0.16	1779	0.25	2772	0.26
24	Gram 7 pulses	2	0.08	796	0.11	1105	0.10
25	provision	2	0.08	828	0.12	1146	0.11
26	Fire wood & other fuel	1	0.04	323	0.04	4.40	0.04
27	Fodder	1	0.04	179	0.02	2.42	0.02
28	Oil seeds	1	0.04	301	0.04	4.41	0.04
29	Other grains	0.50	0.02	176	0.02	235	0.02
30	Tobacco	0.28	0.01	104	0.01	162	0.02
31	Cotton Raw	0.11	0.01	37	0.01	60	0.01
32	Live stock	-	-	-	-	-	-
33	All other commodities	194	7.74	39950	5.50	63390	591
		2506	-	718388	-	1073228	-

APPENDIX – II

ORGANIZATION CHART OF THE BANGLADESH RAILWAY

Step by step the main Organizational Structuure of the BR is given below:

No. 1



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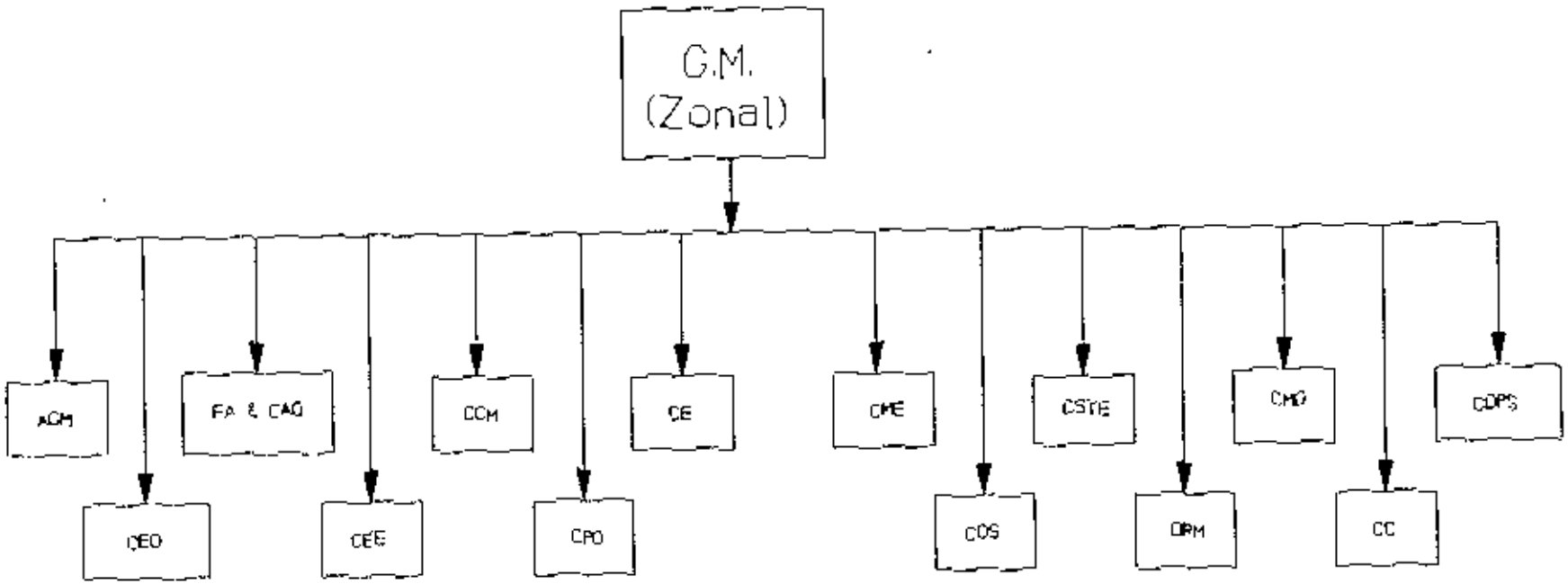
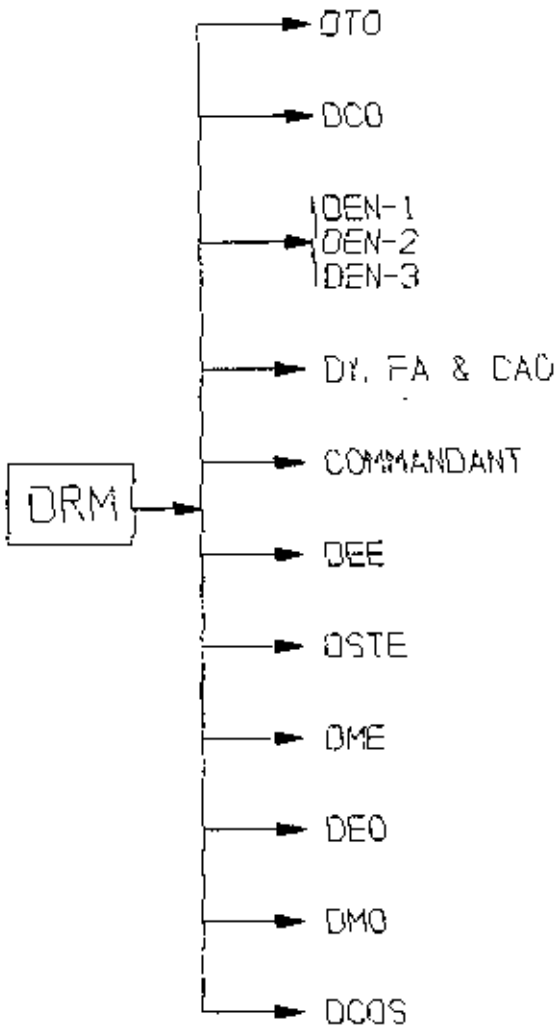


AGM - Additional General Manager
FA & CAO-Financial Adviser & Chief Accounts Officer
CCM - Chief Commercial Manager
CE - Chief Engineer
CME - Chief Mechanical Engineer
CSTE - Chief Signal & Telecommunication Engineer
CMO - Chief Medical Officer

CDPS - Chief Operating Superintendent
CEO - Chief Estate Officer
CEE - Chief Electrical Engineer
CPO - Chief Personnel Officer
COS - Controller of Stores
DRM - Divisional Railway Manager
CC - Chief Commandant

No. 3



DTO - Divisional Transportation Officer
DCO - Divisional Commercial Officer
DEN - Divisional Executive Engineer
DY.FA & CAO - Deputy Financial Adviser and Chief Accounts Officer
DEE - Divisional Electrical Engineer
DSTE - Divisional Signal & Telecommunication Engineer
DME - Divisional Mechanical Engineer
DEO - Divisional Estate Officer
DMO - Divisional Medical Officer
DCOS - District Controller of Stores

APPENDIX–III

DISCUSSION ABOUT CONTAINER

A.1 DESCRIPTION OF CONTAINER

Generally a container is a steel framed box with a strong floor and panel sides, end and roof. The steel container must be strong enough to support other containers stacked above it. The ISO (International Standard Organization) containers have hollow castings at each corner with holes which engage with special Threaded twist locks on vehicles, whether lorries or rail freight wagons. These twist locks can be turned through 90^0 to clamp the container securely to the vehicle. The same hollow castings on the top of the container engage with lifting frame (top lift/side lift spreader) lowered on to the container by gantry crane, straddle carrier, top lifter etc, so that the container can be lifted cleanly by all four corners at once to transfer it from ship to shore and vice versa or one place to another.

The ISO specifications establish four sizes of containers 10 ft, 20 ft. 30 ft. and 40 ft. but the commonly used sizes are 20 ft and 40 ft. Recently 45 ft. containers have been introduced. All containers have a common width of 8 feet, the height, however can vary from 8 feet to 9 feet 6 inches, with the variations occurring in 6 inch increments. Within this frame work of sizes, containers of the following types are in use.

General Cargo Containers :These may be in the following formation: closed, open-top open side, flat racks.

Thermal Containers:These include refrigerated, insulated and heated containers.

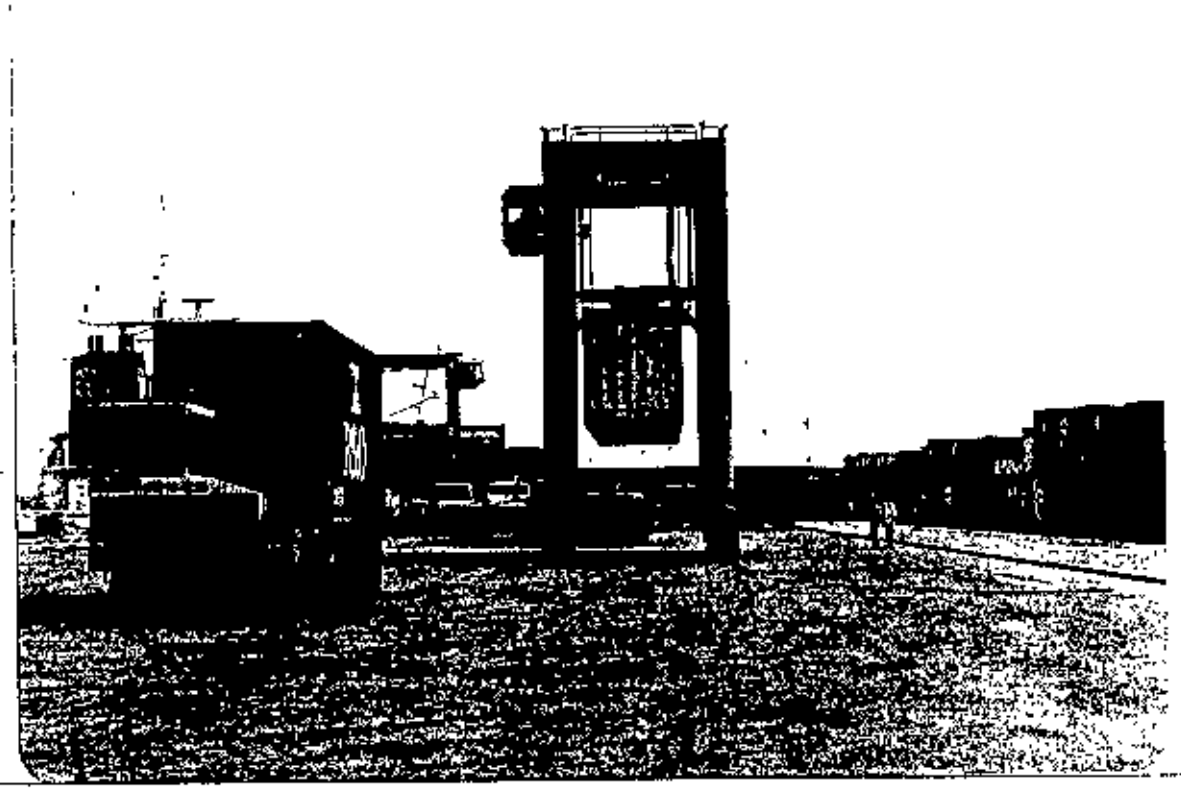
Bulk Containers/These are designed to carry bulk liquids,
Tank Containers :compressed gases or dry bulk commodities.

Platform Containers :Some times called bolsters, designed without corner structures or landing of non-containerized cargo.

Maximum permissible gross weight of containers for 20 ft. is 24 tonne and 40 ft. is 30.5 tonne as laid down by ISO. Allowable stacking weight of 20 ft. container is 192 tonne. Structure of 20 ft. and 40 ft. container are given in the Figure-A.1 and Figure-A.2 .

A.2 GROWTH OF CONTAINER

The growth of containers in international trade jumped from 2 Million in 1970 to 24 Million in 1990 (all container references are to Twenty foot Equivalent Unit (TEU). On the global scene, container volume will increase dramatically and container ships will become larger and larger. Transamerica leasing and data resources estimates that from 1990 to 2000 world container traffic will increase from 24 Million 20 ft. containers to 42 Million.



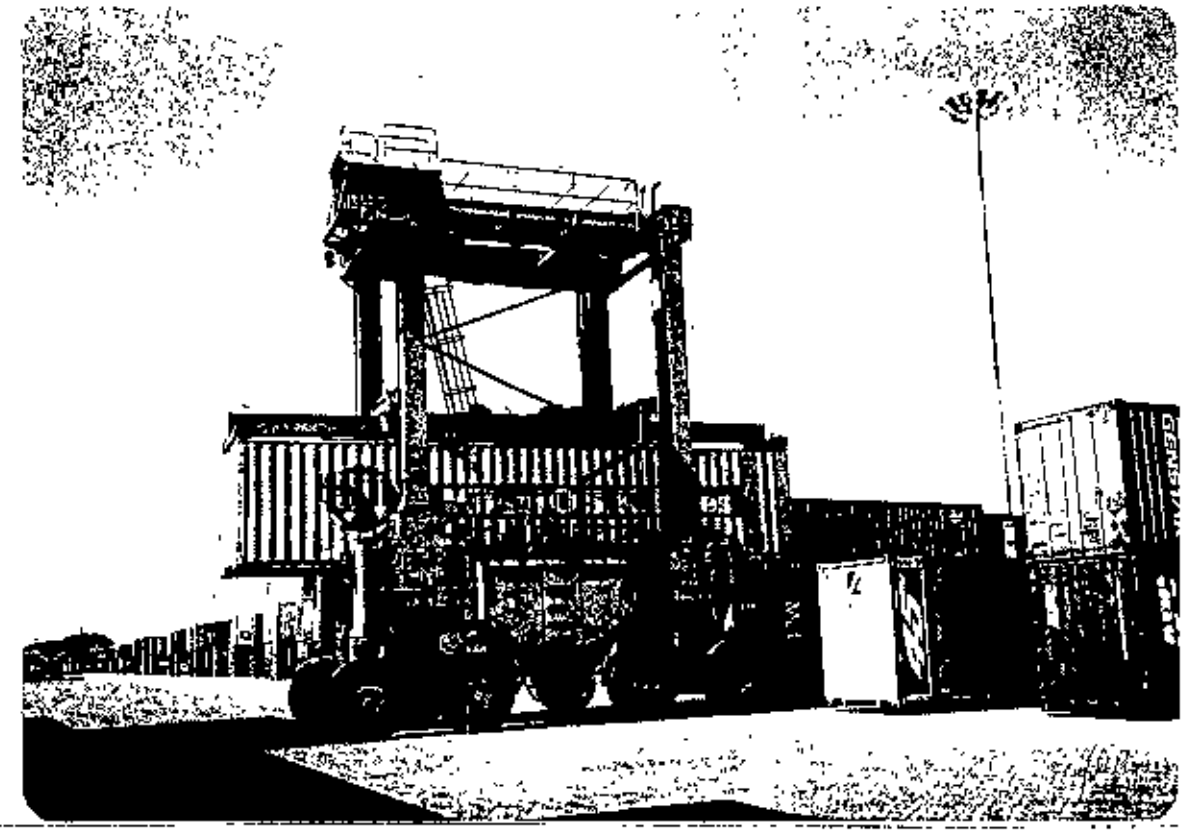


Figure-A.1 & A.2: Structure of 20 feet and 40 feet Container.

Container handling is concentrated in certain geographic areas of the world within 1981, some 75 percent of containerized traffic being handled by the ports of North America, Western Europe and the Far East. However, this is gradually changing. The proportion handled by North America and Western Europe has been declining over at least the last 15 years and in certain years since 1978 the Far Eastern share has also diminished.

The first containers arrived in Chittagong Port in 1977 when six containers were unloaded from the vessel S.S. TENACITY on 22-3-1977. The following year 269 TEUS 20 ft. containers were handled and from then the growth of container traffic has continued unabated, although not much physical facilities could be made available for this highly specialized traffic since all the existing port facilities were designed and oriented towards handling of conventional general cargo. In the last fiscal year the number of containers handled through Chittagong Port rose to 1,21,000 TEUS.

A.3 CONTAINER EQUIPMENT

Wide varieties of equipment are used for container handling such as quay side gantry cranes, straddle carries, rail mounted and rubber tyred yard gantry cranes, tractor trawler units and lift Trucks (front end loaders). A complex set of factors determine type of handling equipment. These include: use of space, shape of area, the need for selectivity, volume of import and export cargoes, specialties like reefers, dangerous, empties and ultimately the location of container freight station. Manufacturers producing container handling equipment are utilizing a wide spectrum of modern

techniques to serve best and to get most efficient performance such as high pressure hydraulics, modular designed electronics, micro computers, high speed data transmission, remote control system etc. Container terminal operations are totally dependent on high capacity specialized handling equipment. For example a terminal designed to handle with a relatively modest annual throughput of 2,50,000 TEUs may have a total investment in equipment along of over US$ 30 Million. Operating and maintaining that equipment is a further enormous expense (US$ 6-9 Million a year) which is about 25%-30% of the investment.