

WORLD MARITIME UNIVERSITY

Malmö, Sweden

**A COMPARATIVE STUDY ON CONTAINER
MOVEMENT USING INLAND WATERWAYS IN
BANGLADESH**

By

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Bangladesh

A dissertation submitted to the World Maritime University in partial
fulfilment of the requirements for the award of the degree of

MASTER OF SCIENCE

in

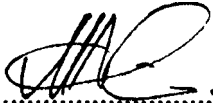
**SHIPPING MANAGEMENT
(Commercial)**

1996

DECLARATION

I certify that all the material in this dissertation that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this dissertation reflect my own personal views, and not necessarily endorsed by the University.


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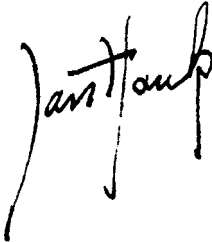
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ACKNOWLEDGEMENTS

I would like to thank the management of Bangladesh Inland Water Transport Corporation for allowing me to participate in this two years programme at the World Maritime University in Malmö, Sweden. I would also like to extend my sincere gratitude to Mr. Waliul Islam, the then Secretary of Ministry of Shipping, Govt. of Bangladesh for his kind effort to send me to this unique university.

My sincere thanks to Shipping Management course professors; Prof. David. J. Mottram and Prof. P. Donner for their guidance and valuable efforts during my two year study in WMU. I am also grateful to numerous expert personnel and visiting professors for their valuable and informative lectures, without whose help, guidance and understanding this study project would have been difficult to complete. In addition, I wish to express my gratitude to those shipping companies, ports, shipyards, insurance companies, classification societies and other related organisations in Germany, France, United Kingdom, Greece, Norway, Denmark and Sweden who received me cordially to visit and gave me the opportunity to take a clear insight of each of the individual organisations.

I would like to express my thanks to Capt. Jan Horck for supervising my dissertation and also for his valuable suggestions, guidance and in particular enormous time for the overall direction to complete my research topic. I am grateful to Carl Duisberg Gesellschaft (CDG) a German organisation of international advanced training and personnel development for providing me this fellowship.

In the end I wish to mention my wife, Mukta; my daughter Nishat and Niloy; who have shown a great deal of patience and sacrifice to encourage me to participate this programme in Sweden, far away from them.

ABSTRACT

**Title of Dissertation: A comparative study on container movement using
inland waterways in Bangladesh**

Degree: M Sc.

This dissertation attempts to focus the movement of containers into hinterland by different modes of transportation and try to stress particularly the movement of containers in inland waterways, its advantage and future prospect. To get an idea of the present movement of containers into various inland destinations this study deals with the brief features and socio-economic condition of Bangladesh and present position of imports and exports of the country. To determine the extent of demand for containerisation this paper will also analyse the principal trading partners of Bangladesh.

The growth and current developments of the existing transport facilities with their problems are investigated. Details background of transport means and infrastructure is discussed to identify basic need of infrastructure. The different modes of inland transport viz. road, rail and waterways through which containers are now moving or can be moved to hinterland are examined taking into account transport infrastructural changes that have taken place. The origin from which containers are brought into a country from outside i.e. the existing port facilities is also discussed to evaluate the movements of containers and their destinations.

Containerisation and inland transportation in other parts of the world is looked at closely, taking into account the consideration of container logistics including transport infrastructure and equipment. To point out some special aspect of different

modes of inland transport with regard to containerisation including basic economic characteristics of the hinterland traffic measures to the cargo flow through ports and trade facilitation as well as is also discussed.

A general evaluation of possible solutions of container movements using inland waterways is carried out. This paper has its intention to explain how an inland clearance depot acts and have to cope with modern demands of container movements and handling. The role of an inland container river port, its necessity and advantage etc. in relation to Bangladesh is discussed. The public and private participation in the inland water transport sector for container movements in Bangladesh is also illustrated. The element represents the opportunities and threats are presented together with the main strengths and weaknesses of the industry as a conclusion to the analysis.

The seventh chapter is the concluding chapter, where the summary and conclusions of the paper are given. Some proposals and recommendations are made concerning the immediate need to facilitate the movement of containers in inland waterways.

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LIST OF ABBREVIATIONS

ADB	Asian Development Bank
BIWTA	Bangladesh Inland Water Transport Authority
BIWTC	Bangladesh Inland Water Transport Corporation
BR	Bangladesh Railway
BG	Broad Gauge
BFR	Bogie Flat Rail truck
BRTC	Bangladesh Road Transport Corporation
CFS	Container Freight Station
CPA	Chittagong Port Authority
DOS	Department of Shipping
DPTC	Deck Personnel Training Centre
EEC	European Economic Commission
EPZ	Export Processing Zone
ESCAP	Economic and Social Council for Asia and the Pacific
FCL	Full Container Load
GDP	Gross Domestic Product
GSP	Generalised System of Preference
ICD	Inland Clearance Depot
ISO	Inland Shipping Ordinance
IWT	Inland Water Transport
JICA	Japan International Co-operation Agency
JMBP	Jamuna Multipurpose Bridge Authority
LCL	Less than Container Load
MFA	Multi Fibre Agreement
MG	Metre Gauge
MPA	Mongla Port Authority
RCC	Reinforced Cement Concrete
RHD	Roads and Highways Department
RMG	Ready Made Garments
SWOT	Strength, Weakness, Opportunity and Threat
TEU	Twenty Equivalent Unit
TIR	International Road Convention
TOFC	Trailer on Flat Car
UNCTAD	United Nations Conference on Trade and Development
VAT	Value Added Tax
WB	World Bank

CHAPTER - 1

INTRODUCTION

This study will endeavour to evaluate the movement of containers by different modes of transportation particularly through inland water ways in Bangladesh. The developing world is now adopting themselves to the new technology of containerisation. Shipping is an international business and the trade in modern world is happening with the concept of door to door service. The handling of containers into the hinterland of the country is progressing apace and adopting with the need of time.

In the past decade containerisation has changed the shape of the transport system not only on the various sea borne trade routes but also had a decisive influence on the inland transport system. Obviously there is a certain degree of competition between road, rail, and inland water transportation modes because all of them are technically able to carry containers between sea ports and their hinterlands. Such a situation is desirable from the shippers point of view, because he can choose between the different systems on a purely commercial basis. But due to the economic characteristics among the systems, it is an established fact that water transport is cheaper, safe and less environmental threat.

Bangladesh is a riverine country. The existence of inland water ways was a major factor influencing the choice of location of sea ports as well as the individual region covering the most commercially important places. In the past rivers were the only means of communication, on which larger volumes of cargo could be transported with economy. Therefore both high and low value goods were extensively carried by inland vessels.

The intention of this study is to stress the importance of one of the greatest natural resources of the country, its rivers. These may become the major highway for unitized cargo. The country has a coast line of approximately 710 km and inland water ways of about 24000 km. The length of the navigable waterways varies according to the season. During the monsoon it reaches over 8453 km and during the dry season it falls to 5200 km. Numerous inland waterway ports, jetties and landing stations help to make the arterial waterways, the most important mode of transport in the country. Out of the estimated total cargo movement about 87% is transported by registered inland water vessels between Chittagong, Mongla and the inland ports of Dhaka, Narayanganj and Khulna areas.

The infrastructure of waterways is obviously important for the inland shipping industry. In terms of economic performance, the most important fact is the volatile capacity of the network. This is due to the fact that water levels vary according to climatological changes. These changes are not only seasonal, but also incidental as for example in a particular dry season or in a wet spring. It is obvious that water levels influence the transport capacity of inland shipping, given the direct relation between the draft of a vessel and its loading capacity. The very nature of the industry's physical and financial environment is a source of instability, as capacity changes cause price fluctuations.

The main port of the country Chittagong, handles close to 75% of Bangladesh's sea borne trade(of both exports and imports). Container handling in Chittagong port has grown at an average rate of 18% per annum in the last five years (1990-95). In the present financial year there has been a considerable growth of 28%. During 1994-95 fiscal the containers handled was 225,000 TEU. The estimated container traffic by the turn of this century is 351,535 TEU.

Containerisation in Bangladesh is still in an infant stage. There are few infrastructural facilities for the transport of containers from the port to inland destinations. This has resulted in a high dwell time per container which creates congestion and reduces the effectiveness of containerisation. In order to avoid this congestion Chittagong Port Authority operates an Inland Clearance Depot (ICD) in collaboration with Bangladesh Railway (BR). The existence of a communication network is a technical precondition for a port to serve the transport demand of its hinterland.

There are several modes of transportation between the port and inland destinations. Since necessary container handling facilities have not been developed in other transportation sectors, the movement of containers at present is done exclusively by railway from the port to Dhaka and its adjoining area. Some limited number of containers are moves on roads but in break bulk condition because the existing road network is neither adequate nor strong enough to cope with the movement of containers.

In view of the containerisation of the country's import/export business and to increase effectiveness of containerisation in Chittagong port, currently there is also construction of a river based ICD on the bank of the river Buriganga. It is likely to be commissioned in mid 1998. The setting up of more Inland clearance depots is undoubtedly important, which will encourage both public and private participation

for carrying of containers from Chittagong port to Dhaka and its hinterland. After completion of this ICD, being a public sector commercial organisation Bangladesh Inland Water Transport Corporation (BIWTC) can play a vital role on carrying containers from Chittagong to Dhaka, act as a feeder service. There is no draft problems of using feeder vessels. As Bangladesh is a riverine country; it might be feasible and useful to have a river based ICD. This ICD certainly could benefit the consumers ideally because the small inland river ports could be faced with this small craft container carriers, reducing the cost of exports and imports.

As a result of tremendous increase in shipping in other parts of the world and the progressive industrialisation in all countries, the situation of transport mode has changed considerably. Integrated transport and physical distribution concept had incorporated quickly in the container operational system. The 'just in time' concept reinforced the intrinsic advantage of container transport with the globalisation of international production and consumption.

Where as the general cargo vessels dominated for inland shipping during the last decades, the developing countries like Bangladesh are now facing the necessity to cope with the requirements of specialised vessels, in particular the container vessels. Although this trend of containerisation does not take in to consideration the special conditions within the country (possible unemployment, low wages etc.), the country have to prepare in handling this specialised traffic in different river ports.

CHAPTER - 2

RECENT DEVELOPMENTS IN BANGLADESH

2.1 History:

The territory constituting Bangladesh was under the Muslim rule for over five and a half centuries from 1201 to 1757 A.D. Before that, it is believed that an Austro-Asian race first inhabited the Indian sub continent in an unknown prehistoric age, then came the Dravidians, Aryans and Mongolians. The British ruled over the entire Indian sub continent including this territory for nearly 190 years from 1757 to 1947. During that period Bangladesh was a part of the British Indian provinces of Bengal and Assam. With the termination of the British rule in August, 1947 the sub continent was partitioned into India and Pakistan. Bangladesh was then a part of Pakistan and was known as East Pakistan. It remained so for 24 years from August 14, 1947 to March 25, 1971. It appeared on the world map as an independent and sovereign state 'The Peoples Republic of Bangladesh' on December 16, 1971 following the victory at the war of liberation from March 25 to December 16, 1971.

2.2 Brief features:

Bangladesh is a riverine delta situated at the head of the Bay of Bengal between India and Myanmar. Most part, is comprised of a flat alluvial plain crisscrossed by a

large number of rivers including some of the world's largest rivers such as the Ganges/Padma, the Brahmaputra/Jamuna and the Meghna. With the exception of Chittagong hill tracts most of the land area has been formed by the deposit of sediment carried down by those great Indian river systems. The alluvial soil is continuously being enriched by heavy silts deposited by rivers during the rainy season.

Bangladesh has a coast line of approximately 710 km. The delta itself is formed by the three principal river systems, which have a net work of 120 tributaries and many hundreds of rivulets and canals or khals. The Brahmaputra flows through Bangladesh 274 km out of a total of 2900 km, the Ganges for 261 km of its 2550 km miles and the Meghna for 403 km out of its 902 km.

The country has about 2858 km of rail ways, 15053 km of paved road and roughly 5896 km of perennial and seasonal waterway side by side. Besides the development of road transports; efforts are made to better utilisation of the water transport system. In fact rivers are the most economical means of transport. Water is used in agricultural operations and to ensure supply of fish for the people. Efforts are made to put more mechanised vessels into the service and modernise the existing fleets.

The production structure of Bangladesh is undiversified; economic growth is largely determined by the performance of agriculture. The country's export base is both small and undiversified, which contributes about 6% of GDP. The principal export commodities are raw jute, jute goods, tea, leather skin, frozen foods etc. The principal import commodities are rice, wheat, sugar, edible oil, fertilizers, cement, chemicals etc.

2.3 Socio - economic background:

2.3.1 Population:

Bangladesh faces an extremely difficult demographic situation. According to the Bureau of Statistics Bangladesh had an estimated population of 111.4 million at mid 1992, who are distributed over an area of 1,47,570 sq km. The percentage of urban population was 20.1 while that of rural 79.9. The growth rate of population estimated by using adjusted population of 1991 census was 2.1 per annum. The average annual rise in population declined from 2.6% in 1965-80 to 2.3% in 1980-90, and was projected to fall further, to about 1.8% in 1989-2000. This rate of growth is not exceptional in developing countries, but when it occurs in the world's most densely populated country, it is not suitable. The most important urban centres where the people concentrates are Dhaka, Chittagong, Khulna and Rajshahi with the population of 6.9m, 2.0m, 1.0m and 0.5million respectively.

The country's wide intensive family planning programme is aimed at reducing the growth rate. An average density of population is 755 persons per sq km. The sex ratio of the population 106 males per 100 females. According to the 1991 census the literacy rate of the country is 32.4 percent for population with an age of 7 years and above.

The high rate of population growth has not only led to excessive pressure on limited arable land but has also exacerbated the problems of poverty and unemployment. Growing landless and lack of employment opportunities in rural areas have increased rural - urban migration. Another dimension of the problem is the rapid growth of urban population. It has been predicted that the urban population would double during the next 13 years. If this occurs, both the composition of the

population as well as the nature of Bangladesh's demographic transition could be different from what has been currently anticipated.

Around 80% of the population live below the poverty line. An underlying factor of poverty and the low level of household income is the substantial open and disguised unemployment of the labour force. About a third of Bangladesh's labour force was underemployed in mid 1995. Job opportunities have fallen sharply behind the growth rate of the labour force in recent years, swelling the ranks of the unemployed. As the population is young, with an increasing female participation rate, there will be tremendous pressure on the labour market in the coming years. A high drop out rate from the school system and an extremely low participation of girls in education - indicate very unsatisfactory living standards in Bangladesh.

The majority people, approximately 68.5% are purely engaged in agriculture. This sector directly contributes 35 percent to the gross domestic products. The total labour force of the country, estimated in 1991 was 51.2 million of which male 31.1 and female 20.1 million as per extended definition. The activities like care of poultry and live stock, processing, husking, preservation of food etc. are considered as economic activities in extended definition. This kind of activities are usually performed by the females 'in and out' of the agriculturally based household in rural areas, less than 1 million in modern manufacturing and about 0.7 million in government service.

2.3.2 Economy:

Bangladesh is the most populous country in the world with a high level of poverty. The present Government has achieved some success in controlling an inherited fiscal imbalance, but the low level of economy continues to cause concern. Both tax

revenue and total revenue registered a sharp increase as a portion of GDP in FY92 and FY93. This increase may be attributed to a range of tax reforms, including the introduction of the value added tax (VAT) of 15% in 1991-92. Some positive results are also achieved in controlling the issue of population growth. The average annual rise in population declined from 2.6% in 1965-80 to 2.3% in 1980-90 and is assumed to fall further, to about 1.8% in 1989-2000.

The per capita gross national product in 1992 was \$220. Gross domestic product (GDP) increased by 4.5% in 1993, and was forecast to grow by 5.5% in 1995. In comparison to other south Asian countries this growth is less impressive. The low rate of investment is an important part of the problem. In 1993 investment as a share of GDP was 12.7%, and was expected to rise 13.6% in 1994; this level of investment is about half of that reached in India.

Since the beginning of the 1990's the macro economic trends are characterised by a record- low rate of inflation, an unprecedented build up of external reserves and an improved resource position of the Government. This is one of the symptoms of stagnation and low level of economic activity. The low rates of investment and saving are perhaps the most serious macro economic weakness of the Bangladesh economy. Private investment has not yet reached to the improvement in the macro economic performance of the economy.

Agricultural growth is affected by the ecological changes in this region and the growth trends mainly reflect the increase of rice production. But this increase of rice production cannot be continued until for a long period, because the land are limited and its fertility is diminishing day by day. Proper irrigation management also is not possible mainly because of the fragmented nature of the land and due to the lack of water in dry season. The vast majority of farmers are cultivating in small fragmented plots. Successful cultivation requires the co-ordination of irrigation, planting and

fertilisers. Agricultural technology is still based on bullock power. The productivity is at around 1,475 kg of rice per hacter. Although, there are lot of limitations in the agricultural sector but this is the dominant sector in the country's economy in terms of employment accounting app. 67% of the economically active population in 1992 and controlling 34% of total GDP.

Bangladesh has been engaged in privatisation programmes since 1982. Productive growth in the privatised industries has been low, but over the last few years growth has been led by new investment. One of the important task in economic policy is to improve the level of investment. Real gross domestic investment was stagnant during 1965-80's, and even declined somewhat's in the 1980's. The financial sector remains burdened with the bed debts of the state owned banks. The Government is trying to take legal action against private sector loan defaulters, but little progress has been made in recovering industrial loans.

The continuing build up of foreign reserves represents a structural surplus in the balance of payment. This surplus needs to be absorbed by raising the rate of investment, since the level of reserves is already quite high. An ideal way of dealing with such situation would be to increase the rate of domestic savings at the same time as the investment rate is increased even to a larger extent. The present favourable trends in the balance of payments can of course take a reverse turn because of some adverse external developments, such as a slackening of export growth or a decline in either aid availability or in the volume of workers remittances. Private unequited transfers continue to remain an important source of foreign exchange receipts for Bangladesh workers remittances, constituting about 90% of private transfers, showed an upward trend during the 1980's and the early 1990's. The level of private transfers rose from US \$ 379m in 1980/81 to US \$ 1065m in 1992/93.

The role played by private transfers as a source of foreign exchange is gradually declining because export receipts have also shown a higher rate of growth. The share of ready made garments (RMG) in total foreign exchange receipts on current account stood at 43%. Bangladesh's RMG exports really constitute a form of export of embodied labour services, invested in assembling imported fabrics. At the recent macro economic level although the indications are negative due to rising inflation, sharp drooping trend of foreign exchange reserves and the unsatisfactory trade and current account deficit but at ground level this out look is more promising.

2.4 Exports:

The main commodities for export are jute and jute goods, tea, ready made garments, leather, frozen fish, shrimps and others. The surge in export growth originated in the strong growth of non traditional exports made up mostly of ready made garments (RMG), the principal non traditional item of export, frozen fish and shrimps and leather/leather products. Export earning from RMG increased from a meagre \$3 million in 1981 to \$ 32 million in 1984. The major export push started from 1987 and during the last few years earning from RMG averaged more than \$1200 million. The non-RMG manufacturing exports of Bangladesh comprising mainly jute goods, leather, frozen fish and shrimps represent a form of value addition to what is primarily a primary product, these commodities used to account for 8-10 percent of the total export earnings.

In Bangladesh's export economy, traditional items such as, raw jute, jute and jute goods failed to withstand the adverse trends in the international economy. The global jute trends has been in recession for over two decades due to technological changes in both the product market as well as modes of transport. However, the jute related export has decelerated sharply in the 1980's and as a result the share of jute

related exports in total earnings also fell sharply. Raw jute exports have fluctuated 17% of the total export earnings in 1981 to 2% in 1994. However, the erosion of the share of jute related exports continues unabated due to its exports stagnation rather than just the faster growth of non traditional exports.

But the most interesting fact is that Bangladesh's exports continue to rise, fuelled mainly by RMG exports, concern is expressed over the sustainability of the RMG export trend. Apart from the issue of value addition to RMG and its implications for the phase out of the Multi Fibre Agreement(MFA), certain other weakness in Bangladesh export scenario need to be noted. The most obvious issue of concern relates to the high degree of commodity concentration associated with the growth of RMG in Bangladesh export basket. Bangladesh in spite of a decade of exposures to trade reforms and trade liberalization, has conspicuously failed to diversify its commodity exports. RMG alone not only accounts for 60% of the total export earnings but also accounts for about four-fifths of the non traditional exports.

Table 1: Export commodity handled at Chittagong and Mongla ports.

commodity	1988-89 All ports	1989-90 All ports	1990-91 All ports	1991-92 All ports	1989-92 % Change
Jute	270,991	320,739	247,090	262,615	-18.12%
Jute goods	423,421	440,809	417,475	467,943	+6.15%
Tea	5,330	16,932	23,550	22,582	+33.36%
Frozen fish	798	11,148	17,003	17,224	+54.5%
Shrimp	-	10,204	11,144	11,922	+16.83%
Ready made garments	528,566	43,806	77,208	112,746	+157.37%

Source: Statistical year book of Bangladesh-1994

Apart from its commodity concentration, Bangladesh's exports also tend to be geographically concentrated. Only six countries of the world buy two-thirds of Bangladesh's exports (USA:33%, Germany:9%, UK:8%, France and Italy:6%, each and Belgium:4%). The share of exports to these countries is not only high but this concentration has increased over time. Quota and Generalised System of Preference (GSP) facilities, among others, might have contributed to this escalation of the concentration ratios. For these reasons alone, Bangladesh's exports could be held hostage to policy changes in particular countries such as the USA or in community policies as with the EC which accounts for 40% of our exports. All traditional export including RMG could be considered as being containerizable. As regards jute and jute goods which are the major export commodities no distinction can be made between the various tonnages for gunnies, hessian, jute yarn and raw jute.

2.5 Imports:

Most of the trans-oceanic dry cargo imports in to Bangladesh are bulk commodities like food grain, fertiliser, cement, crude petroleum and oil accounting for around 75 percent of the total tonnage. From the analysis of the economic classification of Bangladesh's imports, which is shown in the following table it is seen that consumer goods imports accounted for 17.9% of total imports in 1981 whilst those of intermediate goods and capital goods were 55.2% and 26.9% of total imports respectively.

In terminal year of 1991, the share of consumer goods registered a sharp increase holding a share of 34.7%, more than double as much as in 1981. This rise occurred mostly at the cost of capital goods. The decline in the proportion of capital goods imports could be adduced to low investment in the economy. The average import/GDP ratio at current prices was 16% in 1994.

Table 2: Structure of Bangladesh imports.

Import categories	1980/81	1990/91
Consumer goods	17.9	34.7
Materials for consumption	40.3	30.1
Capital goods	26.9	14.4
Materials for capital goods	14.9	20.8
Total imports	100	100

Source: *A review of Bangladesh's development, 1995*

Containerizable commodities can be divided into three main categories as regards their suitability for containerisation. These are i) prime, ii) conditional and iii) non-suitable or most unlikely. Non-suitable commodities are all bulk commodities which usually enter the tramp trades. Conditional commodities such as iron/steel, corrugated iron sheets and iron materials and machinery are under certain conditions containerizable. Prime commodities are those which are usually classified as break bulk general cargo.

Table 3: Import commodity handled at Chittagong and Mongla ports

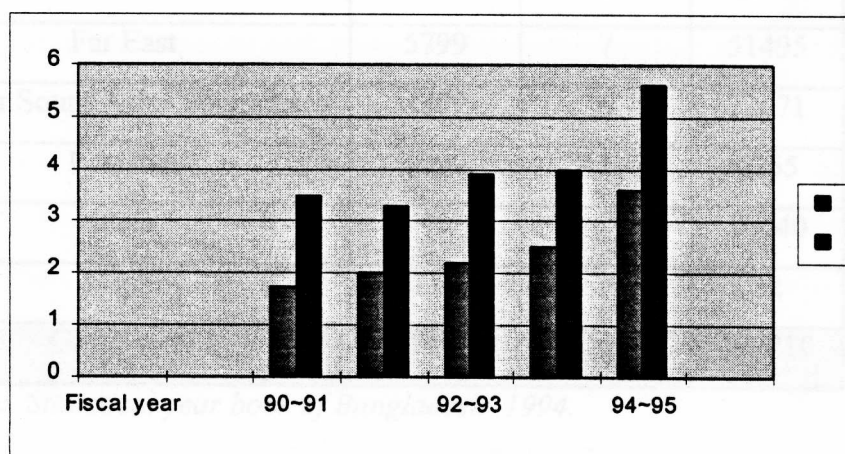
Ton (/000)	1988-89	1989-90	1990-91	1991-92	1989-92
Commodity	All ports	All ports	All ports	All ports	% Change
Food grain	1768	1575	1853	1809	+ 17.02%
Oil	-	314	375	338	+ 7.64%
Fertiliser	589	399	486	559	+ 40.10%
Cement	1275	1440	1389	1428	- 0.84%
Steel & Iron	-	206	150	221	+7.12%
Cotton	3	49	28	46	- 6.12%
General cargo	3814	91	58	63	- 30.76%

Source: *Statistical year book of Bangladesh-1994*

Majority of imports enter the country via Chittagong port and are destined to a very large extent, for the greater Dhaka area. General cargo move inland by all transport modes, but the carriage of freight is dominated by inland waterways. Over all import trade is from the ESCAP region dominated by Japan, China, India, Singapore, Thailand and Australia. Apart from that traditional liner imports and steel originate in Western Europe and to a lesser extent come from the USA, Japan, India and China. In recent years Bangladesh's imports are larger than the export earnings; which widening the trade deficit can be seen in the following figure.

Figure - 1

Export and Import of Bangladesh in the FY 1990-91 to 1994-95



Source: Dhaka Chamber of Commerce, 1996

2.6 Principal trading partners:

The direction and destinations of the exports and imports of Bangladesh by value are shown in the following table 2.4. Import from Middle East, Far East and other South Asian countries have been rapidly increasing and in the financial year 1992-93 accounted for almost 70% of Bangladesh imports, where as in the 1980s the

American Continent was the principal source of this import trade contributing nearly 40%, which in the financial year 1992-93 was 7%.

Table 4: Direction of export and import by areas in FY 1992-93 (in million Taka).

Region	Exports	Percentage	Imports	Percentage
America	34843	39	12942	7
West Europe. EEC countries	28454	32	16990	10
EFTA(excl UK)&others	2973	3	4578	3
Eastern Europe	1675	2	2139	1
Middle East	4232	5	49057	28
African countries	3272	4	866	-
Austrilia & other oceanian.	724	1	2745	2
Far East	5799	7	51495	29
Other South Asian countries.	4879	6	22071	12
Pakistan	1099	1	4755	2
India	95	-	10040	6
Nepal	170	-	32	-
Grand total	88215	100	177710	100

Source: Statistical year book of Bangladesh -1994.

The United States and the EEC countries of the Western Europe are the major destinations of Bangladesh export trades as shown in the table below¹ followed by Far East and South Asian countries. The USA has become the most important as the principal destination for ready made garments (RMG). The other major non traditional exports to Western Europe including RMG are leather, tea, jute goods and frozen fish, which accounted for aboput 32% in the FY 1992-93. From the export scienerio it is important to mention that just USA and the EEC countries buy 71% of the total exports of Bangladesh.

CHAPTER - 3

EXISTING TRANSPORT FACILITIES WITH THEIR PROBLEMS AND CURRENT DEVELOPMENT

3.1 Background of transport means:

Bangladesh for the most part, being extremely flat and low lying. All three modes of surface transport; road, railway and inland water transport play significant role in the transport of both passengers and cargo. The development of Bangladesh transport system started during the British colonial period as a requirement of the administration. The original transport network was created to export commodities like jute and tea to the industrial belt of Calcutta. The concept then was to establish a profit generating centre at Calcutta trading from the periphery of the country. This is why, virtually all railways and roads converged on Calcutta port. To meet the transport needs of outward commodities and raw materials, the ports and railways were developed under the same infrastructure and plans for the whole of the eastern subcontinent.

After the partition of India in 1947, East Bengal at that time, a part of Pakistan was subjected to heavy pressure of commercial activities which lead to substantial development in all modes of transportation. In order to meet such demand five major and a number of smaller inland ports were built, an anchorage at Mongla (former

Chalna anchorage) and a domestic air transport service was also introduced. The principal port Chittagong started its operation in 1888 and mainly served the eastern provincial import trades. At the end of the liberation war in 1971, the Bangladesh started its transport services mainly out of the wreckage of the former transport system. Some new transport structure were set up soon after independence, such as, Bangladesh Biman Corporation, Bangladesh Shipping Corporation and Bangladesh Inland Water Transport Corporation.

3.2 Infrastructure:

The relative role of different transport mode have significant importance because the country is crisscrossed by a large number of rivers and water courses. The existing transport system in Bangladesh for mechanised transport comprises rail, road, water transport system, ports, ocean going shipping and air transport services.

The modal shares in passenger and freight transport of Bangladesh is largely determined by its geographical features. Inland water transport carries a large portion of traffic estimated about 65% of cargo and 38% of passengers. Water ways tends to play a greater role in the south and south west of the country due to the estuarine nature of this part.

In terms of traffic the country is divided into a western part and an eastern part by the rivers. This division is emphasised by the railways which are mainly broad gauge (BG) in the western part and metre gauge(MG) in the eastern part. The railway network of around 2800 km of which some 900 km. are broad gauge, the remainder of the network is metre gauge. As the railway network has a natural division consisting of the east and west sides of the principal river, which is linked with the trans- jamuna ferry crossings.

Road transport is the most dynamic area of transport development. The paved road network has expanded widely in the last decade. The arterial roads and road vehicles are mainly involved in carrying passengers and cargoes. Although a tremendous success has been achieved in the improvement of road transport network but the existing network is neither adequate nor strong enough to cope with the movement of container needs. Chittagong and Mongla are the two major ports of the country serving international trade, these two ports are moderately equipped for multipurpose cargo handling.

Within the inland water transport sector there are approximately 2100 mechanised (propulsion) vessels with a load capacity of around 410,000 mt. and 1450 mechanised passenger vessels with a total capacity of around 155,000 passengers. In addition there are about 20,000 larger country boats (with capacity above 5.5 tons capacity) engaged in cargo transport and 160,000 smaller boats used for passenger and cargo transport.

The Bangladesh ocean going fleet is both government and private operated. It comprises about 50 ships with a total capacity of 600,000 dwt. and carries approximately 18% of the country's total volume of exports and imports.

3.3 Existing railways and rail transport network:

Bangladesh Railway (BR) is a state owned and managed organisation, which operates a track of 2750 km. About 32% of the total area of Bangladesh is effectively covered by the railways. Both management and development are vested in the railways into two administrative zones. East and west zones with their administrative headquarters at Chittagong and Rajshahi respectively.

East zone covers the entire metre gauge (0.99m wide) track from the east of Jamuna including Chittagong- Dhaka route. But the west zones comprises both broad gauge (1.68m wide) and metre gauge track. The railways are more or less confined to the east or west of the country, as defined by the course of the large Jamuna river system. In the east the railway mostly, single track running from the Chittagong area to Sylhet in the north east. If it proves technically and commercially feasible to move tea in containers from the Sylhet area towards the Chittagong port, most probably from Srimangal, this line would be very suitable.

Most of the lines in the western part of the country are single broad gauge track running from the Khulna region in the south to the West Bengal border in the north. A smaller section of MG track also exists in the northeren part of the western region. If the Nepal transit traffic again comes in reality that could also be routed through this MG track. This transit traffic have to pass the Indian border at Biratnagar. The main section of the railways are as follows:

Metre gauges (MG):

- a. Dhaka - Chittagong via Tongi, Bhairab bazar, Akhaura, Laksham.
- b. Dhaka - Bahadurabadghat via Mymensing including Jamalpur- Jagannathganj link.
- c. Akhaura - Sylhet via Kulaura and Fenchuganj.
- d. Phulcharighat - Santahar via Bogra.
- e. Bonarpara - Kurigram, Lalmonirhat via tista.
- f. Bonarpara - Panchagar via Rangpur, Parbatipur.

Broad gauges (BG):

- a. Parbatipur - Khulna.
- b. Ishurdi - Sirajganjghat.
- c. Abdulpur - Amnura via Rajshahi.
- d. Rajbari - Goalunda.
- e. Jessore - Benapole section.

Two railway operated ferries are linking the two systems where the river Jamuna bisects the country. These ferries are capable of lifting both passengers and rolling stock between the two metre gauge systems. Owing to siltation and erosion of the river banks the railway ferries are currently facing much difficulties, causing delays and congestion to cross Jamuna. The operational problems caused by these difficulties are considerable and severely restrict the efficiency of the systems. Traffic on the railways has declined substantially during the last decade, from 105 million passengers and around 3 million tons of freight in 1982 to about 50 million passengers and 2.3 million tons of freight in 1995.

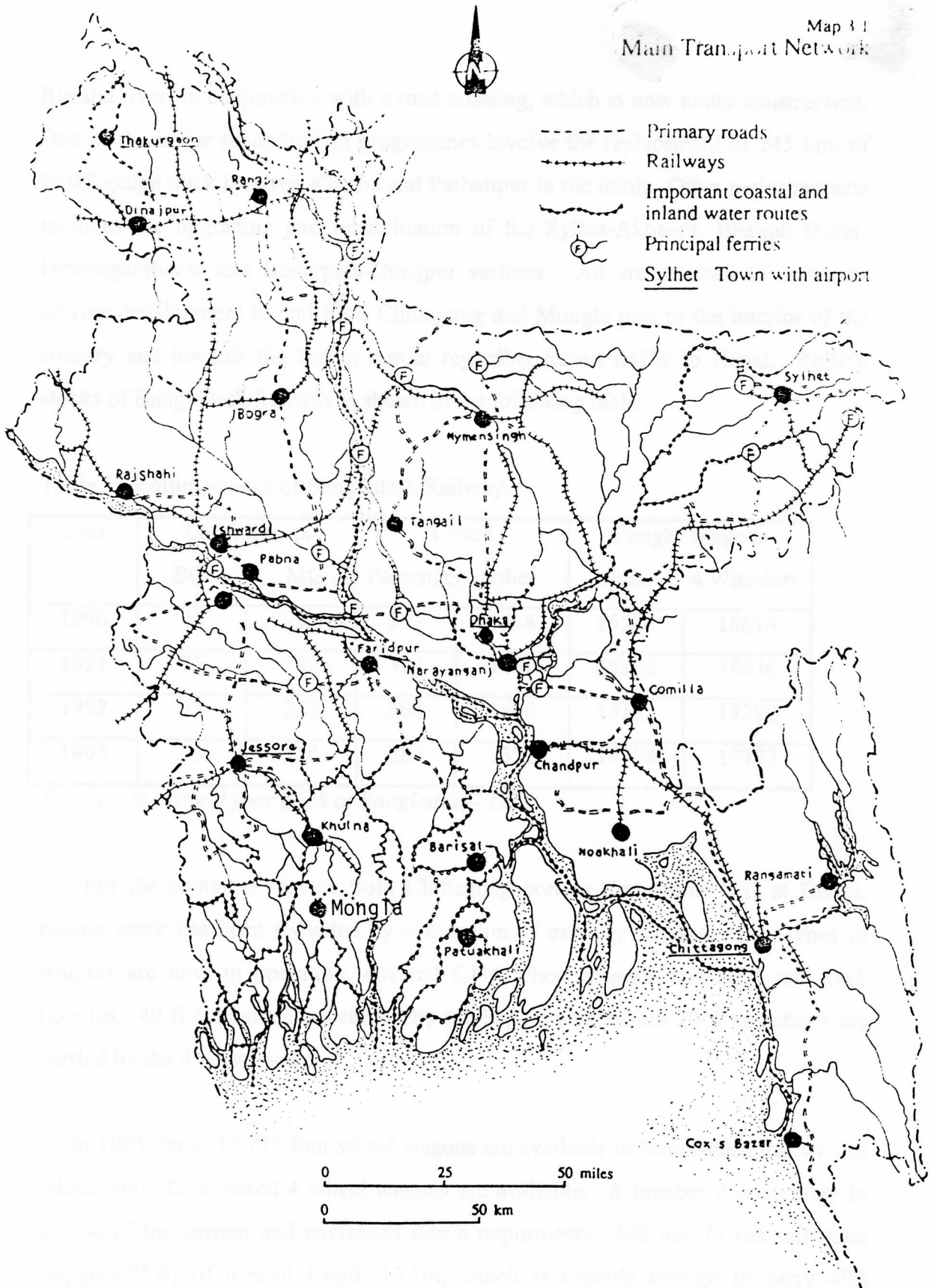
Overall railway performance has deteriorated largely owing to the loss of skilled manpower and to a huge back log of renewal and replacement. This decrease in operational efficiency has reduced freight and passenger movements. High level of direct and indirect subsidies provided by the Bangladesh Government to the railway sector is a very important issue. Only 70% of its operating cost is covered by the revenues earned through Bangladesh railway. This situation has been worsening, with shares of traffic declining and its cost increasing.

Natural disasters such as storm and occasional flood during the monsoon causes severe damage to the railways. Various section of the railway track including bridges are submerged under water and wash outs due to heavy rainfall during June and September.

The current five year plan aim at improving the operational efficiency of railway rather than expanding routes or capacity. Operational efficiency is dependent largely on accomplishing scheduled renewal, replacement and rehabilitation of the current assets and equipment's. The only route expansion planned therefore, is for the expansion of the line from Khulna to Mongla linking the broad gauge system to the Mongla port. This line will require the construction of a bridge at Khulna over

Figure 2

Map of Bangladesh indicating roads, railways and inland waterways



Rupsha river, in conjunction with a road crossing, which is now under construction. One of the major rehabilitation programmes involve the replacement of 245 km. of broad gauge track between Khulna and Parbatipur in the north. Other major projects includes the upgrading and rehabilitation of the Sylhet-Akhaura, Bhairab Bazar-Dewanganjbazar and Bonarpara-Dinajpur sections. All are relevant to container service development to and from Chittagong and Mongla port to the interior of the country and towards the Indian border regarding transit traffic to Nepal. Rolling stocks of Bangladesh Railway is shown in the following table:

Table 5: Rolling stocks of Bangladesh Railway.

Year	Locomotives		Coach		Freight Wagons	
	BG	MG	Passenger	Other	unit	4 Wheelers
1990	75	232	307	1468	15536	18674
1991	75	232	307	1436	15296	18436
1992	75	233	308	1430	15162	18292
1993	73	214	287	1372	14706	17777

Source: Statistical year book of Bangladesh- 1994

For the container service from Chittagong port to Kamalapur ICD at Dhaka, rolling stock has been provided by conversion of existing wagons. Two types of wagons are now in operation, covered CJ 4 wheel wagons and BFR rail track boggies. 40 ft containers are carried by the boggie wagons but 20 ft containers are carried by the 4 wheel wagons.

In 1995 about 17,777 four wheel wagons are available in Bangladesh Railway of which 9000 CJ covered 4 wheel wagons are available. A number considerably in excess of the current and envisaged future requirments. BR has 77 flat rail truck boggies(BFR) of overall length 13.1m, which is capable enough to carry 40ft

containers but these are limited in numbers and could not be spared in sufficient numbers for conversion, mainly because of departmental use.

The total diesel locomotives of Bangladesh Railway is 287, 214 locomotives in the MG section and 73 locomotives in the BG section. Container service on rail can be reliable and efficient only when the trains maintain an appropriate time schedule by ensuring well maintained locomotives.

3.4 Existing roads and road transport network:

Road transport in Bangladesh is the most dynamic area of transport development. The existing road system is now 14500 km under the administration of the Roads and Highways Department (RHD). Paved road network has expanded from a mere 600 km in 1947 to around 8231 km today. The total length of national highways are 2821 km, which are mostly single carriage way two lane roads generally having a pavement width between 7.32m to 12.2m. The alignment of roads is not good enough and in many location it is in a zigzag way because of the locations of different rivers and canals and also different small towns causes obstructions to the smooth movement of traffic.

To avoid passing through the towns the RHD is now constructing new diversion route out side the towns at the important locations. The paved roads provide links to centres of socio-economic, strategic and administrative importance. Numerous large and small bridges and culverts features dominates on the road network. There are 2389 bridges having a total length of 69900m and 7439 culverts having a length of 3110m linked with the road system. A number of major rivers have not been linked with bridges so far. Ferries, which not only slows down the traffic but also places

some restrictions on the type of vehicles. The classification of existing paved road including their crest width can be seen in the following table.

Table 6: Classification of existing paved roads.

Road class	Crest width (metre)	Kilometre
1. National highways.	12.2	2821
2. District highways.	10.8	1428
Feeder roads. (Type- A).	7.32	3982
Total		8231

Source: Statistical year book of Bangladesh - 1994

To facilitate traffic movements the Bangladesh Government has given top priority to the roads sector. This is why Dhaka - Chittagong route is directly linked with several large bridges instead of ferries, which constitutes the busiest corridor in the country. The construction of Jamuna Multipurpose Bridge Project (JMBP) to connect northern part of the country with the rest has also started. The JMBP is much more than the single largest investment in Bangladesh transport sector. The bridge will about 4.8 km long and is expected to be commissioned in 1998. Another important bridge over the river Pusur to connect Mongla port is also now under construction. Even with the construction of above bridges there are still exist some ferry crossings in many important routes like Dhaka - Mawa and Dhaka - Sylhet, which are being planned for replacement with new bridges in the near future.

The Bangladesh Roads and Highways Department (RHD) has indicated that most of the roads in Bangladesh are in capable of sustaining a 25 ton load, which would represent an all up weight (container plus trailer) extreme case for a 9.15m -10.97m container chassis or trailer. As a normal condition, however, 8 tons per axle is quoted which in theory at least would allow the movement of less than full- weight

container loads. The national highway system connecting primary centres has an average crest width of 12.2m and a pavement width of 6.7m. A container would require at least 2.75m-3.00m including safety width. The primary roads connect the following centres:

Dhaka - Chittagong.

Dhaka - Naryanganj.

Dhaka - Chandpur.

Dhaka - Barisal.

Dhaka - Khulna.

Dhaka - Mongla.

Dhaka - Rajshahi via Aricha, Nagarbari ferry.

Dhaka - Dinajpur via Rangpur.

The most important route relevant to this study are the Dhaka - Chittagong highway, Dhaka - Sylhet road and a direct road from Dhaka to Mongla port. Most of the Dhaka - Chittagong road are constructed with 20m-36m crest and a pavement width of 7.32m, or more in some cases. The possibility may therefore, exist in Chittagong for the movement of containers from and to Dhaka or to a specific industrial sites or a free trade zone. It is therefore unlikely, that the movement of containers on the national highways will take place for some years to come.

According to Bangladesh Bureau of Statistics and Bangladesh Road Transport Authority the estimated number of mechanised vehicles on road in 1993 was 265,454. The truck fleet was 31,757. Freight volume carried by road transport has increased by over 13 % during the 1980s from around 73 million tons in 1983 to over 82 million tons in 1993. Similarly passenger volumes have also increased from around 130 million passengers in 1983 to over 210 million in 1993. The primary reasons for the success of road transport due to improvements in the road network

and the better quality of service provided by the trucking industry. Two axle trucks having a typical loading capacity of 6.0 to 7.5 tons are now in existence, but articulated vehicles are virtually non-existent, apparently due to the constraint of ferry crossings.

Bangladesh Road Transport Corporation (BRTC) is the only agency in the public sector transport. This includes both a bus and truck division. In 1993 the total number of fleet of BRTC playing on road was 369. Public sector participation in road transport, through the BRTC, comprises only 10% for passenger service whilst freight traffic is negligible.

3.5 Existing inland waterways and water transport network:

The inland network comprises over 8,300 km of navigable waterways during the monsoon season; this reduces to about 5,200 km during the dry season. Numerous inland ports, jetties and landing places make the arterial waterways the most important mode of transport in the country. More than half of the country's total land area is situated within a distance of 10 km of navigable waterway.

This network of waterways carries about a third of the total freight tonnage and a large proportion of the passengers transported within the country. Out of the estimated total cargo movement about 87% is transported by registered inland water vessels between Chittagong and Mongla, the inland ports of Dhaka/ Naryanganj and Khulna including its direct surrounding areas such as, Aricha, Nagarbari, Daulatpur etc. Extensive interdistrict cargo movement is also undertaken by the countless country boats. Traffic is mainly concentrated at the Dhaka/Naryanganj and the Khulna areas where about 75% of the total cargo quantities are handled. The inland

water transport (IWT) system in Bangladesh is both extensive and well connected with the rest of the transport system.

The distance between the two sea ports and Dhaka/Narayanganj is exactly the same. The Chittagong - Dhaka/Narayanganj route would primarily seem to offer the largest potential for container traffic because two third of the cargo is destined for Dhaka and its hinterland. Inward flow of cargo movement on this route is already very strong and a reasonable return flow of containerizable cargo exists also, such as jute, jute goods and minor export products. Major distances by river from Chittagong and Mongla in statute kilometres:

Table 7: Waterway distances in kilometres.

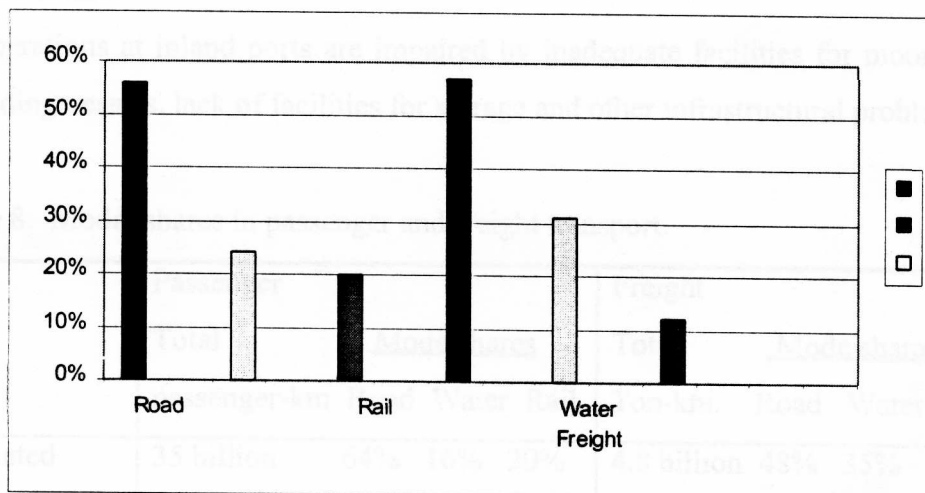
From	To	Distance	From	To	Distance
Chittagong	Chandpur	238	Mongla	Chandpur	224
	Dhaka	307		Dhaka	312
	Naryanganj	290		Naryanganj	295
	Barisal	233		Barisal	137
	Mongla	370		Khulna	48
	Khulna	435		Chittagong	370

The Chittagong and Mongla route is divided in to the bay crossing section and the river section. The Department of Shipping, the regulatory body of Bangladesh put some restrictions to cross the bay during four months of dry season. A convoy of 4 barges can cross the bay while during the remainder of the year the number of barges reduces to two. Utilisation of tugs and barges are certainly affected by these conditions.

The navigable depth of this route through out the year is more than 3.6m. There are different kind of vessels such as tankers, bay-crossing flats/barges and tugs and self propelled barges operating in this route. From the port of Chittagong only coasters and bay crossing barges can be used. The most favourable vessel for carrying container is the bay crossing coaster of 600 dwt or more. Preferably one sizeable hold and breadth in excess of 10.5m, which should give a minimum capacity of 24 TEUs. A certain type of dumb-barge could also carry containers. About of 70% of the import cargo is destined from Chittagong port to Dhaka and its adjoining area and also about 80% of the export cargo are originated in the Dhaka/Narayanganj area including export processing zone near Dhaka.

Figure - 3

Passenger and Freight transport in road, rail and inland waterways in 1995



Another suitable route for carrying containers is Mongla-Khulna and Mongla-Dhaka/Narayanganj area. A substantial number of containers are handled at Mongla port and this numbers are increasing gradually. The outward cargo which is exported via Mongla mainly generated in the Khulna /Daulatpur industrial area and in a lesser extent the Dhaka/Narayanganj area. Inland water transports in this route

have an advantageous position because there is no open bay crossing involved, so that river flats/barges can be utilised exclusively. Another advantage is the water depth in this route, which is practically the same through out the year.

Todays problems with inland waterways:

- * A major problem affecting inland water transport is the shrinking of the navigable network due to both siltation and reduction in the amount of water available during the dry season.
- * Siltation in approach channel is also one of the major problem, this problem are compounded by the unpredictable nature of the rivers which often change course, erode embankments, and in general pose risks for investments in fixed river front infra-structure.
- * Operations at inland ports are impaired by inadequate facilities for mooring and unloading vessels, lack of facilities for storage and other infrastructural problems.

Table 8: Modal shares in passenger and freight transport.

Year	Passenger				Freight			
	Total	<u>Mode shares</u>			Total	<u>Mode shares</u>		
	passenger-km	Road	Water	Rail	Ton-km.	Road	Water	Rail
Estimated 1985	35 billion	64%	16%	20%	4.8 billion	48%	35%	17%
1995 Projected								
ranges (High)	59 billion	69%	24%	20%	9.4 billion	57%	37%	18%
(Low)	42 billion	56%	15%	16%	7.2 billion	45%	30%	12%

Source: The World Bank staff appraisal report, 3rd IWT project (1991).

In spite of different problems in this sector, the importance of inland water transport for Bangladesh is evident from the following table, which shows current and projected modal shares of road, water and rail transport. It is clear that inland water transport will continue to play a significant role in both passenger and freight movements. Taking the lowest forecasts for both total transport output and IWT mode share produces IWT out put levels in 1995, which are higher than at present.

Compared to other countries, the share of inland water transport in passenger transport in Bangladesh is very high, reflecting the essential riverine geography of Bangladesh. Another reverse situation in the inland water transport flows in Bangladesh is the movement in passengers, which is dominant in comparison to other countries. The following table shows projected passenger and freight transport in road, rail and inland waterways in the year 2000.

Table: 9 Projected cargo and passenger movements (road, rail and inland waterway) in the year 2000.

Year	Cargo(ton/kilometre.)				Passenger (billion)			
	Road	Rail	Water	Total	Road	Rail	Water	Total
1985	246	75	138	459	15.46	8.43	6.20	30.09
	54%	16%	30%	100%	51%	28%	21%	100%
1990	311	109	210	630	22.90	10.05	9.32	42.29
	50%	17%	33%	100%	54%	24%	22%	100%
1995	399	159	32	87	33.32	12.06	14.09	59.47
	45%	18%	37%	100%	56%	20%	24%	100%
2000	527	246	523	1296	49.96	14.81	22.47	87.26
	41%	19%	40%	100%	57%	17%	26%	100%

Source: *Inter modal transport study.*

CHAPTER - 4

SEA PORT FACILITIES AND CURRENT POSITION OF CONTAINER HANDLING

Chittagong and Mongla are the two main sea ports of Bangladesh. Both ports are of operating type. These two ports handle all imports and exports, although some frontier crossing trade exist between Bangladesh and India. Chittagong and Mongla ports are expanding their container throughput in response to demands from both shipowners and shippers. In terms of import and export containers Chittagong port handles 92% and 80% of international cargo.

4.1 The Chittagong Port Authority (CPA):

The principal port of Bangladesh, Chittagong was emerged as a significant port among the South Asian countries, with direct links to Singapore, Colombo and Indian ports. Chittagong is situated on the bank of the river Karnafuli. With its natural safe harbour at the confluence of the river Karnafuli and the Bay of Bengal, the Chittagong port is evidently an ideal location, and it retains the potential to emerge as a major international port. The port offers the facilities for handling break bulk, bulk and containers. Chittagong Port Authority is a service organisation under the Ministry of Shipping.

The cargo handling of the port takes place at berths, river moorings and anchorages. Further upstream of river inland water transport facilities are also available for handling of dry and liquid bulks, general cargo on ocean going vessels and inland vessels such as coaster and bay crossing craft. Chittagong port handles close to 75% of Bangladesh's sea borne trade (of both exports and imports) but it needs a boost in its infrastructure in order to meet the growing import and export demands of the country.

4.1.1 Berths: There are 15 main jetties, including 2 multipurpose berths and 6 mooring berths for the ocean bound vessels in CPA's possession. These jetties ranging in length from 143m to 225m. In addition CPA has 4 specialised berths for bulk handling of items such as, fertilisers or foodgrains. A separate berth called 'Kafko' has been newly constructed for the exclusive handling of fertiliser cargo. Among the 4 existing specialised berths, incidentally, only one is under the charge of private sector, the other 3 are public sector owned. Among these berths, 13 are provided with shore cranes and railway tracks, 11 are provided with transit sheds. Vessels of overall length (LOA) up to 185.91m may be berthed at a single main jetty. They are also provided with back up facilities for handling containers. Public sector jetties are handling bulk cargoes like cement clinker, grain, rock phosphates and urea fertiliser.

4.1.2 Cargo handling equipment: General cargo containers, bulk traffic, mostly bagged grain or cement are handled at general cargo berths in the main port area. Light conventional cranes are provided to handle general cargo but discharge and loading of containers are carried out by ships gear. There are 39 shore cranes of 3 ton capacity. One gantry crane of 25 ton capacity, besides this, 27 mobile cranes, 42 diesel forklift and numerous tractors and trailers are available. Purpose built road tugs and trailers are used to convey containers to and from the quays and storage areas.

4.1.3 Facilities: The port presently has 36 transit sheds, ware houses, car sheds and open place as cargo storage space. A large area of the port occupied by containers that causes congestion. Container are stored, loaded, awaiting customs and stripped out, waiting for shipment. Some areas within the within port protected area are covered and others are improvised. Most FCL and LCL containers are stripped and stuffed in the open space. Custom inspection are also takes place in the open. The following table showing the covered storage space within port protected area.

Covered space outside the port protected area is 3,849 sq m with a capacity to hold about 1,703 M tons. 13,600 sq.m space is leased in favour of public and private sectors. Open space within port protected area for storage of cargo is 173,911 sq. m. Coal can be stored in a separate space on the bank of the river Karnafuli, which is outside the port protected area. Delivery of cargo from the sheds into road vehicles is only possible at the quay side, because at the back there is no pavement between the railway tracks.

Table 10: Covered space within port protected area.

Storage space description	No.	Area (Sq km)	Capacity (Mt)
Transit shed	16	113,122	48,685
Ware houses	14	61,429	29,828
Baggage shed		1,789	
X shed (for tea export)		9,536	4,104
Y shed (for tea export)		9,294	4,000
Automobiles		2,258	500
Hazardous		293	102

Source: Year book '92 The Chittagong Port Authority.

4.1.4 Container handling service: To serve the need to improve Chittagong's port throughput capacity and to match the increasing traffic and the growing trend of containerisation, CPA are using a multipurpose berth project which includes the construction of two wharves of 450 metre in length designed to carry gantry cranes and heavy container handling equipment. For the container jetties the port has 26 stradle carriers, forklift, tractors and roll trailers. After the completion of this project, Chittagonj is expected to handle an annual throughput of 250,000 TEU. In the 1994-95 fiscal, the container handling figure of Chittagong port was 225,000 TEU. The estimated container traffic by the turn of this century is 351,535 TEU.

For container storage the back up facilities includes development of about 450 acres of land into paved storage area, container freight station(CFS), office building, garage and workshop, customs fencing, services and utilities etc. The extra facilities include a storage capacity of 10,000 containers at a time, storage of reefer containers, including 318 reefer plugs for containers of frozen foods. Container cargo handled at Chittagonj port in 1993 and 1994 is shown in the following table:

Table 11: Containerized cargo handled at Chittagong port.

Container		1993		1994	
Category	Nature	TEU	Tons(000)	TEU	Tons (000)
Import	Loaded	68,788	900	80,602	991
	Empty	14,427		16,560	
Total		83,215	900	97,162	991
Export	Loaded	59,810	577	69,500	573
	Empty	21,234		24,400	
Total		81,044	577	93,900	573
Grand total		164,259	1427	191,602	1565

Source: *Containerisation International Year book'1995*.

Until now Chittagong has not been able to match the growth of container traffic with the development of its facilities. Existing facilities for transport of containers out of the port to hinterland is not sufficient, which causes congestion in the port and reduces the effectiveness of containerisation. In 1995, Chittagong was facing a serious- threat due to its inability to cope with the rising demand for more container facilities. As a result the container cargo almost over powered the CPA highlighting its inadequate infrastructure.

To avoid congestion CPA jointly with Bangladesh Railway, operates an inland container depot, another river based port is also now under construction. In addition to this , an integrated information system covering port, customs and port users would soon be developed in totality under a computerisation programme. This project called 'Port Net' had been planned by the CPA against the backdrop of rapid growth of container cargo.

Despite having a substantial lack of fund of its own, CPA has been involved in a number of problems over the long period of time. Another big problem that CPA is facing now is the labour management. Due to lack of security personnel at the port, there is also pilferage of goods.

4.1.5 Transport of cargo from/ to hinterland: This port is connected with the hinterland by railway, inland waterways through the bay of Bengal and extensive road network. Rail access is available to all berths and back up storage areas. Therefore, all three modes of transport viz. road, rail and river are available for the transports.

4.2 The Mongla Port Authority (MPA)

The second sea port of Bangladesh is situated in the south western part of the country at the confluence of the Pussur river and Mongla Nulla river about 80 km up from the Bay of Bengal. Almost 85% of jute products in the eastern part of the country flows through this port to direct hinterland by the inland water communication.

Mongla port handled 21.5% of the total import - export cargo of the country in fiscal 1994-95. Total sea borne cargo handled by Mongla was 2.82 million tons in 1994-95. The port is an autonomous organisation under the administrative control of the Ministry of Shipping. The board formulates the policy of operation, administration and development of the port. Basically the port authority operates river moorings and anchorages. The port facility comprises:

4.2.1 Berths: Mongla is mainly an anchorage port. There are 5 newly constructed jetties with a total quay length of 910m. There are 8 swinging mooring buoys where the vessels are made fast with their own cables, 17 more ships can be safely anchored within 4 working miles range. 5 to 6 shackles of chain are considered ample under normal circumstances. The water depth varies between 5.8m and 13.7m.

4.2.2 Cargo handling equipment: There are 11 mobile crane, 11 dock side crane, 28 forklift, 2 primover and 12 trailer to handle conventional general cargo. The cargo handling capacity of the ports is about 2 million tonnes of cargo at the anchorage and 0.3 million tonnes at the jetties. Cargo that cannot be handled in the berths is discharged or loaded over side in to barges at the outer anchorage. The completion of Khulna - Mongla road is also transforming the cargo handling and distribution pattern of this port.

4.2.3 Facilities: There are 4 transit sheds of 4,908 sq. m and 18,000 Mt. capacity and 2 ware houses of 9,816 sq. m and 16,400 Mt. capacity each. Besides there is open stack yards for containers. Construction of other ancillary facilities are in progress.

4.2.4 Container handling service: With the arrival of container ships and unloading of containers on the jetty, the cargo handling pattern of this port has also under gone noticeable change. Container handling started at the anchorage in August 1980. However the berthing of vessels along side, container handling at the anchorage is on gradual wane. For container handling there are 2 prime movers, two 40 ft trailers, ten 20 ft trailers, 3 straddle carriers having 35 ton lifting capacity, one 25 ton forklift and one 30.5 ton forklift are in operation. Classification of container handling at Mongla port by categories is shown in the following table:

Table 12: Containerized cargo handled at Mongla port.

Container					Tonnage	
Category	Nature	20 ft	40 ft	Total	TEU	(000) tons
Import	Loaded	384	225	609	834	9682
	Empty	3431	1803	5234	7037	
Total		3815	2028	5843	7871	9682
Export	Loaded	391	184	575	759	83084
	Empty	3474	1755	5224	6984	
Total		3865	1939	5804	7743	83084
Grand total		7680	3967	11647	15614	92766

Source: Port information book of MPA:

Other support equipment like computerised container logistics, radio telecommunication etc. have been planned to be installed. Container operations have

suffered from congestion of empty containers in the port. The personnel involved in the operation of containers should be trained to deal with this new type of operation technology especially stowage of the containers for locating and delivery to the consignees more easier and quicker.

4.2.5 Transport of cargo from/to hinterland: From the various inland river port break bulk export cargo is received in barges and lighters and brought along side the ships for further transportation. The jetties are mainly used for handling export and import containerised cargoes. Break bulk imports are also handled via barges and lighters and distributed to various inland destinations. Apart from waterways communication the port is connected with the rest of the country by a road system. No rail communication has yet been installed. The nearest suitable rail facilities are at Khulna. Another important project in Khulna is the construction of the Rupsha bridge. It would gear up economic activities in the area and boost the country's revenue earning.

4.2.6 Problem areas and current development: Mongla port is now facing various difficulties. There is little or no concern over continued silting, or the irregular dredging that leaves gapping holes in the port channel. Also because of problems in the shallow parts of the Pussur channel, this port faces under utilisation of its jetty mooring and anchorage facilities, resulting in reduced cargo handling and meagre revenue collection. As a result of substantial amount of cargo volumes falling from 2.65 million tonnes in 1991-92 to 1.93 million tonnes in 1993-94. The second most important port of the country is also suffering problem from poor infrastructural facilities. Absences of a rail line and inadequate road links causes the problem more significant.

To identify the requirement of the port recently, the Bangladesh government initiated an ADB financed (Tk. 24.8 million) six month long Mongla port area

transport development study. Among the various development activities at Mongla like the hydrant system for fire protection, overhead water tanks, under ground reservoir etc. is being currently developed. Work is also carried out on a transshipment yard, residential building, fire fighting system and other facilities to increase utilisation of the port.

CHAPTER - 5

CONTAINERISATION AND INLAND TRANSPORTATION IN OTHER PARTS OF THE WORLD

Containerisation has changed the shape of the transport system on the various sea borne trade routes all over the world in the past three decades. With containerisation, shipping lines eventually focused their attention to extend their activity base inland and offer a point to point transport capability of using different transport modes. Integrated transport and physical distribution concepts quickly had to be incorporated in the container operational system. The 'just in time' concept reinforced the intrinsic advantages of container transport.

An adequate communication system to the inland points of traffic origin and destination is increasing every year. Between shipper and consignee inter modal through- transport has various effects on the structure and organisation of the total transport chain. The efficiency, reliability and quality of the inland connection has an influence on the movement of containers. In order to control the cost and quality of the service offered to inland customers, the different modes of transport aim to provide complete door to door service at competitive rates.

There are three main modes of transportation exist between the port and its hinterland. The hinterland of a sea port is the area from which the port receives its

outgoing cargo and to which it sends incoming cargo. Road and railway are two predominant alternatives in many countries, although there is a general decline in the market share of rail transport. In many archipelago states like the Philippines and Indonesia, coastal shipping is of main importance; where cargo can be transhipped by vessels and barges.

In many countries the advantages of door to door transport cannot be realised due to lack of inferior transport infrastructure. The physical requirements of container transport differ widely according to the mode of transport used. Special aspects of different modes of inland transport with regard to containerisation including basic economic characteristics of the hinterland traffic will be discussed as follows:

5.1 Movement of containers by rail:

As a mode of transport rail is now a days considered to be a successful alternative for transport of containers to various inland destinations. The performance of rail transport is excellent for long distances, high volume and heavy weight of the cargo. Apparently rail road costs are fixed for a certain period because of the long term investment in plant and machinery. On the other hand, the variable costs, i.e. the costs which are dependent on the volume of traffic is relatively low. The total unit cost is therefore declining when the performance (out put) rises. The cost of railway transport differ extensively from country to country, or even from trade to trade.

For the carriage of containers on rail the requirements relates to the characteristics of the permanent way, transfer installations and the equipment used. Concerning the equipment, requirements are rather limited because any flat bed wagon with

sufficient carrying capacity would be about 30 ton for a 40 ft wagon, equipped with proper lashing points.

The rail shuttle approach is designed to offer customers the same speed of service as the traditional transport by road. To reduce the transport costs per container generally 60-80 TEU are put together under the control of one driver. Block movement of containers or unit trains are most economical system in shuttle service between the seaports and inland destinations. Depending upon the situation of railway track a block train can offer economies of scale on the trunk-haul route. The effectiveness of such service is reduced if there is a considerable traffic imbalance on the routes. To minimise traffic imbalance collapsible containers have been introduced in Europe. These can be erected and folded up by fork-lifts and stacked like flats on their back haul. This systems saves a lot of space and thereby also reduces the cost.

American train lines have solved this cargo imbalance problem in a different way. The rail transport of containers has been arranged up to now predominantly by a piggy back or TOFC (trailer on flat car) service i.e. containers are carried on highway trailers or chassis, which move on special flat cars. This system is more capital intensive than the container on flat car (COFC) concept. In the United States, double stack trains have reduced the transport cost of the shippers. In Europe, TOFC is only used for trailers carrying mobile cases.

There are some advantages of rail transport compared with other modes of inland transport when containers are being carried between sea ports and inland points. All the inland points are not necessarily the points of traffic origin or destination but to keep the cost of rail transport down it requires high traffic density and large cargo flows, which are balanced according to time and volume.

5.2 Movement of containers by road vehicles:

Containers on the inland portion were carried exclusively by truck in the initial stage of containerisation. To adopt road vehicles to the container system less investment is required in comparison with railway transport. The road transport operator responded more or less immediately to this new challenge. Railways could build up container carrying facilities on a large scale, only when traffic volumes increased and the limitation of the roads became obvious.

The road hauliers role in containerised hinterland traffic can range from a minimum contribution to complete transport between port and an inland shipper/consignee. Almost all containerised cargo will at least start and/or finish its journey in a road vehicle. In Europe truck transports are concentrated in the following areas:

- * Door to door service in short sea trades where containers are carried by trailers on ro/ro ferries. For example, on the routes connecting the European continent with UK and Scandinavia.
- * Port to door services, where FCL(full container load) boxes are carried between sea ports and short distance inland destinations.
- * Terminal to door services, to and from inland rail terminals or inland river port terminals.
- * In the case of LCL(less than container load) traffic , transport to and from container freight stations(CFS).

In road transport the capital investment is comparatively small. One does not need much capital to start a small-scale truck business. But containerisation movement has not had as much influence on the structure and level of road-haulage costs as it has had on the cost of rail transport.

In Europe, it is very likely that the competitive position of road haulage companies compared with other means of inland transport will further deteriorate in the future. This prospect is not only based on rapid increases in various cost elements (for instance in fuel prices, wages of highly qualified drivers, cost of maintenance and replacement of trucks), but also on the wide regulations restricting the capacity of operations. As for example, European regulations on driving hours and distances. At present drivers are not allowed to drive more than 450 km per day.

The ever growing number of motor way traffic jams and delays is threatening to make certain centres inaccessible. In contrast, inland container shipping provides a clean, efficient and punctual solution to the transport problems. One inland ship can carry 200 containers at once- as much as 4 kilometres of lorries bumper to bumper. There are no traffic jams on the water so there is plenty of room for to move unhindered. According to environmental standards, transport by inland ship is 150% cleaner than transport by rail and no less than 600% cleaner than road transport.

5.3 Movement of containers by inland barges:

The existence of inland transportation was a major factor influencing the location of sea ports and industrial areas. In the past rivers were the only means of communication on which larger volumes of cargo could be transported economically. In all most all over the world both high value and low value goods were carried by inland waterways at that time. With the introduction and development of railways, and later on the road network many rivers lost their part of importance. High value cargoes which offer relatively higher transport costs were more attracted by roads and railways. But still dry bulk cargoes like coal, ore, grain, fertilisers and cement etc. are carried by inland waterways.

The Inland water transport system is suitable for the carriage of large volumes on long distances so that economies of scale can be achieved. Water transports are characterised by a relatively high ratio of fixed costs to variable costs. In this respect it is very similar to railway transport. The transport factor which keep the variable cost low is the low energy consumption due to the slow speed in inland waterways. In some extent due to high speed, container movements are dominant by roads and railways. The rising fuel costs and the attention to environment protection are beginning to change inland haulage structure in such a way that the effect of speed is no longer the most decisive factor for efficient transportation. Another aspect of inland waterway transport compared with road transport is the high productivity of the labour force. The very small crews per unit of cargo carried lead to relatively low manpower costs.

The inland waterways net work is a much under-used source of transport capacity within Europe. But along the river 'Rhine' the container volumes carried to/from the Belgium ports (Benelux) in the European hinterland have grown in 20 years from 20,000 TEU in 1976 to a volume of 550,000 TEU expected for 1995. For every 1 TEU currently handled by a Rhine river barge operator, 2 TEU are handled by a container train operator. Only the barges of maximum 110m length and 200 TEU capacity are allowed to operate on the Rhine. The cranes along the waterways can only load/unload 4 containers wide.

One of the largest container port in Europe, Rotterdam; offers multiple choice between barge, train, truck or sea going for container transports to the hinterland. The strong features of Rotterdam is the possibility of inland transport by barge. The share of container movement from this port by inland barge is 39% for incoming and 29% for out going container cargoes. Currently, an annual 730,000 containers are transported on the Rhine by barges with a capacity of up to 360 TEU.

The disadvantage of low speed transport is due to meandering of rivers and the presence of locks causing time wasting interruptions. Another natural hindrance is inaccessibility during the winter seasons and irregular height of water.

Successful introduction of container transport on inland waterways largely depend upon long distance voyages and the utilisation of large vessels to get the advantage of economy of scale over large scale transport. To attract inland shippers the tariffs should be based on FAK (freight all kinds) rather than to have commodity rates. In particular the tariffs should not include any minimum charge weight limitations in order not to discourage the transport of empty boxes.

Shortage of adequate handling and storage facilities at inland terminals often make the carriers reluctant to use inland waterways. Sea ports some times do not have special installations for loading and discharging container on and off inland barges.

Container transport on Western European waterways started in 1975 on the river Rhine. There are several examples where container transport on natural waterways compete with sophisticated road and rail transport systems. One such example is the transport of containers from Le Havre to Paris. This movement does not only lead to considerable cost savings, compared with the railway alternative, but has virtually no disadvantages as to the transport time.

5.4 The relationship between rail, road and water transports:

From the above discussion it is clear that there is a certain degree of competition between rail, road and water transport because all systems are technically able to carry containers. Competition arises when all systems are suited to carry the same

cargo between the same points of origin and destinations. This type of situation is most favourable from the shippers point of view, because he has several alternatives to fulfil his demand.

Co-operation and co-ordination among different modes aims at using the advantages of all systems and avoiding their disadvantages. The basic advantage and disadvantage of various inland transport system can be seen in the following table.

Table 13: Comparative advantage & disadvantage of different inland transport modes:

Factors of competition	Inland transport mode		
	Water	Rail	Road
Speed	Low	High	High
Capacity	High	High	Low
Flexibility	Low	Medium	High
Energy consumption	Low	Medium	High

5.5 Container logistics:

A new development of container traffic between highly industrialised nations and some developing countries has started at the beginning of the eighties which will create further growth rates. The concept of containerisation has grown from the simple, traditional view of movement of containerised cargo between two points to today's views that encompasses understanding, managing and controlling the overall economies of the total move. This includes related costs and issues of inland and ocean movements, as well as manufactures inventory, production and demand.

In all industrialised nations and in most of the developing countries the practical transport and handling problem has already been solved or going to be solved but there will remain some significant short comings in the field of container logistics. Efficient container turn around depend upon prior positioning and container control. In the primary stage of containerisation the lines used to lease their container and the leasing company handled the supply of empty boxes, the control and storage of containers, this method was simple but expensive.

In the second stage of containerisation, containers are either brought or leased in a long term contract and the transport of boxes from sea port to inland destinations including the return of empty containers from the hinterland to the seaport are arranged by lines or their agents. To achieve optimum container turn round the movements of empty containers in the hinterland and the average dwell time or standing time must be minimised. Again this problem is a function of necessary information regarding storage of containers, empty container stocks, transport of full container and in particular container control.

5.6 Transport infrastructure and equipment:

In many developing countries decisions to plan and develop transport infrastructure are generally decentralised across the different levels of government organisations. This may lead to a lack of co-ordination in the development of road, rail and inland waterways and transport terminal facilities which restricts the achievement of potential economies of scale in transport services. Transport logistics are often neglected by the transport planners in many cases. They do not pay proper attention to the entire process of the movement of goods. Lack of relevant statistical data and information may result in the shortage of transport and storage capacity and

of distribution centres in the major areas of production and consumption. As a consequence, cargo is often held in inadequate facilities, where it deteriorates or is lost, or it is left in rail wagons or road vehicles.

In recent years it is in the strong interest of developing countries that they should keep pace by adapting themselves to the new technology. Technological developments in the transport infrastructure and equipment must respond to the problems created by growth in transport demand and by the challenge to develop sustainable transport systems. Increased speed and capacity within commercially and environmentally viable constraints are the motive force which lead the transport industry to design their vehicles and rolling stock etc. Containerisation techniques in developed world is more or less standardised with better weight/dimension efficiency and handling equipment to modern transport technology.

For all modes of transport it is a complex process to increase the efficiency of the existing transport infrastructure and equipment. The operators engaged in different mode must take advantage of new developments in infrastructure and equipment to cope with increased transport and environmental conditions. Another important trends in transport mode operations is the information technology. The explosion in information technology has increased their market power in a large extent.

Now a days developing countries are paying more attention to the co-ordination and interaction between transport modes. In European countries, ocean and inland waterway transport is mostly private with limited government support of the infrastructure (ports, canal etc.), users pay competitive rates based on market forces. Rail transport is still government owned in most countries. It is almost invariably been the state that provides the infrastructure for road transport, but in many countries, users pay only nominal charges (highway tolls, vehicle taxes etc.). The near saturation of road transport in Western Europe has led the European

Commission to evaluate the environmental impact of the different transport modes; preferably rail, coastal and short sea service including inland waterways:

5.7 Trade facilitation and policies (for facilitating container movements):

“Trade facilitation” is not a well-defined conception, but for the purpose of study the term shall mean any measure related to the cargo flow through the port, which if introduced- would result in:

- (a) Efficient use of man power, reduction of costs or time, or
- (b) an improved service; the beneficiary need not be the relevant port but could be any of the improved parties, which may be mentioned as follows:

- the relevant port authority.
- the ship (captain).
- shipping agents.
- stevedore companies.
- consignees and dispatchers.
- river transport companies.
- railway authorities.
- haulage contractors.
- customs authorities.
- insurance companies.

In wider sense, trade facilitation means to identify measures related to the cargo flow through ports, the result in efficient use of man power, reduction of costs, saves time and improved service. This also includes the present procedures relevant to

various activities in the ports relating to cargo handling, storage and delivery, customs procedures, security, and demurrage or compensation.

To promote trade facilitation it is also necessary to simplify and standardise traffic/trade documentation and procedures that can be used for ports and customs clearance, recommendation measures for computerisation of information system compatible with international practices to enable fast import/export cargo flow. The present procedure relevant for the activities can be described as follows:

- loading and unloading from/to lighter and at quay.
- storage of cargo in transit shed, warehouse or in the open yard.
- stuffing and unstuffing of containers.
- identification of cargo for delivery.
- delivery to consignee.
- transfer cargo to different mode of inland transport.
- customs procedures.
- invoicing.
- security, demurrage/compensation etc.

Standardisation of trade documents in many countries has reduced direct documentation costs by 50 to 75% and has indirectly provided the basis for a common understanding of the data required in trade. Facilitation functions have been created in several international bodies and are linked with the corresponding national bodies through institutional arrangements.

The streamlining of customs procedures is essential for efficient door to door container movement. Custom is an area where a country's government can give great impetus to container transport. There are many countries on the main trade routes that have taken necessary steps to reduce customs procedures and formalities to a minimum. In many cases' containers move inland for clearance.

European international agreements regulate the two main customs problems for container's inspection for transit operations and charges for temporary import. The countries that are contracting parties to the international road convention (TIR) can transport their containerised goods by road under customs seal to the country of destination. This avoids the customs inspection and duties at intermediate frontiers. Inland clearance is often possible at the destination, either at inland clearance depots or at the importers' premises.

Customs procedures are often a major obstacle to door to door container operations in many developing countries. To obtain full benefits a national policy needs to be developed. The traditional customs examination and clearance procedures at the port of the entry to the country need to be changed. It becomes more important to provide guarantee the duty liability during the transit from point to point clearance.

CHAPTER - 6

INFRASTRUCTURE PLANNED FOR CONTAINER MOVEMENT USING INLAND WATERWAYS

6.1 General concept of an inland container depot:

The concept of an inland container depot (ICD) is a major element in the overall transport chain. A country's total trade flows, specific routings between ports and hinterlands and some traditional port functions etc. are influenced by the implementation of this concept. The functions of inland container depot varies in a wide range. It may serve as a consolidation and deconsolidation centre where containers are stuffed or stripped, stored, packed and transported either to sea ports or to inland destinations. It may be a base for customs clearance and also be a warehouse, a storage area, a marshalling yard for containers destined for various modes of transportation and a variety of destinations.

Another integrated part of an ICD is that the container depot relieves the port of its storage problem. At the same time the transport infrastructure and the various transport modes need to maintain certain minimum harmonised standards, because of competition. An inland container depot can also serves the need for shippers personal services which a large port cannot provide because of its prime need to serve the requirements of the ship rather than an individual shipper. As a profit

generating centre inland container depot also have a significant role on the trading and industrial activities in that particular area.

For current and foreseen trends in containerisation; inland container depot now a days has become a vital element in the transport chain. There is no other alternatives to relieve the commercial pressure on port and for efficient inland distribution systems of containers except with an inland container depot.

6.2 Economic factors of inland container river port:

The present trend of international trade and commerce by sea is through containers. Bangladesh depends largely on exports and imports for its vital economic emancipation and therefore, the two existing sea-ports, Chittagong and Mongla play a major role in the socio-economic development of the country.

Dhaka and its adjoining areas constitute the largest industrial commercial and trading centre next to Chittagong and Khulna in the country. The capital city is therefore, the principal recipient and despatcher of cargo. Dhaka is the northern-most city in Bangladesh located on the bank of the river Buriganga, enjoining a navigable water depth of 3.6m from maritime ports. Dhaka is now becoming a gate way for transportation of cargo to and from the northern region also. However since necessary container handling facilities have not developed at the Dhaka river ports, the container have to be stripped and transported inland in break bulk condition by trucks. Some limited numbers of unstripped containers are moved by rail. Door to door service cannot be ensured without high handling and transport costs.

A feasibility study to carry containers from Chittagong and Mongla ports to Dhaka was carried out by JICA (Japan International Co-operation Agency) from Nov.-89 to Dec.-90. In the report JICA has made an assessment of the volume of containers traffic to be handled against Chittagong to Dhaka and Mongla to Dhaka transportations on both short and long term basis. The number of containers to be received at Dhaka by waterways is estimated to be 78,802 TEU's during the short term (up to 1995) study. The long term (up to year 2005) study showed a total of 153,656 TEU's.

The reason for an increased number of handled containers has its consequences on available resources, particularly infrastructure and equipment. Infrastructural facilities for transport of containers out of the port to inland destinations are inadequate. The majority of import containers move through Chittagong port. Due to lack of infrastructural facilities, container movements at present from port to inland destinations is limited to road and railways. Sometimes containers are stripped at the sea ports and the content is carried by trucks to Dhaka at a tremendous high cost and with severe delay. This has resulted in a high level of dwell time per container which is creating a constant congestion in the port.

To avoid congestion and to increase effectiveness of containerisation in Chittagong port Bangladesh Government has decided to construct an inland container river port on the bank of the river Buriganga near Dhaka. The feasibility study carried out by JICA, clearly indicates that the cost of transportation of containers between sea ports and Dhaka is the lowest by inland waterways. This project is likely to be commissioned in the middle of 1998. In order to indicate the magnitude of some representative monetary allocation, Bangladesh monetary unit Taka (Tk) is used here. The rate used is the November/December rate in 1994 where 40 Taka = 1 USD. Physical and financial parameters of the river port project can be seen from the following table:

Table 14: Physical and financial parameters of a container terminal.

Phase	Description of item	Quantity	Unit	Total cost(mill.Tk)
1st.	a) Land acquisition	20.2	Hectors	149.42
2nd.	a) RCC jetty and Revetment	195	Meter	197.95
	b) Embankment.	753000	Qu.M.	45.93
	c) Marshalling yard & port road.	71724	Sq. M	266.29
	d) Container freight station(CFS) building.	7310	Sq. M	93.87
	e) Machinery & Equipment.			747.08
	- Gantry crane	2	Nos.	
	- Straddle carrier	5	Units	
	- Top lifters.	2	Units	
	- Fork lifts	10	Units	
	- Tractors	2	Nos.	
	- Trailers	6	Nos.	

Source: Project Proforma of Inland Container River Port, Dhaka. July-1994.

A comparison of marginal cost by traffic modes in 1995 indicates that transportation cost of containers from Chittagong to Dhaka by waterways, railways and highways is Tk. 7,591, Tk. 10,701 and Tk. 14,899 per TEU respectively.

The objectives of inland container river ports in Bangladesh are:

- a) To construct a container terminal at Dhaka port area for handling containers transported by inland waterways from the ports of Chittagong and Mongla.
- b) To provide RCC jetties, transit sheds and other allied facilities to cater for the requirement of cargo traffic.

6.3 Problems and solutions of existing cargo handling facilities:

The existing RCC jetties and two pontoon jetties of Dhaka river port near Badamtolighat have annual cargo handling capacity of 142,000 and 96,000 tons respectively. This arrangement is not sufficient to serve growing need of the Dhaka river port. In spite of this, a substantial volume of goods are being handled within the port area by other arrangements. For big vessels it is not possible to sail under Buriganga bridge due to inadequate air draft during the monsoon. Moreover, the narrow approach from Badamtolighat creates serious traffic congestion and is a major hindrance to the transport of goods. Absence of transit sheds and mechanised cargo handling facilities makes the problems more difficult.

Table 15: Physical and financial parameters of general cargo facilities

Phase	Description of item	Quantity	Unit	Total cost (mil Tk)
1st.	Land Acquisition	3.5	Hectors	-
2nd.	a) RCC jetty & Revetment	150	Meter	68.48
	b) Embankment	59900	Qu. M	3.65
	c) Marshalling yard & port road	10600	Sq. M	26.39
	d) Transit shed (1 No.)	1500	Sq. M	17.23
	e) Machinery & Equipment			12.32
	-Mobile crane.(25 T)	1	No.	
	-Fork lift (3 T)	2	Nos.	
	f) Access road length	4.8	Km.	
	-Pavement.	31680	Sq. M	41.87
	-Embankment.	638000	Qu. M	47.21
	-Bridges	100	Meter.	56.25

Source: Project proforma of inland container river port. Dhaka, July. 1994.

For the improvement and development of cargo handling facilities at Dhaka port the Bangladesh Government has decided to construct one RCC jetty of 150m length including one transit shed and other allied infrastructural facilities. The jetty will be down stream of the Buriganga bridge out at the container terminal. Physical and financial components of the inland container river port for general cargo facilities is shown in table15.

From the physical and financial component of the project, it is seen that the total cost for the container terminal including machinery & equipment is 1500.55 million Tk. The total cost for general cargo terminal including machinery & equipment is 273.40 million Tk. and the total cost for manpower and other incidental cost (as per table 16) is 996.45 million Tk respectively. The percentage ratio for the container terminal, general cargo terminal and man power and incidental expense is 54%, 10% and 36% respectively of the total expenditure. Manpower and other cost of the project envisages the following table:

Table 16: Manpower and other cost of the ICD project.

No.	Description	Cost (million Tk.)
1	Manpower	4.03
2	Administration	3.11
3	Physical contingency	86.51
4	Engineering services	132.22
5	Physical contingency	534.82
6	Tax & Duties	181.72

6.4 Improving performance of existing ICD at Dhaka:

Chittagong Port Authority (CPA) in collaboration with Bangladesh Railway operates an inland clearance depot (ICD) at Dhaka in order to minimise congestion in the port. For the initial container services from Chittagong port to Kamalapur ICD in Dhaka, rolling stock has been provided through Bangladesh Railway by conversion of existing wagons. To enable the container service to be run up to Dhaka, the railway is providing facilities by a small fleet of converted freight wagons.

The main purposes of a container depot in Bangladesh are as follows:

- To provide rail container services between rail heads at Dhaka ICD and Chittagong port.
- Handling, storage and customs clearance of containerised goods at Dhaka ICD.
- Collection and delivery of containers and containerised goods between Dhaka ICD and custom premises.

The performance of Kamalapur ICD can be seen in the following table:

Table 17: Container handled at Kamalapur ICD in 1994.

Containers category	Nature	TEUs	Tonnage
Import	Loaded	5702	65,131
	Empty	2460	
Total		8162	65,131
Export	Loaded	5700	50,929
	Empty	2200	
Total		7900	50,929
Grand Total		16,062	116,060

Source: *Containerisation International Year book` 1995*

It is also assumed that the following services would be provided by the Chittagong port authority,(CPA), Bangladesh Railway and private road hauliers:

- * CPA would carry out the movement of containers between the port rail head, stack and qua side at Chittagong.
- * BR would operate and maintain the railway infrastructure between Dhaka and Chittagong (the railway track, signalling and telecommunications etc.).
- * Private road haulier would under take local distribution of containers and containerisable goods between Dhaka ICD and containers premises.

This ICD has started its operation in April 1987. Figures from the above table clearly indicates that shippers and consignee are gradually acquainted with the benefits of throughput. This ICD is provided with a custom inspection facility. Other important facilities of existing ICD at Dhaka are as follows:

- a) An administrative building for ICD management, documentation and terminal control staff and to provide office accommodation for representatives of shipping lines or agents.
- b) A rail head area where containers can be transferred to and from trains.
- c) Full container storage area, to accommodate all LCL and FCL traffic with out physical segregation. Random access also available for any particular area.
- d) Empty container storage for accommodation of all empty containers, which are stored in blocks segregated by owner and type.
- e) CFS for packing and unpacking LCL cargo and for customs examination of packages.
- f) FCL customs inspection and unloading area.
- g) Work shop for site machinery and railway wagon maintenance.
- h) Container repair area.
- i) Trailer parking area.
- j) An external vehicle loading area.
- k) A gate house to control access to and from the site.

The location of this ICD is at a central place at Dhaka and have a good linkage with the road communication system. The existing container handling facilities are very limited compared to the volume of container traffic.

6.5 Public participation in the inland water transport sector:

The Ministry of Shipping is responsible for all Government functions in the inland water transport sector. It delegates its responsibility through three organisations namely the Bangladesh Inland Water Transport Corporation(BIWTC), the Bangladesh Inland Water Transport Authority(BIWTA), and the Department of Shipping(DOS). Both BIWTC and BIWTA are autonomous organisations. BIWTC operates a fleet of vessels engaged in inland and coastal cargo service, inland and coastal passenger service and ferry service. BIWTA is responsible for the maintenance of all water way infrastructure, including channels, inland ports and other public facilities. The Department of Shipping (DOS) is responsible for regulatory and training functions.

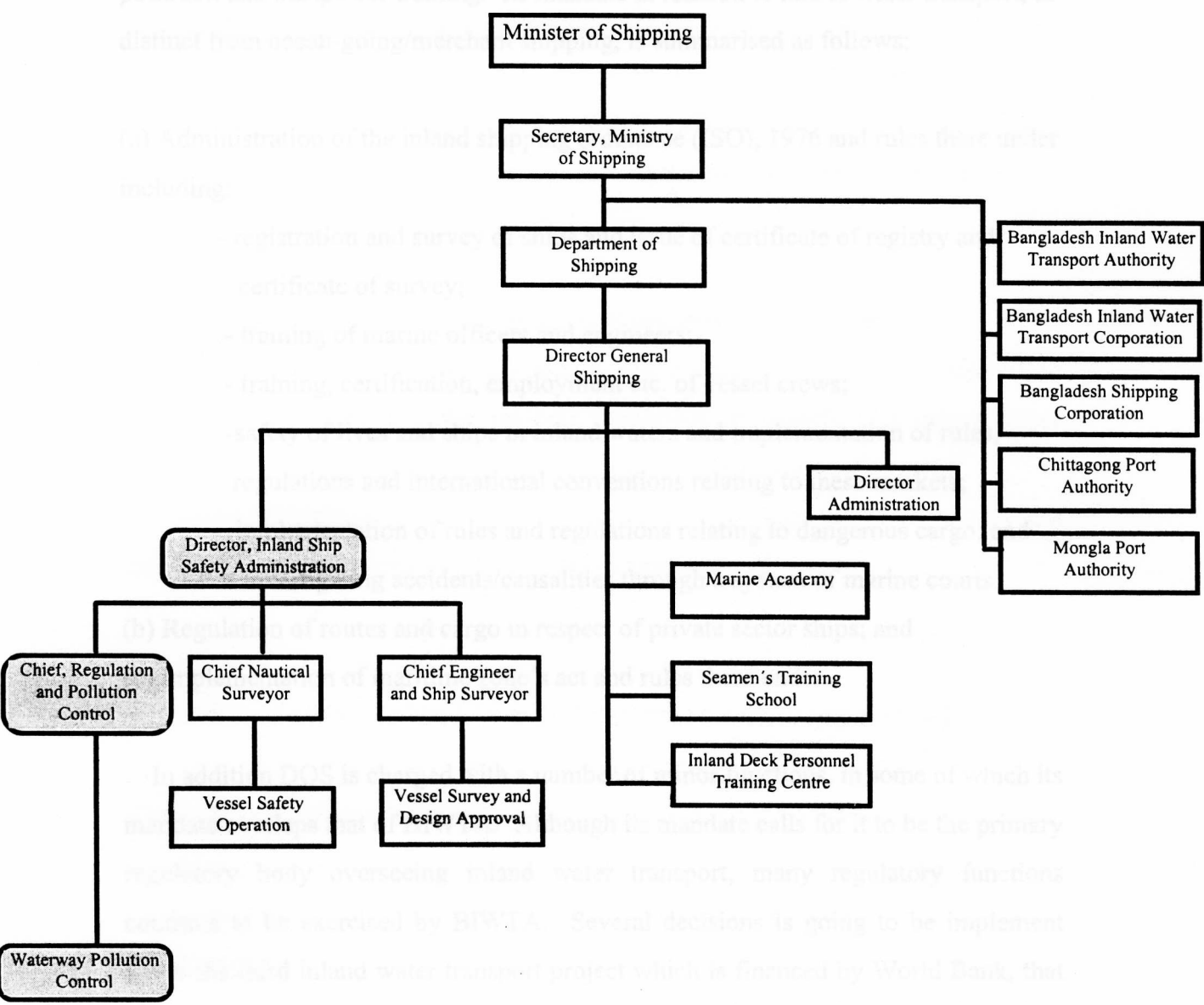
Inland water ways is an essential component of the Bangladesh transport system in view of the floods which regularly affect the country and disrupt the roads and railways. The inland network comprises over 8300 km of navigable water ways during the monsoon season, which is reduced to about 5200 km. during the dry season. Inland water transport tends to play a larger role in the south and southwest of Bangladesh as would be expected given the estuarine nature of this part of the country. The IWT system in the country is both extensive and well- connected with the rest of the transport system.

Figure - 4

BANGLADESH
MINISTRY OF SHIPPING

Organisation Chart

Proposed Additions
under IWT-3 Project



6.5.1 Department of Shipping (DOS):

The primary mission of the Department of Shipping is regulatory in nature. It is a relatively new organisation which is headed by a Director General of Shipping who reports to the Ministry of Shipping. Since its inception in 1976, Department of Shipping has made substantial progress in areas of safety regulation, maritime pollution and manpower training. Its mandate in relation to inland water transport, as distinct from ocean-going/merchant shipping, is summarised as follows:

(a) Administration of the inland shipping ordinance (ISO), 1976 and rules there under including:

- registration and survey of ships and issue of certificate of registry and certificate of survey;
- training of marine officers and engineers;
- training, certification, employment etc. of vessel crews;
- safety of lives and ships in inland waters and implementation of rules, regulations and international conventions relating to these markets;
- implementation of rules and regulations relating to dangerous cargo; and
- investigating accidents/causalities through a system of marine courts.

(b) Regulation of routes and cargo in respect of private sector ships; and

(c) Implementation of maritime zone's act and rules there under.

In addition DOS is charged with a number of minor functions, in some of which its mandate overlaps that of BIWTA. Although its mandate calls for it to be the primary regulatory body overseeing inland water transport, many regulatory functions continue to be exercised by BIWTA. Several decisions is going to be implement under the third inland water transport project which is financed by World Bank, that this department would take over a number of activities from BIWTA including vessel

design and certification, and the training of inland vessel crews. The institutional developmental action plan for development of shipping calls for the establishment of an inland ship safety administration (ISSA), which would have the responsibility over both vessel safety and environmental protection of the waterways.

Department of Shipping would also take over the inland deck personnel training centre (DPTC) from BIWTA. In order to fulfil its expanded responsibilities, particularly for enforcing safety regulation on the waterways its operational staff strength should be improved. In support of this activity, this department will establish five marine courts located at Dhaka, Chittagong, Barisal, Khulna and Naryanganj. The inland ship safety administration will provide the following functions:

- * enforce safety regulations with respect to operations of inland vessels;
- * approve the design and construction of inland vessels, issue safety construction certificates and carry out the periodic inspection of vessels and renew safety certificates in accordance with the provisions of applicable regulations; and
- * protect the inland waterways from environmental degradation caused by the development or operations of inland water transport.

6.5.2 Bangladesh Inland Water Transport Authority (BIWTA):

The primary mission of BIWTA is to develop the water transport system. In 1958, the East Pakistan Water Transport Authority was formed. It was renamed the Bangladesh Inland Water Transport Authority after independence. On promulgation of BIWTA order 1972, it achieved a fairly comprehensive and widespread jurisdiction. The Authority is managed by a board consisting of a chairman and five

members. It is also responsible for establishing, operating, developing and maintaining the aids to navigation system in all Bangladesh waterways except for the ports of Chittagong and Mongla. Its mandate however includes elements that are regulatory in nature. It performs the following major functions:

- * Administration of the inland port area by the port rules 1966 framed under the port act 1908;
- * Construction and operation of inland river port facilities;
- * Development of passenger facilities;
- * Regulation of passenger fares, time tables for passenger vessels, and freight rate for domestic shipping (as provided under section 54A of the inland mechanically propelled vessels act, 1971, in collaboration with the Department of Shipping;
- * Allocation of routes and route permits;
- * Compliance with the inland shipping ordinance (ISO) 1976 by the inland vessels;
- * Approval of design of inland craft;
- * Co-ordination and dissemination of navigational and meteorological information;
- * Provision of navigational aids, conservancy, pilotage, hydrographic surveys;
- * Removal of wrecks and obstructions in channels; and
- * Programming of channels and dredging.

At the recent years massive dredging work is carried out by BIWTA at several different waterways throughout the country. The BIWTA has also been carrying out regular hydrographic surveys to assess the dredging needs and maintenance requirements of water routes. The organisation also runs two training institutions namely, deck personnel training centre, and Bangladesh institute of marine technology for the training of IWT personnel.

Various development projects are carried out by BIWTA for the development of waterways in the recent years. With financial assistance from Norway, the authority

recently completed a project for the development of 100 minor waterways, and the repair of 45 other small ones. A programme for the food rehabilitation in the coastal regions is also underway in 1995 . Five other development projects including dredging of existing waterways and improving existing dredging operations and efficiency, as well as buying navigational aids is also under way by the financial assistance through World Bank. Another important programme for implementing the two phase inland container river port project in Dhaka, with Japanese financial help is also under way.

6.5.3 Bangladesh inland Water Transport Corporation (BIWTC):

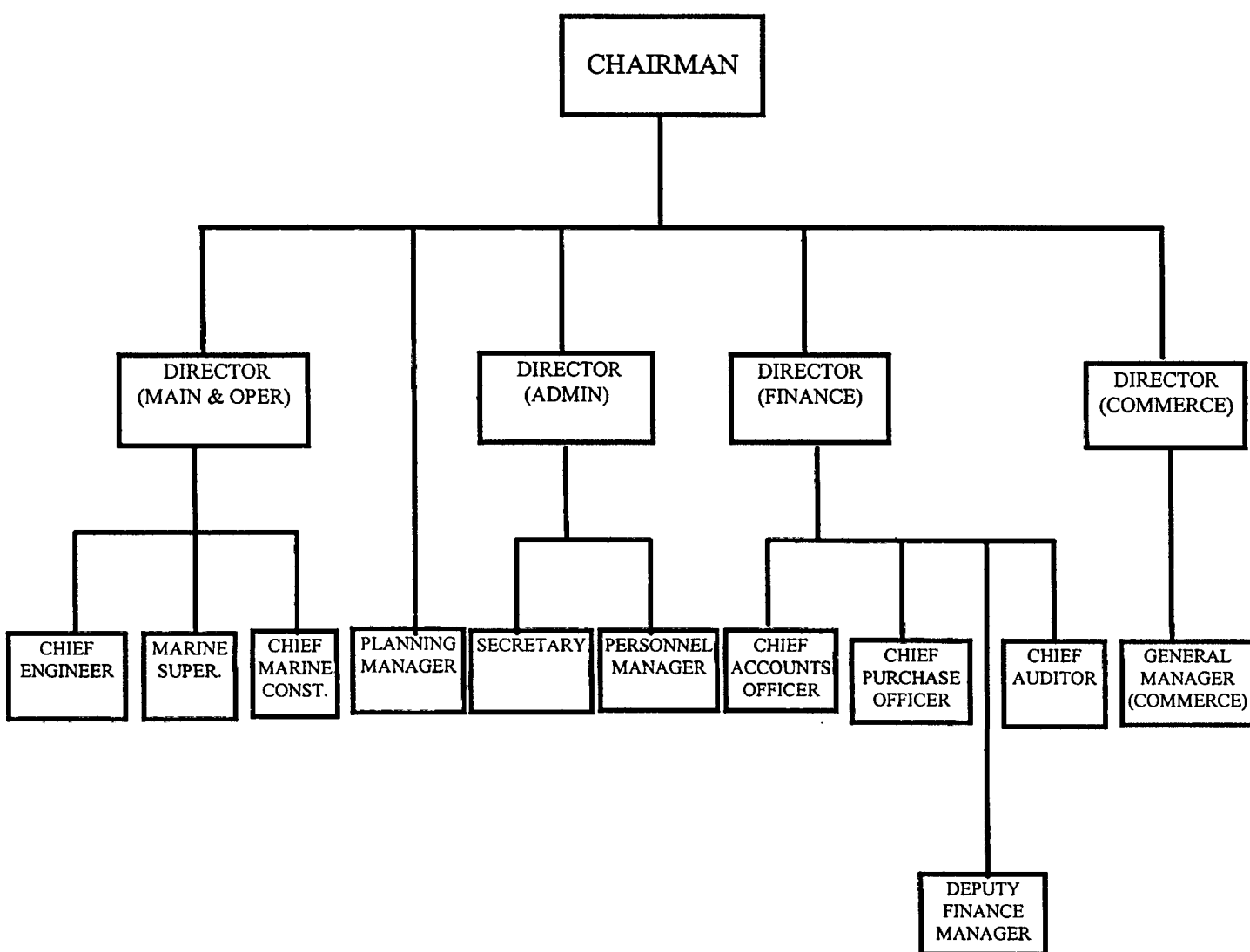
This corporation was created in 1972 mainly to took over the operations of inland water transport services in Bangladesh, after the independence war with Pakistan. At the time, there were about 10 private sector inland water transport corporations, abandoned by Pakistani and foreign owners, which were nationalised by the government of Bangladesh. BIWTC thus became responsible for a wide variety of water transport operations ranging from cargo tanker service, inland tug and barge operations, passenger services on inland waterways and between ports and offshore islands; and ferry services across major inland water ways. The mandate of this organisation has been to operate this government owned fleet. This organisation was formed to fulfil the following objectives:

- * To recommission all damaged craft and repair yards belong to the established units.
- * To restore the riverine and coastal transport net work including the ferry service.
- * To restore the transport link between the main land and offshore islands.
- * To establish freight rates minimum and prevent speculation by private operators.
- * To harmonise the inland passenger and cargo traffic and organise the safest and quickest transport of these.

Figure - 5

BANGLADESH INLAND WATER TRANSPORT CORPORATION
(BIWTC)

ORGANISATION CHART



BIWTC operates the largest fleet of around 300 vessels on the coastal and inland water ways. The corporation is managed by a Board of Directors, which consist of the chairman and four members. It has four major departments; commercial, maintenance and operation, finance and administration. Over the years BIWTC has never the less, developed certain key public services which are not provided by private vessel operators such as coastal passenger services to offshore islands and the main ferry services. The corporation also participates other market segments where it is direct competition with private operators, and in these BIWTC seeks to moderate the market, and provide the government with a minimum capability to transport essential commodities in the event of emergencies.

Various development projects are carried out by BIWTC to improve its activities and operations in the past. At the recent years a massive restructuring programme is under progress by BIWTC to restructure its fleet, organisation, personnel and finance with the financial assistance through World Bank. By increasing inland passenger transport capacity, the project would seek to ensure that the authority can address the essential elements of its development strategic plan is based on various in depth analysis of the BIWTC fleet and of private vessel fleets which provide inland water transport services in Bangladesh.

6.5.3.1 Vessels: BIWTC operates the largest fleet of vessels in inland water transport sector. There are 283 vessels are now in the fleet of BIWTC of which 73 vessels are auxiliary vessel. The other 210 vessels are in commercially operational of which in average 40 vessels are for repair and maintenance work. The BIWTC cargo fleet accounts for around 210 vessels (of which only 160 are truly in operation) and these have a load capacity of around 75000 Mt. BIWTC's passenger fleets accounts for around 43 vessels with a capacity of app. 8300 passengers. The commercial activities of BIWTC can be divided into the following three services,

namely; passenger service (including inland and coastal passenger service), ferry service, and cargo service (both Bay crossing and inland).

Table 18: BIWTC fleet

Type of vessel	Number	Passenger capacity(no.)	Cargo capacity(Mt.)
Passenger	13	7434	1466
Ferry	50	6428	1929
General Cargo/Tanker	39	-	36398
Barge	123	-	50833
Tug	30	-	-
Total	245	13862	86626

Source: 'Development of Inland Waterways' - A country paper presented by Mr. MM. Hussain, Joint Secretary, Ministry of shipping, Bangladesh held in Netherlands.

6.5.3.2 Coastal Passenger Service: These passenger service are provided by the Govt. To the inhabitants of the offshore islands. Two major routes on which these services operate are, a) Chittagong - Hatiya - Sandwip - Barisal (233km.) and b) Chittagong - Hatiya (145 km.). Very little cargo is carried by this service and a lack of infrastructural facilities on the island precludes carriage of significant amounts of cargo by the large mechanised vessels. The coastal passenger service contributes about 4% to total revenue.

6.5.3.3 Inland Passenger Service: The Dhaka to Khulna Rocket service is the main inland passenger service provided by BIWTC. Total 8 vessels are operating in the Rocket service. The inland passenger service contributes about 6% to total revenue of BIWTC.

6.5.3.4 Bay Crossing Cargo Service: The bay crossing cargo service contributes about 42 percent to the total revenue of BIWTC. This sector which includes tankers for petroleum products, coaster for bulk cargo and bay crossing tug barges has the potential for operating profitability. 12 tankers each of dead weight 900-1000 Mt. make up the BIWTC tanker fleet, primarily these vessel are used for carrying petroleum products from Chittagong to points inland. 18 vessels carry bulk cargo from Chittagong to inland destinations, such as, Dhaka. Bay crossing tug barges fleet consists of 35 barges and 6 tugs.

6.5.3.5 Inland Cargo Service: Inland cargo service consist of self propelled barges and inland tug barges. 8 self propelled barges are operated by BIWTC and 90 inland tug barges are actually in operation. This sector contributes about 5% to total revenue of BIWTC.

6.5.3.6 Ferry Service: Ferries contributes 44 % of the revenues of BIWTC, and of this the Aricha ferries (Aricha - Nagarbari, Aricha - Daulatdia) alone account for over 90 % of ferry earnings. The other important ferry is Bhuapur-Sirajganj ferry. Transport activities of BIWTC in the fiscal year 1985-86 to 1992-93 is shown in figure 7.

Among all these, the most favourable vessel for carrying container is the “Bay crossing coaster”, meaning sea going and certified to make the short crossing of the part of Bay of Bengal from Chittagong into lower Meghna river, should be the coaster of 600 dwt or more, with preferably a sizeable hold and breadth in excess of 10.5m which should give a minimum capacity of 24 TEUs. A bay crossing barge of the two hold configuration of 45m length could provide an alternative to the coaster but with a reduced capacity. For inland waterways use, the flat of approximately 70m length will provide a capacity of 48 TEU's.

Figure 6
Map of BIWTC Terminals

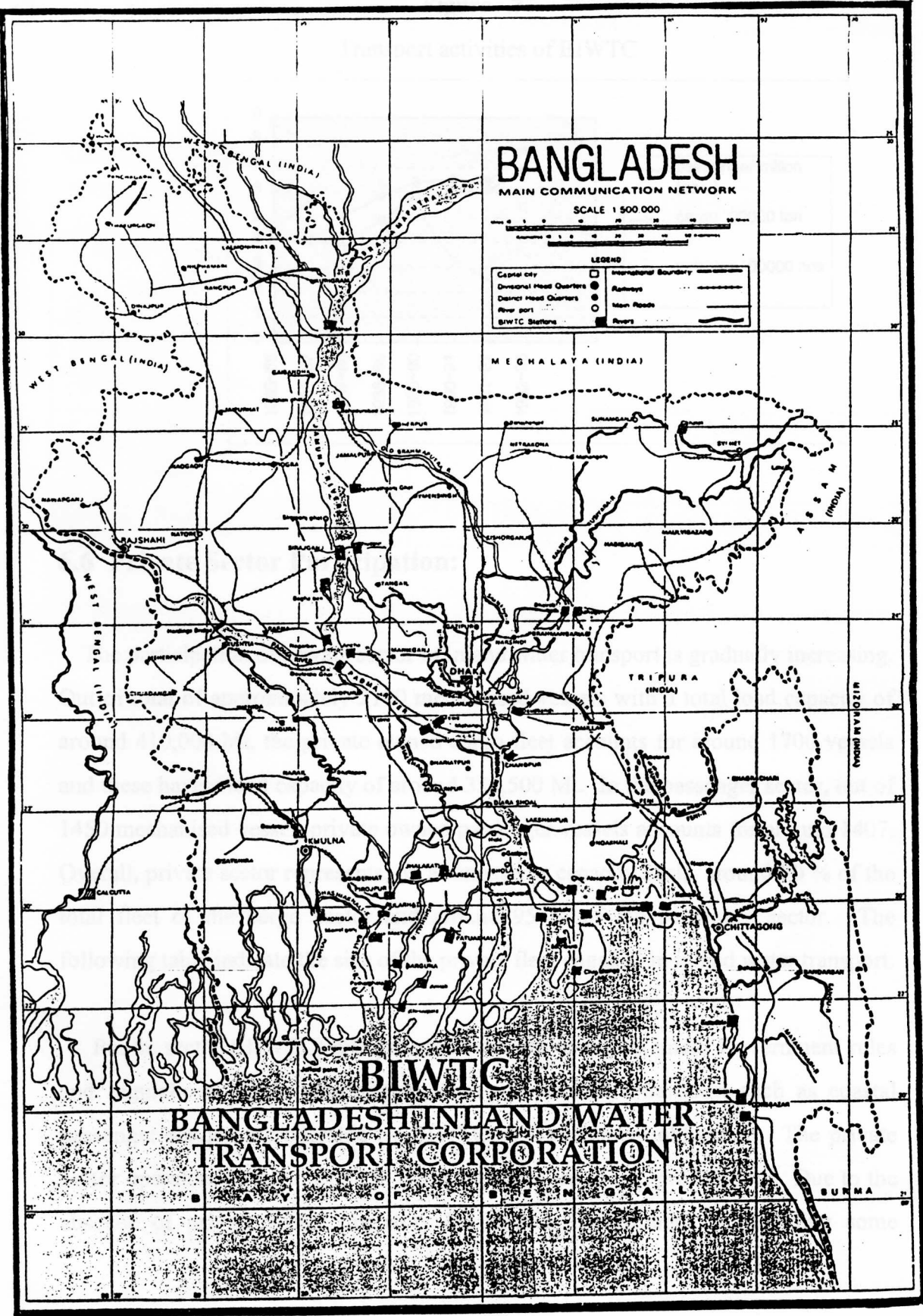
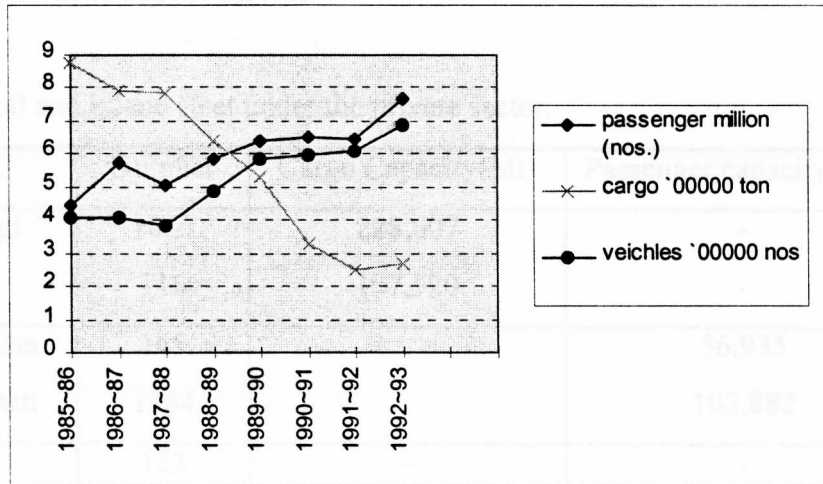


Figure - 7
Transport activities of BIWTC



6.6 Private Sector Participation:

The participation of private sector in inland water transport is gradually increasing. Out of total of approximately 2100 mechanised vessels with a total load capacity of around 410,000 Mt, the private owned cargo fleet accounts for around 1700 vessels and these have a load capacity of around 334,500 Mt. In the passenger sector, out of 1450 mechanised vessel, private owned passenger vessels accounts for around 1407. Overall, private sector represents, on a tonnage or capacity basis, around 80 % of the total fleet of the cargo sector and around 95 % of the passenger sector. The following table indicate the size of the private fleet engaged in inland water transport.

Public sector (BIWTC) and private sector are operating under Government rules and regulations. Some unprofitable areas of waterways transport such as coastal passenger service are operated by BIWTC as Government obligation. The private sector operators do not operate in these area because of non profitability. Due to the absence of private sector operators Bangladesh Government is providing some

limited subsidies to BIWTC for covering those losses which are occurring from operation of unprofitable coastal service.

Table 19: Coastal and inland fleet under the private sector.

Vessel Type	Number	Cargo Capacity(Mt)	Passenger capacity (nos)
General Cargo	1069	228,607	-
Tanker	116	107,520	-
Passenger coaster	165	-	56,935
passenger launch	1384	-	102,882
Towing	153	-	-
Barges	632	155,981	-
Total	3519	501,608	159,821

The freight rate, both for public and private operators; is fixed by the Government. This rate is followed by BIWTC, but for private operators; practically this rate works as ceiling. For them, the actual rate is determined by the supply and demand principle. As a government organisation, BIWTC has to follow the rules and regulations strictly which creates hidden barriers to operate as a true commercial organisation, specially in case of competition with private operators. To enable a perfectly commercial organisation BIWTC needs to operate in a free environment both in terms of policy making and decision making power which will ensure efficient operation based on cost benefit concept.

6.7 SWOT analysis of Bangladesh Inland Shipping Industry:

The SWOT analysis consists of an analysis of the inland shipping industry's internal strength (S) and weakness (W) together with an analysis of the external opportunities (O) and threats (T).

Strength and Weakness (S&W)

Bangladesh has an wide an extensive linkage with both sea ports and all major cargo centres. The transport costs in inland waterways are considerably lower than road or rail transport, especially for long distance shipments. The most important strength of inland shipping industry is probably its higher capacity and environmental standard.

Despite this favourable environment for waterway development the performance of inland water transport in Bangladesh is poor by almost any measure of performance. The inland shipping industry at present facing with two main problems: fragmentation and innovation. Majority of vessels that are operating in inland waterways slow speed, old and obsolete. The performance is decreasing gradually due to lack of modernised equipment. This industry is not capable enough to cope with the new innovative technology as fast as road and rail transport system. Enforcement of regulations would force many operators to scrap or otherwise remove obsolete vessels from the active fleet. This will simultaneously improve the productivity of the remaining fleet and enhance its physical condition.

Opportunities and Threats (O & T)

Government policy encourages the wide use of environmental friendly inland water transport system because of the growing consciousness about the environmental aspect of the people. Inland shipping industry can improve its reliability by expanding the number of shuttle services. More frequent and regular services enable inland shipping to compete more successfully with comparative services. In addition it will increase efficiency and consequently raise profits.

Shrinkage of existing network is obviously a threat to the inland shipping industry. This is due to the fact that water levels vary according to climatological changes. Inland shipping will become less reliable due to more frequent capacity changes and

inability to navigate. Existing modes of transport are upgrading their material and methods. By increasing its transport efficiency with the introduction of electric trains the rail transport may be a major threat for the inland shipping industry. Another dynamic and flexible transport mode is road which is expected to play a more dominant role within a few years in Bangladesh. A number of important highways is being reconsidered in order to carry containers. These elements represent the internal strength and weakness as well as external opportunities and threats that the industry is faced with.

Table 20: SWOT analysis of Bangladesh inland shipping industry

Strengths(S) * Wide and extensive linkage with both sea ports and all major cargo centres * Low cost * High capacity * Environmentally sound	Weaknesses(W) * Low customer focus * Fragmented * Unprofessional image * Insufficiently innovative * Low returns
Opportunities(O) * Government policy (focus on environment) * Innovative transfer facilities (Cheaper, faster and more reliable) * Shuttle service (frequent / reliable) * Transit cargo to the neighbouring countries	Threats(T) * Shrinkage of existing waterway network (water levels are getting more volatile) * New or upgraded modes of transport (competitors are getting better, new competitors are invented)

CHAPTER - 7

CONCLUSION AND RECOMMENDATION

Conclusion:

In Bangladesh containers will move in an increasing numbers to and from the sub-continent as a whole in the forth coming decade. The country itself cannot be isolated from this. The public and private entrepreneurs must adapt the suitable means of inland transportation, as best it can to the demands of containerisation. In Bangladesh the Chittagong Port Authority and the Bangladesh Inland Water Transport Authority have taken the initiative in planning for containerisation and the possibilities of container movement through inland waterways. For both Chittagong and Mongla Port Authorities it is important that, they serve the changing needs of the shipping industry.

Indeed, in most of Bangladesh, the very concept of container operations does not exist. No door to door facilities is in place for importers or garments' manufacturers, because the country's roads are in a pitiable state and the transportation facilities quite erratic. Road and Railway line construction are very expensive and their maintenance is not only difficult but costs the nation huge sums of money every year. In the inland water transport sector no such major investment is necessary for the basic infrastructure. A nominal investment in dredging and river training can serve

the nation much better and at much lower costs compared to rail and road construction costs.

There are no physical restrictions at this moment for the movement of inland waterway vessels that could carry containers and among the major ports of Dhaka/Naryanganj, Chittagong and Mongla. There is sufficient water depth at all times of the year to allow access for large purpose built container vessels in the future.

In the short term, the inland waterway provides the only feasible mode of transport for inland container movements and is likely to play a major part in the future. The individual public corporations such as the Bangladesh Inland Water Transport Authority (BIWTA), the Bangladesh Inland Water Transport Corporations (BIWTC) and the private sectors have an important part to play in this. The most important contribution of containerisation is the achievement of seamless, continuous (without intermediate loading and unloading the contents) and door to door transport service. Another important aspect of containerisation is the replacement of the existing traditional segmented transport system.

All the three modes of inland transport are mainly performing, in the traditional way of cargo transports except for rail that have a limited container carrying capacity between Dhaka and Chittagong. Container block train services require a large and regular volume of long distance transports in order to achieve economies of scale. Still now, road transports are dominating mainly for break bulk cargoes. Basic factors of inland water transports in Bangladesh are favourable and excellent. All parts, particularly south and south western parts are very suitable for carrying containers because the country is well connected by natural navigable waterways. The demand of IWT may be considered to increase with the improvement of important river port facilities. With regard to the cost savings of water transport

compared with the different means of land transport; it should seriously be considered to be an alternative.

Recognising the continuing growth of containerisation in the region BIWTC as a public sector organisation can take special responsibility for the long haul and very long hauls as well as for hauls in the coastal belts and to the islands. The private sector cannot handle this type of transports at this moment. The private sector uses vessels that operates in the short and medium distance trade. For distances more than 160 km the need is different and requires vessels with bigger investment. To have a return on such heavy investments takes a very long time- about 10 years. Most private sector investors would like to get their returns within 3-4 years. This type of return cannot be achieved by investing in container vessels that are particularly required for long haul operations. In Bangladesh, there are not many entrepreneurs who have that much of investment capacity in terms of owners' equity.

In Bangladesh, there is a tremendous demand for special container vessels because there are many containers which need to be moved on the river route in near future. As the largest inland vessel operator inside the country BIWTC has not enough vessels for carrying containers. To cope with the present demand of container movements in inland water ways it requires modification of existing vessels and at the same time early procurement of new vessels. Initially the movement of containers could be undertaken by the existing BIWTC coaster/barges fleet, with minor rebuilding. Cubic utilisation would of course be low, but this would be more than amply compensated by the short turn-around time assuming that inland water transport facilities could be better and more available.

The ship acquisition process may not be an easy task for BIWTC, as the organisation is not operationally profitable. It is bearing some inherital losses since its inception in 1972 and is accumulating losses, which are incurred by operating

older vessels. Another problem is that the corporation, shared with several other affiliated departments have the lack of funds. These constraints are magnified because of the government steps is not sufficient enough to subsidise the loss of coastal passenger services suffered by the organisation.

In other parts of the world many ports offer multiple choice between barge, train, truck or sea for container transports to the hinterland. The inland waterways network is a much under-used source of transport capacity within Europe. But along the river 'Rhine' the container volumes carried by inland vessels to/from Belgium, the Netherlands and Germany are quite substantial. The share of container movement from Rotterdam port by inland barge is 39% for incoming and 29% for out going container cargoes. This indicates the importance of waterways for transportation.

It is felt that radical changes take place with regard to formerly well defined hinterlands due to changes in transport systems and organisation as well as improvements in inland water transport. BIWTC, as a commercial organisation have to adjust themselves to these changes, and offer modern facilities to attract a reasonable share of trade.

To gain the full economic benefits of containerisation it is necessary to offer adequate inland port facilities for handling and storage of boxes on the one hand and efficient use of inland water transport systems on the other hand. This aspect calls for high-density, regular and uninterrupted traffic flows between ports and inland terminals in order to achieve the special advantages from the cost structures of inland waterways. Local collection and delivery by road vehicles makes complete door to door service possible. Rising overall transport cost can be met only by a high degree of flexibility and a continuous search for new solutions concerning all parts of the transport chain.

The establishment of port related industries will positively encourage container movements inland away from the immediate port area. The Export Processing Zone (EPZ) in Chittagong and Dhaka is definitely a step in this direction. Although sufficient consideration had not been given to the prospect of containerisation but as a prime candidates for containerisation, EPZ should consider appropriate planning widening market strategies related to the containerised cargo.

Recommendation:

In view of the containerisation of the country's export import trade to and from hinterland to the ports it is felt that government of Bangladesh should develop the infrastructure so that public as well as private sector can share the market. Including Dhaka and Naryanganj river ports, some other important river ports as Chittagong, Barisal and Khulna should also be well equipped with modern cargo handling equipment and other facilities.

For adapting the present demand of container need, government should assist the acquisition of container vessels by providing long term loan and interest subsidies. To encourage both public and private sector entrepreneurs the financial institutions should also offer long term loan with less interest rate and easy terms and conditions.

Sedimentation and siltation may occur in the major routes due to the nature of meandering river. To keep the main route navigable through out the year the government should take necessary steps for extensive and continuous dredging. This can be done by upgrading the utilisation of the present dredging equipment and also by acquiring some new dredger.

For efficient operation of a modern container vessel BIWTC should provide adequate training facilities to its existing crews, so that they can comply with matters related to documentation, loading and unloading of containers, safety and other regulations. Requirement for the crew also includes their minimum qualification, education and training, minimum number of crew on the vessels, working hours and working environment of the crew.

Good co-ordination is essential between all parties namely, shipping company/agent, customs, operators at inland ports, consignees, exporters, IWT and truck companies; if the entire process is to be successful. Full co-operation with the public authorities will require organisational and institutional changes. As a commercial organisation under the public entity BIWTC, should play an active role for safe and effective movement of containers by providing efficient management

In Bangladesh, inland shipping is considered to be a primitive business. Although in the past inland water transport was the only means of communication both for passenger and freight, but in the recent days both passenger and cargo has shifted to other faster modes of transportation like road and rail. This trend is growing because most of the large rivers are connected by bridges. After completion of Jamuna multipurpose bridge, definitely BIWTC will lose a substantial market share from ferry sector, which is the only profitable sector of the organisation. BIWTC may have to reallocate these ferries to some other non important routes but that may create over capacity, which ultimately in the long run may turn this sector unprofitable. To avoid this kind of risk and in order to survive as a commercial organisation BIWTC should pay more attention on traditional bulk and liquid cargo and particularly should concentrate on container movement.

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