RIVERINE PASSENGER VESSEL DISASTER IN BANGLADESH: OPTIONS FOR MITIGATION AND SAFETY

A Dissertation for the Degree of Master in Disaster Management

Submitted By
ABUL KALAM AZAD
Student ID: 08268023

Fall 2009

Postgraduate Programs in Disaster Management (PPDM)
BRAC University, **Dhaka, Bangladesh**

Riverine Passenger Vessel Disaster in Bangladesh: Options for Mitigation and Safety

Acknowledgement

The study on Riverine Passenger Vessel Disaster in Bangladesh and Options for Mitigation and Safety would not have been possible without the support and cooperation of the various government and non-government officials. The author likes to convey his gratitude and sincere thanks to all of them. His appreciation also goes to some of his friends and colleagues who tried to help him by providing their valuable views and information in various aspects of the subject matter. The author expresses his sincere thanks to Canadian International Development Agency (CIDA) and Comprehensive Disaster Management Programme (CDMP) for their financial contribution to the program.

The author is grateful to Mr Zahid Hossain, The Chief Inspector of the Department of Shipping (DOS) for his whole hearted support by providing current data and other information related to the study. Continuous suggestions by Lecturer M Aminur Rahman, Program Coordinator of the Postgraduate Programs in Disaster Management were an immense help to shape up the report.

Finally the author likes to acknowledge the amiable and professional contribution of Dissertation Supervisor Professor **Dr. Fuad H Mallick**, the Director of Postgraduate Programs in Disaster Management, BRAC University for his constant guidance and precious advice towards the successful completion of the study.

Abstract

Bangladesh is a riverine country and waterways are very important means of communication in this region. Since long, traditionally river network has been regarded as safe and cost-effective route especially in the southern part of Bangladesh. Every year around 87.80 million passengers are carried through this route (Bangladesh Inland Water Transport Authority). This important mode of transport is ridden with tragic disasters every year, incurring a heavy toll of human lives. Around 3,869 people have died and 279 gone **missing** in 458 launch disasters since 1976 (Department of Shipping). The inland routes of **Barisal**, Bhola, Chandpur and Patuakhali and their connected water ways to Dhaka and Chittagong are found to be more accident prone. Boundless operation of unfit vessels, overloading of passenger, recruitment of unskilled crews, poor capacity of relevant government bodies and low standard maintenance of Inland Water Transport (IWT) channels are initiating these deadly accidents. The government's weakness in enforcing **laws, mismanagement**, negligence and irresponsibility of concern authorities, profit centred attitude of vessel owners, corruption and insufficient budget are the underlying causes of these tragic disasters. The unlimited death causing accidents definitely has a negative impact on this promising sector of transportation. Government is to take immediate **measures** for establishing risk free riverine transport systems and eradicating irregularities and corruption from this sector for proving sincerity and pro-poor stance. This study is an attempt to identify different factors that **causing** passenger vessel fatalities and thereby addressing viable options for Bangladesh.

Table of Contents

List of Figures

List of Tables

List of Abbreviations

ADP	Annual Development Program
BIWTA	Bangladesh Inland Water Transport Authority
BRTC	Bangladesh Inland Water Transport Corporation
BWDB	Bangladesh Water Development Board
C&P	Conservancy and Pilotage
CPA	Chittagong Port Authority
DOS	Department of Shipping
GIS	Geographic Information System
HHWL	Highest High Water Level
HP	Horse Power
ICT	Inland Container Terminal
IWM	Institute of Water Modeling
IWT	Inland Water Transport
LAD	Least Available Depth
LGED	Local Government Engineering Department
MOS	Ministry of Shipping
MPA	Mongla Port Authority
RHD	Roads and Highway Department
SHWL	Standard High Water Level
SLWL	Standard Low Water Level

List of Relevant Glossary

"**Disaster**" A disaster is a catastrophic situation in which the day to day pattern of life are suddenly disrupted and as a result people need protection, food including water, shelter, clothing, medical and social care and other necessities of life.

"**Hazards**" It is a phenomenon or situation, which has the potential to cause disruption or damage to people, their property, services and their environment. Hazard is a probabilistic function of magnitude or intensity, according to the hazard type over time.

"**Risk**" The probability that a community's structure or group of people or geographic area is to be damaged or disrupted by the impact of a particular hazard, on account of heir nature, construction and proximity to a hazardous area.

"**Draft**" It is the height of the underwater hull of a vessel below the water line.

"**Inland passenger vessels**" Unless other wise stated, Inland passenger vessels includes all types of water transport operating in the inland waterways to carry passengers.

"**Pilotage**" It is the temporary service of an experienced crew to guide master of a vessel in unfamiliar channel for safe navigation.

"**Inland navigable** waterways**" means and includes** all rivers and canals where vessels can ply during any part of a year;

- ➢ Any lake, haor, beel or any other expanse of water which are used by vessels in any part of the year;
- > Shores of the above mentioned waterways;
- ➢ Inland river ports, Landing ghats and terminals maintained and operated by the authority on any of the above mentioned waterways.

"**Inland ship**" means every description of vessel ordinarily plying on inland waters and propelled wholly or in part by steam, liquid fuel, electricity or any other mechanical powers and includes a sailing boat, dumb barge and other craft which is not so propelled but is towed or pushed by a vessel so propelled.

`**Inter-Zonal** Service' means inland water transport Passenger vessels plying through any two or more zones.

"**Mitigation**" Measures taken prior to the impact of a disaster to minimize its effects.

"**Obstruction**" means any impediment to the use of inland navigable water ways by any means.

`**Owner**' means a person or a body of persons engaged in the business for the carriage of passengers or cargo or both either for hire or for reward, by Mechanically Propelled

Vessels either owned or partly owned or chartered by him/them or mortgage-in-possession or agent of a vessel.

"**Passenger**" includes any person carried on board an inland ship not being the master, officer and a member of the crew of the inland ship.

"**Response**" Actions taken immediately following the impact of a disaster when exceptional measures are required to meet the basic needs of the survivors.

`**Season**' **means a** period of time in a calendar year.

"**Survey**" means survey of an inland ship under this Ordinance.

"**Surveyor**" **means** a surveyor appointed under this Ordinance.

"Voyage" in relation to an inland ship, includes plying at or about any place within the inland waters.

"Vessels" means and includes any thing made for the conveyance by water of human being or of property.

"Wreck" **means and** includes the following when found in the inland navigable waterways or on the shores thereof-

- Goods which have been cast into the waterways and then sink *and* remain under water;
- Goods which have been cast or fail into the waterways and remain floating on the surface;
- Goods which are sunk in the waterways, but are attached to a floating object in order that they can be found again.
- Goods which are thrown away or abandoned;
- A vessel abandoned without hope or intention of recovery; and
- A vessel sunk or capsized due to collision, storm or any other reasons.

`**Zone**' **means** the geographical divisions of Bangladesh into suitable areas for the convenience of operation and control of inland water transport as defined in appendix E- I and E-2 to these Rules.

`**Zonal service**' means the Inland water transport passenger vessels plying **in a zone as** defined in appendix E-1 and E-2 to these Rules.

Chapter 1: Introduction

1.1 Background

Bangladesh is a riverine country situated in the funnel shaped coast of the Bay of Bengal. Due to her geographical location, a large number of rivers flow through the country towards the Bay of **Bengal** forming a strong river network. In the absence of strong land based transportation infrastructure, the cheapest water transportation is considered as very powerful and essential means of communication in this underdeveloped country. As a result the inland water transportation is capable of playing very significant role in the national economy. Passengers and goods of different kinds are transported through out the country **using** her strong river network. Different kinds of Inland Passenger Vessels are plying in the inland routes. Thereby passenger vessel has become the major modes of transport. In places inaccessible by land, water transport acts as the only gateway of communication with rest of the country. This important mode of transport is ridden with tragic accident every year, incurring a heavy toll of human lives and properties. Recurring riverine accidents may influence shifting of transportation loads towards roads and highways. These will definitely cause overburden to weaker land based transportation network.

I

Figure 1.1: Scores are killed each year** from ferry **disasters in Bangladesh; Source: Author

After each accident uproar follows. Media and people cry out for drastic measures to review and restructuring of the existing rules and system. Various anomalies regarding

design approval, issuance of fitness certificate, insufficient budget etc is pointed out. Unfortunately nothing happened positively for the safety in this respect. This crippled sector needs a complete overhaul. With the development of technology and public awareness, it is the time demand issue to mitigate the risk involved in riverine passenger vessel operations to minimize tragic accidents. And that is not a job of the relevant authorities alone. A lot depends on government policy itself. This study attempts to provide a comprehensive picture of riverine passenger vessel disaster in Bangladesh followed by options for way out.

1.2 Risk and Hazards of Riverine Transportation

Over the past several decades, the number and frequency of large-scale passenger vessel fatalities had been increased in a dramatic way. This trend has continued to the present time, with over 4,000 people reported to have died between January 2000 and May 2004 alone (DOS 2004). Over 350 dead bodies were recovered in the year of 2005 (DOS 2006). In addition, precise documentation is not always possible because of the unknown actual number of passengers. Passenger vessels are operating in inland waterways with deadly hazards all around. Most frequent hazards in the Inland Waterways are as follows:

> Inclement weather': cyclone, tornado

- Underwater fishing nets and bamboo
- Wrecks

> Sunken ships

- Low depth
- Foggy weather
- Low visibility

Naked and live electric wire

Confluences2, underwater current

> Other unknown obstructions

Passenger vessels running with above mentioned hazards are always at risk of following deadly events:

' Inclement weather can include any kind of extreme weather, usually snow or ice, fog, storm, tornado etc which might create hazardous driving conditions or significantly impair safe navigation into the channel.

2 It is place where two or more river flow meets into the same point creating turbulence or vortex which is very dangerous to ships or vessels.

- Collision
- Foundering3
- Fouling4
- Capsizing

1.3 Objectives

The objective of this dissertation is to draw a comprehensive picture of riverine passenger vessel accident scenario of Bangladesh followed by possible options for mitigation. The objectives will be sought under following approaches:

- Examining the types and consequences of accidents
- Identifying underlying causes
- Figuring out possible **measures** for mitigation

The study will follow a framework involving parties responsible for safety across the full social fabric. This will include owners, local and national authorities, individual passenger, national trade associations and regulatory associations.

1.4 Methodology

To conduct this study different sources have been explored for both primary and secondary data and facts. The existing organizational structure of relevant authorities, government budgetary allocation, inland waterways routes, vessels, registration, training etc has been examined for this purpose. Therefore, emphasis has been given on collection of information from various daily newspapers, reports, individuals and database of Department of Shipping (DOS) and Bangladesh Inland Water Transport Authority (BIWTA).

It has been found that different organization has different types of data to meet their own requirements. Therefore, compilation of database by cross matching with different sources was a troublesome task. However, a total of 201 accidents from 1975 to 2009 have been considered in this study. A database has been developed using SPSS which comprises five different variables.

3 A nautical term used to describe a vessel that has ceased to operate properly and is beginning to sink below the water

4 Being obstructed by any submerged elements or river bed, wrecks etc

1.4.1 Primary Sources of Information

The study has been conducted primarily with practical observation and also interviewing of following personnel:

- A number of officials of BIWTA at different levels
- A number of officials of DOS at different levels
- Few launch owners,
- Inland marine crews,
- Few victims,
- Passenger and
- Few engineers of various shipyard

1.4.2 Secondary Sources of Information

As for secondary sources of information relevant websites, papers and articles, daily newspapers and statistical brochures, available database, relevant study reports have been consulted. Existing practices for risk reduction in various countries have also been consulted for real time approach of the problem.

1.4.3 Data Analysis

Relevant data has been compiled by cross matching among different sources. Thereafter data has been processed in computer by using Statistical Package for Social Science (SPSS version 17) and Microsoft Excel.

1.4.4 Facts Representation

The facts and figure have been represented in the forms of tables and figures by using appropriate software package.

1.5 Scope of the Study

The study is expected to provide a scenario of riverine passenger vessel fatalities of Bangladesh. It is an endeavor to identify underlying causes of such fatalities along with possible ways to reduce it up to reasonable level. In doing so, the riverine transportation networks, infrastructures, concerned authorities, passenger vessels, risk and hazards, budget allocation, relevant laws etc have been taken into consideration.

1.6 Limitation of the Study

The study has been confined to the riverine passenger vessel accidents in Bangladesh. Moreover this study is simply an inquiry through some practical observations, interviews, available data and literature resources. There are more scope remains to work out to present a more specific and qualitative finding and solutions on this subject matter.

Chapter 2: Literature Review

2.1 History **of IWT of Bangladesh**

The use of waterways by 'mechanized vessels in Bangladesh began more than 150 years ago. Lord William Bentinck was the name of the first inland steamer vessel that propelled in the river Ganges in 1834. The steamer was owned by the Government. The India General Navigation and Railway Company Ltd. (I.G.N.R.), the first inland steamer company in India, was floated on February 6, 1844. During the latter part of the nineteenth century (1880-1899) as many as 898 vessels used to ply on the route from Calcutta to Khulna through the Sundarbans every year. The development of inland ports, terminal facilities and ancillary services for a smooth and safe navigation were adjuncts to the commercial requirements of the individual operators. There were no provision for governmental control and maintenance of waterways. The river conservancy work was carried out at the district level by the companies. Each district was headed by a Pilot Superintendent comprising a large establishment of pilots and surveyors grouped together and placed along the navigational routes. Each group used to cover a specified length of the waterways. They used to inspect the channels regularly using country boats and measured depth with bamboos and other materials. They demarcated the deepest part or the shallow **area** with bamboo sticks. Whenever a vessel arrived in a particular pilot station a pilot went on board and guided the master of the vessel for negotiating the river.

During the early part of the twentieth century only little infrastructural development was implemented on the waterways for navigational purpose except development of the Madaripur Beel route. The first dredger was acquired in 1907 for the improvement of navigation which was named "Foyer". Utilising this dredger the Madhumati River, the Madaripur Beel route, the lower Kumar and Gopalganj loop were excavated. The second dredger called "Alexandra" was purchased afterwards. Thus dredging was introduced in the river conservancy work. But still many problems were unattended which include development of inland ports and navigational guides. During British period the Gabkhan Khal an existing narrow creek between the mighty tidal rivers was excavated and moderately widened. The Bengal Legislature passed the Inland Waterways Bill in 1934.

[1] Vessels operated by motor power.

This would have set up a Waterways Board. Unfortunately the act was never put into operation.

Since the creation of Pakistan, however, several proposals were made by the various experts and agencies for the creation of a competent statutory organization for the management, operation and development of inland water transport sector. Though many proposals were made from time to time for the creation of a statutory organization to look after the IWT, no effective steps were taken until October 1958. To set up an authority for development, maintenance and control of inland water transport, the then East Pakistan Government promulgated an ordinance called the East Pakistan Inland Water Transport Authority Ordinance, 1958 on 31st October, 1958 (E. P. Ordinance. No LXXV of 1958). On November 4, 1958 the Government constituted East Pakistan Inland Water Transport. The present Bangladesh Inland Water Transportation Authority (BIWTA) is the successor organization of that.

2.2. Present Scenario of IWT

Presently waterway is a vital means of mobility in the coastal transportation. Inland passenger transports perform two types of function: Vessels that used for river crossing are designed to carry land vehicles; and vessels that travel longer distances with passengers and goods throughout the country but mainly in the islands and delta communities. The first category of vessels rarely involved in accidents whereas the second one is more likely to be involved in catastrophic accidents. There is a huge water ways in Bangladesh with a large number of inland ports *(Figure 2.1)*. About 87.80 million people use these routes every year (BIWTA 2009). Especially people from coastal districts and islands including Bhola, Barisal, Patuakhali and Barguna have their day to day communication with Dhaka and other major cities through water transports. As a result pressure on river route is increasing day by day but the support from the government and the concerned authorities in terms of management is decreasing as well. Passenger vessel operators exploit these scopes and openly ignore government regulations, bribing concerned officials to ignore government regulations.

Bangladesh IWT Networks

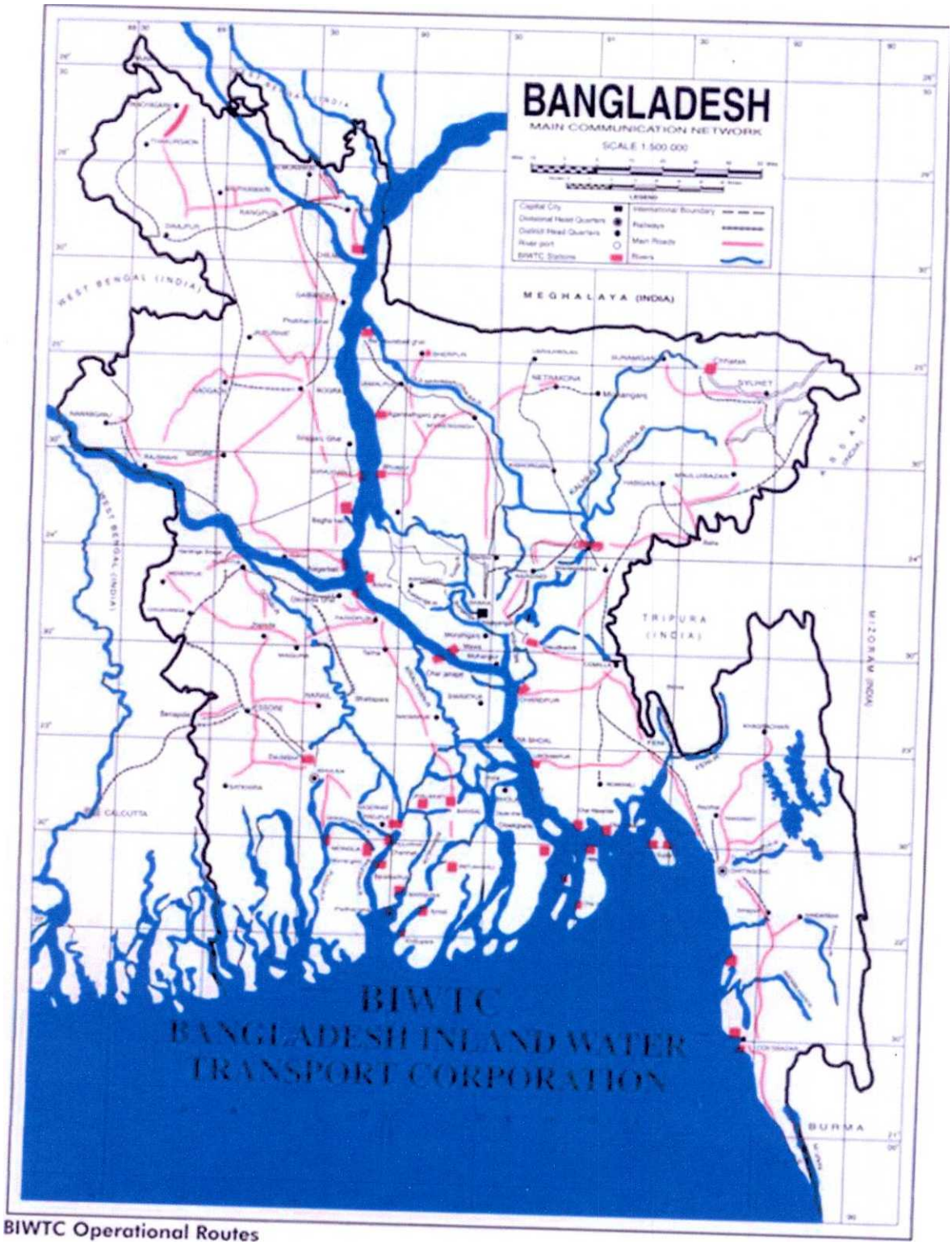


Figure 2.1: IWT Networks of Bangladesh; Source: BIWTC

2.3. Importance of IWT

Among the four means of transportation (air, road, rail and water), water transportation is the most efficient, least expensive and environmentally safe. In Bangladesh Inland Water Transport (IWT) contributes 30% of overall freight transport output and 20% of passenger travel (Banglapedia, 2004). Besides, inland water transport is very important because of the following reasons:

- It ensures access to the remote areas where development of other modes is not feasible.
- It attracts new industries to the remote zones.
- It helps expanding markets for a regional resources and products.
- It generates water related recreation and tourism activities.
- It creates related small business opportunities.
- The maintenance cost of waterways is much less than other modes of transportation.

Bangladesh, a flat alluvial delta, is a land of three mighty rivers, Padma, Meghna and Jamuna. A dense network of water bodies cover the major parts of the country and provide a relatively cost effective means of transport, particularly for the coastal settlements in the southern districts. The *Figure 2.1* clearly shows the vast waterway network which allows access to almost all parts of the country.

2.4 Inland Waterways **of Bangladesh**

Bangladesh has about 24,000 km. of rivers, streams and canals (BIWTA, 2009) that together cover significant portion of the country's surface. Most part of the country is linked by a complex network of waterways which reaches its extensive size in the monsoon period. Out of 24,000 km. of rivers, streams and canals only about 5,968 km. is navigable by mechanized vessels during monsoon period. It shrinks to about 3,865 km during dry period. The detail breakdowns of inland waterways are given in the *Table 2.1.*

Table **2.1: Status of Inland Waterways**	
Length of inland waterways	4,000 km.
Length of navigable waterways Monsoon Dry season	 5968 km. 3865 km.
Least available depth range	.90 m to 1.50 m.
Annual water discharge	1400 billion cubic meters.
No. of passenger carried (In year)	87.80 million.
Quantity of cargo carried (In year)	.58 million ton.

ource:

The status of river routes is shown in the *Table 2.2.* Inland waterways are specifically called `routes' which serve to interconnect or link various inland ports or `nodes'. On the basis of scale of operation and the least available depth (LAD) the IWT routes are grouped into following four classes:

- Class **I routes** include the main arteries of traffic flow connecting the five principal river ports, viz. Dhaka, Narayanganj, Chandpur, Barisal and Khulna as well as connecting them with the sea ports of Chittagong and Mongla. The more important routes in this category are (i) Narayanganj-Chittagong via Chandpur; (ii) Narayanganj-Mongla via Chandpur, Barisal and the Sundarban channels; and (iii) Mongla-Khulna.
- Class **II routes** are secondary routes which provide links between the principal river ports and the secondary river front centres. On these routes, dredging operations are often required in order to maintain navigability. Some of the notable routes in this category are (i) Chandpur- Goalundo; (ii) Chandpur Barisal; and (iii) Narayanganj/Dhaka-Chhatak (in Sylhet) via Bhairab Bazar.
- Class **III routes** are IWT links of regional importance connecting smaller commercial centers like Patuakhali, Bagerhat, Kushtia, Jhalakati, Chilmari, Chandraghona etc.
- Class IV routes are also often recognized for such routes which are entirely seasonal and serve as feeder routes to the other three classes of routes.

Table 2.2: Inland Navigable Waterways				
Name of Route	**Minimum Depth**	**Length of Route and Percentage**	**Minimum Vertical**	**Minimum Horizontal**
Class- I	3.66 m	683 km (11%)	18.30 m	76.22 m
Class- II	2.13 m	1000 km (17%)	12.20 m	76.22 m
Class -III	1.52 m	1885 km (32%)	7.62 m	30.48 m
Class -IV	Less than 1.52 m	2400 km (40%)	5.00 m	20.00 m
Total		5968 km (100%)		

***ource**: BITWA 2009*

2.5 Navigational Aids and Night Navigation Facilities

Navigational aids are very **essential** elements of waterways. Beacons, light buoys, iron marks, bamboo marks even lead lines are used to mark shoals, channel bends, shallow patches and other obstructions in the waterways. All of these are used for safe navigation. Various navigational aids used in waterways of IWT is shown in the *Table 2.3*

Table 2.3: Navigational Aids in IWT							
	Positions						
Nav Aids	East Delta, Chitta-gong	Central delta, Chandpur	West delta, Khulna	North-east Sadargha	South delta, Barishal	Aricha	Total
Lighted buoy	16 nos.	15 nos.	7 nos.	5 nos.	8 nos.	-	51
l0m Tower beacon	3 nos.	1 no.	2 nos.	1 no.	5 nos.	-	12
4.5 Tower beacon	44 nos.	84 nos.	46 nos.	54 nos.	114 nos.	23 nos.	365
Spherical buoy	8 nos.	11 nos.	10 nos.	36 nos.	16 nos.	-	81
P.C Pole marks	-	-	-	427 nos.	-	-	427
Iron Marks	74 nos.	65 nos.	350 nos.	54 nos.	275 nos.	21 nos.	839

ource:

Out of 5968 km of waterways, only 1600 km have been provided with night navigational aids. Thus the major part of IWT networks remains risky. The navigation of vessels in this huge portion of networks is entirely depending on the assumption and experience of

vessel crews. Therefore vessels are plying blindly in the night in these routes. The details are shown in the *Table 2.4.*

Table 2.4: Waterways **for Day and Night Navigation**

Sr No	Class of waterways	Length (km)	Navigation	
			Day Only (km)	Day & Night (km)
1	I	638	-	638
2	II	1000	688	312
3	III	1885	1278	523
4	IV	2400	1290	43
Total		5968	3256	1561

ource:

2.6 Vessels Operating in Inland Waterways

There are several types of inland water transports operating throughout the country. For simplicity, these are considered under seven different categories as follows:

- Cargo Ships
- Passenger Launches
- Passenger Trawlers
- Passenger steamers
- Cargo Trawlers
- Ferries
- Engine Boats
- Country Boats and
- Others

Cargo ships (Figure 2.2) are basically larger vehicles which are made of steel hull and often designed with sub-divisional bulkheads to provide water tightness to the cargo holds. In addition, cargo ships contain cargo hatch openings on the upper deck through which the commodities are being loaded and unloaded. Also some cargo ships contain self-sufficient pumping facilities to load or unload liquid cargoes on or off the cargo holds.

I

a

Figure 2.2: Cargo Ship; Source: Author

The passenger launches (Figure 2.3) are generally made of steel hull with no designated cargo holds. Instead of conspicuous cargo compartments, passenger launches contain smaller private cabins to provide some luxury and privacy to the wealthy passengers. Nevertheless, in most of the passenger launches there remain large open spaces on the decks where the economy class passengers reside disorganized during a journey. It is worth mentioning that both cargo ships and passenger launches are designed with mechanical or hydraulic steering and mostly being used for medium to long distance traveling in Bangladesh.

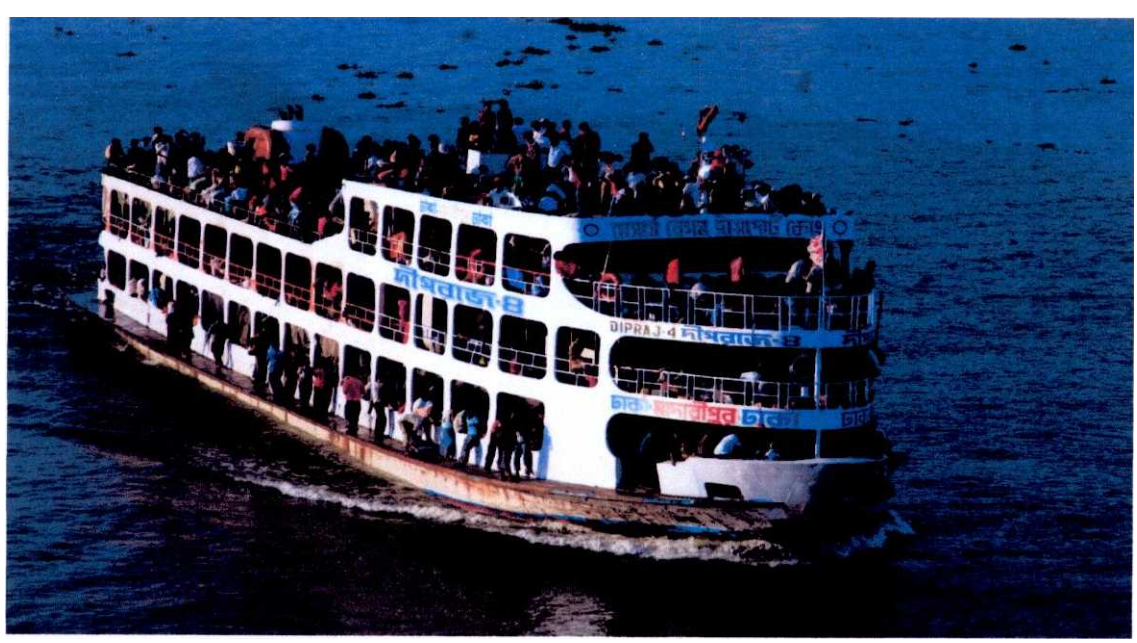


Figure 2.3: Passenger Launch; Source: Author

Passenger trawlers and cargo trawlers are both similar kind of vehicles where the only difference lies on what they carry during their voyages; i.e. if they carry passengers during a voyage, they are designated as passenger trawlers and if they carry cargo, they are called as cargo trawlers. Basically these vehicles are large wooden vessels with some steel plating adhered at the outer skin and also have engines mounted at the rear end. Most of them contain neither cargo holds nor passenger cabins except for a few enclosed spaces for the crews and therefore, these vehicles are used for medium to short distance traveling.

The engine boats (Figure 2.4) are probably the most popular mode of transportations for medium to short distance traveling. Such boats are wooden made and propelled by agricultural multipurpose engines which are often known as shallow engines. These vehicles are relatively smaller than trawlers but noticeably larger than littler country boats. No compartments or enclosed spaces are found in this type of vessels and fundamentally these vessels have only one deck to carry passengers and their commodities and steers manually using locally made rudders.

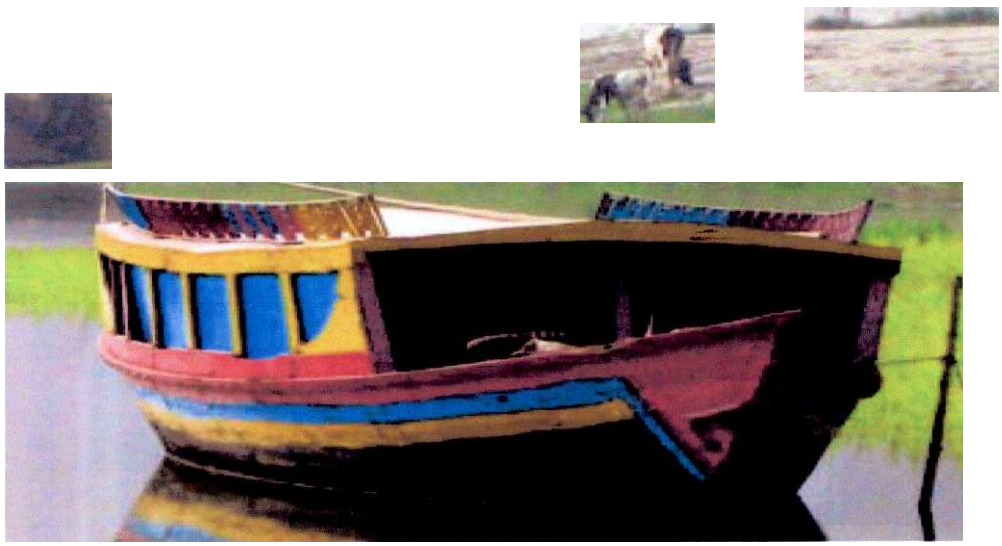


Figure 2.4: Engine Boat; Source: Author

The country boats (Figure 2.5) in Bangladesh are many in numbers and varied in types with rich traditions that trace back hundreds of years in to the past. However, the common characteristic that most of the country boats possess is that all of them are non-mechanized and manually maneuvered. Most of the country boats have the provision of being towed by the wind power using very traditional looking sails, particularly in the inland waters of the country. Bangladesh has a wide range of marine vehicles both in

numbers and in types. All vessels are not registered under DOS. However, *Table 2.5* shows the statistics of registered vessel under the Department of Shipping.

Figure 2.5: Country Boat; Source: Author

Table 2.5: Registered Vessel Under Department of Shipping Under Inland Shipping Ordinance 1976

Sr No	Types of Vessel	As on 2006	As on 2007	As on 2008
1	**Passenger** Vessels	2075	2089	2122
2	Cargo Vessels	1898	1954	2041
3	Ferry	94	94	94
4	Oil Tanker	127	136	150
5	Tug	270	271	271
6	**Dumb Barge**	1650	1659	1666
7	Fishing Boat	70	70	70
8	**Speed Boat**	615	615	664
9	**Inspection** Lunch	421	422	422
10	Sand Carrier	1232	1974	2488
11	Others	604	664	699
Total		**9056**	**9948**	**10687**

***Source**: **Department** of Shipping 2009*

2.7 Relevant Authorities

A number of government and non government bodies are associated with operation, maintenance and development activities of Inland Water Transportation System of Bangladesh. The principal bodies are as follows:

- **Ministry of Shipping (MOS)**
- **Department of Shipping (DOS)**
- **Bangladesh Inland Water Transport Authority** (BIWTA)
- **Bangladesh Inland Water Transport Corporation** (BIWTC)

The institutional relationship of these organizations is shown in the Figure 2.6.

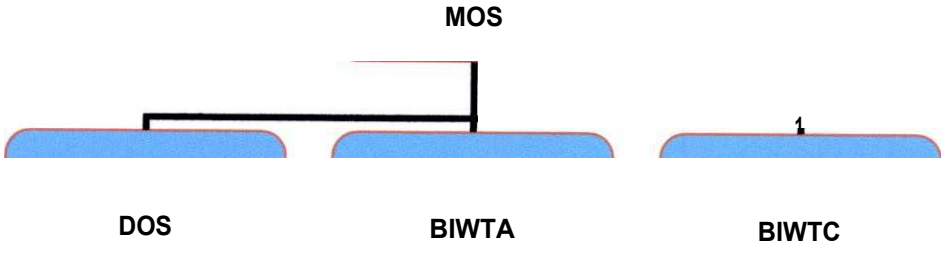


*Figure **2.6: Organization Structure** of IWT Authority*

2.7.1 Ministry of Shipping (MOS)

The Ministry of Shipping is the ministerial part of the Government of Bangladesh. It formulates policies regarding development, maintenance and operational activities in connection with IWT.

2.7.2 Department of Shipping (DOS)

Department of Shipping (DOS) is a directorate under the Ministry of Shipping of the Government of Bangladesh. It is mainly concerned with overseas shipping. The function of this department with inland shipping is mainly looked after by the Inspectorate of Inland Shipping headed by the Chief Inspector. The functions of DOS include following:

- Approval of design and drawing of vessels.
- Inspection of vessels construction and issuance of completion certificate.

- Examination of deck and engine hands and issuance of competency certificates.
- Implementation of safety rules, regulations and orders.
- To carry out annual survey of vessels under Inland Shipping Ordinance (ISO).
- To register the vessel with the Registrar of Inland Ships.
- To carry out investigations of marine accidents and identifies the person(s) responsible for that accident.

2.7.3 **Bangladesh Inland Water Transport** Authority (BIWTA)

BITWA is a recognized authority for development, maintenance and control of inland water transport and of certain inland navigable waterways in Bangladesh. It is considered as the guardian of Inland Water Transport System. This organization works under the Ministry of Shipping and consists of one chairman and two other members who directly control 13 different departments. Each department is headed by a director or its equivalent. BIWTA conducts hydrographic surveys in 3,000 km of inland waterways and 1,000 sq. km. of coastal area every year. The volume of its annual dredging is about 2.5 million cubic meters. It carries 50 million passengers every year. Presently BIWTA has following capacities:

2.7.3.1 Capacity of BIWTA

- 21 nos. Inland River ports *(Dhaka, Narayanganj, Barisal, Chandpur, Khulna, Baghabari, Potuakhali, Narsingdi, Aricha, Nothakhola, Daulatdia)* and 10 nos. newely gazatted (Tongi, Mawya, Char-Janajat, Ashuganj-Bhairab Bazar, Bhola, Bargona, Nawyapara, Mirkadim, Chatak, Meghna Ghat).
- 448 nos. Secondary riverine station (Developed)
- 374 nos. Landing points (without infrastructure)
- 23 nos. Coastal Station
- 08 nos. Ferry terminals

> 25 nos. Field offices

- 24 nos. Pilot Stations
- 7 nos. Dredgers

- 6 nos. tug ships
- 2 nos. salvage units
- 410 nos. Pontoon and barge
- 5 nos. Differential Global Positioning Systems (DGPS) Stations

2.7.3.2 **Functions** of BIWTA

The development and maintenance functions of BIWTA include:

- To carry out river conservancy works including river training works for navigational purposes and for provision of aids to navigation including marks, buoys, lights and semaphore signals.
- To disseminate navigational and meteorological information including publishing river charts.
- To maintain pilotage and hydrographic survey services.
- To draw up program of dredging requirements and priorities for efficient maintenance of existing navigable waterways and for resuscitation of dead or dying rivers, channels, or canals, including development of new channels and canals for navigation.
- To develop, maintain and operate inland river ports, landing/ferry ghats and terminal facilities in such ports or ghats.
- To carry out removal of wrecks and obstruction in inland navigable waterways.
- To conduct traffic surveys to establish passenger and cargo requirements on the main rivers, feeders and creek routes.
- To develop the most economical facilities for passenger traffic to ensure comfort, safety and speed on mechanized craft.
- To develop rural water transport by progressing of schemes for modernizing and mechanizing country craft.
- To ensure co-ordination of Inland Water Transport with other forms of transport, with major sea ports, and with trade and agricultural interests for the optimum utilization of the available transport capacity.

- To conduct research in matters relating to Inland Water Transport Including development
- To arrange programs of technical training for Inland Water Transport personnel within and outside Bangladesh
- To maintain liaison with the shipyard and ship repair industry to meet the requirements of the Inland Water Transport fleet repairs and new constructions.
- To maintain liaison with the Government and facilitate import of repair materials for the Inland Water Transport Industry.
- To prepare plans or schemes for carrying out any of the above mentioned functions.

2.7.4 Bangladesh Inland Water Transportation Corporation (BIWTC)

BIWTC is a service oriented commercial organization in the public sector. Since its creation, it has been playing a vital role in the inland and coastal water ways by carrying passengers, cargo and vehicles. The functions of BIWTC are as follows:

- To provide services for safe transportation of passenger and cargo in inland and coastal water ways.
- To provide services for transportation of vehicles in the waterways.
- To operate safe transport services for transportation of passenger and cargo between mainland and off-shore islands, where thousands of people are living.
- To provide services in the uneconomic routes as Public Service Obligation (PSO).
- To render any other emergency services at time of national needs.
- To maintain dockyard and repair yard for repair and renovation of vessels engaged in the above mentioned activities.

2.7.5 Relationship of DOS and BIWTA

DOS and BIWTA both work under the MOS. There are some interrelated issues of performing their duties which creates anomalies for better performance of their duties. Some of these are highlighted below:

- DOS has **the judicial power to prevent overloading of vessels but does not have sufficient manpower to exercise it. On the other hand** BIWTA has 22 **officials but does not have the administrative jurisdiction to impose its decision on the vessel.**
- **Regarding the raining of deck and engine crews**, **training is conducted** by BIWTA **in their training center**. **But this training is examined by** DOS which **is also responsible for issuing/renewing competency certificates.**

2.7.6 Relationship of BIWTA and BIWTC

BIWTA and BIWTC are the sister services working under the MOS. While BIWTA is responsible for providing waterways and port infrastructures, BIWTC is the IWT operator. However, there are some anomalies in their relationship of performing their duties. Ferry service of BIWTC is actually the extension of RHD. The funds for maintaining safe channel for ferry service should be met from RHD. But practically BIWTC ferry channels are maintained by BIWTA funds which are allocated for IWT only. Thereby the limited BIWTA funds are diverted and many inland river routes can not be maintained and IWT is hampered.

2.8 Safety Issues

Directorate of Shipping (DOS) and Bangladesh Inland Water Transport Authority (BIWTA) are two public organizations under the Ministry of Shipping to ensure the safety of inland waterways

2.8.1 Role of BIWTA in Safety

BIWTA has the responsibility to ensure safety in inland waterways and landing points. Some of the major areas of heir responsibilities are;

- **Dredging and Bandalling** Works: They are to carry out dredging and bandalling works to provide favorable draft for smooth and safe sailing of vessels.
- Vertical and **Horizontal Clearance**: They are to ensure the Vertical and horizontal clearances for a bridge, electric cables, underwater pipelines to enable safe navigation in the inland waterways. There are

certain specified criteria set to follow in these cases. But the execution of this responsibility needs the close cooperation of other organization like RHD, LGED, and Rural Electrification Board etc. Unfortunately these issues are not concisely maintained by concern authorities during the planning and execution of their projects.

- **Night Navigation and Navigation** Aids: BIWTA is responsible to provide appropriate navigational aids for safe navigation in the inland waterways for smooth navigation both in day and night.
- **Pilotage Service**: To assist the safe navigation in some unknown and risky area, BIWTA is to provide pilotge service to vessels concern. There are 23 pilot stations strategically located in the country (Inland Water Masterplan Study Final Report, 2009). Unfortunately this service is suffered by sever manpower crisis.
- **Wireless Communication**: BIWTA is to have an integrated VHF communication among all regional offices, salvage vessels, survey ships, dredger and other working vessel. His is required to facilitate urgent **message** transmission relating to channel conditions, weather forecast etc.
- **Cyclone Warning System**: BIWTA is to provide and disseminate the appropriate cyclone warning signal to all of its inland ports, landing stations and ships or crafts.
- **Removal or Wrecks**: The BIWTA is responsible to remove wrecks (sunken and overturned vessel which cause hazards to safe navigation in the channel) from inland waterways to ensure the safe navigation. BIWTA has two salvage vessels of 60 tones capacity each to perform this duty. As the size and weight of vessel has become larger and heavier, these old salvage vessels are now totally useless to handle those.

2.8.2 Role of DOS in Safety of Vessels

By virtue of the power vested by the government of Bangladesh, DOS is **responsible to ensure** the safety of vessels. To do this job, it has the following responsibilities:

- Approval of **vessel design**

Registration of new vessels constructed in Bangladesh or imported from abroad

- Annual vessel fitness survey

> Examination **and issuing** competency certificates to vessels crews and

> Implementation of safety rules

2.9 Government Budget in IWT Sector

The government budget is always one sided giving lowest priorities to the IWT sector. *Table 2.6* shows the disparity of annual fund allocation among transport sector of Bangladesh. From the statistics of last six budgets it is observed that the IWT sector could not exceeds 1% of total transportation budget. The lowest allocation of ADP is the indication of poor condition of IWT in Bangladesh.

Table 2.6: ADP **Allocation in Transport Sectors** (**in m Tk)**

Year	**Total**	**Roads** & **Highway %**	**Railway (%)**	IWT (%)	Civil **Aviation**
1002-03	30837.10	24571.80	1645.52	256.00	230.00
	(100%)	(79.68%)	(18.74%)	(0.83%)	(0.75%)
2003-04	33985.5	25990.60	7594.7	251.0	149.20
	(100%)	(76.48%)	(22.35%)	(0.77%)	(0.44%)
2004-05	30998.10	24176.8	6085.3	398.5	337.50
	(100%)	(77.99%)	(19.63%)	(1.29%)	(1.09%)
2005-06	27488.30	20776.6	5512.7	348.5	850.50
	(100%)	(75.58%)	(20.05%)	(1.27%)	(3.09%)
2006-07	29364.50	22841.6	5966.9	297.6	258.40
	(100%)	(77.79%)	(20.32%)	(1.01%)	(0.88%)
2007-08	24346.40	19388.4	4468.5	334.5	155.00
	(100%)	(79.64%)	(18.35%)	(1.37%)	(0.64%)

***Source**: **Seminar Report**, BIWTA and World **Bank**, 2003; **and Revised** ADP of Govt. of Bangladesh.*

2.10 Relevant Laws

The Inland Shipping Ordinance, 1976 has stated the various courses of actions to control different events and activities in the IWT sector. The details discussion of laws and rules is not practicable in this study. However, an overview of the Ordinance is appended in the Table 2.7.

Table 2.7: An Overview of The **Inland Shipping Ordinance, 1976**		
Sr No	**Sections**	**Legal** Aspects
1	1 -2	Preliminary
2	3-33	Vessel Registration and survey
3	34 - 43	Manning, examination and Certification
4	44 - 53	Shipping Casualties
5	54 - 60	Protection of Vessels and Passenger
6	60A - 60B	Protection of Inland water from Pollution
7	61 - 74	Penalty and Procedure
8	75 - 83	Miscellaneous

Source: Adapted from the Inland Shipping Ordinance,

Chapter 3: Passenger Vessel Accidents and Rescue Operation

3.1 Accident Scenario

There are large numbers of passenger vessel accidents in Bangladesh in which hundreds of people die every year. It is to be noted that tracking the exact number of casualties is difficult because the number of passengers is usually not known and multiple accidents occur at similar times and places. The tears of a father for loosing his child or crying of relatives for losing their close ones are very frequent occurrences in Bangladesh since long time (**Figure 3.1).**

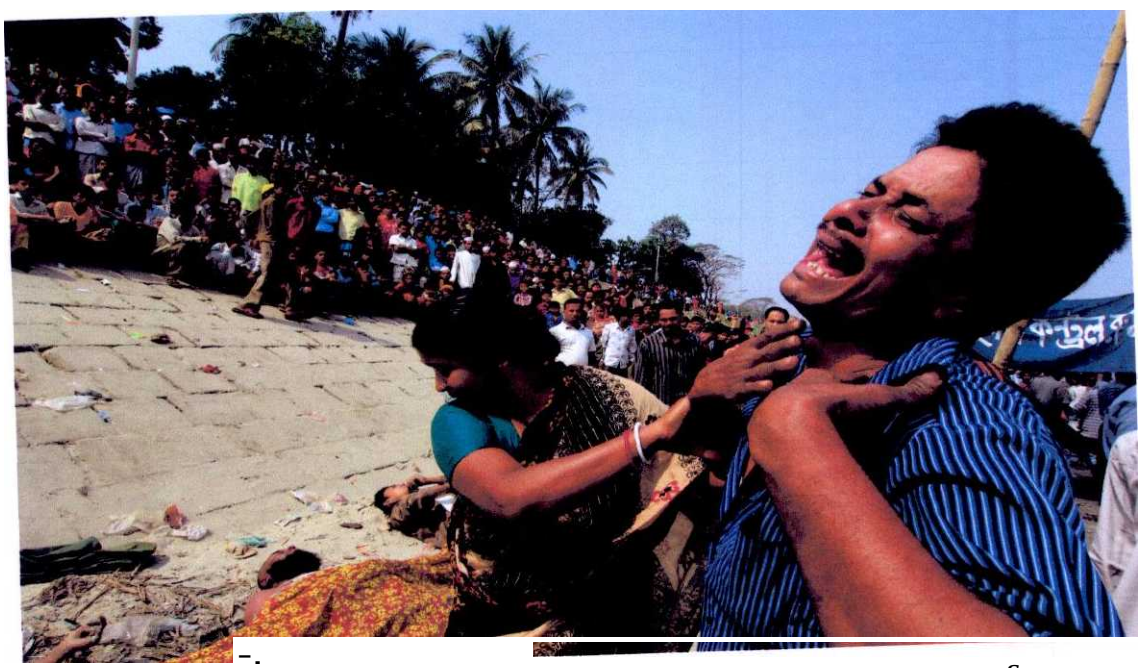


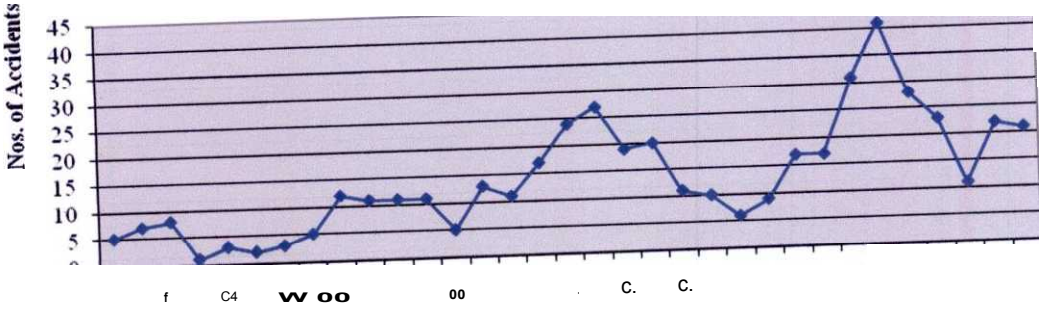
Figure 3.1: *A father* ***mourns the loss*** *of his* ***child in the passenger vessel disaster****;* ***Source: Author***

According to official **statistics of Department of Shipping**, **3,869 people have died and** 279 gone **missing in 458 launch disasters since** 1976. Certainly **the independent surveys will give much higher figures on this.**

From the available information of BIWTA **and Department of Shipping a statistical scenario of vessel fatalities is shown in the Figure 3.2 and 3.3. Figure** 3.2 shows the **occurrences of accidents since** 1977. Over the **last three decades**, **maximum number of accidents had been occurred in the year** of 1994, 2003, 2004 **and 2005**. Only in the year of

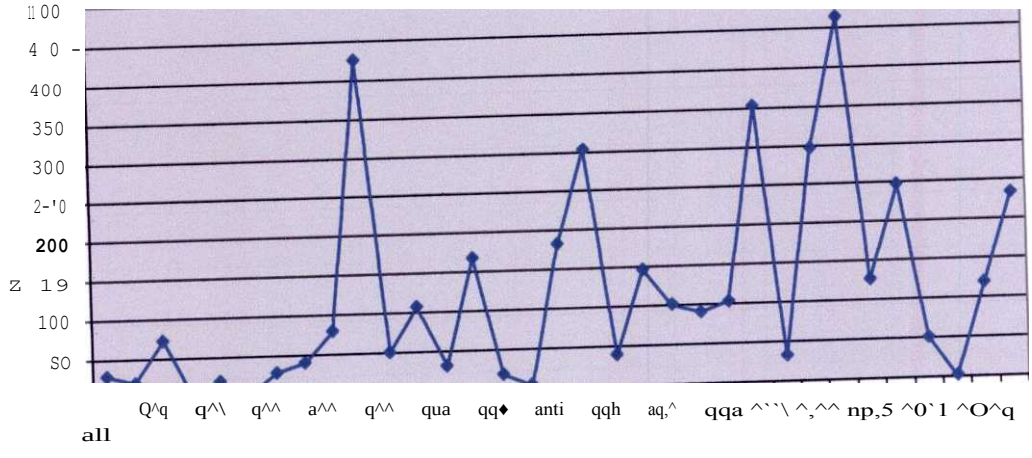
2004 there were more than 40 accidents. Around 430 and 455 people had been killed in the year of 1987 and 2003 respectively (Figure 3.3). In the recent year 2009, around 250 deaths had been recorded.

Figure 3.2: Passenger Vessel Accident (1977-2009)



Vears (19"--2009)
(Source Adapted froniI)epartrnent of Sluppurg 2009)

Figure 3.3: Nos**, of Death** by Vessel **Accidents** (1977-2009)



Year (19""-2009)
(Source adapted **fromDepaitmc^d of ShrppmY** '_009)

3.2 Occurrences of Accidents

3.2.1 Month Wise Occurrences

After analyzing 201 accidents data since 1975 it has been found that the time and frequency of accidents is not uniform throughout the year. Table 3.1 shows the month wise occurrence of passenger vessel accidents from 1975 to 2009. It is evident that the numbers of accidents are more in the month of Aril, May and August than any other months of the year. Generally the weather condition of Bangladesh **remains** rough in the months of March to July. The adverse weather **acts as** initiator to various accidents like collision, capsizing etc. This may be one of the main reasons of more accidents in these months of the year.

Table 3.1: Month wise Occurrence of Accidents (1975-2009)

Month of Occurrences	Frequency	Percent (%)
Apr	19	9.5
Aug	19	9.5
Dec	17	8.5
Feb	10	5.0
Jan	19	9.5
July	18	9.0
Jun	17	8.5
Mar	15	7.5
May	20	10.0
Nov	17	8.5
Oct	18	9.0
Sep	12	6.0
Total	201	100.0

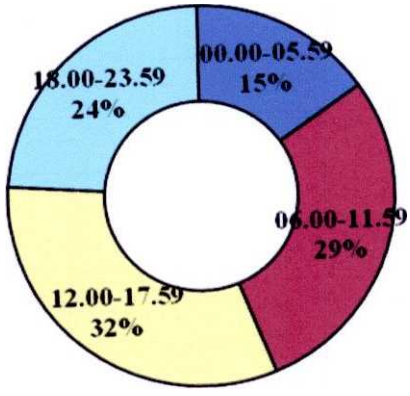
Source : ***Department*** *of Shipping 2009*

3.2.2 Time Band of Accidents

Accidents do not occur evenly across the time of a day. *Figure 3.4* shows the time band of accidents from 1995 to 2005. It is observed from the graph that, occurrence of accidents is maximum in the afternoon (12.00-17.59 Hours) while it is minimum in the very early morning of the day (00.00 - 05.59 hours). The occurrence of maximum accidents in the afternoon may be due to the following reasons:

- **In general**, the after noon period of the day is more vulnerable for cyclonic storms, tidal surge etc which in turn contributes various types of accidents as discussed in the previous section.
- Maximum numbers of vessels are scheduled to ply on day time.

Figure 3.4: Time Band of Accidents (1995-2005)
(Source Inland 1^'ater Tran port Shute Final Report. MEnistiti of Shippui 2. 2009)



3.2.3 Accidents statistics by cause (1975-2009)

There are **numerous** causes behind each of the vessel accidents. However, in the analysis **main** contributor of the **accidents has been** considered **as cause.** ***Table*** 3.2 and *Figure 3.5* represent **the causes** of accident in IWT sector from 1975 to 2009.

Table 3.2: Occurrence of Accidents by Cause (1975-2009)			
Sr No	**Cause of Accident**	**Frequency**	**Percent**
1.	Bottom Hull Damage	2	1.0
2.	Capsize	1	.5
3.	Collision	109	54.2
4.	Foggy Weather	9	4.5
5.	Fouling	1	.5
6.	Grounding	2	1.0
7.	High Tide	1	.5
8.	Overloading	50	24.9
9.	Rap with Electric Wire	1	.5
10.	Storm	21	10.4
11.	Tornado	4	2.0
	Total	**201**	**100.0**

Source: ***Department*** *of Shipping 20*

After **analyzing 201 cases**, it **has been found that collision is the main cause of accidents having maximum share of 55%. Some factors like rough weather, low** visibility, **machineries breakdown**, **unavailability of navigation aids onboard and above all unskilled crews are related to this type of accidents.**

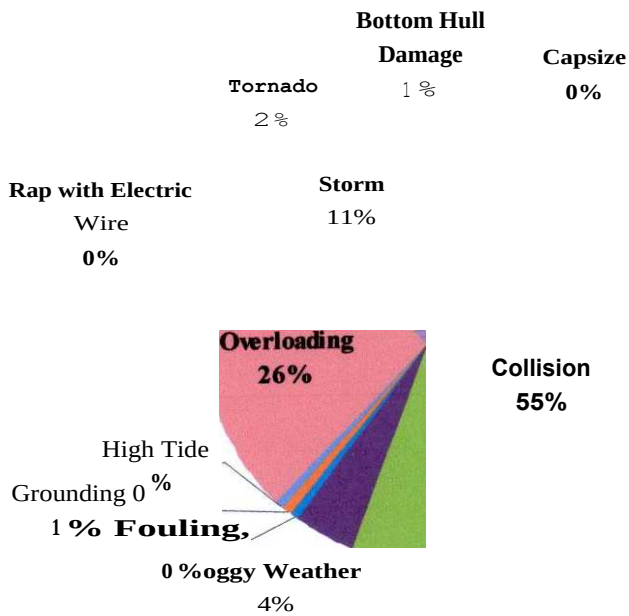
The second contributor of the accidents is overloading. Overloading has 26% share of total number of accidents **since** 1975. Overloading the vessel for maximizing profit is the general tendency of vessel operators in Bangladesh. Loading of excess cargos in upper deck of passenger vessels and allowing passengers in the upper deck are the common symptoms. This intern increase top weight of the vessel and promote **leading** into accidents. Most of the accidents due to overloading indicate that vessels were found to be overloaded as many as 5 times of their capacity.

Storm has been found as the third contributor of vessels accident with 11% share of the total. The absence of meaningful weather forecast and cyclone warning system is responsible for such accidents. It has also been found that vessel

operators are very reluctant to follow order of concern authority regarding sailing in the inclement weather.

Other significant **causes are** foggy weather (4%), tornado (2%), and bottom damage (1%), grounding (1%).

Figure 3.5: Share of Accidents by Cause (1975-2009)
(Source:Department of Shipping 2009)



3.2.4 Accident Statistics by Geographic Location

The districts of Barishal, Patuakhali, Bhola, **Borguna**, Pirojpur, Jhalakathi are linked through **inland** waters with the Dhaka city. On **an average** nearly 50,000 **passengers** travel through this routes every day (BIWTA). These vessels ply on the rivers of Padma, Meghna, Arial Kha, Kalabadar, Tetulia, Agunmuhki, Paira, Bishkhali, Baleshwar and Sanddhya. Statistics shows that the number of accidents is more in these locations *(Table 3.3).*

Table 3.3: Geographical Distribution of Vessel Disaster **in Bangladesh** (1975-2009)

Sr No	Place of Accident	Frequency	Percent
1.	Anandabazar	1	0.5
2.	Aricha	8	4.0
3.	Ashuganj	1	.5
4.	**B Baria**	3	1.5
5.	**Badartuni**	1	.5
6.	**Bagerhat**	3	1.5
7.	**Bahadurabad**	1	.5
8.	**Bakerganj**	1	.5
9.	**Barisal**	20	10.0
10.	Bhairab	1	.5
11.	**Bhandaria**	2	1.0
12.	**Bhola**	13	6.5
13.	**Borguna**	3	1.5
14.	Chandpur	20	10.0
15.	Char Nazirpur	1	.5
16.	Chittagong	4	2.0
17.	Cox's Bazar	1	.5
18.	Daulatkhan	1	.5
19.	Deyara	1	.5
20	Dhaka	8	4.0
21.	Dhaleswari	1	.5
22.	Digreer Char	1	.5
23,	Farazikandi	1	.5
24.	Faridpur	4	2.0
25.	Fatulla	1	.5
26.	Firingi bazar	1	.5
27.	Gaforgaon	1	.5

Sr No	Place of Accident	Frequency	Percent
28.	Gazipur	3	1.5
29.	Haimchar Bazar		.5
30.	Hatiya	2	1.0
31.	Hizla	1	.5
32.	Hularhat	1	.5
33.	Jamalganj	2	1.0
34.	Jessore	2	1.0
35.	Jhalokati	3	1.5
36.	Kalia	1	.5
37.	Kapasheya		.5
38.	Keraniganj	I	.5
39.	Khulna	5	2.5
40.	Kirtonkhola		.5
41.	Kishoreganj	8	4.0
42.	Kutubdia	2	1.0
43.	Mahanpur	1	•5
44.	Matamuhari & Bay of Bengal Estuary	1	•5
45.	Meghna	1	.5
46.	Mithamoin	2	1.0
47.	Mohanganj	1	.5
48.	Moheshkhali	1	.5
49.	Mongla	4	2.0
50.	Munshigonj	6	3.0
51.	Najirpur	1	.5
52.	Nalcity	1	.5
53.	Narail	2	1.0
54.	Narayanganj	10	5.0
55.	Narsingdhi	1	.5

Sr No	Place of Accident	Frequency	Percent
56.	Netrakona	2	1.0
57.	Pabna	1	.5
58.	Patuakhali	5	2.5
59.	Pazla	1	.5
60.	Pirojpur	2	1.0
61.	Postogola	2	1.0
62.	Rajbari	1	.5
63.	Rupganj	1	.5
64.	Sadarghat	3	1.5
65.	Sandwip	2	1.0
66.	Sariatpur	1	.5
67.	Shatnal	1	.5
68.	Sherpur	1	.5
69.	Shibchar	1	.5
70.	Sirajganj	1	.5
71.	Sosarkanda	1	.5
72.	Sunamganj	1	.5
73.	Tangail	1	.5
74.	Teknaf	2	1.0
75.	Tongi	1	.5
	Total	**201**	**100.0**

Source: *DOS 2009*

The table indicates that **most of the accidents are occurred in the inland routes of Barisal**, **Bhola**, **Chandpur and Patuakhali and their connected** water ways **to Dhaka and Chittagong** (**Figure 3**.6). Other significant places are Narayanganj, Dhaka, Munshigonj, Kishoreganj and Patuakhali. The reason of maximum accidents may be due to the maximum number of vessels operation in these routes.

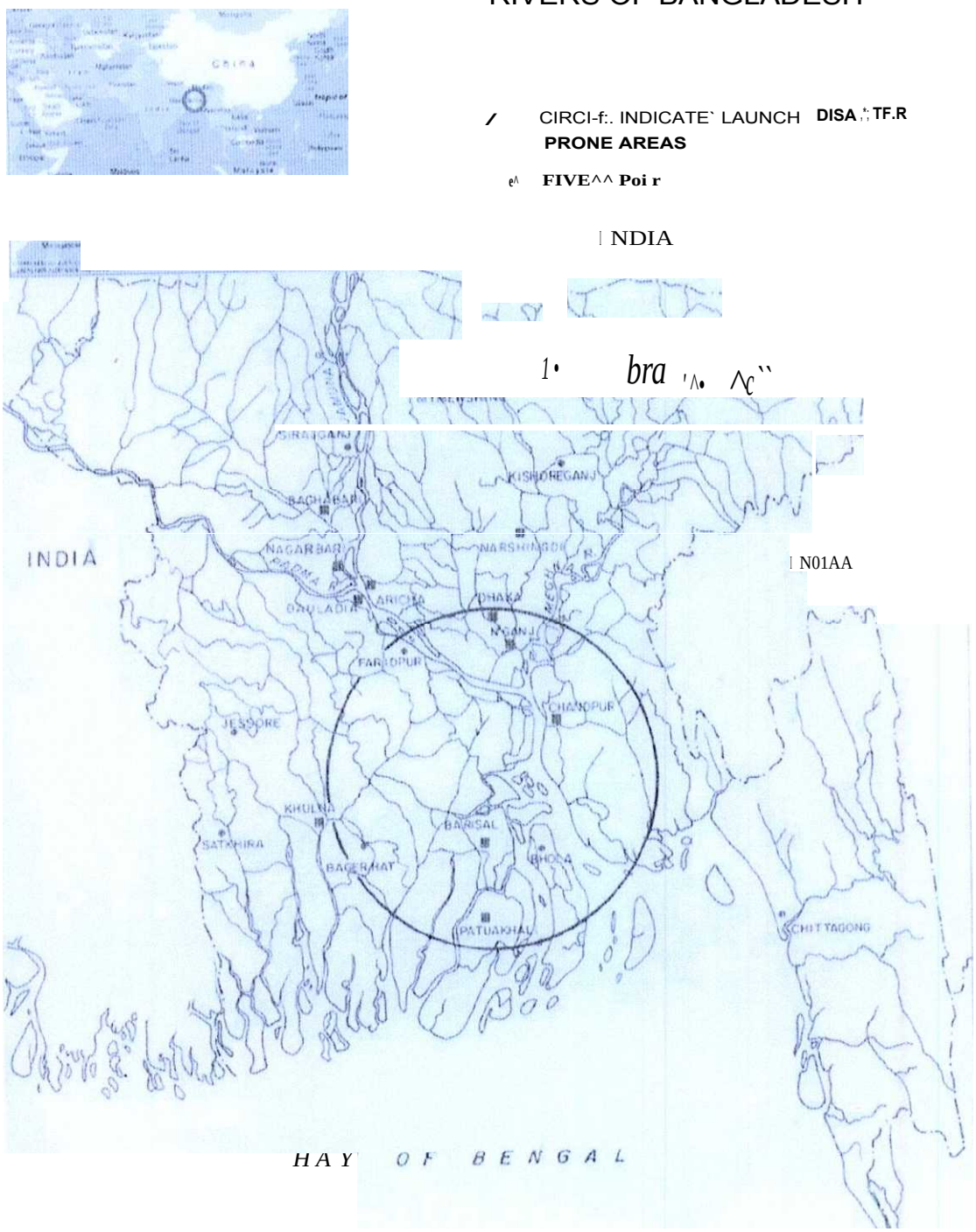


Figure 3.6: Disaster prone area *of IWT;* ***Source: Launch Disaster in Bangladesh: A Geographical Study, 2003 by Naznin and Ashraf***

3.3 State of **Rescue Operations**

3.3.1 Background.

Response and recovery is the utmost requirement of any emergency. Unfortunately this concept is totally neglected in IWT sector. The relevant authority (BIWTA) has very limited capacity and outdated instruments for carrying out rescue operations. In the study it has been found that, rescue operations are always at dilemma. In so many cases, rescue mechanism of BIWTA could not reach the spot within two to three days after the occurrence.

Figure 3.7: Salvage vessel** MV HAMJA in **Rescue operation; (Source: The Daily Star, Internet Edition)

3.3.2 Capacity **and Limitation**

BIWTA has only two age-old salvage vessels namely MV HAMZA and MV RUSTAM. The breif statistics of these vessels are given in the Table 3.4. HAMJA and RUSTAM were inducted in to the service in the year of 1964 and 1983 respectively. The usual service period of a rescue vessel is about 20 years. It means that the Hamza should have been withdrawn at least 20 years ago while the Rustam 7 years back. Now a day many of the passenger and cargo vessels operating in Bangladesh IWT routes carry more than 300 tonnes, including weight of the vessel.

Table **3.4: States of Salvage** Vessels, BIWTA

Sr No	**Parameters**	**MV Hamja**	**MV Rustom**	**Remarks**
1	Country of Origin	Germany	Belgium	Capacity has reduced
2	Built	1964	1983	significantly over time
3	Lifting Capacity	60 tonnes	60 tonnes	
4	Fittings	Only single crane	Only single crane	
5	Station	Narayanganj and in Barisal	Narayanganj and in Barisal	

Source: *BITWA 2009*

HAMZA and RUSTAM together can pull a maximum of 100 tonnes. Considering the present size and weight of vessel, these two vessels are nothing but showoff only. Besides, these vessels are equipped with the most outmoded and slow-paced apparatus and run by mostly untrained manpower. There is no under water detection system onboard these vessels. It is very difficult to conduct rescue operation during major disasters with only two such vessels. The vessels are usually kept in Narayanganj and Barisal which also takes too much time for them to reach the accident sites.Other than the salvage vessels, BIWTA and DOS are also suffering from severe manpower crisis to look after the whole IWT platform.

3.3.3 Future Plan

According to the information of BIWTA, the government is going to induct two salvage vessels at a cost of around Tk 263 crore with the assistance from South Korea. An agreement in this regard was signed between the two governments on January 31, 2005. Both the vessels, each 250-tonne capacity, will have modern equipment to detect sunken launches rapidly in deep water. It is expected that two new vessels will join BIWTA fleet very soon to enhance the capacity of salvage drive and speed up the operation ultimately reducing death toll in vessel accidents.

Chapter 4: Case **Studies**

4.1 Case Study-1: MV KOKO - 4

4.1.1 Description of Incidents: The accident occurred on 27 November 2009 just before the eid ul azha. The Bhola-bound MV KOKO - 4 was very close to the river terminal when its bottom fouled to the ground/obstruction. The vessel was overloaded with around 1500 passenger which is 5 times of its capacity *(The Daily Star Internet Edition, December 2009)*. So, she could not keep her stability upwright and thereby capsized. The death toll in the launch mishap in the river Tentulia reached to 86 with significant numbers of missing. The most of the victims were reported to be children and women who had absolutely no chance of swimming ashore.

The rescue operation was usually very slow. The rescue MV HAMJA and RUSTAM having rated lifting capacity 60 tons each went up the spot but failed to upright the 400 tonnage sunken ship (Figure 4.1).

Figure 4.1: KOKO - 4, the Sunken Vessel in Bhola; (Source: The Daily Star Internet Edition, December 2009)

4.1.2 Description of the Vessel: Extracted information from the vessels registration records of DOS are shown in the table 4.1.

Table 4.1: Vessel Informations of KOKO - 4		
Sr No	**Parameters**	
1.	Name	MV KOKO 4
2.	Type	Passenger Vessel
3.	Reg Numberr	5826
4.	Place of Reg	Dhaka
5.	Date of Reg	28 Sep 2007
6.	Length	42.37 m
7.	Breadth	8.59 m
8.	Draft	2.13 m
9.	Gross Tonnage	654.37 tonnes
10.	Passenger Capacity	446 passengers in daytime and 307 at night

***Source**: DOS 2009*

4.1.3 Accident Analysis: From the statistics and accident informations of the vessel, it is evident that the vesel was overloaded as many as 5 times of its capacity. The time of the occurrence was night. Just before the jetty the vessels was fouled with ground obstruction which made it vulnerable to capsize. There was no adverse weather in the time of accident. But the vessel was blindly moving in to the jetty through uncharted depth. If we notice the loading pattern of passenger vessel in our river route we will see that a major portion of passengers are interested to stay in the upperdecks. **Excess loading in the upper deck shift the Center** of Gravity (CG) upwards. **In this situation**, **the vessel is known to be unstable**. **The unstable condition does not allow any vessels to remain upright**. It is suspected that the said vessel was also unstable due to the combined effect of bottom fouling and overloading and thereby it could not regain its upright condition. As a result it sank. The scenario of the accident may be summarised as follows:

- Vessel was overloaded with significant top weight2.

I it is the height of the underwater hull of a vessel **below the water line.**

2 **Weight stored in the decks above the center of gravity of a floating body**. **The top weight is very dangerous to make the vessel unstable by the disturbance of any external forces like wind**, **tide etc.**

- It was approaching towards jetty through uncharted low depth at night.

> The vessel got fouled with ground and tilted in one side.

- The movement of huge number of passengers made the vessel unstable and finally she capsised.

4.2 Case Study - 2: MV MITALI

4.2.1 Description of Accident: The Two-Decker launch MV MITALI-2 with 300 passengers sank in the river Buriganga on 22 April 2003 (Figure 4.2). The vessel was heading to Barisal from Dhaka and was caught in a storm at Pagla, 15 km from the capital Dhaka. Around 70 passengers could swim ashore and an unspecified number of other passengers were dead. The upturned sunken vessel was towed closer to the bank. The Fire Brigade personnel retrieved dead bodies.

Figure 4.2: People ***mourn the*** *loss of their* ***relatives in the disaster*** *(Right) and Capsized* ***vi ccel*** *rLIITALI -2 (Left) - Source: RRC*

4.2.2 Description of the Vessel: Extracted information of MV MITALI from the vessels registration records of DOS are shown in the *Table 4.2.*

Table 4.2: Vessel **Informations** of MV MITALI		
Sr No	**Parameters**	
1.	Name	MV MITALI - 2
2.	Type	Passenger Vessel
3.	Reg Numberr	7022
4.	Place of Reg	Dhaka
5.	Date of Reg	22 Aug 2007
6.	Length	38.4 m
7.	Breadth	7.31 m
8.	Draft	2.01 m
9.	Gross Tonnage	559.7 tonnes
10.	Passenger Capacity	263 day and 381 night

Source: DOS 2009

4.2.3 Accident Analysis: This was the accident caused by natural adverse weather. The vessel was moving towards Barisal in the day of April. Generally the weather condition in April remains risky especially in the waterways. Just after leaving Dhaka, it was caught in storm and sank. It was the indication of vessel not having weather forecast or they disobeyed that. It is learned from one of DOS official that despite the clear instruction from them for not sailing in the adverse weather, most of the cases the vessels crews are always found reluctant to follow that.

4.3 Case Study - 3: MV NASREEN-1

MV NAZREEN-1 **was traveling from the Dhaka Sadarghat terminal to Lalmohan in Bhola_She was badly overcrowded and sank in flood-swollen waters at the confluence of the Padma, Meghna and Dakatia rivers on the night of 8 July 2003. The spot was some where about 170 kilometers southeast of the capital Dhaka,**

The triple-deck passenger vessel, which was licensed to carry 294 **passengers**, packed with **as many as** 1,000 people **and a large cargo** of rice and **vegetables**. The vessel operator has no record of how many, or who, was on board. Only 220 of the crew and

passengers were able to free themselves and swam to survive. The vessel itself was found on July 14, after six days by the Bangladesh Navy Ship.

Passenger vessels were "generally advised " by BIWTA **to avoid the Meghna confluence from July to mid-October** . It was found that the MV NASREEN-1 deviated from the original route on the night of disaster and directly plied through the risk-prone zone of Dakatia.

The scenario of the accident may be summarised as follows:

- Vessel was overloaded with large number of passeneger and huge goods in the upper deck which increased the topweight.
- It was traveling at night through the prohibited confluence of meghna in the month of July.
- The vessels got trapped into the vortex of huge current of confluence and thereby sunk.
- The reason for navigating the vessels into the confluence zone was not known.
- It is suspected that the vessel was mistakenly navigated without support of navigational aides onboard.
- Authorities failed even to salvage the vessel or retrieve trapped victims with their inferior capacity.

4.5 Deduction from Case Studies

After the analysis of three cases as mentioned in foregoing sections, following facts have been established:

4.5.1 Reasons of vessels accident

- Vessels are always overloaded beyond their licensed capacity.
- Passenger vessels also carry huge goods and cargo on the upper decks to earn extra money. This intern increase top weight which make the vessel unstable to help sinking with any sort of external forces.
- Significant numbers of passenger vessels are unfit and running with mostly non operational mechanism.
- Passenger vessels are generally advised to avoid risk-prone zone "confluence" in the channel of navigations. Those places are

generally marked in the marine charts. But the vessels crews do not care that and leads to such accidents.

4.5.2 Difficulties in rescue operations

- Rescue operations are always very complicated and difficult due to the unavailability of passenger records, suitable rescue vessels (Tug) and trained manpower.
- The BIWTA now owns two salvage vessels, RUSTAM and HAMZA, but they are not capable to work with most of the passenger vessel of higher displacement and size. These tugs are also incapable of withstanding strong river current during the monsoon.

4.5.3 Other factors

- **Fitness**: **Despite a number of catastrophic** river **mishaps in the recent years**, **faulty vessels continue plying in the river routes threatening the country**. The owner **of some vessels**, which **were declared unfit, is plying them after changing their colors and names**. Typically, a river **transport operator construct a vessel at will and then acquire the approval of its design from the shipping department. Bangladesh Inland Water** Transport Authority (BIWTA**) is unable to take well care of this due to shortage of manpower**. There **are only nine inspectors** for nearly **8,000 passenger vessels plying the inland river routes** (BIWTA).

- **Communication and early warning:** The absence of an early warning system is another problem. Authority can not communicate with vessels or warn them once they leave the terminals. So vessel crews find themselves suddenly in rough weather, quite ill prepared to face the hazards.

- **Government rules and actions**: Government rules regarding vessel fitness and other issues are only formulated ones. The vessels owners are generally less concerned about any laws and regulations. Moreover, after any accident as usual habit, **government try to impose existing rules**, **but fail due to the protest of stake holders.**

- Trial **and Punishment**: There is a provision for punishment for launch accident, but, it is very rare. The responsible masters, pilots and owners of the vessels causing the deaths and injuries of hundreds of innocent passengers are always escaped. In the real scene, no body is punished. Because after filing a case against defaulter, victim has to produce witnesses before the court. In most cases, the witnesses do not appear in the court, being intimidated or bribed by the wealthy defendants. A magistrate who presided over the country's lone marine court is having hundreds of cases including some lodged as far back as 1988 as pending.

Chapter 5: Underlying Causes and Effects of Accidents

5.1 Background

There are numerous factors behind the scene of riverine passenger vessel accidents as discussed in previous chapters. Some of the factors have direct and some of them have indirect influence on these tragedies. Inclement weather, faulty design, unfitness, unskilled crews, unsafe routes, overloading etc have direct contribution to cause tragic accidents. On the other hand, corruption in government bodies, conflict and confusion among inter departmental management, limited capacity and budget etc have indirect contribution. In view of the findings of the study some important issues related to vessels tragedy are discussed in the subsequent sections.

5.2 Direct Influencing Factors

5.2.1 Inclement weather

From April to October weather condition is often very unsettled over the Bay of Bengal and in the inlands. Cyclones, gusty winds and heavy rainfalls are usual phenomena at this time of year. As most passenger vessels are typically not equipped with radio reception equipments, weather news do not reach to the vessel operators timely.

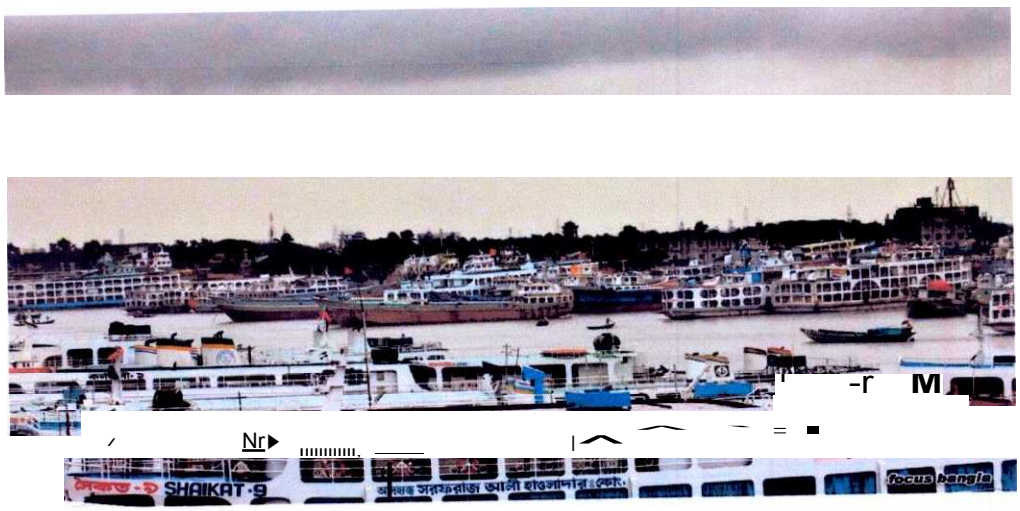


Figure 5.1: Passenger vessels in the Sadrghat terminal during cyclonic warning; Source: Author

5.2.2 Unsafe river route

Over all condition of inland river routes in Bangladesh is not safe at all due to several factors. **The flow pattern of rivers**, **river bed**, **currents etc are always changeable**. That is why the navigability of river route also changed frequently. In the developed **countries**, government and other organizations carry out survey on the river routes regularly and river charts are updated accordingly. Any change in depth or the presence of wreckage **in channel** are regularly recorded and marked in the charts. **Inland marine** crews always navigate with the latest updated charts. It makes it very easy for the **master** of a vessel to avoid risk zone of the channel.

Bangladesh does not have sufficient technology and trained manpower to carry out river survey regularly. As a result the river routes remained uncharted for long time. **Reduction of the depth of rivers by siltation**, **presence of under water wreckage always remains as hidden danger in this country**. Besides some of the spots of major rivers especially the confluences are always threatening. BIWTA has general advice to avoid those confluences in a particular time of the year. Without giving due concerns to the available information's and advice, vessel operators are always interested to pass through a short route. As a result the unsafe river routes become one of the major causes of passenger vessel fatalities.

5.2.3 Faulty **design and construction of vessels**

Many passenger vessels sink in mid-river due to faulty construction as well as other associated defects (Khalil 1985). There is no provision of regular checks by surveyors for faults in the construction of vessel. Proper inspection is either nominal or not done at all. Due to construction fault the stability of the vessel is liable to be disrupted by even small external disturbance leading to accident

Figure 5.2: Vessels with faulty design and weak structure are the major part of the inland fleet; Source: Author

5.2.4 Inadequate navigational equipment

All most all the passenger vessels are supposed to have sufficient navigational equipment fitted onboard. Navigational radar for channel orientation and scanning, communication equipments for keeping contact with other vessels and shore, GPS' for automatic positioning, Eco sounder for depth measuring are very essential for all types of vessels. Unfortunately our passenger vessels do not have such arrangements. Very few vessels are found with few of such equipments which are mostly non-operational. Due to not having these essential equipments onboard, inland crews remain in dark about weather information, river route conditions and other hidden danger. As a result vessels are falling into the death trap.

5.2.5 Overcrowding

Bangladesh is an overpopulated country and the available transport is always in short of supply. To make matters worse, **the motor vessel owners, in their quest for maximum profit, tend to overload by doubling or tripling the actual carrying capacity of their passenger vessels**. Because of this practice, **passenger vessels also carry commercial cargo along with the passengers in the upper deck making them highly unstable** (**Figure 5**.3) and vulnerable.

[1] Global Positioning System used in navigation for latitude-longitude position, vessel speed and direction in the rivers. It also helps to chart a channel in digital form for safe navigation.

During festive seasons homebound travelers bogged only by the single desire to make the journey as fast as it is possible. In doing so, they disregard safety considerations and travel in the overloaded vessels. That is why passenger vessel accidents due to overloading are a very common phenomenon in festive season in Bangladesh.

Figure 5.3: Overcrowding increases the top weight ***making the*** *vessel* ***unstable*** *and accident prone; Source: Author*

5.2.6 Unplanned stowage of goods

Passenger vessels are not authorized to carry goods in the upper decks. **Storage of goods in the upper decks increases the top weight. The increase of top weight shifts the center** of gravity[2] **(CG) upwards reducing the stability of vessel which in turn helps in capsizing.**

Generally all passenger vessels in inland water routes carry huge amount of goods for earning extra money. Goods are again kept in the upper deck without knowing the dangerous effect of that. There is no check and control of it. As a result the vulnerability of passenger vessels increases and thereby the get into the point of no return.

[2] The point at which all of the weight of an object appears to be concentrated

5.2.7 Fitness of vessels

A large number of vessels operating along the inland waterways do not have fitness or registration papers. They have a tendency to violate river traffic rules as apparently no government authorities are overseeing them. Crews of most of unauthorized vessels also do not have enough experience and expertise required by the law to do the job. The illegal practice of running vessels without proper documents bribing relevant government officials is nothing new. According to a DOS official, out of 20,000 passenger vessels in the country, only 8,000 are registered. Of those just 800 have the required safety certificates. Most of them lack mechanical steering. Some vessels have manual steering systems but that are a century old. They are poorly constructed and lack basic safety features such as lifeboats or lifejackets.

5.2.8 Unskilled Crews

Motor vessel collisions have been identified as the major type of accidents in the inland waterways of Bangladesh. The regime of the river changes from season to season. During the monsoon, the width of the waterways increases to several kilometers but the navigable channel is still generally narrow, shallow and meandering. Because of not having appropriate knowledge and training on the rules and regulation of inland navigation, especially during night time journeys they misunderstand the signs and signals, which cause accidents.

The inexperienced operators have a common tendency to go faster to prove their superiority. In doing so they try to overtake other vessels. Thus collision occurs due to this reckless driving. Moreover vessel owners prefer to hire untrained operators and crew because they are cheaper. So, maximizing profits by the capitalist owners is really at the heart of vessel collisions in Bangladesh.

5.3 Indirect Influencing Factors

5.3.1 Absence of check and control

Bangladesh Inland Water Transport Authority (BIWTA) has formulated instructions in the form of ordinance (THE PILOTAGE ORDINANCE 1969), act and rules (THE REMOVAL OF WRECK AND OBSTRUCTIONS IN INLAND NAVIGABLE WATERWAYS RULES, 1973) regarding duty, authority and responsibility of all concern. Unfortunately those are not followed by the concern

parties and also not implemented properly by relevant authorities. Most of our vessels owners and marine crews are unaware about the existence rules and regulations. Most of the staffs of concern authorities are also very casual and unaware about rules and regulations. It is learnt from the recent history of vessel disaster that government efforts are almost useless. Almost all efforts of government were successfully protested by the vessel owners.

Figure 5.4: No check ***and control on unauthorized berthing impeding the navigation*** *for other* ***vessel; Source****:* ***Author***

5.3.2 Corruption **in government bodies**

Corruption in government bodies like BITWA, DOS, BIWTC, Police department and in the civil administrations has a significant indirect contribution to passenger vessels accidents. The profit centered attitude of vessels operator has added a new dimension to it. Non compliance of relevant rules and regulations regarding fitness, overloading etc are related to accidents in different capacity. All of these factors are the effect of corruptions in relevant bodies. As a result, command and control on the inland water transport system of Bangladesh seems to be very ineffective.

5.3.3 Shortage **of manpower in government bodies**

All relevant bodies are suffering from severe crisis of manpower. Day by the number of vessels, landing ports, ghats etc have increased a lots. Subsequently all

related activities have also expanded to higher magnitudes and diversity. Unfortunately manpower and equipment has not been increased proportionately. As a result, the relevant government bodies have become ineffective to handle a large fleet of vessels in IWT.

5.3.4 Limited budget

Government budget (ADP) is another factor pulling back the development of IWT sector. From the last few budget of ADP, it is found that IWT has got the lowest amount (around 1% of the total) among all transportation sectors in Bangladesh as shown in Figure 5.5 and 5.6 (Adapted from BIWTA and World Bank, 2003; and Revised ADP of Govt of Bangladesh 2008). Insufficient budget is hindering the procurement of new vessels and instruments which are very essential for safety IWT operation.

Figure 5.5: ADP for Transport Sector (FY 2002-03)
(Source:Adapted from BIWTA and World Bank, 2003; and Revised ADP of Govt of Bangladesh 2008)

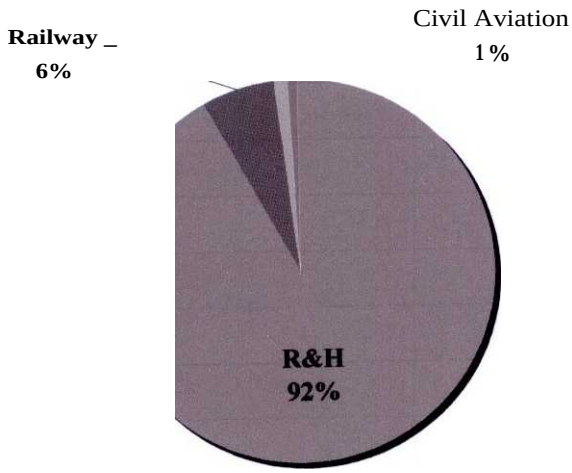
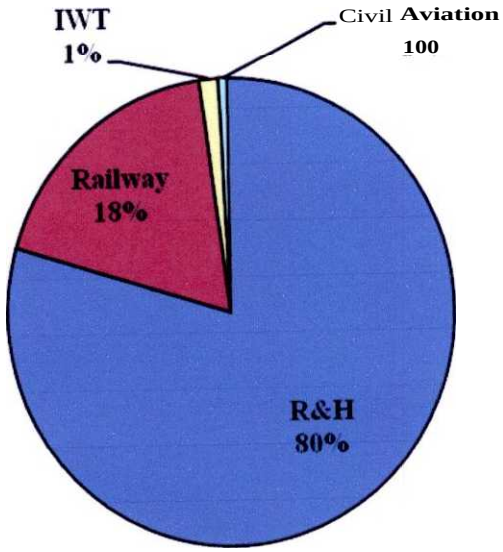


Figure 5.6: ADP for **Transport Sector (FY 2002-03)**
(Source adapted fi-oniBIWTA anti R`orid Batik, '003, and Revised ADP of Govt of Ban-21a(lesh 2008)



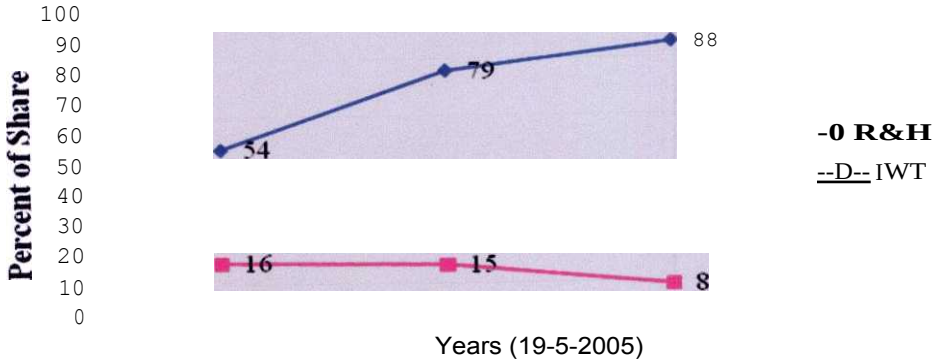
5.3 Impact of Accident on IWT

The frequent accidents in the IWT sectors have already created panic among the travelers. The unlimited death causing accidents has a negative impact on this promising sector of transportation. The scenario is well reflected by *Table 5.1*.

Year	**Table 5.1: Modal Share of Passenger Traffic (Billion Pass.-Km)**						
	Grand	**Road**		Rail		IWT	
	Total	Total	%	Total	%	Total	
1975	17	9.2	54%	5.1	30%	2.7	16%
L19906	66	52	79%	3.9	6%	10.1	15%
2005	111.5	98.4	88%	4.2	4%	8.9	8%

Source: *Adapted from* ***IWT Masterplan*** *Study,* ***Final Report 2009,***

Figure 5.7: Declining Trend of Passenger Traffic in IW T Sector (1975-2005)



(Sorn•ce .4daptc'cl fi-orn 1(f T .llirst^^rplrirr.Strr^lr Final Report. APInstn' Of Slapping _ 009,

With the rapid increase of population and mobility, **the pressure on the** IWT sector **is increasing** day by **day. But the** share of IWT **traffic in overall transport sector has a declining trend** (**Figure** 5.7). The percentage of passenger in IWT has decreased by 50% from 1975 to 2005. As a result land based transportation is becoming overburdened with excessive load. So government is to spend more money for the development and maintenance of relatively costly land based transport infrastructure. This is an alarming situation for a riverine country like Bangladesh where cheapest IWT sector could be the best choice of transportation.

Chapter 6: Possible Ways of Mitigation

6.1 Background

The passenger vessels safety is one of the important national issues to be considered. The safety of passenger, crews and national properties is due with proper attention. All concern parties are responsible to adopt mitigation approach to minimize this disaster. It may not be possible to prevent the vessels fatalities completely but it is possible to **minimize** up to an acceptable level. Department of Shipping (DOS), Bangladesh Inland Water Transport Authority (BIWTA), Bangladesh Inland Water Transport Corporation (BIWTC), Vessel owners, law enforcing agencies like coast guard and police and individual passengers are to contribute significant effort for better future in this sector.

6.2 Possible Institutional Measures

Department of Shipping (DOS), Bangladesh Inland Water Transport Authority (BIWTA), Bangladesh Inland Water Transport Corporation (BIWTC) and law enforcing agencies comes under this category. They are the main striking element to bring favorable change in the situations. Following institutional steps may be realized:

- **Reviewing present structure of government bodies and rules-regulations**: BIWTA is the successor of the East Pakistan Inland Water Transport Authority (EPIWTA). In the course of time, the number of vessels, area of responsibility and functions has been increased a lot. With the rapid increase of population, the numbers of accidents are also increasing day by day. Considering the previous experience, current scenario and available platforms, present structures of relevant government organizations, relevant laws and regulations may be reviewed to make it more realistic and effective.

- **Enhancement of manpower** for DOS, BIWTA: DOS and BIWTA are suffering from severe shortage of manpower as it is mentioned earlier in this study. Skilled and trained manpower is required to have an effective workforce which will intern increased their capabilities for safer operation in IWT.

- **Increasing** ADP for IWT: Allocation of ADP budget is the most essential part of improvement. Without sufficient budget, no plans for development can come into true. Government is to look into this matter very urgently.

- **Annual Inspections**: Annual inspection and survey of passenger vessels should be done positively to confirm the vessels fitness. Officials in charge found guilty of misconduct and malpractices such as issuing fitness certificate to unfit vessels should be punished.

- **Regular check and control**: DOS need to have a tight control regarding overloading and carrying of commercial goods by passenger vessels. Appropriate punishment for misconduct should be properly implemented in this regard. Frequents inspections, surprise visit by officials may be regularly arranged to have effective check and control. Regular patrolling by coast guard and police may be adopted to be enforced for check and control.

- **Liabilities and accountability**: Creating liabilities and accountability among the officials for any misconduct may be fruitful to reduce vessels accidents.

- **Marine courts**: Effective marine courts may also be established in the key points of river routes throughout the country for instant trial and judgments for any misconduct.

- **Awareness campaign**: Awareness campaign on safety of river travel by relevant government bodies will definitely induce positive impact on disaster scenario.

- **Involvement of law enforcing agencies**: Bangladesh Coast Guard and Police in some extend may be tasked to ensure en-route discipline of passenger vessels.

6.3 Possible Measures by Owners

- Anomalies in recruitment of crews and masters to be stopped by the owners for the great interest of nation. Regular and appropriate training of master and crews to be ensured.

- Provocation and ill motives of owners regarding regular survey and inspection of vessels to be avoided.
- Greediness of launch owners to earn extra money by allowing overloading of passenger and carrying commercial goods to be stopped.
- Unfit **vessels to be discarded to save human lives.**
- A final opportunity may be the rapid adoption of communication technologies, such as HF, VHF, UHF communication sets, mobile phones and other wireless devices. As developing nations expanding the use of wireless technologies, citizens will be able to report unsafe situations (Arnold 2001). These communications could make enforcement easier and also serve as receivers for weather information or other news that could influence the safety of vessel **sailings.**
- Awareness campaign on safety of river travel may bring significant change in the disaster scenario. Thereby awareness campaign may be regularly conducted.

6.4 Personal Safety Measures

Personal safety measures are found least effective tools to reduce the accidents in riverine transport. Individual passengers may be able to avoid the risk in some cases. They also can correct some of the anomalies created by vessel operators and owners. However, following measures can be undertaken by individuals:

- Avoiding travel by unfit vessel.
- Avoiding the overcrowding vessel as a means of journey.
- Knowing about the individual life saving equipments which are available onboard during journey.
- Avoiding gathering on the top decks of vessels.
- Cooperation with relevant government bodies to ensure proper application of laws.

Chapter 7: Concluding Remarks

7.1 Findings

The approximate picture of riverine passenger vessel fatalities in Bangladesh is drawn in this study where history and present scenario of IWT sector, passenger vessel disaster, underlying causes, responsible parties and probable mitigation approaches have been discussed in a limited way. However, findings of the study are as follows:

- Bangladesh has a history of thousands of deaths by launch accidents each year. But the exact number of people onboard or victims are never known because vessels mostly do not keep passenger lists or follow operational rules set by maritime transport authorities.

- Although the share of passenger is decreasing in IWT sector as discussed in section 5.4, the pressure on river route is increasing day by day due to the rapid increase of population. On the other hand, the support from the government and the concerned authorities in terms of management is decreasing. Passenger vessel operators exploit these conditions and openly ignore government regulations, bribing government officials to ignore breaches regulations.

- About half of the vessels operating in Inland water routes do not have registration, while most of the authorized vessels do not have proper design and necessary safety equipments.

- A severe crisis in manpower is felt in the controlling authority like DOS, BIWTA etc. Due to the shortage of manpower, relevant authorities are unable to perform their assigned task to have effective control over the IWT platform.

- Government budget in the IWT sector is very less. The development and maintenance of this sector is practically halted down for last few decades.

- The private sector is presently dominating the inland water transport sector where profit maximization is the main aim. Operators and owners often

neglect weather forecasts and shipping rules despite repeated accidents. The owners have little moral liabilities in using unfit vessels and untrained crews in running their business.

- The majority of accidents in Bangladesh are related to collisions where adverse weather, unskilled operators and machinery breakdown are responsible.

- From May to October some of the spots in the river routes become very dangerous which become the death trap for passenger vessels due to the ignorance and negligence of vessel operators.

- According to rule, DOS issues **registration** number and fitness certificate to proven **design**. Vessels **must be designed** by naval architect. Indeed, it is not enforced. **Design is made** by unskilled draftsmen. They design **vessels basing on** their own understanding and manage approval from Bangladesh Inland Water Transport Authority (BIWTA) through different **illegal** ways. As a result, vulnerability of launch **capsize is on increase.**

- The government's weaknesses in enforcing laws influence the repeated accidents. No effective measure has been taken as per the investigation reports submitted by the authorities concerned in the past.

- BIWTA **does not have suitable rescue vessels (Tug) to carry out rescue operations**. They **do not have skilled manpower/divers to rescue trapped bodies from the sunken vessels**. That is why **the number of casualties' increases in accidents.**

- Combined effort of Department of Shipping (DOS), Bangladesh Inland Water Transport Authorities (BIWTA), Bangladesh Inland Water Transport Corporation (BIWTC), human attitude of vessels owners and individual awareness are essential to reduce this manmade disaster.

7.2 Recommendations

Other than few exceptions, reasons for passenger vessel disaster include the irresponsibility of concerned authority and erratic behaviours of owners in a captive market. Government should take immediate measures for establishing risk free riverine transport systems and eradicating irregularities and corruption from this sector. It may not be possible to prevent the vessels fatalities completely but it is possible to minimize up to an acceptable level. Some recommendations to mitigate future vessel disasters are put forward herewith:

- Considering launch fatalities as a disaster, Ministry of Shipping and Ministry of Disaster Management may take joint efforts for mitigation.
- Overloading onboard vessel shall be checked at starting points as well as enroute. A dedicated work force may be formed for this purpose.
- Unfit and risk prone passenger vessels may be identified and removed from service encouraging new entrepreneurs to build new and safe water vessels/launches. Concern authority is to ensure that all passenger vessels equipped with necessary navigational and life saving equipments before getting fitness certificate.
- Appropriate design of all inland passenger vessels to be ensured by DOS through their existing control mechanism. Annual inspections of passenger vessels should be made mandatory. Officials-in-charge found guilty of misconducts and malpractices should be punished.
- Central board of recruitment for vessels operators may be established under the government control to ensure educated and skilled marine crew recruitment for all vessels.
- Provisions of life insurance facilities for commuters' of water ways may be incorporated which will in turn help to implement rules and regulation of this sector.
- Carrying commercial cargoes on the top decks and overloading of passengers to be stopped.

> It is to be ensured that passenger vessel owners are paying compensations to the surviving passengers or the family members of passengers who perished in accidents caused by human negligence and misconduct.

- Adequate government support in terms of fund shall be given to IWT for facilitating maintenance and development of this sector.
- Regular hydrographic survey shall be conducted to ensure the safe navigability of various waterways.
- Navigational aids are like traffic signals on road which guide and instruct the masters to navigate through safe channel. So adequate navigational aids in the waterways shall be provided by the appropriate authority. Adequate light beacon and buoys are to be provided for safe day and night navigation.
- Adequate pilotage service is another requirement for safety.

> Massive awareness campaign regarding safety of water transport may be arranged by all concern.

References

Wimal, A. 2003. *Ferry disaster in Bangladesh claims hundreds of lives.* Retrieved March 15, 2003, from http://www.wsws.org

2. *Third Bangladesh river disaster* 2005. Retrieved March 15, 2009, from http://www.BBC.org/BBC NEWS/World/South Asia/third Bangladesh..

3. Arnold, W. 2001. Cell Phones for the world's poor: Hook up rural Asia, some say, and ease poverty. New York Times. January 19.

4. *Ferry disaster claims hundreds.* Retrieved March 15, 2009, from http://news.bbc.co.uklgo/pr/fr/2/hi/south_asia/3051683.stm.

5. Lawson, A. 2003. *Bangladesh minister holds firm*. Retrieved July 16, 2003, from http://www/news.bbc.co.uk/go/pr/fr/-/1 /hi/world/south_asia/3070039.stm.

6. Lloyd's List. 2004. *Bangladesh in the news again.* May 24, 2004.

7. Priyangika, N. 2001. *Bangladesh's worst ferry disaster claims nearly 200 lives.* Retrieved January 15, 2001, from. http://www.wsws.org/articles/2001/jan200l/bangj05. shtml.

8. Tribune. 2003. *Ferry sinks in Bangladesh, 400 feared dead.* Retrieved July 9, 2003, from http://www.tribuneindia. com/2003/20030710/world.htm.

9. World Bank. 2003. *Annual Report on Bangladesh.* Retrieved September 20, 2003, from http://lnweb 18.worldbank.org/

10. Worldwide Socialist News. 2002. *Bangladesh ferry workers strike over safety*. Retrieved June 9, 2002, from http://www.wsws.org/articies/2002/J*un2OO2/lab-j 15_prn.shtml.

11. Bangladesh Inland Water transport Authority (BIWTA) 1998, BIWTA Annual Report, Dhaka.

12. Khalil, G.M. 1985, `A study of passenger launch disaster in Bangladesh'

13. Rashid, H. 1991, *Geography of Bangladesh,* University Press ltd, Dhaka.

14. Transport Sector Coordination Wing, Planning Commission 2009, *Inland Water Transport Masterplan Study Final Report,* Ministry of Shipping, Dhaka.

15. Julfikar, M 2009. *The Inland Shipping Laws and Rules,* Green Square, Dhaka

16. BIWTA 2009. Retrieved August 13, 2009, from http://www.biwta.gov.bd

17. DOS 2009. Retrieved August 16, 2009, from http://www.dos.gov.bd