

ベンガル湾沿岸域・河川域における 水運・造船事情調査

2016年3月

一般社団法人 日本舶用工業会
一般財団法人 日本船舶技術研究協会

刊行によせて

当工業会では、我が国の造船業・船用工業の振興に資するために、ボートレースの交付金による日本財団の助成金を受けて、「造船関連海外情報収集及び海外業務協力事業」を実施しております。その一環として、ジェトロ関係海外事務所を拠点として海外の海事関係の情報収集を実施し、収集した情報の有効活用を図るため各種報告書を作成しています。

本書は、（一社）日本舶用工業会と日本貿易振興機構（ジェトロ）が共同で運営しているジェトロ・シンガポール事務所舶用機械部（竹内智仁所員）が、ベンガル湾沿岸国のうちバングラデシュを中心に沿岸域・河川域の水運・造船の動向について調査した結果を取りまとめたものです。

本書が関係者の皆様の参考となりましたら幸いです。

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はじめに

ベンガル湾沿岸諸国－インド、バングラデシュ、ミャンマー、タイ、スリランカ－は、China プラス 1 としての生産拠点、膨大な人口を背景として増加する内需、政治的変革等による急速な自由経済の伸びと対内投資の拡大等により、今後世界で最もダイナミックな成長が期待される地域のひとつである。中でも、欧米や日系企業の進出が進むバングラデシュは、首都ダッカとチッタゴン・マタバリ間に中心に産業集積を図り、東・東南アジアと南アジアを結ぶバリューチェーンのハブを目指そうという「ベンガル湾産業成長地帯構想」が日・孟両国政府の間で打ち出され、更にインド北東部・中国西部への国際物流の玄関口としての役割も期待されている。従来、同国では国内物流・人流に水運が広く活用されており、その歴史から造船分野でも実績を持つことから、こうした動きは当該地域の水運・造船分野の発展の機運にも繋がっている。

本報告書では、まず第 1 章としてバングラデシュの沿岸域・河川域で用いられる船舶の船腹量、船種、船齢等を概観するとともに、沿岸・内陸船舶の実態を具体的にイメージできるよう就航船の構造・設備情報を示した。

第 2 章では沿岸・内陸水運の輸送動向として、チッタゴン港を発着とする国内貨物の輸送量、モード別輸送分担率、主要河川港旅客数などのデータ及びインド・バングラデシュ間の輸送協定に基づく沿岸・内陸水運輸送の推移を示すとともに、国際機関による将来の輸送需要予測及び政府による水運振興関連施策についてまとめている。

一方で同国の内航旅客船については、世界最悪レベルと言われるほどに事故が頻発しており、安全性確保が喫緊の課題となっている。第一章で調査した船舶の実態を踏まえつつ、海難事故の現状と政府の安全対策の動きについて概観する。

最後に、上記各章及び当事務所の 2014 年度特別調査「バングラデシュ海事産業概況調査」を踏まえて、今後の動向と課題について考察した。

ベンガル湾沿岸地域の海事産業は将来大きく発展する可能性を持つと信ずるもの、政治体制・経済制度をはじめ、それを促す取り組みが海運・造船先進国から大きく立ち遅れる中、我が国はじめ国際社会からの継続的な支援が不可欠である。そのためには詳細かつ広範な調査が必要とされるが、本調査報告書がその一つとして関係各位のご参考となれば幸いである。

本調査実施中の 2015 年 10 月にバングラデシュ北部で発生した邦人殺害事件は極めて残念な事件であった。日本政府により当面の渡航自粛措置が取られ、日孟のビジネス交流は一時停滞し、本件も十分な現地調査を行うことができない状況となった。犠牲者の方のご冥福をお祈りするとともに、早期の事態回復を期待したい。かかる中、現地での情報収集を支援いただいた関係各位にはこの場を借りて深くお礼申し上げたい。

JETRO シンガポール事務所
舶用機械部長 竹内 智仁

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1. 沿岸・内陸水運船舶

1.1 登録船舶

表1は、内陸水運に従事する船舶としてバングラデシュ船舶局に登録された隻数である。2010年に比べて2011年の隻数が大きく減少したのは、登録船舶について確認を行い、所有者の所在不明の船舶などを除外したためである。2011年以降、全体としては緩やかに増加しており、特に貨物船、油タンカー及び浚渫船の増加が目立つ。一方、表2は商船局に登録された船舶の隻数であり、外航船及び漁船を含む。90%以上が漁船（ボート）、貨物ボートである。最近5年間で沿岸タンカーが大きく増加した。表3及び4の船齢別構成に示すように、タンカーと貨物船は5年以内の船齢が多く、これらの増加分はおもに新造船と思われる。しかしながら、未だに船齢20年を超える老齢船、さらには40年を越える超老齢船も今尚数多く運航している。超老齢船は旅客船、タンカーで多く見られる。



ダッカ河川旅客ターミナル・ショドルガットの風景

表 1. Registered vessels (inland shipping) information (NO. OF VESSELS REGISTERED WITH DEPARTMENT OF SHIPPING UNDER INLAND SHIPPING ORDINANCE-1976)

Type of vessel	As on Dec 2008	As on Dec 2009	As on Dec 2010	As on Dec 2011	As on Dec 2012	As on Dec 2013
Passenger vessels	2,122	2,162	2,188	970	984	1,061
Cargo vessels	2,041	2,088	2,217	1930	2,048	2,213
Ferry	94	94	96	23	27	27
Oil Tanker	150	160	175	190	210	260
Tug boat	271	273	283	75	83	89
Dumb barge	1,666	1,674	1,683	180	202	216
Fishing boat	70	70	70	NA	NA	NA
Speed boat	664	674	684	205	224	226
Inspection launch	422	422	422	40	44	44
Sand carrier	2,488	2,893	3,506	3,375	3,654	3,811
Dredger		80	175	620	794	857
Others	699	718	776	350	398	563
Total	10,687	11,308	12,275	7,958	8,668	9,367

Source: Department of Shipping (DOS)

表 2. Registered vessels (merchant shipping) information (VESSELS REGISTERED WITH MERCANTILE MARINE DEPARTMENT UNDER MERCHANT SHIPPING ORDINANCE'83 AND INLAND SHIPPING ORDINANCE 1976)

Type of Vessels	Total No. Of Vessels					
	As on Dec 2008	As on Dec 2009	As on Dec 2010	As on Dec 2011	As on Dec 2012	As on Dec 2013
Sea Going Vessel	27	34	46	67	67	67
Coastal Vessel (Cargo)	82	83	84	85	87	100
Tanker	95	95	104	112	118	143
Passenger ship	15	15	21	22	23	23
Dumb Burge	6	6	7			7
Tugs	7	7	8			8
inspection Vessel	1	1	1			1
Dumb Burge (Under ISO)	6	6	15	15	15	15
Dredger/Water Barge	1	1	5	5	7	7
Fishing Trawler	153	177	194	180	201	217
Fishing Boats	6,591	6,751	6,959	7,730	7,923	8,313
Cargo Boats	2,512	2,547	2,577	2,615	2,666	2,728
Others				16	16	17
Ambulance Vessel						1
Total Vessels No.	9,496	9,723	10,021	10,847	11,123	11,630
						12,127

Source: DOS

表 3. Number of inland vessel by classification and age (>=100 GRT)

Age Vessel Type	No. Regd.	N/A ¹	0-4	5-9	10-14	15-19	20-24	25-30	30-34	35-39	>=40
Passenger	285	26	57	12	47	39	33	33	20	4	14
Cargo	2,203	144	575	508	398	190	152	170	54	11	1
Ferry	34	1	12	3	2	0	2	4	2	1	7
Oil tanker	172	4	107	21	12	9	8	6	3	1	1
Sand carrier	214	1	103	99	8	0	1	1	1	0	0

Source. DOS

表 4. Number of coastal vessel by classification (>=100 GRT)

Age Vessel Type	No. Regd.	N/A	0-4	5-9	10-14	15-19	20-24	25-30	30-34	35-39	>=40
Coastal cargo ²	102	-	18	8	4	0	14	13	6	5	34
Coastal tanker	162	-	46	2	0	2	18	20	15	9	50
Fishing trawlers	161	50	3	31	40	5	3	2	4	11	12

Source. Mercantile Marine Department

¹ Not available

² Coastal cargo includes coastal container vessels

1.1.1 船舶建造国

これら内陸水運船は基本的にバングラデシュ国内で設計・建造されているが、エンジン等搭載機器は中国製、日本製、米国製が多い。旅客船に関しては船齢の老若に関わらず同様の構造であり、かつての開拓時代のアメリカ河川船舶を思わせるようなデザインが用いられている。沿岸・内陸水運油タンカー（1000-2000DWT）については、老齢船の多くは輸入であるが、近年バングラデシュ国内で多く新造されている。建造造船所からのヒアリングでは新造用設計は中国から購入しており、併せて、主要機器も中国製を多用しているとのことであった。また、現在運航中の沿岸・河川コンテナ船3隻は中国からの輸入である。

1.2 沿岸・内陸水運船舶の構造・設備

沿岸・内陸水運船舶の主要目及び構造・設備について、旅客船、貨物船（タンカー、一般貨物船、コンテナ船）及びトロール漁船の一般配置図等を関係機関より入手するとともに、一部の船舶について船舶検査関係者の協力を得て現地調査を行った。これらの情報（主要目及び搭載機器関連情報並びに一般配置図及び船舶各部写真）を参考として添付する。ただし、収集情報の範囲及び正確性の問題から機器情報は不明が多く、入手可能な範囲で記載した。

1.2.1 内陸水運旅客船

- ・ 船長は全長約 30m 強から 70m、喫水は 1.2-1.5m。船長 70m サイズのもので定員は 500-700 名。船体の材質は鋼製、小型のものは木製。上部構造物は 3 層が一般的。最上層前面が航海船橋となっている。
- ・ 航海時間はダッカ発南部沿岸エリアへの航路の場合で 8 時間以上。夜間航行の場合は定員が昼間の定員より 30%程度少なくなっている。
- ・ 上甲板の船体中央部に複数のハッチがあり、下部艙内に一般貨物を積み込むようになっている。当該ハッチのコーミングは 10-30cm 程度であり、ボルトで閉鎖するようになっているが水密性は保持されていない。エンジルームは水線下にあるが、入口及び周囲の壁（上甲板上部分）は金網となっており、また、入口のコーミングがない。
- ・ 機関出力は、全長 30m 級、定員 200 名で 200HP 前後、50m 級、定員 500-600 名で 500-600 馬力（250-300 馬力×2 基）、70m 級、定員 700 名超で約 500-1000 馬力（250-500 馬力×2 基）程度。航海速力は 8-10kt。
- ・ 船橋内の設備は、舵輪（ロープまたはチェーンによる機械式手動操舵）、エンジンテレグラフ、航海灯スイッチ、ホーン。電子的な航海設備は設置されておらず、無線通信設備はラジオ受信機及び携帯電話。輸入中古船の場合は GMDSS 機器が搭載されているものもあるが、整備不良や乗組員の知識不足により機能せず、取り外され売却されている場合もある。
- ・ 救命設備は旅客エリアの天井に救命浮輪が設置されているが、定員分には足りず、規則によれば定員の 10%（Seasonal Rough Area 航行船舶の場合）。救命胴

衣は船員分のみが義務付けられており、乗客分は基本的に搭載されていない。救命いかだ、救助艇は無い。

1.2.2 沿岸・内陸水運用タンカー及びコンテナ船

- ・全長 60m-70m で、喫水は 3.5-4m。主機出力は合計 1000 馬力前後（1 基又は 2 基）。Coastal として建造されたものは、設計、構造としては概ね日本の内航船（平水、沿海）に近いものと見受けられる。近年新たに建造されたタンカーはダブルハルを採用するとともに、バットフローホーク型で 2 基 2 軸という設計が多用されている。載貨重量は 600-2000DWT。多くは国内建造であり、船級は GL、RINA、NK などを取得。
- ・内陸水運用の貨物船は極めて簡易な構造で、航海設備はほぼなし、無線通信はラジオのみ、消防設備はポンプは 1 台のみで、バケツや砂が搭載されている。救命設備も救命胴衣が搭載されていないケースもある。いずれにしても維持管理は極めて悪い。
- ・設計は欧州又は低価格を指向するところでは中国からの購入であり、機器類についても欧米製か、価格重視で中国製を多く用いるとの回答であった。欧米製については船主の指定のほか、スペアパーツが入手しやすい（中国又はインドでライセンス生産されたものが入手可能）という理由が挙げられた。

2. 沿岸・内陸水運輸送動向

2.1 国内貨物輸送量（主要港国内貨物取扱量）

バングラデシュの国際貨物の 90%以上はチッタゴン港を出入口とし、その貨物の発着元の大部分は首都ダッカである。チッタゴン・ダッカ間における輸送モード別貨物輸送量のデータは入手できなかったが、表 5 にチッタゴン港湾局公表の輸送モード別貨物検査量を示す。河川による貨物量の構成比は 50%を超えるが、ほぼ全てが穀物、セメントクリンカーなどの産業基礎物資及び農産品関係バルク貨物である。その他の主要貨物は、石油類の液体貨物や車など。鉄道による輸送は、穀物、石炭及びコークス、油及びコンテナ貨物。主な輸入物資の繊維産業向け材料、機械、食料、果物などならびに主要輸出貨物（繊維製品、ジュート、加工食品、水産品）の多くは自動車及び鉄道により輸送されている。アジア開発銀行の調査によれば内陸水運輸送モードはトン kmあたり 0.99 タカ以下と最も安価な輸送モードとされるが、その利用は進んでいない。

表 5. Clearance of dry cargo from Chittagong port by different modes

Year	Rail	Road	River
2011-12	518,552 (1.79%)	13,080,859 (45.09%)	15,411,102 (53.12%)

Source. CPA

表 6. Cargo (& Container) Statistics (import in MT)

YEARS	FOOD GRAINS	CEMENT CLINKER	FERTILIZER	COAL	SALT	SUGAR	EDIBLE OIL	PETROLEUM OIL	BULK OTHER	BULK TOTAL	CONT. IMPORT	TOTAL IMPORT
2000-01	1,191,893	491,383	2,190,659	633,510	7,425	52,436	256,287	749,114	3,508,223	2,593,218	11,674,148	3,235,164
2001-02	674,402	16,468	4,279,954	833,834	5,954	9,878	168,873	907,276	3,462,182	2,475,206	12,834,027	3,254,668
2002-03	968,450	3,004	5,306,651	723,975	22,750	91,133	427,574	935,812	3,655,680	2,460,437	14,595,466	3,723,745
2003-04	800,873	0	5,486,431	800,650	4,845	89,408	535,676	3,652,903	1,032,469	2,212,715	14,615,970	4,370,324
2004-05	1,178,740	0	5,462,592	1,318,212	4,024	110,740	921,687	1,176,564	3,978,342	2,327,816	16,478,717	5,197,709
2005-06	1,756,960	0	6,299,678	1,235,142	2,005	150,388	496,046	1,058,390	3,728,988	2,733,779	17,461,376	5,708,489
2006-07	1,966,072	0	6,187,915	1,245,876	511	109,384	853,841	1,199,608	3,727,819	2,430,283	17,721,309	6,114,985
2007-08	2,053,030	0	6,958,316	1,168,463	309	11,675	812,624	1,130,810	3,530,845	2,201,072	17,847,144	7,498,904
2008-09	3,068,585	0	6,324,428	946,675	0	38,675	955,835	1,102,409	3,615,333	2,497,217	18,549,157	8,169,677
2009-10	3,337,833	0	8,683,875	1,604,133	18,251	289,331	1,356,854	1,373,681	4,029,929	2,742,050	23,435,937	9,377,271
2010-11	4,717,195	0	11,479,377	1,894,270	145	95,064	1,370,679	1,327,706	4,971,161	2,986,722	28,842,319	11,071,826
2011-12	1,957,685	0	11,023,432	1,541,968	0	0	1,863,563	1,626,718	5,381,533	3,350,049	26,744,948	9,439,987
2012-13	1,428,491	0	12,031,461	1,467,554	40,714	488,248	1,474,516	1,614,218	5,371,990	4,465,771	28,382,963	9,928,300
2013-14	2,072,156	0	13,580,424	1,256,454	0	0	2,044,215	1,710,798	5,576,296	4,594,479	30,834,822	11,125,348
												Source. CPA

表 7. Cargo (& Container) Statistics (export in MT)

YEARS	JUTE GOODS	JUTE GOODS	LEATHER GOODS	TEA	GARM- ENTS	FROZEN GOODS	CONT, OTHER	TOTAL CONT	UREA/ FERTI- LIZER	AMMO- NIA	NAPHTHA	BULK OTHER	BULK TOTAL	TOTAL EXPORT
2000-01	99,824	351,180	50,752	42,372	657,170	34,599	183,414	1,419,311	366,479	155,247	41,326	16,122	579,174	1,998,485
2001-02	74,689	346,846	27,879	20,525	720,457	30,039	188,130	1,408,565	334,931	153,547	75,638	18,760	582,876	1,991,441
2002-03	68,272	275,991	24,394	19,385	665,656	27,098	496,860	1,577,656	337,641	187,508	118,162	40,316	683,627	2,261,283
2003-04	111,433	180,282	32,413	27,833	825,512	29,715	634,536	1,841,724	297,256	83,386	150,112	28,024	558,778	2,400,502
2004-05	137,162	253,808	21,905	20,407	920,432	37,861	731,372	2,122,947	361,034	70,669	138,695	17,618	588,016	2,710,963
2005-06	155,542	325,807	3,706	3,873	1,321,794	47,805	508,272	2,366,799	289,575	157,715	112,341	0	559,631	2,926,430
2006-07	134,714	475,201	7,248	2,975	1,554,017	46,560	575,531	2,796,246	274,535	130,887	87,471	0	492,893	3,289,139
2007-08	161,205	581,371	11,995	11,984	1,442,757	59,161	875,837	3,144,310	157,139	143,292	138,751	17,028	456,210	3,600,520
2008-09	149,820	487,482	8,729	3,949	1,747,377	51,540	778,177	3,227,074	239,702	187,057	89,422	20,492	536,673	3,763,747
2009-10	143,137	629,769	15,989	2,251	1,757,847	59,391	954,594	3,562,978	131,396	58,246	332,770	102,578	624,990	4,187,968
2010-11	122,920	644,462	21,137	493	1,944,010	89,337	1,687,755	4,510,114	123,374	30,792	168,641	147,454	470,261	4,980,375
2011-12	204,117	769,925	20,572	694	2,063,511	81,134	1,258,731	4,398,684	50,259	48,100	79,752	139,579	317,690	4,716,374
2012-13	165,793	820,702	23,777	49	2,364,576	86,884	1,165,895	4,627,676	12,658	27,275	134,920	257,876	432,729	5,060,405
2013-14	190,071	808,741	31,477	495	2,653,198	173,429	115,4936	5,012,347	80	14,000	98,621	213,329	326,030	5,338,377

Source. CPA

表 8 チッタゴン港コンテナ取扱量

	Import		Export		Total	
	TEUs	TONs	TEUs	TONs	TEUs	TONs
2010-11	729,693	11,071,826	739,221	4,511,273	1,468,914	15,583,099
2011-12	675,796	9,439,987	667,612	4,398,815	1,343,408	13,838,802
2012-13	743,547	9,928,300	725,166	4,627,834	1,468,713	14,556,134
2013-14	812,918	11,125,348	812,591	5,012,427	1,625,509	16,137,775
2014-15	940,827	13,132,923	926,115	5,535,446	1,866,942	18,668,369

出所 : Chittagong Port Authority "Overview 2015-2016"

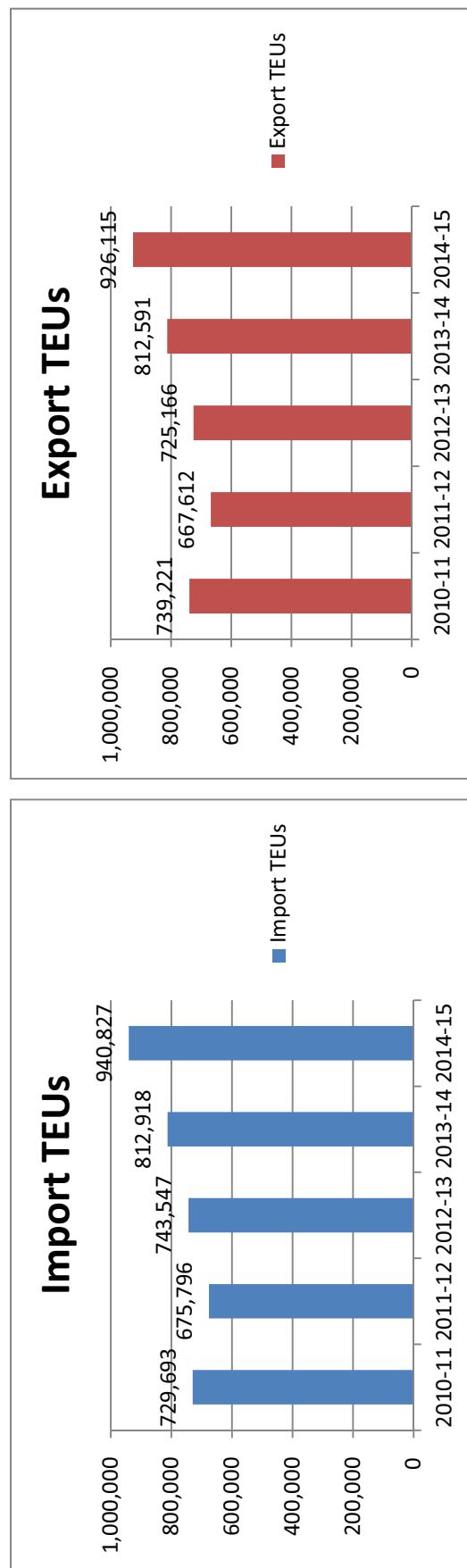


図 1 チッタゴン港コンテナ取扱量（輸入、輸出）

表 9. Amount of cargo transported (loaded) through major river ports (million MT)

Name of the river port	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015
Dhaka river port	4.091	4.329	4.653	4.579	4.586
Narayanganj river port	2.199	2.399	2.444	4.207	4.333
Khulna river port	0.251	0.272	2.833	0.250	.330
Chandpur river port	0.250	0.275	0.285	0.146	.158
Barisal river port	1.000	1.250	1.375	7.701 ³	7.778
Patuakhali river port	0.261	0.295	0.308	0.570	.761
Chittagong office	0.094	0.097	0.098	0.092	.094
Aricha river port	5.902	6.275	6.672	4.382	4.529
Baghabari river port	0.053	0.061	0.110	0.085	.138
Maowa river port	-	-	-	-	-
Total	14.101	15.253 (▲8.16%)	18.774 (▲23.08%)	22.012 (▲17.24%)	22.707 (▲3.15%)

Source. BIWTA

表 10. Amount of passengers transported (loaded) through major river ports(million)

Name of the river port	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015
Dhaka river port	90.299	95.266	115.594	69.040	69.119
Narayanganj river port	37.407	48.220	48.494	44.620	41.287
Khulna river port	1.558	1.675	1.739	1.710	1.859
Chandpur river port	4.000	3.800	4.150	5.459	5.799
Barisal river port	9.000	9.300	10.200	6.226	12.512
Patuakhali river port	3.300	3.653	3.499	8.191	6.156
Chittagong office	2.610	2.640	2.655	2.662	2.706
Aricha river port	42.932	45.213	46.428	0.673	3.494
Baghabari river port	-	-	-	0.691	.207
Maowa river port ⁴	-	-	-	-	9.264
Total	191.106 (▲4.01%)	209.767 (▲9.76%)	232.759 (▲10.96%)	139.272 ⁵ (▼40.16%)	152.03 (▲9.42%)

Source. BIWTA

³ この急増は、近郊に新たなセメント工場がいくつか新設されたため (BIWTA の見解)

⁴ 2014-15 より、Dhaka river port から分離して 独立の Maowa river port としての運用開始。

⁵ この年の輸送旅客数の激減は、政治的混乱により主にダッカ発着旅客が激減したため (BIWTA の見解)。

2.2 インド・バングラデシュ輸送協定に基づく両国間輸送量

2.2.1 輸送協定の概要⁶

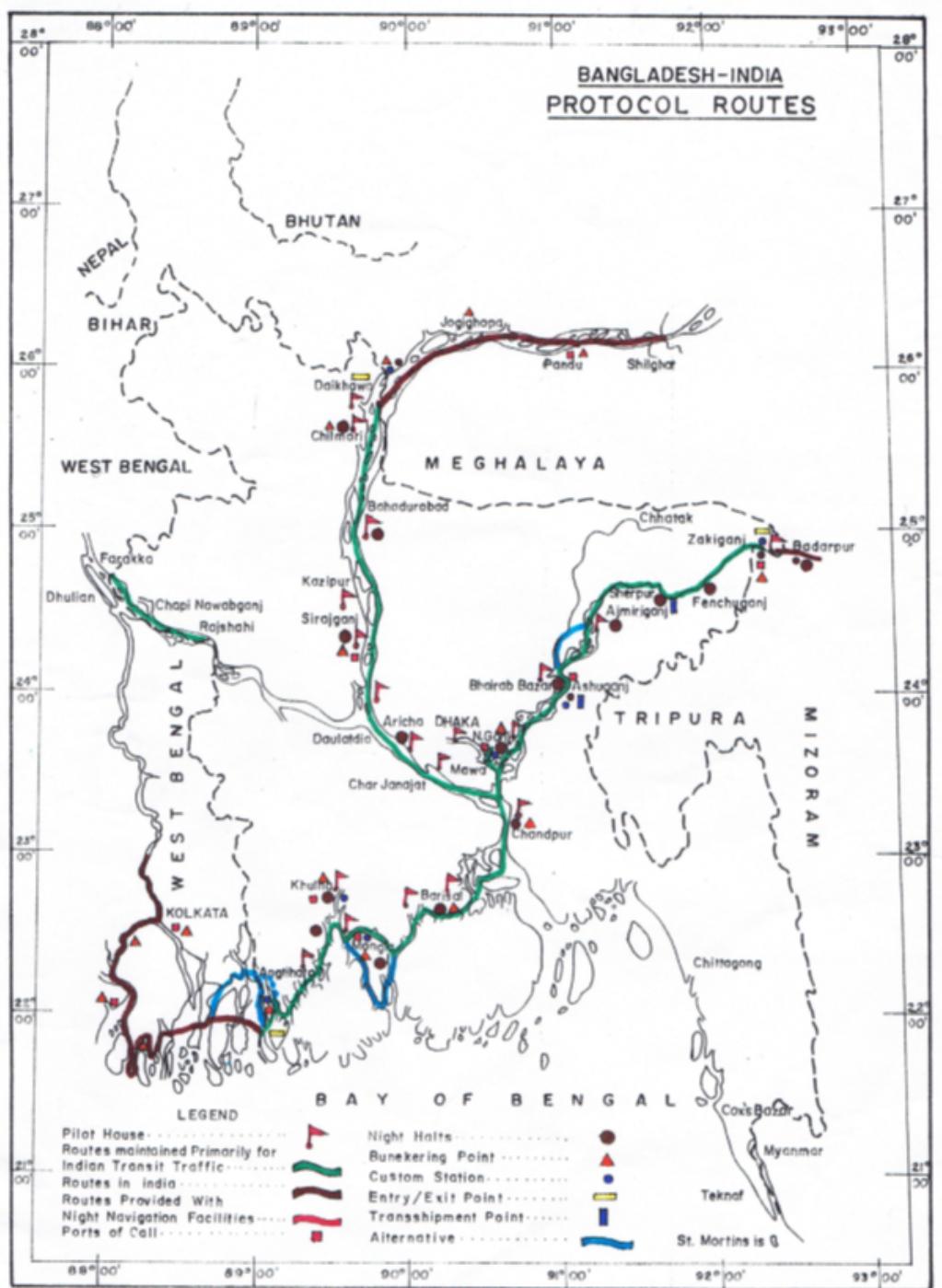


図 2. インド・バングラデシュ協定に基づく航路

出所：(BIWTA)

⁶ <http://mofa.gov.bd/sites/default/files/Protocol%20on%20Water%20Transit%20and%20Trade%20%28PIWTT%29.pdf>

本協定は、相互に利益あるものとして、二国間の商業輸送、一の国における二点間輸送のための通行及び第三国への輸出のための領域内輸送を認めるものである。最初の協定は 1972 年に締結され、2015 年 7 月に新たな協定が締結された。本協定に基づく輸送ルートは以下のとおりであり、関連当局により適宜他のルートが追加される。

1. Kolkata- Haldia- Raimongal- Chalna- Khulna- Mongla- Kawkali- Barisal- Hizla- Chandpur- Narayanganj- Aricha- Sirajganj- Bahadurabad- Chilmari- Dhubri- Pandu- Shilghat
2. Shilghat- Pandu- Dhubri- Chilmari- Bahadurabad- Sirajganj- Aricha- Narayanganj- Chandpur- Hizla- Barisal- Kawkali- Mongla- Khulna- Chalna- Raimongal- Haldia- Kolkata
3. Kolkata- Haldia- Raimongal- Mongla- Kawkali- Barisal- Hizla- Chandpur- Narayanganj- Bhairab Bazar- Ashuganj- Ajmiriganj- Markuli- Sherpur- Fenchuganj- Zakiganj- Karimganj
4. Karimganj- Zakiganj- Fenchuganj- Sherpur- Markuli- Ajmiriganj- Ashuganj- Bhairab Bazar- Narayanganj- Chandpur- Hizla- Barisal- Kawkali- Mongla- Raimongal- Haldia- Kolkata
5. Rajshahi- Godagari- Dhulian
6. Dhulian- Godagari- Rajshahi
7. Karimganj- Zakiganj- Fenchuganj- Sherpur- Markuli- Ajmiriganj- Ashuganj- Bhairab Bazar- Narayanganj- Chandpur- Aricha- Sirajganj- Bahadurabad- Chilmari- Dhubri- Pandu- Shilghat
8. Shilghat- Pandu- Dhubri- Chilmari- Bahadurabad- Sirajganj- Aricha- Chandpur- Narayanganj- Bhairab Bazar- Ashuganj- Ajmiriganj- Markuli- Sherpur- Fenchuganj- Zakiganj- Karimganj

寄航港は両国の同数が開港されることとなっており、以下のとおりである。

Bangladesh	India
Narayanganj	Kolkata
Khulna	Haldia
Mongla	Karimganj
Sirajganj	Pandu
Ashuganj	Shilghat

2.2.2 協定に基づく輸送量

主な輸送貨物は、機械、石膏、石炭、鉄インゴット、食用油、鉄板、穀物、フライアッシュ等。表 10 に示すように、バングラデシュ・インド輸送協定に基づく輸送量は増加の一途をたどっており、その多くはバングラデシュ国内のセメント産業によるフライアッシュ、石膏、スラグ輸入。輸送は、インド籍船に代わりバングラデシュ籍船のシェアが急増し、現在、貨物量の 99% がバングラデシュ籍船により輸送されている。これは、バングラデシュ籍船のほうが輸送コストが安いためである。

表 11. インド・バングラデシュ協定に基づく輸送量

Year	Quantity of good carried B'deshi vessels (MT)	Quantity of good carried Indian vessels (MT)	No. of trips by B'deshi vessels	No. of trips by Indian vessels	Total trips under protocol	Ratio of goods carried by Bangladeshi and Indian vessels	Change in Transport Agreement
2001-2002	47,958	58,170	106,028	170	258	428	45:55
2002-2003	122,335	87,100	209,435	458	390	848	58:42
2003-2004	121,926	61,627	183,553	372	120	492	66:34
2004-2005	376,839	36,993	413,832	1,142	90	1,232	91:09
2005-2006	538,020	0	538,020	1,492	0	1,492	100:00
2006-2007	881,011	0	881,011	1,540	0	1,540	100:00
2007-2008	994,345	1,900	996,245	1,976	2	1,978	99:01
2008-2009	930,094	14,328	944,422	1,329	11	1,340	98:02
2009-2010	1,277,436	4,474	1,281,910	1,918	16	1,934	99:01
2010-2011	1,424,767	12,697	1,437,464	2,063	21	2,084	99:01
2011-2012	1,429,444	55,558	1,485,002	2,033	36	2,069	96:04
2012-2013	1,507,357	46,661	1,554,018	1,977	32	2,009	97:03
2013-2014	1,912,622	21,327	1,933,949	2,332	31	2,363	99:01
2014-2015 (up to March)	1,346,227	9,500	1,355,727	1,642	18	1,660	Costs of shipping to India reduced

2.3 沿岸・内陸水運の今後の輸送需要予測

下図 2 および 3 は、2012 年のアジア開発銀行の調査における今後の国内旅客及び貨物輸送量予測並びにモード別分担率の推移である⁷。

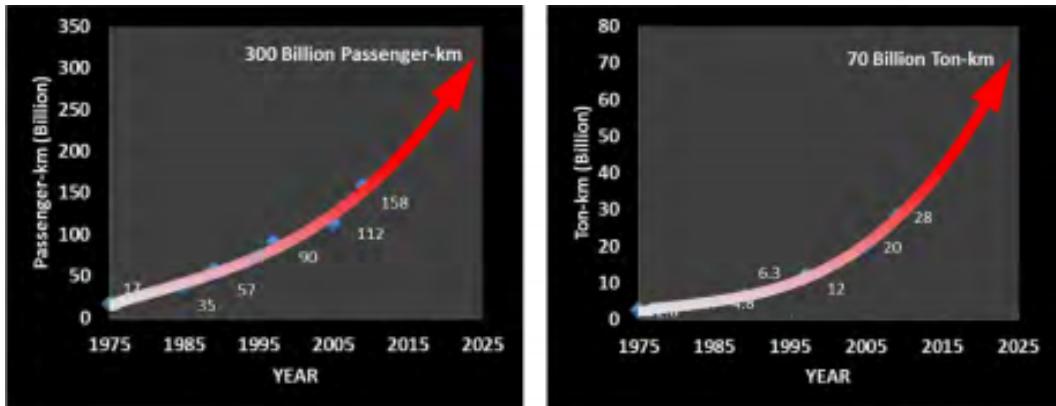


図 3. 2025 までのバングラデシュ国内輸送需要予測
(左 旅客、右 貨物) (2012 アジア開発銀行)

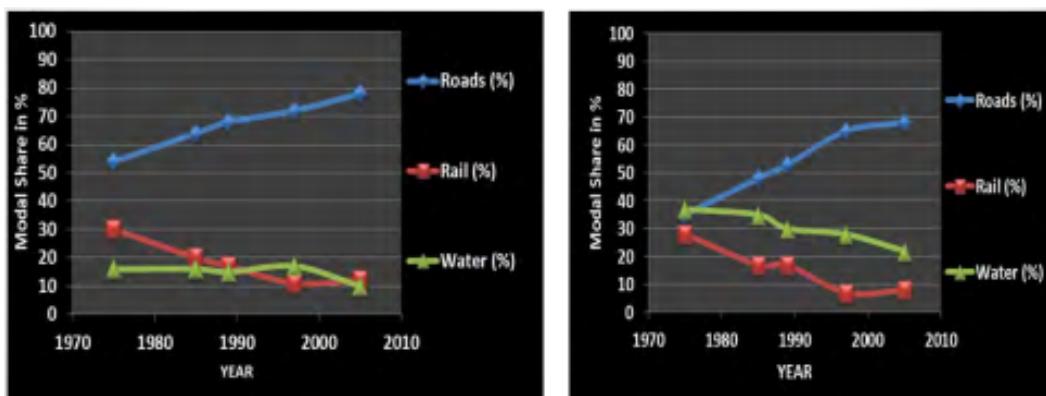


図 4. モード別輸送分担率 (左 旅客、右 貨物) (2012 アジア開発銀行)

旅客と貨物の双方共に、2025 年における輸送需要は 2010 年の倍以上と予測している。モード別輸送分担率としては、道路（車両）による輸送が今後とも中心となり、鉄道及び水運は、その輸送信頼度の改善がない限り減少傾向が続くとしている。一方、港湾におけるコンテナ取扱量は 3 倍以上、ばら積み貨物は 2 倍以上になると予測されており、主要都市の交通渋滞は一層悪化すると予測している。

⁷ <http://www.adb.org/sites/default/files/project-document/78858/43062-012-ban-tacr-01.pdf> ; <http://www.adb.org/sites/default/files/project-document/78858/43062-012-ban-tacr-02.pdf>

2.4 沿岸・内陸水運振興に関する施策

2.4.1 水運向上に関するプロジェクト

2015-16 予算年度において予定されている水運向上に関するプロジェクトを下表に示す。⁸

**表 12. Revised Annual Development Program (RADP) for 2014-15
(in million dollars)**

SL	Project Name (Implementation Period)	Approved Project Cost	RADP 2014-15 Allocation
Bangladesh Inland Water Transport Authority (BIWTA)			
1	Dredging of Madaripur-Charmuguria-Takerhat-Gopalganj River Route (2nd Revised). (January 2011 – June 2016)	17.91	1.3
2	Establishment of Inland Container River Port at Ashuganj. ⁹ (January 2011 – June 2016)	31.5	0.005
3	Construction of infrastructural facilities on evicted foreshore land under Dhaka, Narayanganj and Tongi River Port Area. (July 2011 – June 2015)	13.9	3.08
4	Procurement of 10 dredgers, crane boats, tugs, officer house boats and crew house boats with other accessories (1st revised). (July 2011 – June 2016)	95.6	12.8
5	Dredging of 12 important river routes. (October 2011 – June 2015)	65.2	5.1

⁸ [http://www.mof.gov.bd/en/budget/15_16/cdg/en/52_shipping_en.pdf](http://www.mos.gov.bd/site/page/2221473b-fead-4036-839a-9a6e91bf77d3/%E0%A7%A8%E0%A7%A6%E0%A7%A7%E0%A7%AA-%E0%A7%A7%E0%A7%AB-%E0%A6%85%E0%A6%B0%E0%A7%8D%E0%A6%A5-%E0%A6%AC%E0%A6%9B%E0%A6%B0%E0%A7%87%E0%A6%B0-%E0%A6%B8%E0%A6%82%E0%A6%B6%E0%A7%87%E0%A6%BE%E0%A6%A7%E0%A6%BF%E0%A6%A4-%E0%A6%AC%E0%A6%BE%E0%A6%9C%E0%A7%87%E0%A6%9F-(%E0%A6%89%E0%A6%A8%E0%A7%8D%E0%A6%A8%E0%A7%9F%E0%A6%A8-%E0%A6%AC%E0%A7%8D%E0%A6%AF%E0%A7%9F ;
<a href=)

⁹ Acquisition of land (18 acres) for construction is currently on-going under an Indian Line of Credit.

SL	Project Name (Implementation Period)	Approved Project Cost	RADP 2014-15 Allocation
6	Capital Dredging of 53 River routes in Inland waterways (1st phase: 24 River routes). (July 2012 – June 2018)	240.2	23.4
7	Establishment of Ship Personnel Institute, Madaripur. (July 2013 – June 2015)	5.	0.09
8	Development of launch ghats and way side ghats in rural areas of Bangladesh. (July 2013 – June 2016)	11.03	4.7
9	Procurement of 2 dredgers, crane boats, crew house boat and tug boat with other accessories for maintaining the navigability of inland waterways. (July 2011 – June 2015)	21.8	2.2
Bangladesh Inland Water Transport Corporation (BIWTC)			
10	Rehabilitation of 6 Ro-Ro ferries, 2 K-type ferries & 6 Pontoons of BIWTC (2 nd Revised). (July 2011 – June 2015)	9.1 (60 percent GOB, 40 percent BIWTC)	0.9
11	Construction of 1 Ro-Ro ferry and 1 Ro-Ro Pontoon for operation in Chandpur-Shariatpur ferry route. (July 2012 – June 2015)	4.3 (80 percent GOB, 20 percent BIWTC)	1.9
12	Procurement/Construction of 4 Nos. 108 TEU's Self Propelled Multipurpose Inland Container Vessels (1st Revised). ¹⁰ (January 2010 – June 2016)	19.4	7.8
13	Construction of Passenger vessels for providing efficient passenger services in Chittagong-Sandwip-Hatiya-Barisal coastal route ¹¹ (December 2014-June 2017)	6.7	0.003
Department of Shipping			

¹⁰ 2010年、BIWTCは、対日債務減免基金（Japanese Debt Cancellation Fund : JDCF）により、Khulna Shipyard Limited 及び Chittagong Dry Dock Limited より 4 隻調達することを決定。.

¹¹ 旅客の混雑を緩和するための公共事業

SL	Project Name (Implementation Period)	Approved Project Cost	RADP 2014-15 Allocation
21	Establishment of GMDSS and Integrated Maritime Navigation System. ¹² (January 2014 – December 2016)	47.6	1.6
22	Establishment of 4 Marine Academy in Bangladesh. (July 2012 – June 2016)	56.5	7.4
23	Bangladesh Trade and Transport Facilitation Studies RETF (March 2014-February 2016)	5.1	1.0
Self Financed Project.			
Bangladesh Inland Water Transport Corporation (BIWTC)			
1	Construction of 2 no Passenger Vessels for BIWTC for Operation in the Inland River Route (2nd revised). (April 2012 – December 2016)	7.0	1.9
2	Construction of 6 nos water Bus for Circular Waterways. (August 2013 – June 2015)	0.7	0.5
3	Construction of high rise head office building complex at 5 Dilkusha C/A, Dhaka. (July 2013 – June 2017)	3.9	0.06

ダッカ西部地域をカバーし、Sadarghat から Ashulia を繋ぐダッカ環状水路計画は、バングラデシュ内陸水運庁（BIWTA）により 2001 年より一部実施されたが、計画通りの実施が進まず、また、都市中心部との接続性も悪いため、将来の交通状況改善に役立つとは見られていない。また、計画実施の困難は地域の政治的な動きが影響していることも一因。BIWTA としては、当該計画への国民の関心を得るべく、当該水路に水上バスを就航させることを計画している。

2.4.2 河川コンテナ港の開設

2013 年、ダッカ南部 Pangaon 地区ブルガンガ川沿いに、初の河川コンテナターミナル「Pangaon ICT」が開設された。同国の消費と産業（主に繊維産業）の拠点であるダッカと国際貿易の出入口となる国際港チッタゴンとの間のコンテナ輸送はトラックが中心となっているが、渋滞等による物流遅滞がボトルネックとなっており、将来更なる輸送キャパシティ不足が指摘してきた。1991 年、JICA が河川コンテナ港のフィージビリティスタディを実施、これを踏まえて新たな輸送ルート拠点として整備され、チッタゴン港湾局が運営を行っている。

¹² 本プロジェクトは、ダッカの総合海上交通ナビゲーションシステムセンター（Center for Integrated Maritime Navigation System in Dhaka）及びベンガル湾沿岸無線基地局（救難警報受信及び航行用無線・信号の送受信）を設置するもの。

Pangaon ICT は、船長 90m の船舶を 2 隻着岸できるバース長を有し、コンテナインスペクションや税関の設備・機能も持ち、ここで国際コンテナの輸出入手続きを行うことが可能となっている。

表 13 PANGAON ICT コンテナ取扱量実績 (TEUs)

	IMPORT	EXPORT	TOTAL	便数 (のべ)
2013	238	120	358	7
2014	433	551	984	17
2015	656	591	1247	36
2016 (1月)	96	95	191	6

出所 : Pangaon ICT



面積は 55000 m²で 3500TEU 収容可能とのこと。しかし、ほとんどコンテナがない。



荷揚用クレーン

ダッカ発着貨物の新たな物流拠点としていわば鳴物入りで開港したものの、実際の利用は極めて低レベルに留まっている。主な輸送貨物はチッタゴン発ダッカ行の鉄スクラップなどで、帰り荷はなく空コンテナ輸送のみ。利用が伸びない最大の理由は 2 週間に一便という就航船の少なさとそれに起因する輸送費の高さ（ハンドリングチャージ等を含め、トラックより輸送費が高い）ということであるが、船主サイドからすれば荷物

が集まらないことが原因があると言える。本ターミナルの開設に合わせ、河川用コンテナ船の保有ライセンスが 31 隻分交付されたが、ほとんどの船主は様子見となっており、31 隻中建造中が 15 隻（うち 5 隻は最近キャンセルされた）に留まる。現在 **Pangaon ICT** に運航している船舶は中国からの輸入であるが、品質が低く船舶局の承認が出ていないため海上保険を付保することができず、このため、一層荷主が利用を敬遠するという事態となっている。運営者である **CPA** としては荷物及び運航便の増加に取り組んでいるが、輸送費の低減については、基本的に船舶運航者マターであるとして否定的であり、荷物の増加がすればそのうち低減されるであろうという姿勢であった。

河川によるコンテナ輸送そのものは将来にわたり有効と思われるが、顧客へのサービス内容を目標としてコンテナ運営と運航サービスを一体運営するという姿勢がないこと、また、一定の利用客を確保し経営を軌道に乗せるまでの財政的措置がないことに問題があると思われる。関係者のヒアリングでは **CPA** による運営が効率化を阻んでいるとの指摘もあった。

最近、タイやインドなどベンガル湾沿岸国相互の海運振興協力の取組みが始まり、また、外国の援助による新たな大型コンテナターミナルも計画されており、ダッカを発着とする貨物の輸送需要は今後一層伸びるものと思われる。この **Pangaon ICT** のほかにも、**SUMMIT** や **AK** など大手財閥系が民営河川コンテナターミナルを計画している。こうした官民の取り組みが進み、荷主のニーズに応えられるような沿岸・内陸水運コンテナ輸送システムが構築されれば、より大きな河川コンテナ輸送需要を生み出すことに繋がると期待される。

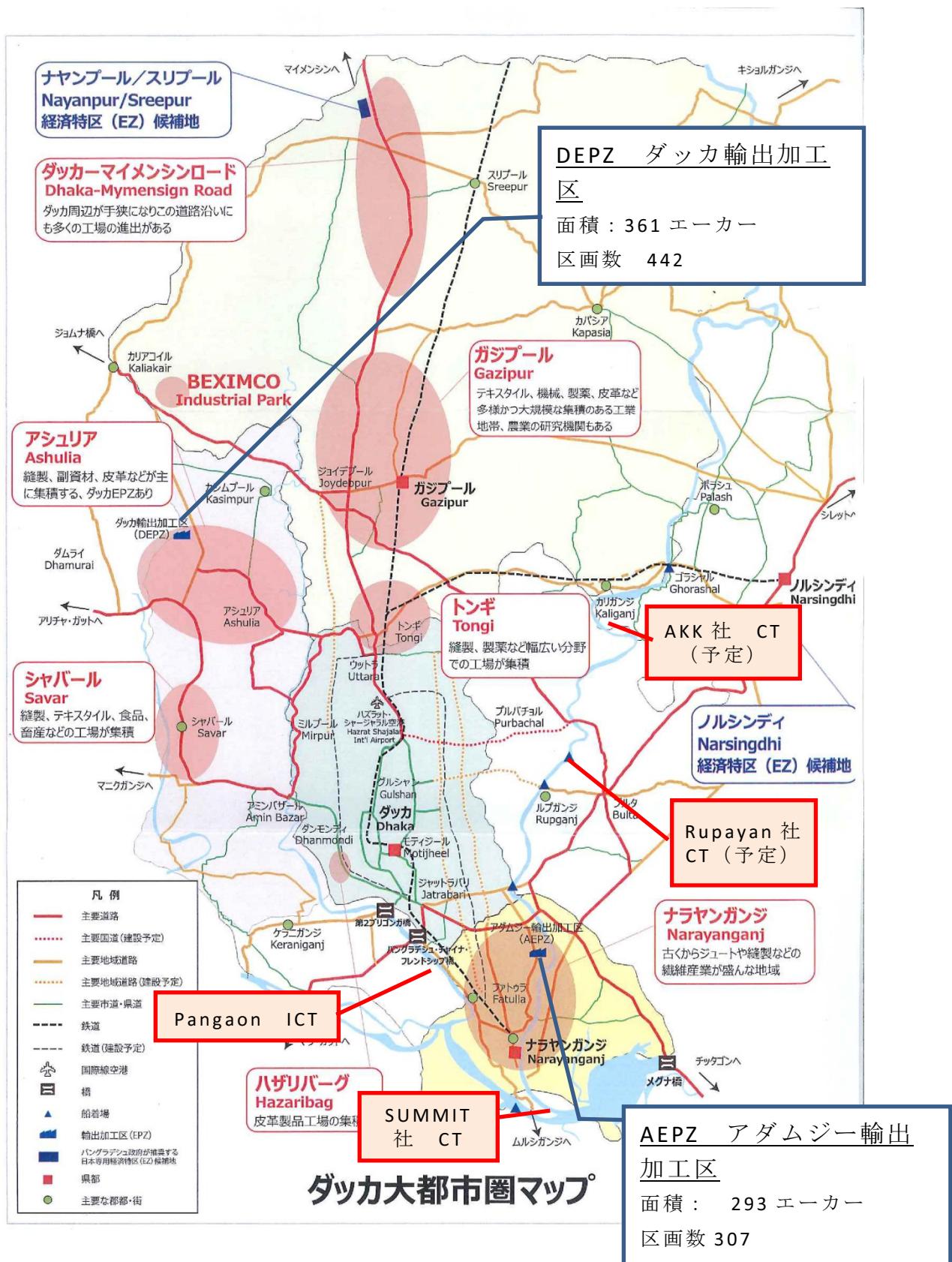


図 5 ダッカ近郊工業地域及び河川コンテナターミナル

出所：JETRO ダッカ資料より作成

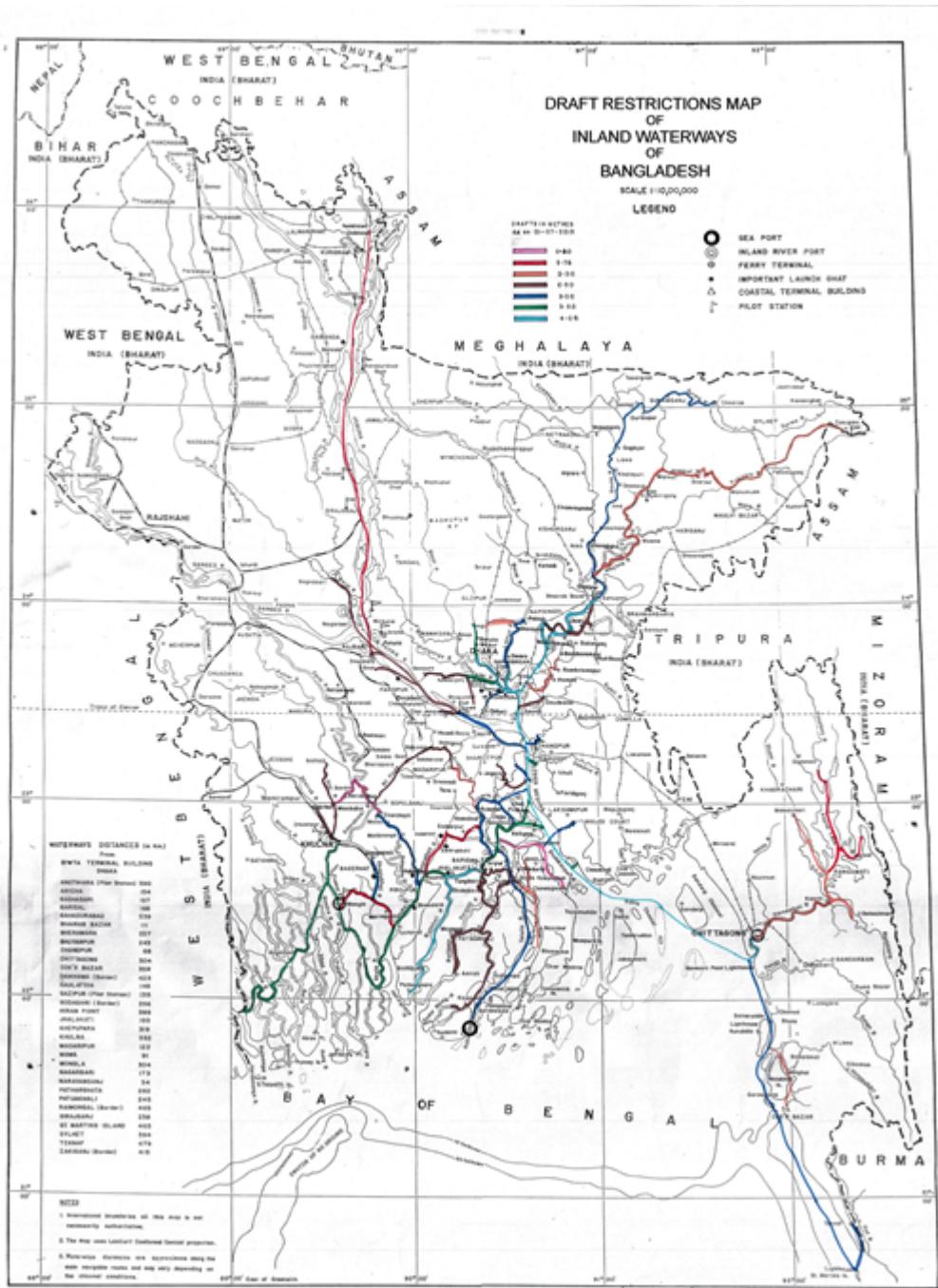


図 6 Draft restrictions map of inland waterways of Bangladesh (BIWTA, as on 2015)

3. 沿岸・内陸水運の安全性及び環境保全

3.1 船舶事故の傾向

米コロンビア大学の調査によれば、世界のフェリー事故の 95%が発展途上国で発生しており、バングラデシュはその中で最も発生頻度が高い国であり、また、事故による犠牲者数も最も多い（下図、Golden, 2015）。表 14 は過去の海難事故である。内陸水運旅客船の安全性向上は、バングラデシュ海事当局にとって喫緊の課題となっている。

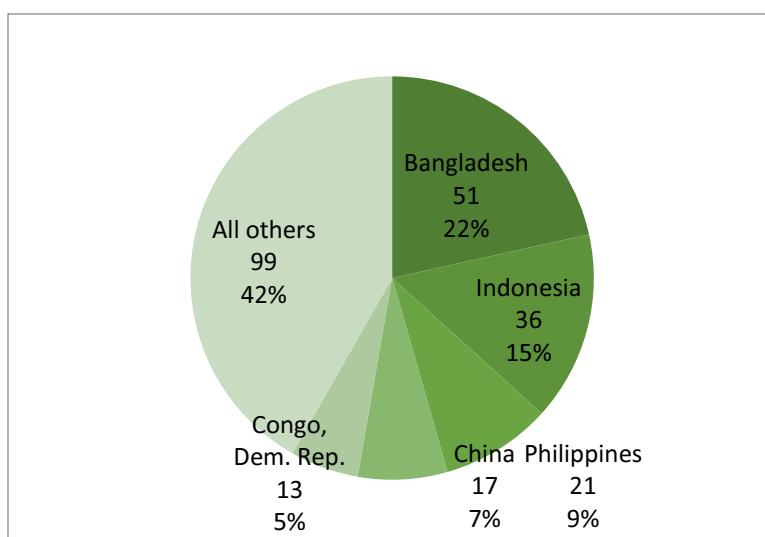


図 7. Top 5 accident prone countries in the world 2000-mid 2015 (Golden, 2015)

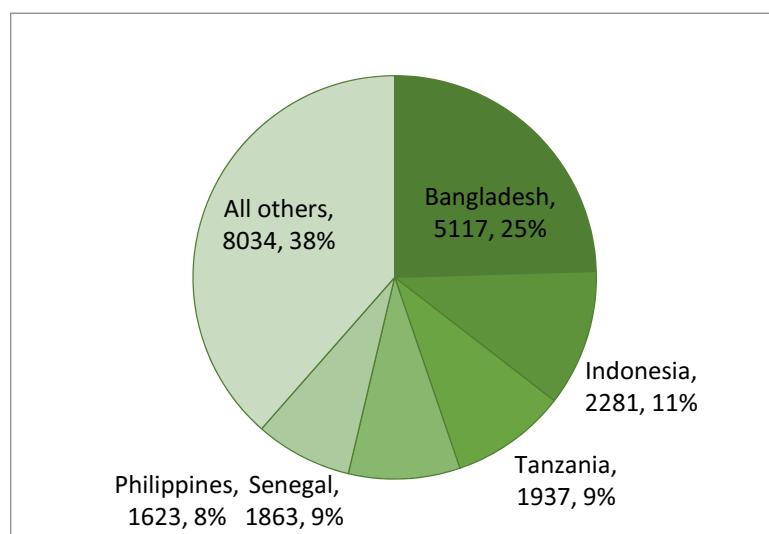


図 8. Countries with Top 5 Fatality Rates 2000-mid 2015 (Golden, 2015)

表 14. 大規模事故 (死者及び行方不明者 30 名以上) (Golden, 2015)

Day and Month	Dead and Missing (Minimum Estimate)	Vessel Name	Vessel Age at Time of Accident (Years)	Cause	Overloaded	Weather	Time of Day	Waterway and characteristics	Crew Response	Search and Rescue	Root Causes/Exacerbating Factors/Other
1-May-00	196	—	—	Capsized in storm	—	Storm	—	—	—	—	—
29-Dec-00	250	MV Rajhangshi	—	Collision with cargo ship MV Jalkapot	Y	Heavy fog	Night	Meghna River, swift currents	—	3 hours late; navy divers, police, local volunteers	—
29-Nov-01	100	—	—	Unknown	—	—	—	Tetulia River	—	—	—
3-May-02	450	MV Salahuddin 2	—	Weather, overcrowding, poor training, capsiz	Y	Whirlwind, rainstorm	Night	Meghna River	—	—	—
23-May-02	60	M.L. Suraha	—	Storm	—	Storm	Night	Baleswar River	—	—	—
4-Apr-03	251	—	—	Overcrowded, collision with a barge, sank	Y	—	Night	Surna River near Chatalk town	—	—	—
12-Apr-03	116	MV Sharifpur	—	Storm	—	Storm	Night	Naghchini River	—	local fishermen	—
21-Apr-03	38	MV Majlishpur	—	—	—	Winds 70 km/h	—	Meghna River	crew ignored passengers' requests to go back to shore because of bad weather	carrying wedding party	—

Day and Month	Dead and Missing (Minimum Estimate)	Vessel Name	Vessel Age at Time of Accident (Years)	Cause	Overloaded	Weather	Time of Day	Waterway and characteristics	Crew Response	Search and Rescue	Root Causes/ Exacerbating Factors/Other
22-Apr-03	335	MV Mitali	—	Storm	—	Sudden afternoon/evening storm	—	River Buriganga near Dhaka	—	fire brigade, police, and locals	—
8-Jul-03	1000	MV Nasreen	—	Overcrowded; sank after hitting turbulent water	Y	—	Night	juncture of Padma, Meghna and Dakaria rivers; strong currents, monsoon season caused heavy flooding	—	immediate; local Red Crescent, local fishermen	ferry not recovered until July 14; about 400 passengers boarded at the last minute after another ferry was canceled
4-Feb-04	30	MV Sattar Khan, MV Asha Jawa	—	Collision between two ferries	—	—	Night	Meghna River	—	—	—
23-May-04	161	MV Lighting Sun	—	Weather	—	Pre-monsoon season, when fierce storms blow up quickly; winds up to 90 kph (56 mph)	Night	Meghna River, near the junction with Padma River; swift currents	—	villagers and rescue vessel MV Rustam; rescue hampered by storm	passengers were asleep at the time of the disaster
23-May-04	40	MV Diganta	—	Weather	—	Pre-monsoon season, when fierce storms blow up quickly	—	Meghna River, near the junction with Padma River; swift currents	—	villagers	—
19-Feb-05	136	MV Maharaj	—	Weather	—	Sudden tropical storm	—	Buriganga River; strong currents	—	villagers, fishing boats	—

Day and Month	Dead and Missing (Minimum Estimate)	Vessel Name	Vessel Age at Time of Accident (Years)	Cause	Overloaded	Weather	Time of Day	Waterway and characteristics	Crew Response	Search and Rescue	Root Causes/ Exacerbating Factors/Other
15-May-05	137	ML Prince	16	Capsized, storm, overcrowded	Y	Storm	Day	strong tides	—	—	no lifeboats; mechanical and structural faults; vessel sank 3 times since 1989
17-May-05	163	MV Raipura	—	—	Y	Strong currents	—	—	—	rescue vessel MV Rustam delayed by bad weather; divers hampered by strong currents	—
19-May-05	30	—	—	—	—	—	—	mouth of the Meghna River	—	—	—
26-Feb-06	51	—	—	—	Y	—	—	Kirtan Khola River	—	—	—
8-Jun-06	37	—	—	Capsized	—	Rough weather	Day	Bay of Bengal	—	police	—
23-Oct-06	65	MV Shah Poran	—	Collision with cargo boat	—	—	—	Meghna River	—	—	passengers traveling for Eid
9-Oct-07	35	—	—	Weather	—	—	—	Meghna River	—	—	—
16-Oct-07	100	—	—	Weather	—	Tropical storm	—	—	—	—	—
28-Feb-08	59	MV Saurav	—	Hit by sand-laden barge from behind	—	—	—	—	—	—	—
13-May-06	92	MV Chanpur	—	Weather	—	Storm	—	Ghorautra River	—	—	—

Day and Month	Dead and Missing (Minimum Estimate)	Vessel Name	Vessel Age at Time of Accident (Years)	Cause	Overloaded	Weather	Time of Day	Waterway and characteristics	Crew Response	Search and Rescue	Root Causes/ Exacerbating Factors/Other
19-Feb-09	50	—	—	Collision with a cargo boat in dense fog	—	Fog	Dawn	Kirtankhola River	—	—	—
27-Nov-09	120	MV Coco-4	—	Capsized during disembarking when passengers scrambled to get off after vessel hit a shoal	—	—	Night	Tetulia River	—	rescue slow because rescuers were on holiday for Eid	Capsized at dock
4-Dec-09	48	—	—	Collision between passenger boat and ferry; all casualties from passenger boat, no damage to ferry	—	—	—	—	—	—	Collision in fog
8-Jun-10	62	—	—	Sank	—	Rough weather	Day	Sunamganj district	—	—	—
19-Dec-10	37	—	—	Collision with a cargo trawler	—	Fog	Night	Surma River	—	—	—
21-Apr-11	45	—	—	Collision with a wreck	—	—	Night	River Meghna	—	—	—
6-Jul-11	32	MV Madinar Alo	—	Collision with a tanker	—	—	Night	Sitalakhya River	—	—	—
30-Jul-11	81	—	—	Collision with a cargo vessel	—	—	Night	Buriganga River	—	vessel salvaged within a few hours	—
13-Mar-12	147	MV-Shariatpur-1	—	Head-on collision with oil tanker	—	—	Night	Meghna River	—	—	—
8-Feb-13	52	MV Sarosh	—	Collision with a sand carrier	—	—	—	Meghna River	—	—	—

Day and Month	Dead and Missing (Minimum Estimate)	Vessel Name	Vessel Age at Time of Accident (Years)	Cause	Overloaded	Weather	Time of Day	Waterway and characteristics	Crew Response	Search and Rescue	Root Causes/ Exacerbating Factors/Other
15-May-14	79	MV Miraj-4	—	Weather	Y	High winds, deep water, strong currents	—	Meghna River	captain refused to take cover as storm began	coordinated by BIWTA	overloaded
4-Aug-14	172	Pinak 6	21	Tipped over by strong winds	Y	Strong winds and currents	Day	Padma River	launch operator had no license	—	excessive loading; owners arrested and tried for overloading and homicide; owners claimed BIWTA forced them to overload
22-Feb-15	100	MV Mostafa	—	Hit by cargo trawler Nargis-1	Y	—	Day	Padma River	—	no formal passenger list; number of missing unknown; captain and assistant in charge of cargo arrived at night	passengers swam to shore; rescue vessel arrived at night

3.1.1 海難事故の発生事由

これらの海難事故の原因の多くは、過積載（定員オーバー）、荒天下の運航、衝突またはこれらの複合とされているが、中でも過積載と荒天下運航が最大の要因と見られている。これに加えて、不適切な設計と建造が大きな災害を招き、適切な免状を有しない未熟な船員による運航が犠牲を拡大しているとの指摘がある。

設計・構造については、復原性の不足が指摘されている。衝突・座礁時に姿勢及び浮力を維持できないケースや、過積載と荒天下の揺れが相俟って姿勢を維持できず転覆するケースである。

バングラデシュの内陸旅客船における定員オーバーは常態化しており、とりわけ、宗教行事により多くの国民（多くは貧困層）が移動する時期には、屋根やブリッジ甲板等あらゆるオープンデッキなど、本来旅客がいることを想定していない区域まで旅客でいっぱいとなる。また、こうした過積載のため、非常に大きなフェンダーを取り付ける傾向があり、これはまた衝突時の被害を拡大するという点で懸念されている。

バングラデシュでは、度々局地的な嵐が発生する。また、外海に面する河口の広さもあって、内陸河川であっても季節によってはかなり高い波が発生し、流速の激しい箇所もある。こうした気象条件において船舶が傾斜した際に、上述の過積載（重心の上方移動に加え、傾斜時に乗客が片方の舷に集まることでさらに復原性が悪化）が複合し、転覆に至るというのが多くの悲惨な事故の原因と見られている。

定員オーバー対策は内陸水運の安全性向上において最優先で取り組むべきものであるが、実際には港湾での定員確認がされることはほとんどなく、実効性において困難を抱えている。



図 9. 定員オーバーで運航する河川フェリー

事故に関わる設計・構造要因としては、このように多数の乗客を収容するために上部構造物が大型になっていることが指摘されている。付録の各船舶の主要目及び一般配置図に示されるように、喫水 1-2-1.4m 程度に対して、上部構造物は一般に 3 層以上である。荒天下において、こうした大型の上部構造物が強風を受けて船舶が傾斜し、また、喫水下は強い潮流を受けて船舶が回転し、非常に危険な状態となる。

2001 年の内陸水運法により、内陸船舶の非損傷時復原性要件が定められ、また、風速 10m/s を超える場合は、当該船舶の設計要件がそれ以上の風速を想定したものでない限り、出航を停止することとされた。気象当局からの予報を受け取った港湾当局は、一定の大きさ以下の船舶の出航を規制する信号を掲示し、また、船舶は港湾当局から出航許可を得ることとされ、これにより、一定の改善が見られたとのことである。

しかしながら、2001 年以降も大型の海難事故が発生している。現地関係者からのヒアリングでは、その要因として以下が指摘された。

- ・ 復原性規則を導入しても、船主及び造船所がそれを理解しておらず、結局以前の古い船と同じ設計で船を建造している。機関室（水線下）や上甲板の水密性も確保されていない。また、これを検査する立場の検査当局は人員と能力不足によりほとんどチェックできていない。
- ・ バングラデシュでは局地的な嵐が頻繁に発生し、こうした天候の急変は気象予報により予め予測して出港停止することが困難。航行中の船上では、こうした天候急変の傾向を察知する、又は、その情報を得る設備がない。もしくは、気圧計などについていてもそれを理解する船員が少ない。
- ・ 船員が訓練を受けておらず、適切な避航措置・安全措置をとることができない。
- ・ 主機の出力不足の恐れ。設計速度が 8-10 ノット程度となっているが、上部構造物の風圧面積も考えれば、荒天下での避航に十分な推力があるのか疑問。

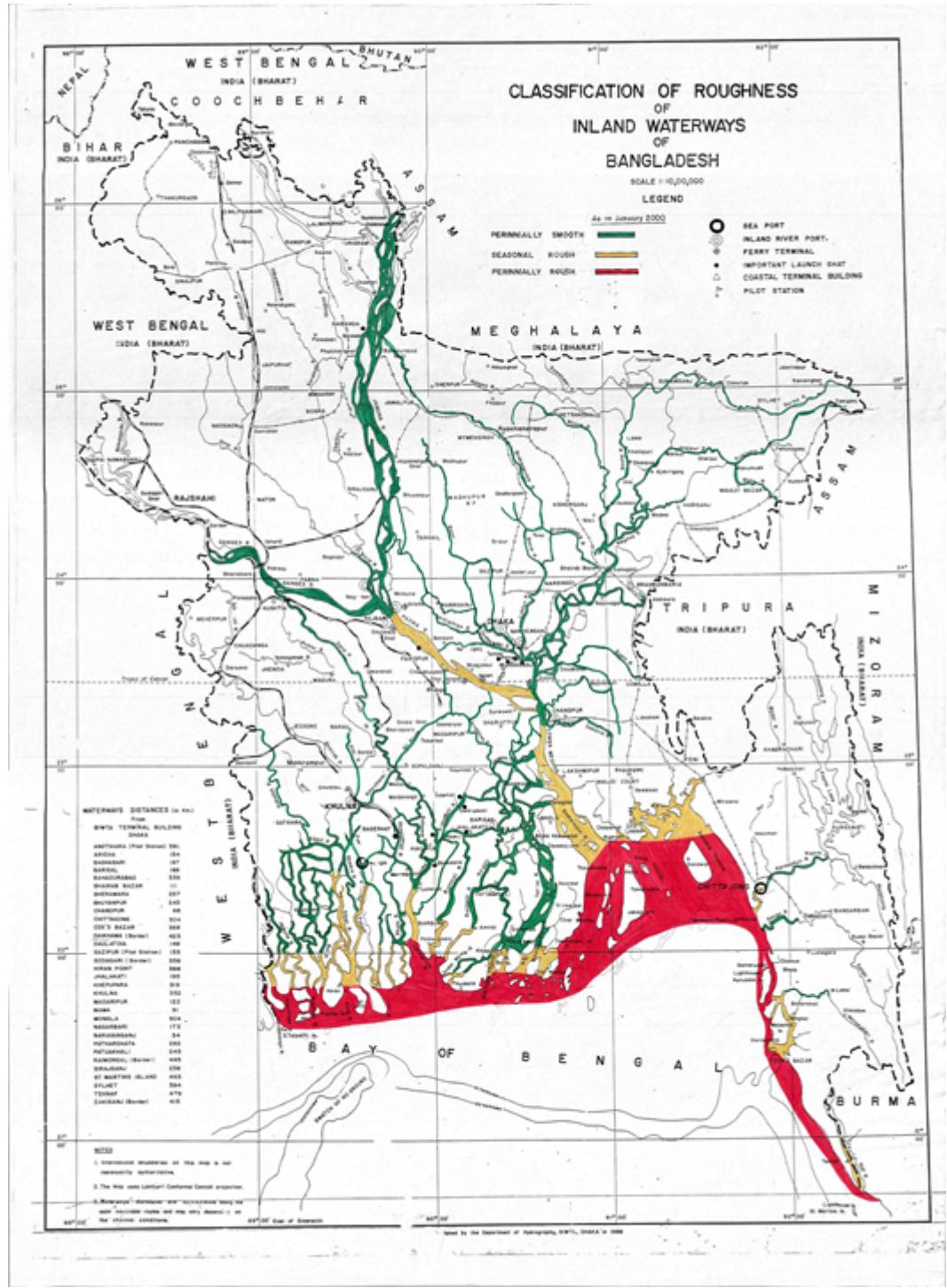


図 10. 海象区分による航行区域 (BIWTA, as on 2000)

3.1.2 最近の海難事故事例

Ship particulars	MV Miraj 4	Passenger Vessel	Dhaka - Wapda
	Loa (m) 35.67	Lpp(m)	B(m) 7.03
	D(m) 1.90m	d(m) (designed) 1.40	d(m)(scantling) 1.40
	Age (years) 12	Capacity pax	Day: 122 Night: 202
Outline	<p>On 15 May of 2014 around 1300 hours, an overloaded MV Miraj- 4 around 1515 hours sank during a storm in Munshiganj on the Meghna river as it was Shariatpur bound from Dhaka. Around 58 passengers died and 3 went missing. Storms and gusts started in Munshiganj and a stormy wind started blowing from the right. The stormy winds, and passenger climbing to one side of the ship rolled the vessel. The ships water tight integrity had been jeopardized by having the hatch covers improperly closed. The ship was also found to have design and construction flaws and a semi-skilled master. The number of death may have been exacerbated as the life buoys were strongly fastened.</p>		
Weather and hydrographic conditions	<p>During the day of the accident the river had a #1 warning signal till 1400 hours according to the weather forecast. While there are weather observatories in Dhaka and Chandpur, there are no observatories in Munshiganj or Shariatpur to help navigate the ships based on the forecast.</p>		

Ship particulars	MV Pinak – 6	Passenger vessel	Maowa-Kawrakandi via Kadhalbari
	Loa (m) 19.50	Lpp(m)	B(m) 4.60
	D(m) 1.40	d(m) (designed)	d(m)(scantling)
	Age (years) 23	Capacity pax	Day: 85 Night: NA
Outline	<p>On 4 August of 2014 around 0930 hours, MV Pinak – 6 with the capacity 85 passengers was Munshiganj bound from Madaripur with more than 200 passengers. During the journey the ship stopped at another port in Madaripur, where an additional 40-50 passenger got on the ship. When the vessel reached the main part of the Padma river, the river had a lot of waves and current. While driving the vessel down the middle of the river the waves crashed and entered into the lower level/deck window(s) of the sunken deck vessel (vessel constructed prior to the Inland Shipping Rules, 2001). As the passengers out of fear moved from one side of the vessel to the other, at one point the vessel one kilometer from the destination port tilted to the left side and sank.</p>		
Weather and hydrographic conditions	<p>During the day of the accident the river had a #1 warning signal. The river had strong currents. The speed of the current was 5 knots. The presence of wind during the time of the accident lead to large waves that made the vessel become unstable.</p>		

出所：海運省

3.2 内陸水運に関する安全規則・基準

内陸水運に関する安全規制は、The Inland Shipping Ordinance, 1976（2005年のthe Inland Shipping (Amendment) Actにより改正）において、運航船舶の検査、登録及び監督が規定されている。

The Inland Shipping Ordinance の第二節に規定される全ての船舶は、同法に基づき検査され、また、登録しなければならない。船舶検査官は船舶の状態を検査し、法律に定める要件に適合している場合にはこれを証明する。登録当局は、当該船舶が機関及び構造に関して欠陥が発見された場合には登録を拒否することができる。その他、海難、船舶及び旅客の安全保護、河川等水域の環境保全、場即答が規定されている。

内陸運航船舶の構造設備基準は、Inland Shipping Laws and Rules, 2001 により規定されており、その内容は IMO で定める安全基準ガイドライン（非国際航海）をベースに策定された。これらの規則は全てベンガル語で策定されている。付録 A2 に同基準に含まれる各規則を、A3 に同規則中特に復原性や究明設備など旅客の安全性に関わる部分の英訳を添付する。

しかしながら、このような構造・設備基準に対する船主及び造船所の理解の低さ（基準に適合した設計を行う能力がない）、国の検査担当者の能力及び人員不足などから、執行が極めて不十分であると指摘されている。実際、2001 年以降に建造された船舶と、それ以前の船舶で船型にほとんど違いは見られない。現地の海事専門家のヒアリングでは、例えば復原性についても規定どおりの復原性を有しているか極めて疑わしいとの指摘があった。

3.3 安全に関する政府の取組み

1986 年に 600 名を超える犠牲者を出した旅客船「SAMIA」号及び旅客船「ATLAS STAR」号事故により内陸水運旅客船の安全性が大きく問題視され、海運省は事故原因の調査と安全対策に乗り出した。また、IMO からの勧告を受け、1992 年、海運省はフィンランドの技術協力（FINNIDA）により、内陸水運安全当局の設立に向けたプロジェクトを実施した。このプロジェクトは、当該安全当局の組織構成を提言すると共に、12 の規則からなる安全基準案を策定した。このプロジェクトは 2000 年に終了し、これに基づいて、2001 年の Inland Shipping Laws and Rules が策定された。しかしながら、安全規制担当局の設立及び船舶局に関する人的能力及び関連予算の確保については、実現の見通しじゃなく、検査官や海難審判員の増加は未だ途上である。

政府としては、船舶の安全性向上は喫緊の課題と位置づけ、そのための諸外国や国際機関との協力を歓迎している。IMO 及び Interferry は、2005 年にバングラデシュのフェリーの安全問題に取り組み、フェリー安全性検討作業部会を組織して事故の原因分析を行い、これに基づいて 4 つのデモンストレーションプロジェクトを実施した。このうち、船舶情報の電子化・データベース化及びヒューマンエラーに関する訓練プログラムは概ね成功した。2010 年、船舶局はこの訓練プログラムに基づき約 100 名の生徒の訓練を行い、その効果は有効であると改めて示した。

定員過剰を防止するための乗船チケットの販売システムは、船舶所有者・運航者の施設利用能力の欠如や、法定運賃が極めて低価格であることから、進んでいない。

また、内陸水域における竜巻など局地的に急激に発生する荒天・嵐の情報を直ちに船舶運航者に連絡するためのシステムについても実現の見通しは暗い。これは、長寿命の電池を搭載した通信機を船舶に搭載し、気象衛星が災害につながるような荒天情報を察知した場合に直ちに通知するというものである。気象情報は、米国海洋大気情報局(NOAA)が発する情報である。NOAAは政府に対してシステムの購入を求めたがうまくいかず、現在は試験的運用のためとして船舶運航者に直接アプローチしている。

3.4 環境規制

内陸水運に係るバングラデシュ政府の環境政策として以下の方針が定められている。

- (1) 環境の保全と向上を通じて、総合的な開発と自然保護のバランスを保つこと
- (2) 環境に悪影響を与える活動を明らかにし、これを規制すること
- (3) 内陸水路に係る資源は、持続可能かつ長期に、環境に配慮して利用することを確保すること

The Inland Shipping Ordinance, 1976において環境汚染の防止を規定し、2002年には MARPOL73/78条約に加盟し、その締約国となった。しかしながら内航船に対しては未だ適用するに至っていないのが実情である。2004年、バングラデシュ船舶局は MARPOL73/78条約が同国に対して効力を発するのに合わせて海洋環境保全法(Marine Environment Conservation Act 2004)の法案を作成した。同法案は MARPOL のほか海洋環境保全に関する 7 つの条約¹³を一括して国内担保するためのものとして作成されたが、現時点未だ成立・施行されていない。

バングラデシュにおける海洋汚染の大きな原因の一つは、沿岸及び内陸水域における未規制の船舶からの汚染物質の排出である。主に船舶に起因する環境汚染は油汚染であり、タンカー事故による油流出や油燃料及び油性ビルジの排出が度々発生し、環境に深刻な影響を及ぼしている。また、ゴミや汚水の排出・投棄も問題となっており、微生物により分

¹³ 本法令で担保予定の 7 条約: the International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties, 1969 and its protocol 1973; the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Dumping Convention), 1972; the International Convention on Civil Liability for Oil Pollution Damage, 1969 and its Protocols of 1976 and 1984; the Convention Relating to Civil Liability in the Field of Maritime Carriage of Nuclear Material, 1971; the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1971 and its Protocols of 1976 and 1984; the International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990 (OPRC); International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea, 1993.

解できない物質の増加とともに深刻化している。地域としては、都市部及び工業地帯、港湾区域内など、船舶が集中し、排出事故が起きやすい水域に集中している。

大量の土砂が常に堆積するバングラデシュの河川・沿岸域においては航路開発・維持のための浚渫は極めて重要であるが、この浚渫が生態系に与える影響も問題視されつつある。土砂廃棄・埋め立てによる当該地域の生態系破壊、水底堆積物の攪拌による堆積汚染物質の拡散などが、水質と漁業に影響を及ぼしている。また、浚渫物投棄場所における酸性・アルカリ性物質の蓄積や水中拡散の危険性も指摘されている。

4 今後の動向と課題

以下、前章までの調査結果、昨年度実施した「バングラデシュ海事産業概況調査」及び現地海事関係者（バングラデシュ政府当局及び民間企業、日本政府機関（JETRO ダッカ、JICA バングラデシュ事務所、在バングラデシュ大使館））からのヒアリングを踏まえ、バングラデシュ沿岸・内陸水運の今後の動向と課題について述べる。

4.1 伸びる沿岸・河川域水運需要

○ 堅調に続く経済成長、内需拡大、日系企業進出

欧州・中国を中心に世界経済の減速が一層顕かとなる中でも、バングラデシュの経済は旺盛な内需と堅調な輸出を背景に好調を維持し、GDP 実質成長率は引き続き約 6 % を維持している。バングラデシュの輸出先は主に欧米向けであるが、その製品はいわゆるファスト・ファッショントと呼ばれる庶民向けの大量生産・廉価製品であり、景気の影響を受けにくいことが理由として挙げられる。JETRO ダッカ事務所によれば、これら縫製産業向けの産業機械（安全対策の強化もあり、設備入れ替え需要が急増）、アパレルに続き医薬品産業向け機械の増加、インフラ整備を含め建機類等の官公需などが増え、これら産業機械類の輸入は特需とも言える状況にある。

強い内需は、1.6 億人という人口の多さと、近年の富裕層・中間層の拡大による購買力の高まりが成長のエンジンとなっており、さらに、2050 年頃に人口ボーナス期に入ると予想され、内需拡大と経済成長は今後も堅調に続くと予測される。

2015 年 3 月時点の進出日系企業は 223 社。2010 年の約 80 社から年平均 20% 超のペースで増加している。新興経済発展国 NEXT11 として注目を集め、労働集約的生産拠点（アパレル産業を中心に CHINA プラス 1 の代替地として進出）のみならず、拡大する内需、富裕層・中間層拡大に伴う消費市場をターゲットとするもの、また、貧困層を対象とするソーシャルビジネス（グラミン銀行のマイクロ・クレジットなど低所得者層向けビジネス）が進んでいる。最近では新日鉄住金が電炉製鋼業を開始し、これまで遅れていた重工系産業分野でも日系企業の進出が始まった。

○ 海上交通インフラ計画、沿岸諸国の輸送連携

アジア開発銀行の予測（2.3 章 参照）にもあるように、バングラデシュ経済を支える資源及び同国発着輸送需要の大きな伸びが予測される中、その国際玄関口である国際港の新設計画も相次いでいる。

チッタゴン南方のマトバリ地区では、日本の経済支援による深水石炭ターミナル港と高効率石炭火力発電所の建設が開始された。同港は、さらに LNG ターミナルや工業団地としての開発も視野に入れて開発が進められることとなっている。石炭火力発電は、今後も同国内で複数のプロジェクトが計画されており、同ターミナルからの国内フィーダー輸送の構想もある。

コンテナ貨物については、中国・韓国がボリシャル管区のパイラ地区での大型コンテナ港及び造船所の建設を提案している。当該地域での深水港・大型ドック建設は、建設・航路維持のために大規模な浚渫が必要と指摘されているが、現首相の地元でもあり、

同政府内では相当のハイプライオリティで検討されている。一方、対抗案として他国よりチッタゴン南方コックスバザール地域の深水コンテナ港も提案されている。

こうしたバングラデシュを起点・終点とする輸送需要のみならず、ベンガル湾沿岸諸国の経済的結びつきの深化を図る沿岸域・河川域の輸送連携強化の動きも進んでいる。既に、バングラデシュとインドは両国間の沿岸・内陸輸送協定を結んでいるが（2.2章）、その対象とする船種を拡大するとともに、スリランカ、ミャンマー、タイとの沿岸域輸送協定の議論を進めており、これら沿岸国を包括した「汎ベンガル湾輸送協定」の締結に向けて検討を進めている。

4.2 遅滞するインフラ整備

○ 国内水上輸送に関する政策・インフラ整備の遅れ

しかしながら、現時点の国内輸送における水上輸送分担率は低く、ADB 調査では 20%程度(Ton-km ベース、2.3 章)にとどまり、減少傾向が続いている。また、その輸送貨物は旅客及びセメント材料等のばら積み貨物であり、経済発展を支える繊維産業等加工貿易を対象とするコンテナ輸送を担うに至っていない。

チッタゴン・ダッカ間の陸上輸送ルートの問題は、混雑による輸送容量の逼迫のみならず、産業向け大型重量物を輸送できないといったケースも聞かれた。沿岸・内陸水運の適切な効率化・近代化が図られなければ、増大する国内輸送需要の受け皿となることができずにその輸送分担率はさらに低下し、また、バングラデシュの経済発展の大きなボトルネックとなると思われる。

バングラデシュ政府においては、内陸船舶輸送の向上のため、航路整備（浚渫）、浚渫船等政府所有船の調達、また、GMDSS システムの導入¹⁴などの政策を実行中である（2.4 章）。しかしながら、認可プロジェクト予算に対する執行能力が低く、年間予算の編成と承認や予算成立後の発注・手配業務や支払い手続きに時間を使い、スケジュール・工程管理の能力も低いことから、結局後ろ送りとなっていくケースが目立つ。

コンテナ輸送に関しては、ダッカ近郊パンガオン地区に河川用コンテナ港が開設されたが、トラック輸送に劣る高輸送コスト、コンテナ船の航行頻度の少なさ、コンテナ船の質が低く船舶保険がつかないといった点がネックとなり荷主から敬遠されている。河川コンテナ輸送のため 31 隻のコンテナ船の保有ライセンスが発給されたが、その多くは未だ建造されていない。このような状況の要因として民間企業からは、港湾局による非効率的運営及び集荷営業力のなさ、1 社 1 隻といった横並び・ばらまき型のライセンス付与などが指摘されたほか、運営側からは、現在の位置選定について工業団地から輸送しにくい、Pangaon の近傍で航路（河川）が大きく曲がっており大型の船を就航させることができないといった声もあった。輸送時間・コスト・頻度・通関手順において陸上輸送に対する優位性を確立できるよう、思い切った取り組みが必要となろう。

¹⁴ GMDSS 及び Integrated Maritime Navigational System（統合航行支援システム）の構築のための情報システムセンター（ダッカ）及び沿岸無線局 7 基地の設置及びシステム導入計画。支援国は韓国で、金利 1.0% のソフトローン。条件は、韓国企業が事業を実施すること及び韓国製機器を使用すること。（Department of Shipping からの聞き取り）

○ 運輸分野の日本の支援状況

海運分野における日本の支援は前述のマトバリ深水港（石炭ターミナルと石炭火力発電所のパッケージ）であり、同国へのエネルギー輸送を主眼としたものである。国内物流については、Pangaon ICT 建設の基となったフィージビリティ・スタディを行っているが、現在においては、逼迫する国内物流として水運の活用を考えるべきということは認識しつつも、具体的な支援プロジェクトは陸上（道路、橋、都市交通、空港）がメインであり水運関連 PJ はほぼ無い。2015 年になって、近年のベンガル湾諸国及びインド北東部の経済発展を視野にベンガル湾沿岸域海運 Regional Connectivity に関する JICA 調査が始まった。

バングラデシュサイドからは、運輸分野ではなく防災能力向上の観点から小型の防災船・救助船などを求める声が出ているとのことである。海事当局としては日本の支援を強く期待するものの、日本側と具体的な議論がなされたという情報はなく、また、当局側としても求める支援に具体的なイメージを持つに至っていない。

○ 國際的支援の今後

運輸関係のみならず、電力・ガス、整備された工業用地、IP ネットワーク等の産業インフラの整備の遅れはかねてより問題となってきた。5 年毎の総選挙のたびに二大政党が激しく争う政治的混乱のため一貫・強力な開発政策が欠如している。行政機関の立案能力・執行能力も極めて低く、計画通りに事業が進捗しない。

ところが、こうした状況に対する国際的な近代化の外圧・ドライブは今のところ意外にも低い。政治的にはこれまでインドと中国への依存が高く、安全保障上の問題も特にないこと、また、ミャンマーやイランの制裁解除の時のような国際政治上の大きな変化もないため、欧米及び日本からの关心・期待が高まらない。加えて、2013 年 1 月の総選挙における野党ボイコットの結果、野党不在の議会となつたことから、むしろ国民の不満の蓄積を避けるべく慎重な政権運営となっており、国際的な関心を引く出来事がない状況が当面続く。日系企業等外資の進出はこれまで好調であったが、インフラ不足や政治的混乱が長引く中でブレーキがかかりはじめたとの指摘がある。

日本としては、2014 年に安倍首相が来訪し、マトバリ港・発電所を含む 6000 億円規模の支援を行うことを表明した。2017 年にこれらインフラ・プロジェクトが具体的に動きはじめる見込みであり、2021 年には独立 50 周年を迎えることから、これらの時期を節目に近代化に向けた様々な動きが加速していると期待される。

4.3 近代化が遅れる内陸旅客船

○ 内陸旅客船の構造設備と安全対策の遅れ

内陸水運船、沿岸船とともに増加しており、その増加率は概ね輸出入貨物の増加に連動している。100GT 以上の船舶（特に旅客船、貨物船（Inland、Coastal）、油タンカー（Inland、Coastal））は過去 5 年間に大量建造された模様であり、船齢 4 年未満のものが最も多い。一方で、船齢 20 年以上の老齢船、40 年以上の超老齢船も相当数残存している。

船舶の構造としては、新造タンカーにはダブルハル構造、バトックフロー船型（2基2軸）が採用されており、標準的なレベルにあるものと推察される。

一方、内陸旅客船については、世界最悪レベルで頻発する海難事故を経ても抜本的な安全対策が講じられるに至っていない。国民からの批判を受けて2001年にIMOの内航船安全基準指針を参考に内陸船舶の安全規則を制定したものの、多くの船舶が現存船扱いとして今なお現状のまま運航を継続している。復原性確保に係る過激措置として機関室の入口周りに高さ1mの水密壁を設置させるとしたが、実際には執行されていない。現存船のみならず新造旅客船の場合でも、その設計は安全規則制定前の設計を踏襲して建造されており、新規則への適合性を疑わせる。船舶所有者及び建造者におけるルールへの無理解及び政府当局による規則適合審査能力の欠如を示唆している（船舶局によれば、技術審査能力を持つ担当官は全国で4名しかおらず、厳格な技術審査は事実上不可能とのこと）。

加えて、定員超過の常態化や搭載設備の劣悪な状態が示すように、船舶運航と状態保全に関する安全意識が極めて希薄である。運航者及び船員の能力・訓練の不足（高度な海事教育を受けた人材は外航海運等海外に流出）が根本にあるが、過積載・定員オーバーでの運航禁止、荒天時の出港停止、避航指示といった運航に関する規程が不備であり、船舶所有者（運航会社のオーナー）との責任関係も不明確である。運航管理に関する規則を厳格運用（運航マニュアルの整備・訓練等を含む）することが重要であり、また一方で、例えば定員超過が社会的に不可避であるならば構造設備に係る規則はそれを想定したものであるべきである。しかしながら、現在の安全規則はバングラデシュの特性（気象海象、運航実態）を十分考慮したものではなく、復原性のほか操縦性（船型に対する機関出力、操舵機構）、無線通信、究明設備等の不足不備を指摘する声があった。

近代化が遅れる要因として業界の閉鎖性・既得権益も指摘された。ダッカ・ボリシャル航路にカタマラン船型を導入しようとした新規事業者が、既存業者の妨害を受け撤退に追い込まれたといった事例があった。

○ 近代化に向けて

安全当局としては、安全性向上のために船舶の代替を図りたいとの意向を強く持っているが、そのための政策ツールの企画能力不足及び執行能力不足に悩んでいるのが実情。船舶局との議論の中では、日本に対して以下のような支援策の要望があった。

- a) サンプル船設計：内陸旅客船のサイズ別に、4ないし5船型の標準設計の供与。
これに従って建造される船舶には速やかに運航ライセンスを発給したい。
- b) 建造資金の供与：ソフトローンによる低利融資。ただし、上述の設計に従うなど一定の基準をクリアすることを条件とし、また、一定量の日本の機器を搭載することも条件としたい。
- c) 政府の安全審査能力に関するキャパシティビルディング：船舶検査に係る人材育成、当面の課題としての復原性計算システムの導入。また、安全規則の検討や審査及び船舶の維持管理に関する職員・船員の教育を行う組織の設立。

4.4 造船業の動向

- ・ バングラデシュの造船業の国際的レベルは総じてベトナムと同程度であり、溶接技能では概ね中国と同等、設計、機器・電装、生産性（工程管理）では世界の平均的水準から大きく劣る（2014年 バングラデシュ海事産業概況調査 第III章）。造船所はダッカ近郊、チッタゴン、クルナの河川沿いにあり、喫水制限のため 10000DWT 程度が建造可能サイズの上限である。設計能力に乏しく、輸出用船舶のデザインは主に欧米やシンガポールから、沿岸・内陸船については中国から購入している。内航船主は初期コストを抑える傾向が強いことから中国製機器が多く用いられ、さらに機器輸入に対する中国金融機関からの融資供与が中国製を後押ししている。財務面では、ANANDA など一部の造船所は未だリーマンショックの影響から抜けきれておらず、設備投資も低調である。クルナなど軍関連造船所は安定している。一般にバングラデシュビジネス界における国軍の影響力は強く、軍のビジネス部門（クルナ造船など）と良好な関係を築くことは同国内でのビジネス展開にとって重要とのことである。

沿岸・内陸船舶の建造量は年々増加しており、沿岸域・河川域の水運需要の増加を反映。最近は中小型船分野での中国造船所の低価格攻勢が激しく、機器類を中国等からの輸入に頼るバングラデシュ造船業としては輸入コストや運転資金の高金利といったハンディを抱えて苦しい状況に置かれており、日本からの機器輸入に対する金融支援に期待する声が聞かれた。

政府としては大型船建造に進出したい意向があり、パイラ地区（現首相の地元管区）に中国・韓国の支援により国際コンテナ港と大型造船所を建設する計画がある。

参考文献

Analysis of Bangladesh Accidents: A Decision-making Approach, by Major Muhammad Rabiul Islam, PhD, Cdr Kaosar Rashid, psc, BN (2015)

Preventing Ferry Fatalities: Providing a Safer Ferry for Developing Nations, by Carl Nagle and Harlysson Maia (Stevens Institute of Technology, 2013).

Ferry Fatalities – Findings (Excel spreadsheet file), by Abigail Golden, Department of Ecology, Evolution, and Environmental Biology, Columbia University.

Revival of Inland Water Transport: Options and Strategies, Bangladesh Development Series Paper No. 20, (The World Bank Office, 2007)

Implementation of the MARPOL convention in Bangladesh, by Md Saidul Karim (2009)

Bangladesh: Capacity Building and Support to the Transport Sector Coordination Wing of the Planning Commission (Asian Development Bank, 2012)

Annex

A1. 沿岸・内陸水運船舶の構造及び設備の例

A2. 内陸水運関係法令:

- a) The Inland Shipping Ordinance, 1976;
- b) Inland Shipping Laws and Rules

A3. Inland Shipping Laws and Rules, 2001 (抜粋、英訳)

A1. 沿岸・内陸水運船舶の構造及び設備の例

① MANIK-3 (Inland, Passenger)

(Name of Ship、Type of Ship, Navigational Area) MANIK-3, PASSENGER VESSEL, DHAKA-DULARCHAR					
Classification Society					
Particulars			BRIDGE., NAVIGATIONAL AID		
Loa(m) 35.05	Lpp(m)	B(m) 7.31	Equipment	Number	Manufacturer & Condition
D(m) 1.91	d(m) (Designed) 1.20	d(m) (Scantling)	Radar	No	
DWT(MT) at Scantling			GPS	1	Furuno - good
GRT 393.04			Gyro Compass	No	
Service Speed(kt) 6 NM			NAVTEX	No	
Endurance(NM) at Service speed					
Capacity	Passenger	Day: 217 Night: 278	Engine telegraph	2	In operation, Poor
			M/Engine Remote Control System	No	
	Officer		Others, If Any	N/A	
	Rating				
	Others				
MACHINERY			RADIO COMMUNICATION		
Machinery		Spec, Number	Manufacturer	(Type) & Number	Manufacturer & Condition
E/R			GMDSS		
M/E		kW * rpm * Number 205 * rpm * 1	CHINA MARINE DIESEL ENGINE	Radio Communication to Shore/ Other ships	N/A
propeller		Diameter	Wireless Transceivers	N/A	
Generator Engine		kW * rpm	Radar Transponder	N/A	
Generator Motor		kW * Number	EPIRB	N/A	
			Other	Name and	

Water Pumps	1	In operation	equipment for Search and Rescue, If any,	Number N/A	
Fuel oil pumps	Hand pump				
Oil Purifiers	No				
Contd. on next page ▼					
Machinery	Spec, Number	Manufacturer	SAFETY EQUIPMENT		
Bilge Pumps	No		(Type), Number	State/Condition	
Oil separator	No		Life Boat	No	
Ballast Pumps	No		Life Raft	No	
Stripping Pumps	No		Life Buoy	43 Fair	
Electric Distribution Box/Panel`	1	Poor	Life Jacket	No	
Others, If any	N/A		Others, If any	N/A	
DECK	EQUIPMENT FOR FISHERY				
	Number	State/ Condition		Number	
Steering Gear	No		Trawl Winch	N/A	
Windlass	No		Power Crane	N/A	
Mooring Winch	No		Net Hauler	N/A	
Deck Crane	No		Refrigerating plant	N/A	
Horse Handle Crane	No				
STRUCTURAL INTEGRITY OF HULL	Comments				
Plate thickness	Within range				
Corrosion state	Painted				
Water tightness of upper deck	Railing, Doors are not water tight				
Water tightness of hatch	Poor Condition				
Height of hatch coaming	12 inches				
Any other Special N/A					
Overall assessment of safety:					

Not Satisfactory

Notes:

- > E/R having non-watertight door with grill covered;
 - > Manually controlled rudder found;
 - > No communication system between engine control room and bridge;
 - > Manually operated steering gear found;
 - > No Fire pump, No Emergency Generator, Poor condition of Control box in E/R;
 - > Fire Hydrant/Firehose: Poor condition (not standard), No coupling system;
 - > No Fire alarm found;
 - > Passenger deck railing height found 3 ft;
 - > 1 no. of windlass found on board at forward;
 - > No availability of drawings/Plans on board;
- ETC.

In Wheel House: The following equipment were found with poor maintenance

- > Telegraph (alternately used by bell)
- > Horn
- > Compass (Magnetic Compass)
- > Steering Wheel (Mechanical)
- > Navigation light
- > Air whistle



外観・座席



船橋（舵輪、エンジンテレグラフ（汚損））



機関室入口（スライドグリルドア、非水密）



発電機、E/R コントロールボックス



消火バケツ (Sand)、消火器



消火ホース (汚損)、消火栓

② SHURESHSHAR-5 (Inland, Passenger)

(Name of Ship, Type of Ship, Navigational Area) SHURESHSHAR-5, PASSENGER VESSEL(SUNKEN DECK), DHAKA-SURESHSHAR					
Classification Society					
<i>Particulars</i>			BRIDGE., NAVIGATIONAL AID		
Loa(m) 31.40	Lpp(m) ~29.60	B(m) 6.10	Equipment	Number	Manufacturer & Condition
D(m) 1.83	d(m) (Designed) 1.20	d(m) (Scantling)	Radar	No	
DWT(MT) at Scantling			GPS	No	
GRT 233.47			Gyro Compass	No	
Service Speed(kt) 8 km/h			NAVTEX	No	
Endurance(NM) at Service speed					
Capacity	Passenger	Day: 114 Night: 205	Engine telegraph	2	In operation, poor
			M/Engine Remote Control System	No	
			Officer	Others, If Any	N/A
			Rating		
Others					
MACHINERY			RADIO COMMUNICATION		
<i>Machinery</i>	<i>Spec, Number</i>	<i>Manufacturer</i>		(Type) & Number	Manufacturer & Condition
E/R			GMDSS	No	
M/E	kW * rpm * Number 168 * 2100 * 1	WEICHAI HEAVY MACHINERY	Radio Communication to Shore/ Other ships	No	
propeller	Diameter		Wireless Transceivers	No	
Generator Engine	kW * rpm	'	Radar Transponder	No	
Generator Motor	kW * Number		EPIRB	No	
Water Pumps	1		Other equipment for Search and	Name and Number	

Fuel oil pumps	No		Rescue, If any,	N/A			
Oil Purifiers	No						
Contd. on next page ▼							
Machinery	Spec, Number	Manufacturer	SAFETY EQUIPMENT				
Bilge Pumps	No			(Type), Number	State/Condition		
Oil separator	No		Life Boat	No			
Ballast Pumps	No		Life Raft	No			
Stripping Pumps	No		Life Buoy	43	Fair		
Electric Distribution Box/Panel`	No		Life Jacket	No			
Others, If any	1		Others, If any	N/A			
Cooling pump for engine							
DECK	EQUIPMENT FOR FISHERY						
	Number	State/Condition		Number			
Steering Gear	No		Trawl Winch	N/A			
Windlass	No		Power Crane	N/A			
Mooring Winch	No		Net Hauler	N/A			
Deck Crane	No		Refrigerating plant	N/A			
Horse Handle Crane	No						
STRUCTURAL INTEGRITY OF HULL	Comments						
	Not Satisfactory						
Plate thickness	Within Range						
Corrosion state	Locally corroded on deck.						
Water tightness of upper deck	Railing Only. Doors are not watertight.						
Water tightness of hatch	Poor condition						
Height of hatch coaming	18 inches						
Any other Special							
N/A							

Overall assessment of safety
Not Satisfactory

Notes:

- > E/R having non-watertight door with grill covered;
- > Manually controlled rudder found;
- > No communication system between engine control room and bridge;
- > Manually operated steering gear found;
- > No Fire pump, No Emergency Generator, Poor condition of Control box in E/R;
- > Fire Hydrant/Firehose: Poor condition (not standard), No coupling system;
- > No Fire alarm found;
- > 1 no. of windlass found on board at forward;
- > No availability of drawings/Plans on board;
- ETC.

In Bridge: The following equipments were found with poor maintenance

- > Telegraph
- > Magnetic compass
- > Horn
- > Search light
- > Wheel
- > Navigational light



外観



船橋、チェーン式操舵機



上甲板ハッチ、E/R 入口グリルドア（非水密）



天井の救



汚損した救命浮器がぶら下げられた煙突



M/E



手動ビルジポンプ

③ Eagle-1 (Inland, Passenegr)

(Name of Ship、Type of Ship, Navigational Area)

MV Eagle-1, Passenger Vessel, Inland (日本製、中古輸入)

Classification Society > n/a

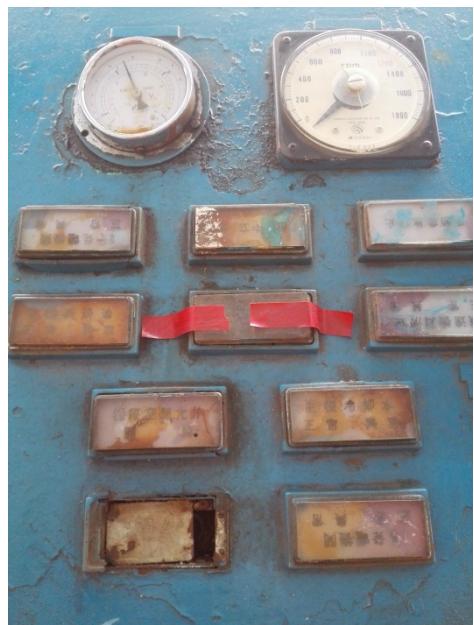
Particulars			BRIDGE., NAVIGATIONAL AID				
Loa(m)	Lpp(m)	B(m)	Equipment	Number	Manufacture		
32.31		7.8	Radar				
D(m)	d(m) (Desinged)	d(m) (Scantling)	GPS	Not fitted			
2.9			Gyro Compass				
DWT(MT) at Scantling			NAVTEX				
GRT	263.13		Engine telegraph	No			
Service Speed(kt) 10			M/Engine Remote Control				
Endurance(NM) at Service speed							
Capacity	Passenger	Day: 352					

			System		
	Night: 202		RADIO COMMUNICATION		
Officer		GMDSS	(Type)		
Rating					
Others					
MACHINERY			Radio Communication to Shore/ Other ships	(Type)	
<i>Machinery</i>	<i>Spec, Number</i>	<i>Manufacture</i>			
E/R			Wireless Transceivers		
M/E	521.99kw*rpm *1	China Diesel, China			
propeller	Diameter :				
Gen Engine		'	Radar Transponder		
Gen Motor					
Water Pumps			Other equipment for Search and Rescue, If any	Radio -1	
Fuel oil pumps					
Oil Purifiers					
Bilge Pumps			LIFE SAVING		
Oil separator			Life Boat		
Ballast Pumps			Life Raft	2	
Stripping Pumps			Life Buoy	40	
Electric Distributi on Box/Panel`			Life Jacket	250	
DECK			Others, If any	Fire bucket - 15	
Steering Gear				Fire pump - 1	
Windlass				Sand box - 2	
Mooring Winch					
Deck Crane					
Horse Handle Crane				Any other Special	



船首部（船首ドア非水密、鎖で固定）





船橋、汚損したコントロールパネル



旅客デッキにある通風筒

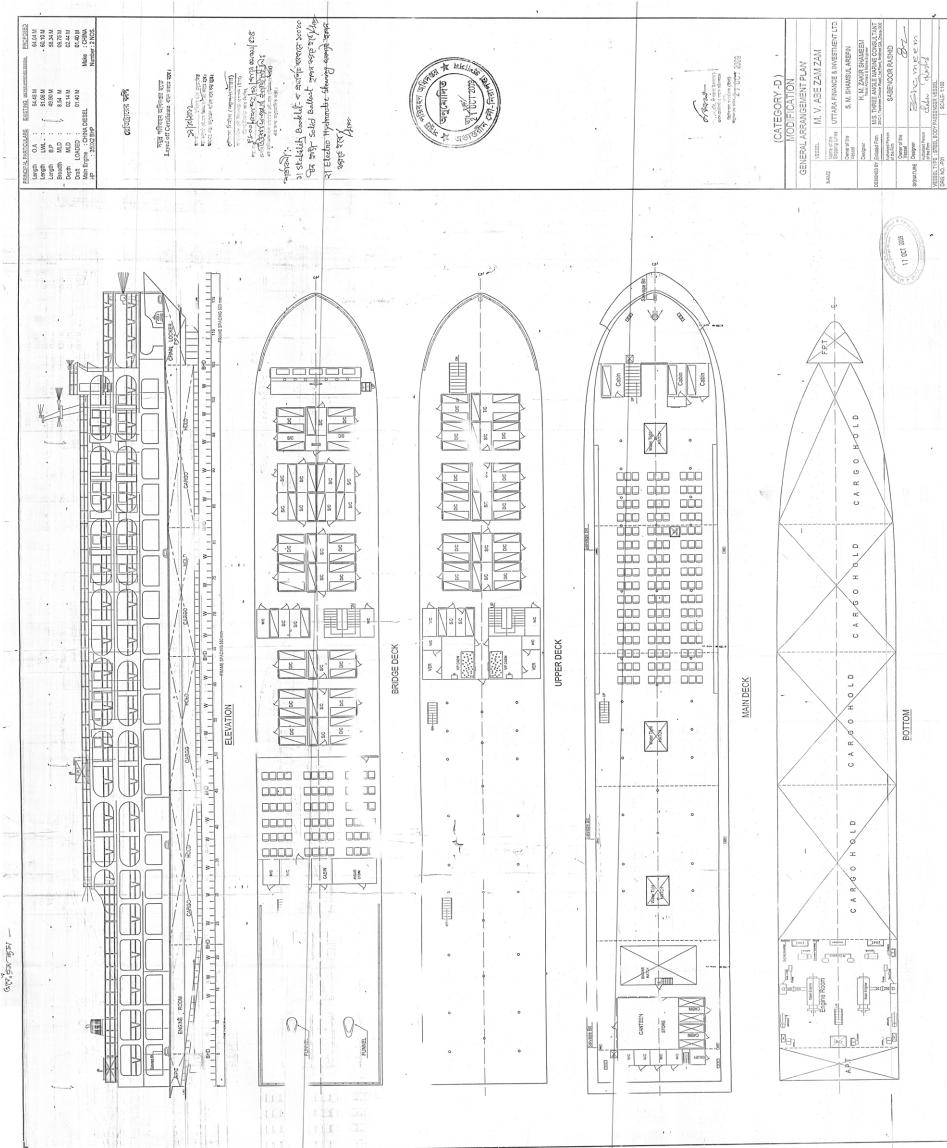


主機

④ ABE ZAM ZAM (Inland, Passenger)

(Name of Ship, Type of Ship, Navigational Area) MV ABE ZAM ZAM, Steel Body Passenger Vessel, Inland (Dhaka-Chandpur-Ituli)							
Classification Society > Complies ISO							
<i>Particulars</i>			BRIDGE., NAVIGATIONAL AID				
Loa(m) 64.79	Lpp(m) 58.34	B(m) 9.75	Equipment Radar	Number	Manufacture		
D(m) 2.4	d(m) (Designed) 1.4	d(m)(Scantling) 1.4	GPS Gyro Compass	Not fitted			
DWT(MT) at Scantling			NAVTEX				
GRT 520			Engine telegraph	No			
Service Speed(kt) 10			M/Engine Remote Control System				
Endurance(NM) at Service speed							
Capacity	Passenger	Day: 750	RADIO COMMUNICATION				
		Night: 519	GMDSS	(Type)			
	Officer		Radio Communication to Shore/ Other ships	(Type)			
	Rating						
	Others						
<i>MACHINERY</i>							
<i>Machinery</i>	<i>Spec, Number</i>	<i>Manufacture</i>	Wireless Transceivers				
E/R							
M/E	261kw*1000rpm *3	China Diesel, China	Radar Transponder				
propeller	Diameter : 1625 mm		EPIRB				
Generator Engine		'	Other equipment for Search and Rescue, If any	radio-1			
Generator Motor							
Water Pumps							
Fuel oil pumps			LIFE SAVING				
Oil Purifiers			Life Boat	N/A			
Bilge Pumps			Life Raft				
Oil separator			Life Buoy		90		
Ballast Pumps			Life Jacket		85		
Stripping Pumps			Others, If any	Fire extinguisher - 10			
Electric Distribution Box/Panel`				Fire bucket - 20			
DECK				Sand box - 2			
Steering Gear	Rudder stock dia 110 Hard P to S (Degree) 30 degrees			Fire axe - 2			
				Fire alarm -1			
				Fire pump - 2			
				Hydrant - 3			
				Any other Special			

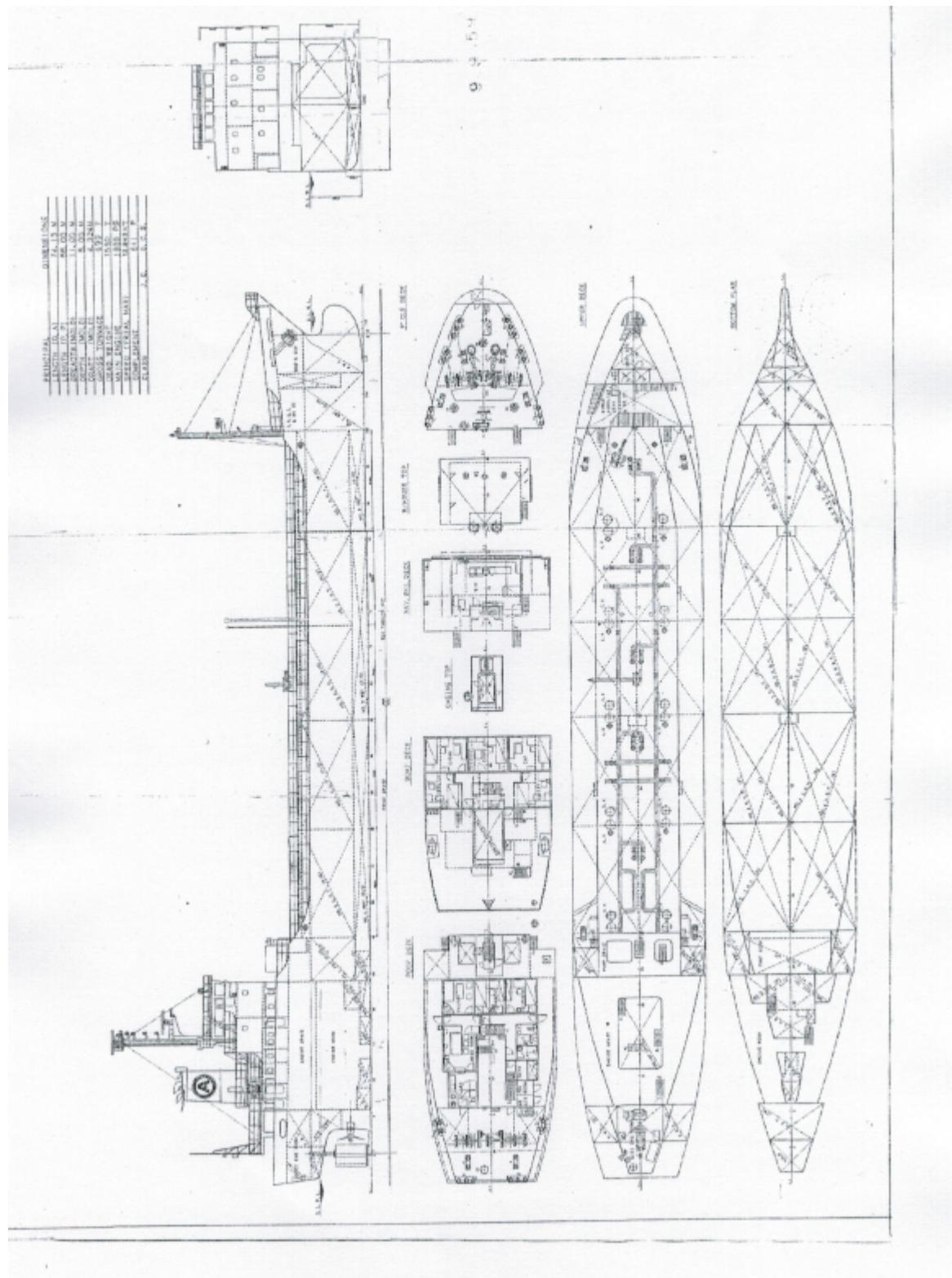
Windlass	Forward - Capstan (hand driven)		Navigational equipment Search light on bridge at forward – Fitted Navigational lights – Fitted Bridge aft view – Restricted
Mooring Winch			
Deck Crane			
Horse Handle Crane			



⑤ Shah Amanat (Inland, Oil Tanker)

(Name of Ship, Type of Ship, Navigational Area) SHAH AMANAT, OIL CARRIER, Inland					
Classification Society: NK					
<i>Particulars</i>			BRIDGE., NAVIGATIONAL AID		
Loa(m) 64.7	Lpp(m)	B(m) 10	Equipment	Number	Manufacturer & Condition
D(m) 4.5	d(m) (Designe d) 3.9	d(m) (Scantling) 3.9	Radar	1	Furuno
DWT(MT) at Scantling 1,227			GPS	1	Furuno
GRT 499			Magnetic Compass	1	Daiko
Service Speed(kt) at sea trial: 11.5			NAVTEX	N/A	
Endurance(NM) at Service speed: 550					
Capacity	Personnel	Day/Night: 8	Engine telegraph	N/A	
			M/Engine Remote Control System	N/A	
	Officer	4	Others, If Any	Nil	
	Rating				
Others 1282 m ³					
MACHINERY			RADIO COMMUNICATION		
<i>Machinery</i>		<i>Spec, Number</i>	<i>Manufacturer</i>	(Type) & Number	Manufacturer & Condition
E/R			GMDSS	N/A	
M/E		kW * rpm * Number 735 * 355 * 1	The Hanshin Diesel Works, Ltd	HF set	1 ICOM
Propeller shaft		Diameter 200 * 1	Kamume	Wireless Transceivers	N/A
Generator Engine		290 kVA 3 nos	Yanmar	Radar Transponder	N/A
Generator Alternator			EPIRB	N/A	
General Service Pumps		50m ³ /hr	Garbarino	Other equipment for Search and Rescue, If any	Name of Equipment and Number N/A
Fuel oil		10m ³ /hr			

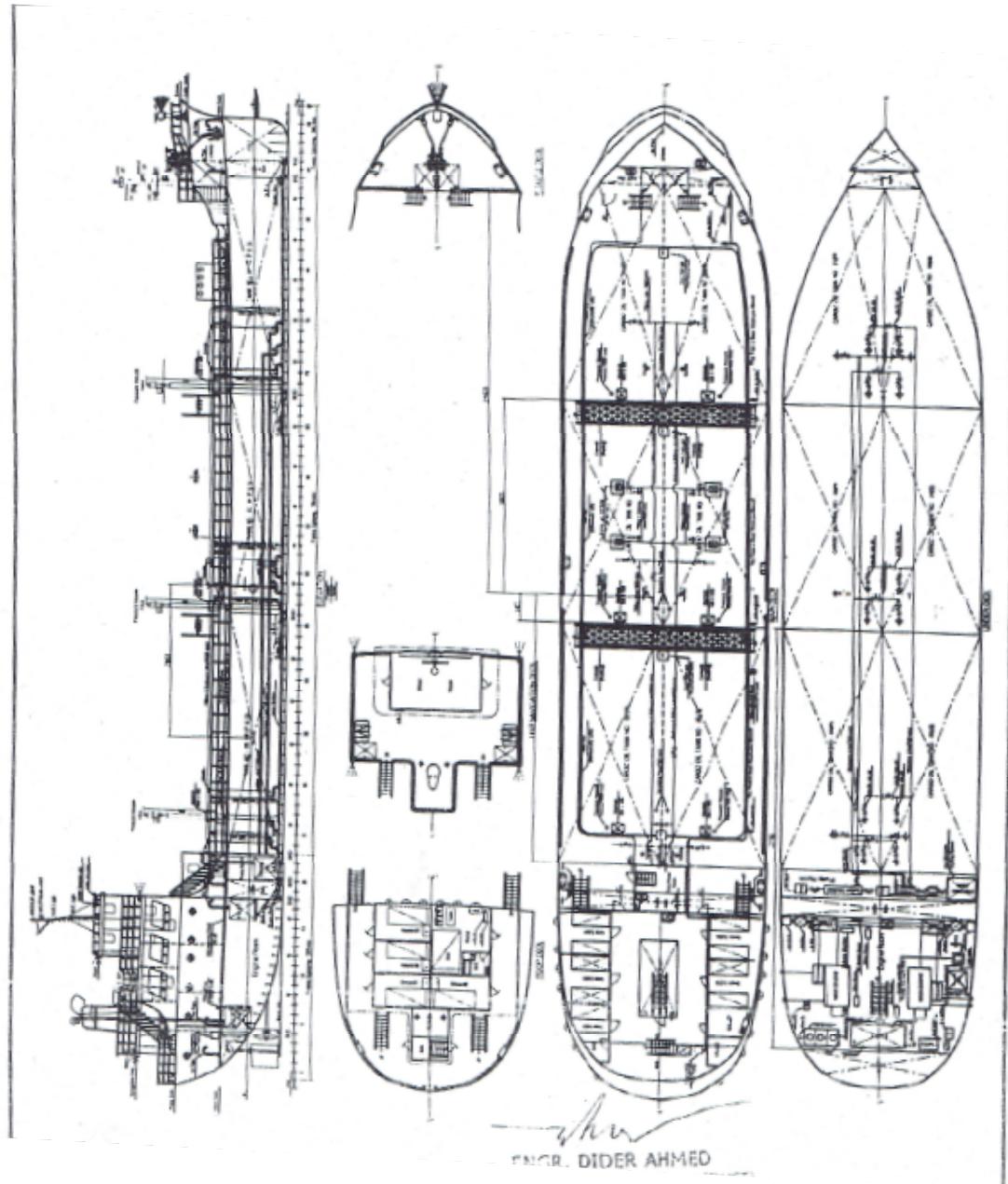
pumps										
Oil Purifiers										
Contd. on next page ▼										
Machinery	Spec, Number	Manufacturer	SAFETY EQUIPMENT							
Bilge Pumps	50m ³ /hr	Garbarino		(Type , Number)	State/Condition					
Oil separator	N/A		Resque Boat	1	Good					
Ballast Pumps Stripping Pumps	50m ³ /hr	Garbarino	Life Raft	3	Good					
			Life Buoy	15	Good					
Electric Distribution Box/Panel`	N/A		Life Jacket	20	Good					
Others, If any	N/A		Others, If any	N/A						
DECK			EQUIPMENT FOR FISHERY							
	Number	State/ Condition		Number						
Steering Gear	2		Trawl Winch	N/A						
Windlass	2		Power Crane	N/A						
Mooring Winch	2		Net Hauler	N/A						
Deck Crane	N/A		Refrigerating plant	N/A						
Hose Handle Crane	1									
STRUCTURAL INTEGRITY OF HULL	Comments									
Plate thickness	Good									
Corrosion state	Painted									
Water tightness of upper deck	Good									
Water tightness of hatch	Good									
Height of hatch coaming	As international standard									
Any other Special										
N/A										
Overall assessment of safety										
Satisfactory										



⑥ Meghoboti (Inland Oil Tanker)

(Name of Ship, Type of Ship, Navigational Area) OT Meghoboti, Steel Body Oil Tanker, Inland						
Classification Society RINA						
<i>Particulars</i>			BRIDGE., NAVIGATIONAL AID			
Loa(m)	Lpp(m)	B(m)	Equipment	Number	Manufacture	
54.09	51.9	11.1	Radar			
D(m)	d(m) (Designed)	d(m)(Scantling)	GPS	fitted		
3	1.8	2.6	Gyro Compass			
DWT(MT)			NAVTEX			
GRT 440			Engine telegraph	fitted		
Service Speed(kt) 10.5 +-1			M/Engine Remote Control System			
Endurance(NM) at Service speed						
Capacity	Passenger			Other equipment for Navigation, If any	Air horn - Fitted	
	Officer	Crew - 18		Fog horn/Bell - Not Fitted		
	Rating			Search light on bridge at forward - fitted		
	Others			Navigational lights - 5		
MACHINERY			RADIO COMMUNICATION			
Machinery	Spec, Number	Manufacture	GMDSS	(Type)		
E/R			Radio Communication to Shore/ Other ships	(Type) VHF		
M/E	279.637kw*1 032rpm*2	Weichai Heavy machinery Co. Ltd.				
propeller	Diameter : 1625		Wireless Transceivers			
Generator Engine						
Generator Motor			EPIRB			
Water Pumps			Other equipment for Search and Rescue, If any	Radio-1		
Fuel Pumps						
Oil Purifiers						
Bilge Pumps			LIFE SAVING			
Oil separator			Life Boat			
Ballast Pumps			Life Raft	2		
Stripping Pumps			Life Buoy	8		
Electric Distribution Box/Panel`			Life Jacket	14		
DECK			Others, If any	Fire extinguishers - 10 Fire bucket - 9 Sand box - 2 Fire axe - 2 Fire alarm - 1 Fire pump - 2		
Steering Gear						
Windlass						

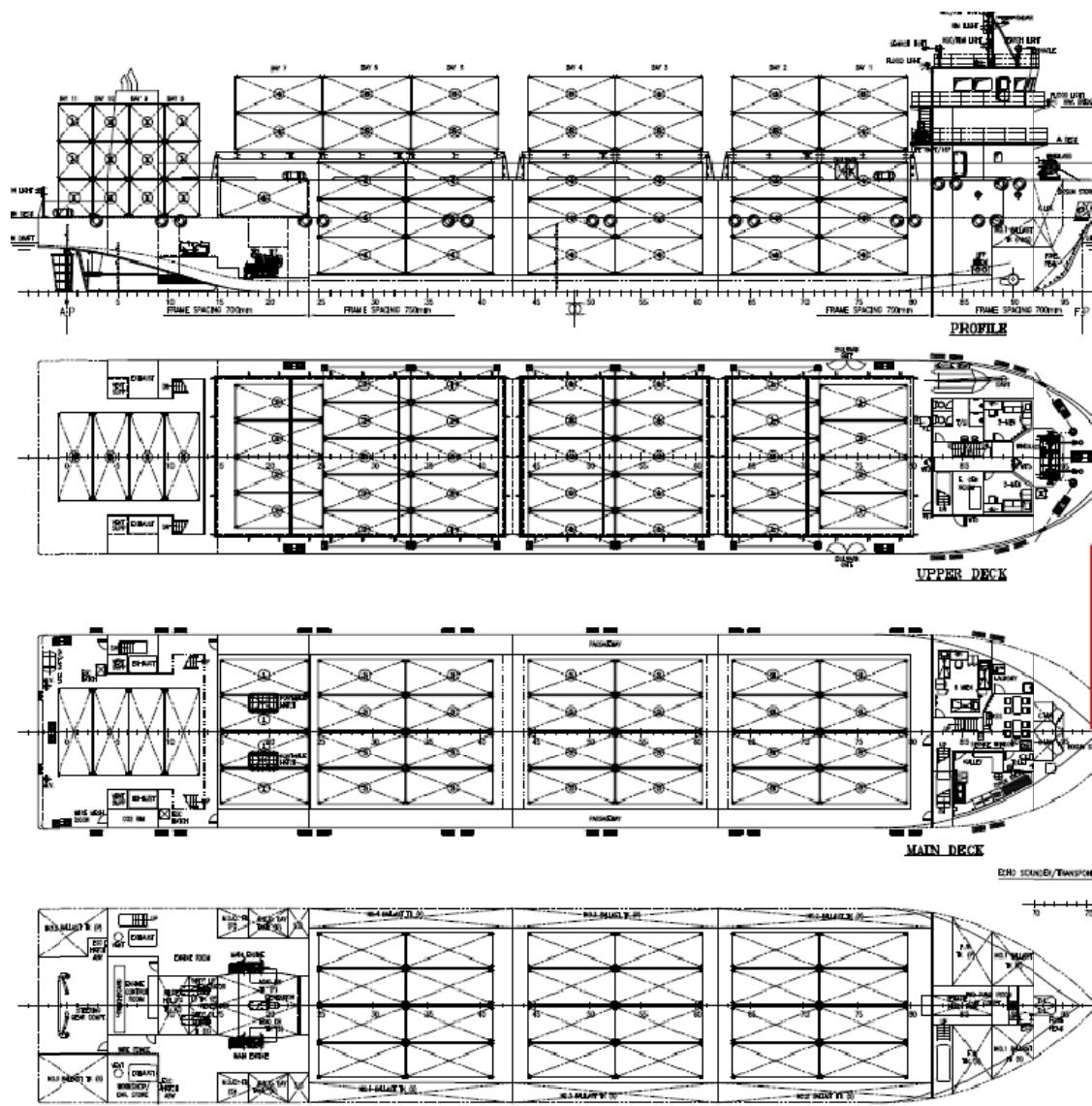
Mooring Winch			No of hydrant - 5
Deck Crane			
Horse Handle Crane			Any other Special



⑦ Nou Kollan (Coastal-Inland, Container Carrier)

(Name of Ship、Type of Ship, Navigational Area) NOU KOLLAN, CONTAINER CARRIER, Coastal (20NM)					
Classification Society					
<i>Particulars</i>			BRIDGE., NAVIGATIONAL AID		
Loa(m) 75	Lpp(m)	B(m) 13.5	Equipment	Number	Manufacturer & Condition
D(m) 5.2	d(m) (Designe d) 4	d(m) (Scantling) 4	Radar	1	Furuno 1835, Good
DWT(MT) at Scantling	2,126		GPS	1	Samyung SPR 1400, Good
GRT	2,204		Magnetic Compass	1	Daiko SR2- 150pk, Good
Service Speed(kt)	10		NAVTEX	N/A	
Endurance(NM) at Service speed	700				
Capacity	Personnel	Day/Night: 14	Engine telegraph	N/A	
			M/Engine Remote Control System	2	Kobelt Good
	Officer	8	Others, If Any SART	1	Samyung, Good
	Rating				
	Others	DRY; TEU 140			
<i>MACHINERY</i>			<i>RADIO COMMUNICATION</i>		
<i>Machinery</i>	<i>Spec, Number</i>	<i>Manufacturer</i>		(Type) & Number	Manufacturer & Condition
E/R			GMDSS	1	Samyung SRR 6000A
M/E	kW * rpm * Number 447 * 1800 * 2	Cummins Inc.	HF set	1	ICOM, Good
propeller	Diameter 152.*2	Asia foundry & manufacturer	Wireless Transceivers	3	Samyung STV 160, Good
Generator Engine	kW * rpm 125, 1500	Perkins`	Radar Transponder	1	Furuno, Good
Generator Alternator	kW 108	Stamford	EPIRB	1	Samyung SEP-500, Good
			Other	Name of	

General Service Pumps	50 m ³ /hr	Garbarino	equipment for Search and Rescue, If any	Equipment and Number N/A	
Fuel oil pumps	05 m ³ /hr	Garbarino			
Oil Purifiers					
Contd. on next page ▼					
Machinery	Spec, Number	Manufacturer	SAFETY EQUIPMENT		
Bilge Pumps	1	Garbarino		(Type), Number	State/ Condition
Oil separator	1	Victor Marine Ltd CS0500	Resque Boat	1	Good
Ballast Pumps Stripping Pumps	1	Garbarino	Life Raft	3	Good
			Life Buoy	10	Good
Electric Distribution Box/Panel`	6	Tarasaki	Life Jacket	20	Good
Others, If any	N/A		Others, If any EEBD Distress Signal Smoke detector	3 6 14	
DECK	EQUIPMENT FOR FISHERY				
	Number	State/ Condition		Number	
Steering Gear	2		Trawl Winch	N/A	
Windlass	2		Power Crane	N/A	
Mooring Winch	2		Net Hauler	N/A	
Deck Crane	N/A		Refrigerating plant	N/A	
Hose Handle Crane	N/A				
STRUCTURAL INTEGRITY OF HULL	Comments				
Plate thickness	Good				
Corrosion state	Keel – 12mm, bottom/shell/deck – 9mm				
Water tightness of upper deck	No corrosion				
Water tightness of hatch	Good				
Height of hatch coaming	As international standard.				
Any other Special					
N/A					
Overall assessment of safety					
Satisfactory					





Container Hold



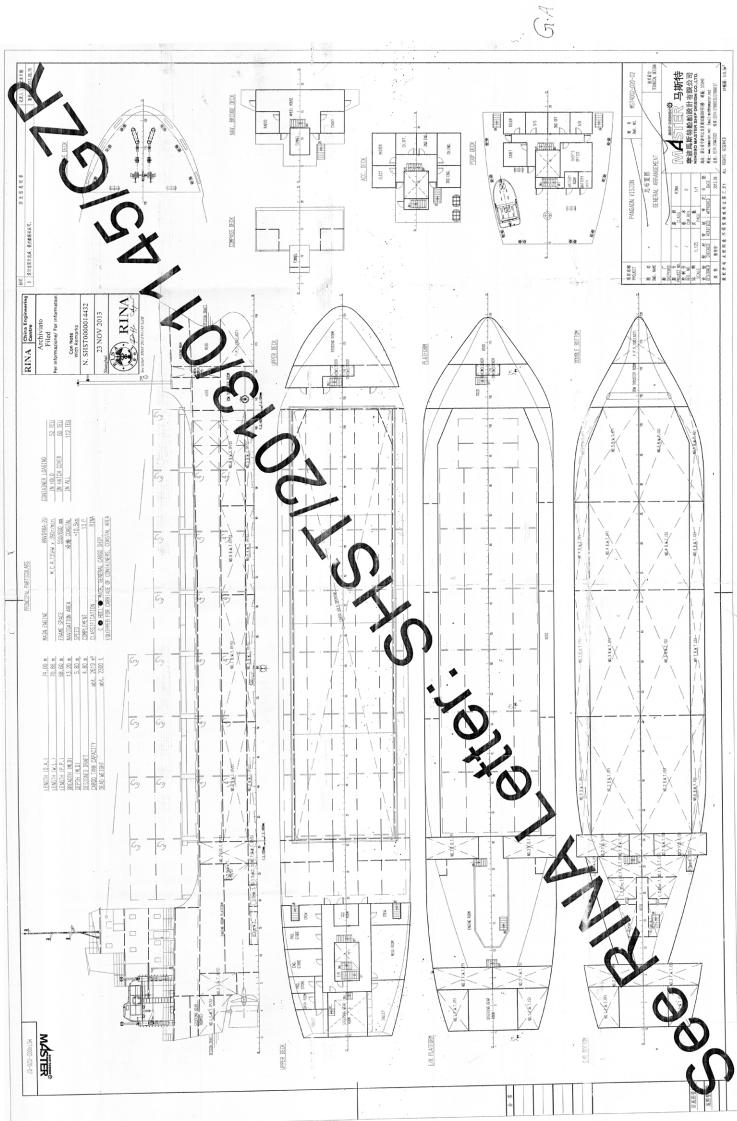
Construction at Shipyard

⑧ Pangaon Vision (Coastal-Inland, Container Carrier)

(Name of Ship, Type of Ship, Navigational Area) PANGAON VISION, General Cargo Ship Equipped for Carriage of Containers, Coastal (Chittagong-Pangaon)							
Classification Society RINA							
<i>Particulars</i>			BRIDGE., NAVIGATIONAL AID				
Loa(m)	Lpp(m)	B(m)	Equipment	Number	Manufacturer		
74 or 70.45 or 68.6	70.5 or 68.6	13.2	Radar				
			GPS				
D(m)	d(m) (Designed)	d(m)(Scantling)	Gyro Compass				
5.8	4.8	Summer draft 3.75	NAVTEX				
			Engine telegraph				
DWT(MT) at Scantling: 2280 TEU:132			M/Engine Remote Control System				
GRT 1535 or 1418							
Service or 10.5·1			Other equipment for Navigation, If any				
Endurance(NM) at Service speed							
Capacity	Passenger		RADIO COMMUNICATION				
			GMDSS	(Type)			
	Officer		Radio Communication to Shore/ Other ships	(Type)			
	Rating						
	Others						
MACHINERY							
<i>Machinery</i>	<i>Spec, Number</i>	<i>Manufacture</i>					
E/R			Wireless Transceivers				
M/E	970kw*428rpm* 1 Or 735kw * 390 rpm* 1	YEBSKL GERMAN/	Radar Transponder				
			EPIRB				
propeller	Diameter : 1802, QTY: 2						
Generator Engine	Generator (S) POWER: 100KW RPM: 1500 RPM FREQ/VOLT: 50HZ/400V Generator (P) POWER: 90KW RPM: 1500	Generator (S): Name: LISTER PITTER Model: LL0100 TYPE: TZNW2- 250M4-TH Generator (P): Name: MWM (GERMANY) Model: D232V6	LIFE SAVING				
			Life Boat				
Generator Motor			Life Raft				
			Life Buoy				
			Life Jacket				
			Others, If any	Fire @GS Pump Model: Y-160-2 RPM - 2930 Power: 11 KW			

Water Pumps	<p>a) SEA WATER MODEL: GP 100-30 POWER: 10.5 KW RPM: 2900 FREQ/VOLT: 50 HZ/380 V</p> <p>b) FRESH WATER HYDROPHORE MODEL: Y 100L-G</p> <p>TYPE: Y RPM: 2880 POWER: 3 KW FREQ/VOLT: 50 HZ/380V</p>
Fuel Pumps	DIESEL OIL QTY: 2 MODEL: Y 100L-1 RPM: 1430 POWER: 2.2 KW TYPE: 1P44 FREQ/VOLT: 50 HZ/380V LUBE OIL MODEL: 1 MOFA POWER: 5.5 KW RPM: 1435 FREQ/VOLT: 50 HZ/380V VRPM: 1420-1730 r/min
Oil Purifiers	
Bilge Pumps	Bilge, Ballast, Firefighting & Deck Wash Pump - 2
Oil separator	MODEL: AO2-HT 114 TYPE: DFCS-125 STND SEPARATION: 1500 LIT/HR BOWL SPEED: 6930 RPM
Ballast Pumps	MODEL: J031601-2TD2T17 OUTPUT: 54 m ³ /HR POWER: 18.5 KW RPM: 2940
Stripping Pumps	
Electric Distribution Box/Panel`	
DECK	
Steering Gear	STEERING MOTOR QTY : 2 MODEL : 63SCY 14-1B POWER: 10KW

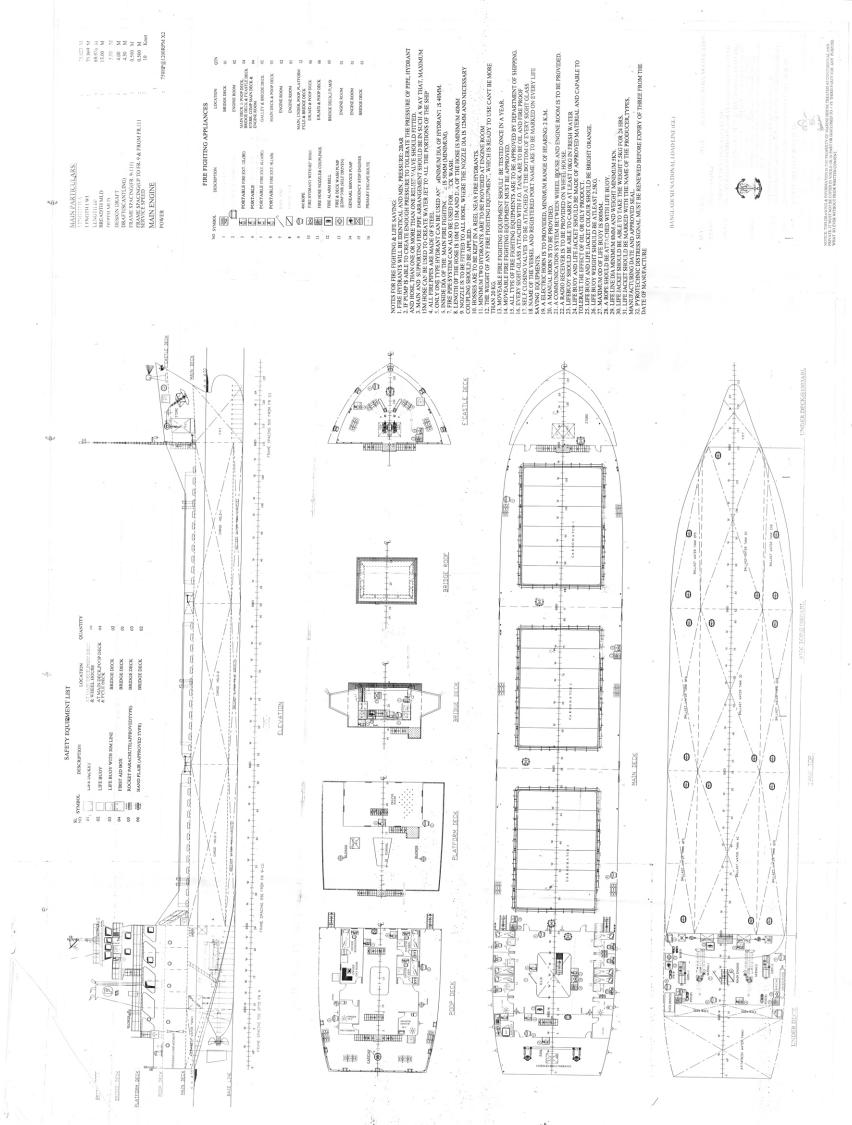
	RPM: 1500	RATED PRESSURE: 31.5 MPA
Windlass		
Mooring Winch		
Deck Crane		
Horse Handle Crane		
Any other Special		



⑨ Tasnim-4 (Coastal, General Cargo)

(Name of Ship, Type of Ship, Navigational Area) MV TASNIM - 4, Twin Screw General Cargo Vessel, Coastal							
Classification Society > Bangladesh Government National Load Line Certification from Germanischer Lloyd							
Particulars			BRIDGE., NAVIGATIONAL AID				
Loa(m)	Lpp(m)	B(m)	Equipment	Number	Manufacture		
75.023 or 74.98	69.976	13	Radar	N/A			
D(m)	d(m) (Designed)	d(m)(Scantling)	GPS	Yes			
5	4	4.5	Gyro Compass	N/A			
DWT(MT) at Scantling: 2200			NAVTEX	N/A			
GRT	1311.62 or 996		Engine telegraph				
Service Speed(kt) 10			M/Engine Remote Control System				
Endurance(NM) at Service speed							
Capacity	Passenger	Day:					
		Night:	Other equipment for Navigation	Magnetic Compass Course indicator on Rudder console Rudder Indicator			
	Officer						
	Rating						
	Others		RADIO COMMUNICATION				
MACHINERY			GMDSS	(Type)			
Machinery	Spec, Number	Manufacturer	Radio Communication to Shore/ Other ships	(Type) VHF set (fixed)			
E/R							
M/E	536.904kw * 1200rpm * 2	WEICHAI HEAVY MACHINERY CO. LTD					
propeller	Diameter 1800 mm QTY – 2	China	Wireless Transceivers				
			Radar Transponder				
Generator Engine	G/E Number type*02 NOS. Rated Power:50K W Nominal revolutions: 1500 to 1510 (min- 1)	DIESEL PRIME MOVER - WEICHAI HEAVY MACHINERY CO. LTD MODEL: CCFJ50- WV, CCFJ24J-	EPIRB				
			Other equipment for Search and Rescue, If any	Telephone (intercom) – yes PA system – yes			
			LIFE SAVING				
			Life Boat				
			Life Raft				
			Life Buoy	6			
			Life Jacket	16			

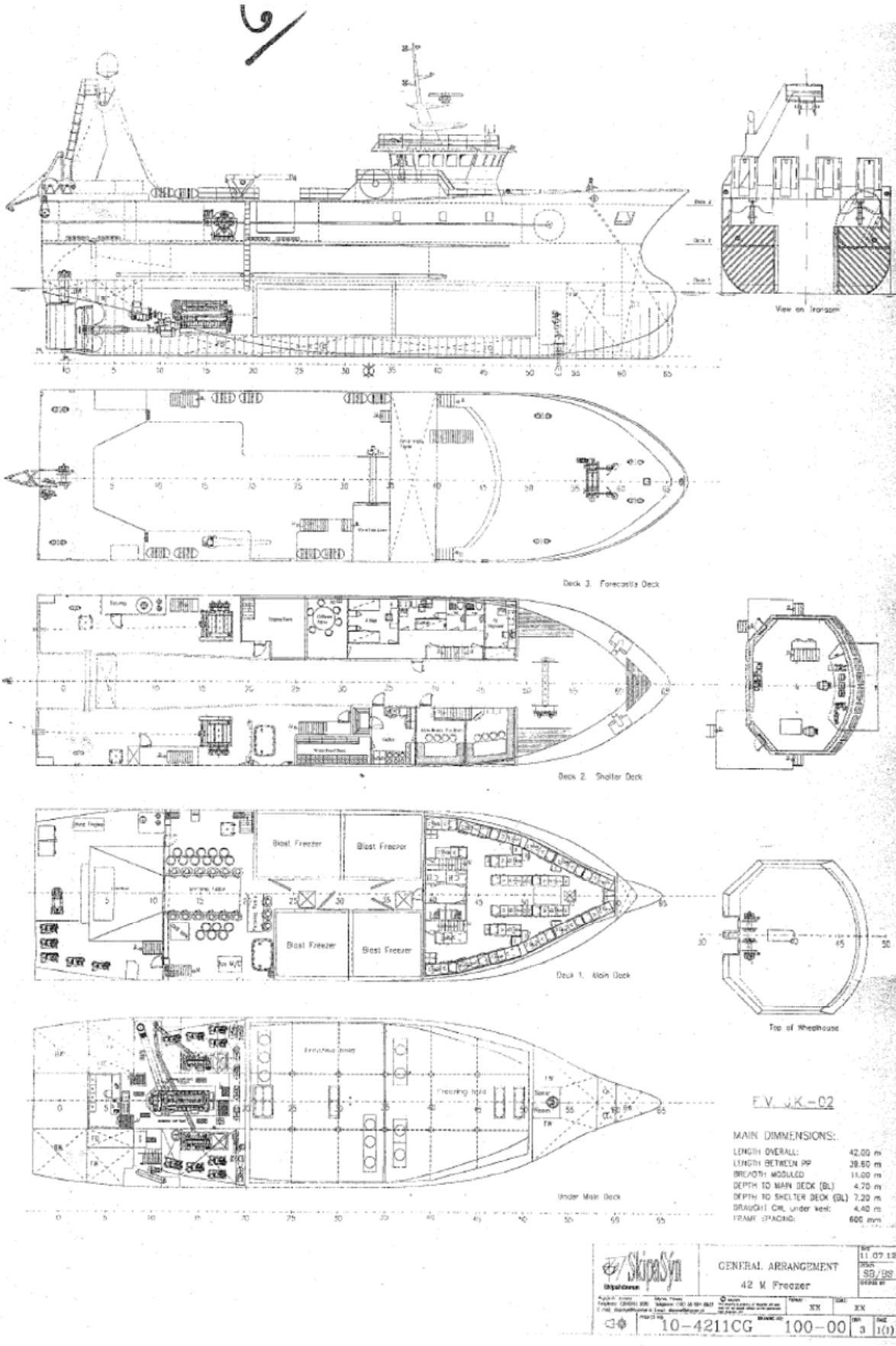
		WV		
Generator Motor	Frequency (c/s) – 50 Hz Voltage/Power (v: kva) – 400/62.5	STAMFOR D/UCM224 F13	Others, If any	ire fighting and gas pumps – 2 Rocket Parachute - 3 Hand flare – 2 Sand box – 2 Fire extinguisher - 13 Fire ex -2 Fire hydrant -6 Fire hose nozzle and couplings -6 Emergency stop engine -1
Water Pumps			Any other Special ANCHOR/ANCHOR WINDLASS TOTAL CHAIN LENGTH 192.5 m	
Fuel oil pumps				
Oil Purifiers				
Bilge Pumps				
Oil separator				
Ballast Pumps				
Stripping Pumps				
Electric Distribution Box/Panel				
DECK				
Steering Gear				
Windlass	Hoisting speed (P) 10, (S) 10.47, (P+S) 9.35			
Mooring Winch				
Deck Crane				
Horse Handle Crane				



⑩ FV JK-2 (Fishing Trawrer)

(Name of Ship, Type of Ship, Navigational Area) FV JK-2, 42 m Fishing Trawler, Coastal					
Classification Society Bureau Veritas (BV) Class, Singapore					
<i>Particulars</i>			BRIDGE., NAVIGATIONAL AID		
Loa(m) 42	Lpp(m) 39.6	B(m) 11	Equipment Radar	Number fitted	Manufacture
D(m) 4.7	d(m) (Desinged) 3.8	d(m)(Scantling) 5.2	GPS	fitted	
DWT(MT) at Scantling			Gyro Compass		
GRT 520			NAVTEX		
Service Speed(kt) 10.5 + -1, Mean ship speed at full load 10.65			Engine telegraph		
Endurance(NM) at Service speed			M/Engine Remote Control System		
Capacity	Officer		RADIO COMMUNICATION		
	Rating		GMDSS	(Type)	
	Others		Radio Communication to Shore/ Other ships	(Type)	
<i>MACHINERY</i>					
<i>Machinery</i>	<i>Spec, Number</i>	<i>Manufacture</i>			
E/R					
M/E	kW * rpm * Number 1052*1600*1 (MCR) Or 947 * 1600 * 1 (NCR)	3516B or 3512B, USA	Wireless Transceivers		
			Radar Transponder		
			EPIRB		
			Other equipment for Search and Rescue, If any	N/A	
propeller	Diameter 2280 mm Type: Fixed pitch (Ni-Al Bronze)				
Generator Engine	Diesel		LIFE SAVING		
Generator Motor			Life Boat	N/A	
Water Pumps	Condenser cooling pump		Life Raft	2	
Fuel oil pumps	fitted		Life Buoy	8	
Oil Purifiers			Life Jacket	47	
Bilge Pumps	fitted		Others, If any	Fire extinguisher - 15 Fire & GS Pumps - 2 Fire axe - 2 Fire blanket - 1 Fire valve - 6 Hand flares - 6 Diving mask - 1 Muster station - 1	
Oil separator		'			
Ballast Pumps					
Stripping Pumps					
Electric					

Distribution Box/Panel`				
DECK				
Steering Gear	65 degrees by 28 seconds (main) 30 degrees by 60 seconds (emergency)	Scan Machinery	EQUIPMENT FOR FISHERY	
Windlass	Depth of sea condition 12.5 m, Hauling in speed 9.5 (S) and 10 (P) m/min	Scan Machinery	Power Crane Net Hauler Refrigerating plant	Specs not available (layout is available in GA)
Mooring Winch			Any other Special SSB – yes Echo sounder – yes Rudder indicator – yes PA system – yes	
Deck Crane				
Horse Handle Crane				



A2 内陸水運關係法令

Table c. *The Inland Shipping Ordinance, 1976*

Sections	Chapters
1-2	I. Preliminary
3-33	II. Registration & Survey
34-43	III. Manning, Examination and Certification
44-53	IV. Shipping Casualties
54-60	V. Protection of Vessels and Passengers
60A-60B	VA. Protection of Inland Water from Pollution
61-74	VI. Penalty and Procedure
75-83	VII. Miscellaneous

Table d. *The Inland Shipping Laws and Rules, 2001*

Rules	Chapters
1	Inland Steel Body Ship Construction Rules, 2001
2	Inland Ship (Passenger) Rules, 2001
3	Inland Ship (Free-board) Rules, 2001
4	Inland Ship (Stability) Rules, 2001
5	Inland Ship (Life Saving) Rules, 2001
6	Inland Ship (Fire Safety) Rules, 2001
7	Inland Ship Examination Syllabus (Inland Master, Driver, Etc) Rules, 2001
8	Inland Ship (Manning, Examination & Certification) Rules
9	Inland Ship (Minimum Crew Size) Rules, 2001
10	Inland Ship (Shipping) Rules, 2001
11	Inland Ship (Dangerous Goods) Rules, 2001
12	Inland Ship (Tonnage Measurement) Rules, 2001

A3 Inland Shipping Laws and Rules, 2001 (抜粋、英訳)

INLAND SHIPPING STABILITY RULES, 2001

GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH

MINISTRY OF SHIPPING

NOTIFICATION

S. R. No.

In exercise of the powers conferred by sub-section (1) and clause (xxxii) of sub-section (2) of section 82 of the Inland Shipping Ordinance, 1976 (LXXII of 1976) the Government considers it necessary and expedient for carrying out the purposes of the Ordinance to prescribe the manner in which stability of inland ships shall be determined and tests, including inclining tests, shall be carried out to ensure that the ships shall be stable in all circumstances and conditions for them to ply safely in the inland waters, and in supersession of all previous rules in these regards, the Government is pleased to make and promulgates the following Rules; namely:--

INLAND SHIPPING STABILITY RULES, 2001

CHAPTER 1

PRELIMINARY

1. Short name.-- These rules shall be called: The Inland. Shipping Stability Rules, 2001.

2. Definitions.—

(1) In these rules unless the there is anything repugnant to the subject or context,—

a) "Inland Waterways" means "inland, water" as defined in the Inland 'Shipping Ordinance, 1976.

- b) "Length" (L) means the distance on the load water line from the forward edge of the stem to the after-edge of the rudder post, or to the center of rudder stock if there is no rudder post.
- c) "Breadth" (B) means the vessel's greatest moulded breadth measured over the outer edge of the framing.
- d) "Depth" (D) means the, vertical distance, 'measured at the middle of the vessel's length (L) from the upper edge of the keel to the upper edge of the main deck beam, or upper edge of the vessel's side on open vessels.
- e) "Draught" (T) means the vertical distance at the middle of the vessel's length. (L) between the upper edge of the keel and the load, water line.
- f) "Water Tight" when refers to a deck or a device means that it will, under all circumstances, prevent water to enter the vessel or floating equipment.
- g) "Weather Tight" when refers to a deck or a device means that it will prevent rain and spray water to enter the vessel Or floating equipment.
- h) "Freeboard" means the distance between the depth and draught of a vessel or floating equipment with a watertight freeboard deck.
- i) "Freeboard Deck" means the uppermost weather/water tight deck.
- j) "Safety Distance" means the distance between- the depth and draught of a vessel or floating equipment without a watertight free board deck.
- k) "Opren Vessel" means a vessel without a weather deck.
- l) "Passenger" means any person carried on board an inland ship not being the master, officer and a member of the crew of the inland ship and will exclude, for the purposes of these rules, a child under one year age.
- m) "Passenger Vessel" means a vessel with a water tight weather deck, and includes any multidecked vessel, engaged for carrying more than 12 passengers.
- n) "Open Passenger Launch" means an open vessel, without a weather deck, and is engaged for carrying more than 12 passengers.

- o) "Passenger Ferry" means a vessel with superstructure engaged for ferrying 12 or more passengers and vehicles.
 - p) "Road Ferry" means an open flush deck vessel engaged for ferrying 12 or more passengers and vehicles.
 - q) "Cargo Vessel" means a self propelled vessel used for carrying cargo and more than 12 passengers.
 - r) "Tanker" means a vessel used for carrying bulk liquids in tanks.
 - s) "Tug" means a vessel intended for towing or pushing other vessels or floating equipment.
 - t) "Fishing Vessel" means a vessel used or intended to be used for fishing.
 - u) "Service Vessel" means a self propelled vessel constructed for special duties and that is not a passenger vessel, cargo vessel, tanker or fishing-vessel.
 - v) "Dumb Barge" means a vessel, boat or floating equipment used for carrying cargo or liquid, not being self propelled and does not carry any passenger.
 - w) "Pontoon" means a dumb barge with no hatches or openings in weather deck except manholes and air pipes.
 - x) "Floating Equipment" means miscellaneous equipment used for various work afloat, such as dredger, floating crane, etc., and are not self propelled.
 - y) "New Vessel" means a vessel which is registered under the Inland Shipping Ordinance, 1976 on or after 1st of January 1996.
 - z) "Existing Vessel" means a vessel that is not new.
- aa)"Angle of Flooding" means an angle of heel at which water can penetrate into the vessel or floating equipment through openings in hull, superstructures and deck houses, and which can cause progressive flooding

(2) When applicable to a vessel's plans and stability information the following will mean:

- a) G, the center of gravity.
- b) M, the initial metacenter.
- c) K, the plane of the keel.

- d) S, the point of projection of M.
- e) GM, the initial metacentric height.
- f) KG, the height of the centre of gravity G above the keel.
- g) KM, the height of the initial metacentre above the keel.
- h) GZ, the righting lever.

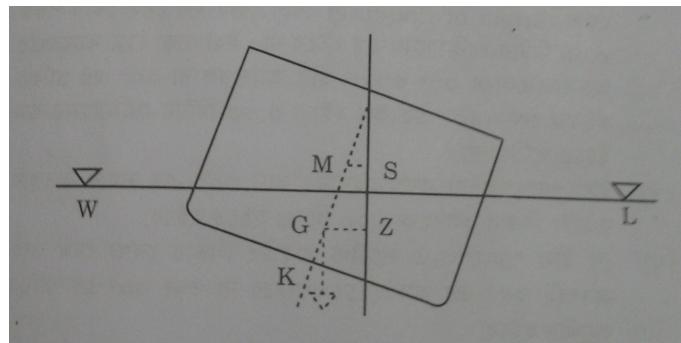


Figure: I/1

3. **Application**-- Unless expressly provided otherwise these rules shall apply to built on or after 1st of January 1996.
4. **Design and Construction**-- All vessels and floating equipment shall be designed, constructed and equipped observing good naval architectural standards, seaworthiness, safety and sturdiness to the satisfaction of the surveyor.
5. **Freeboard**-- All vessels and floating equipment shall fulfil the requirements as stated in "Inland Shipping Free Board Rules, 1995"

CHAPTER II

MINIMUM REQUIREMENTS OF STABILITY.

6. **General**-- All vessels, except barges, pontoons and floating equipment, with a length over 24 m shall fulfil either of the following two criteria under any loading condition:

I. Criteria A

- a. The area under the GZ curve shall not be less than 0.055 metre-radians up to an angle of heel of 30° and not less than 0.09 metre-radians up to an angle of heel of 40° or to the angle of flooding if this angle is less than 40° . Additionally the area under GZ curve between the angles of heel of 30° and 40° or between 30° and the angle of flooding if this angle is less than 40° , shall not be less than 0.03 metre-radians.

- b. The righting lever GZ shall be at least 0.20 metre at an angle of heel equal to -30° .
- c. The angle of heel at which the maximum righting lever GZ occurs shall not be less than 25° and should preferably exceed 30° .
- d. The initial metacentric height GM shall not be less than 0.15 meter for $L \leq 70$ m and 0.35 meter for $L < 70$ m.

(ii) Criteria-B

- a. Area under the righting arm curve should not be less than 0.070 meter-radian up to an angle of 15 degrees when the maximum GZ occurs at 15 degrees and 0.055 meter-radian up to 30 degrees when maximum GZ occurs at 30 degrees or above. When the maximum GZ occurs at angles between 15 degrees and 30 degrees, the corresponding area under the righting lever curve should be:
- b. Area under the righting lever curve between 30 degrees and the angle of flooding or 40 degrees, whichever is less, to be not less than 0.03 meter-radians.
- c. Righting lever to be at least 0.02 meter at angles equal to or greater than 30 degrees and angle of flooding.
- d. Initial metacentric height GM is to be not less than 0.15 meter for $L \geq 70$ meters and 0.35 meter for $L < 70$ meters.
- e. Maximum righting lever is to occur at an angle of heel exceeding 15 degrees.

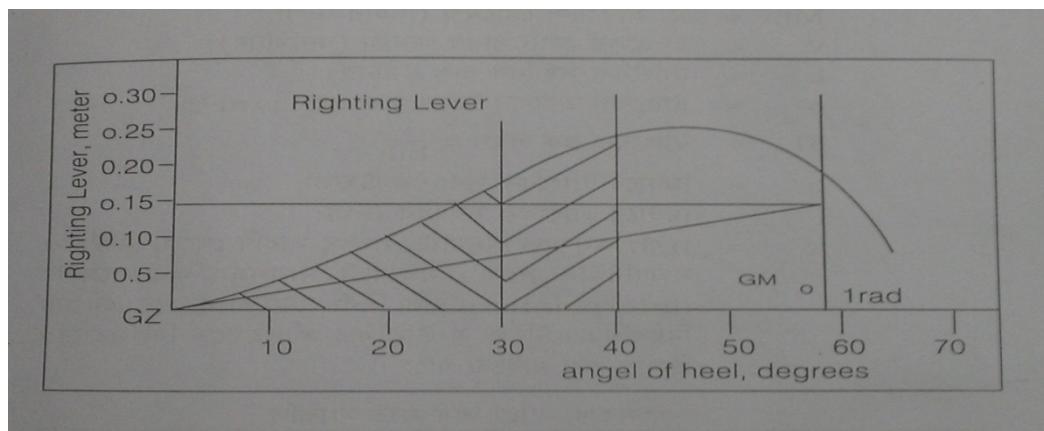


Figure: II/1

7. Influence of Free Liquid Surfaces.— For all conditions, the initial metacentric height and the GZ.curves shall be corrected for the effect of free - surfaces of liquids in tanks, in accordance with the following assumptions:

- a) Tanks which are taken into consideration when determining the effect of liquids on the stability at all angles of inclination1 shall include single tanks or combinations of tanks for each kind of liquid (including those for water ballast) which can simultaneously have free surfaces.
- b) It is recommended that the tanks should be empty or filled up as far-as possible.
- c) For the purpose of determination of the free surface correction, the tanks assumed slack shall be those, which develop the greatest free surface moment - M_{fs} at 030° inclination, when in the 50 per cent full condition.
- d) The value of M_{fs} for each tank can be calculated from the formula:

$$M_{fs} = vb\delta l k \sqrt{\delta}$$

Where,

- M_{fs} = free surface moment (Meter-Ton);
 v = the total tank capacity in Cubic Meters;
 b = the tank maximum breadth in Meter;
 ρ = the specific weight of liquid in the tank t/m^3 ;
 δ_1 = the tank block coefficient = V/blh ;
 h = the tank maximum height in meter;
 l = the tank maximum length in meter;
 K = dimensionless coefficient to be determined from enclosed table according to

the ratio b/h . The intermediate values are determined by interpolation. The

value of 'k' can alternatively be calculated from the formula following the

table:

Table Value of coefficient- "K"

b/h	5°	10°	15°	20°	30°	40°	50°	60°	70°	b/h
10	0.01	0.11	0.12	0.12	0.11	0.10	0.09	0.07	0.05	10
5	0.04	0.07	0.10	0.11	0.11	0.11	0.10	0.08	0.07	5
3	0.02	0.04	0.07	0.09	0.11	0.11	0.10	0.09	0.08	3
2	0.01	0.03	0.04	0.06	0.09	0.11	0.11	0.10	0.09	2
1.5	0.01	0.02	0.03	0.05	0.07	0.10	0.11	0.11	0.11	1.5
1	0.01	0.01	0.02	0.03	0.05	0.07	0.10	0.12	0.13	1
0.75	0.01	0.01	0.02	0.02	0.04	0.05	0.08	0.12	0.15	0.75
0.5	0.00	0.01	0.01	0.02	0.02	0.04	0.05	0.09	0.16	0.5

$k = (\sin\theta/12) (1 + \tan^2\theta/2) (b/h)$, where $\cot\theta \geq b/h$

$k = (\cos\theta/8) \{1 + \tan\theta / (b/h)\} - (\cos\theta / \{12 (b/h)^2\}) (1 + \cot^2\theta/2)$ where,
 $\cot\theta < b/h$.

8. Passenger Vessels.--

1. This rule shall apply to all passenger vessels and launches, new and old.
2. The stability shall be such that the freeboard requirements are always fulfilled.
3. The list shall not be more than 10 degrees when all passengers are on one side of the vessel and there shall remain a sufficient freeboard to account for rolling waves wind and centrifugal forces in a turning circle.
4. In calculating the list the CG of the passengers shall be assumed to be 1/4 of the breadth away from the centre line.
5. Passenger vessels and launches shall not ply in wind speeds exceeding 10 m/s (36 km/h).
6. If the wind speed rises to over 10 m/s (36 km/h) during the voyage the passenger vessel or launch shall at once proceed to the nearest bank, canal or sheltered water.
7. A vessel may ply in stronger winds only if it is demonstrated that the resulting heel does not exceed 3 degrees.
8. It must be ensured that a vessel will never have a total combined momentary list of more than 12 degrees caused by wind, turning, waves and passenger crowding on one side.
9. When calculating the intact stability of a vessel it the following is to be assumed:
 - a) Total weight of each passenger and his luggage is 75 kg:
 - b) Height of center of gravity for a passenger and his luggage should in average be considered 0.8 m above the respective deck.
 - c) The GM of the vessel shall satisfy the following condition

$$GM = \text{or} > : \frac{V \cdot AZ}{Disp}$$

Where

V = maximum allowed wind speed for the vessel.

DispΔ = the vessel's displacement,

A = Lateral wind area, m².

Z = the vertical distance between center of lateral wind area and half draught

(d) The heeling moment for the angle of heel on account of turning can be calculated as follows:

$$MR = 0.02 \times V^2 s/L \times \Delta (\bar{K}G - T/2)$$

Where,

MR = heeling moment, m;

Vs = designed motion, m/s;

Δ = rate of change of the ship, t;

KG = height of gravity on keel of the ship;

T = perpendicular distance from the upper edge of keel to the load water line of the ship;

L = length of the ship;

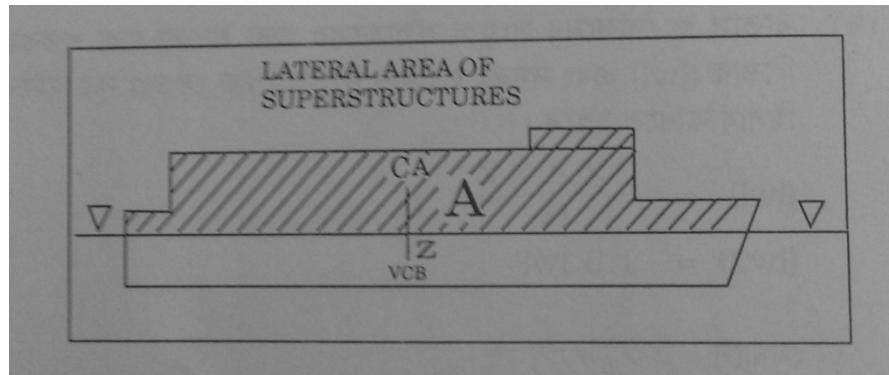


FIGURE II/2

10. Minimum required GM for an open passenger launch is 0.8 m and for a passenger vessel 0.6 m.

11. Following shall apply only to new passenger vessels:

a) Water tight subdivision of passenger vessels over 36 m length shall be such that it will comply with "one compartment vessel" requirement of SOLAS 1974 and with a margin line of at least 75 mm. The subdivision shall be calculated as stated in SOLAS 1974 Chapter II Part B.

b) This rule shall also apply to Passenger/Car Ferries and Road Ferries.

9. Cargo Vessels and Tankers.-- Vessels which do not fulfil the requirements in rule 6 shall have a minimum GM of 0.6 m and the minimum range of stability shall be 40°.

10. Tugs and Service Vessels.-- A tug or a service vessel with a length up to 15 m or 250 BHP shall have a minimum GM value of 0.6 m and a tug or service vessel with a length over 15 m or over 250 BHP.the minimum GM shall be 0.75 m

11. Barges and Pontoons.-- Barges and pontoons shall have a minimum G.M. of 0.3 m. The minimum range of stability shall be 20°.

12. Floating Equipment.-- Minimum stability will be decided from case to case.

CHAPTER III

INFORMATION TO BE FURNISHED

13. Loading Condition to be Examined:

(1) Main Loading Conditions: Stability calculations shall be performed for the most frequent of the loading conditions, which may occur in connection with the operation of the vessel.

(2) Standard Loading Conditions: In case the sufficient detailed information is not provided by the ship owner, concerning the most frequent loading conditions referred to in sub-rule (1), stability calculations shall be performed for the following standard loading conditions

a) Cargo and tanker vessels

- I. Departure condition full cargo homogeneously distributed in all cargo spaces and full stores and fuel.
- II. Arrival condition as in I but with 10 per cent stores and fuel.
- III. Departure condition in ballast with full stores and fuel
- IV. Arrival condition in ballast with 10 per cent stores and fuel

b) For a vessel, that can be aflicd to carry deck cargo additionally:

- I. Departure condition, full cargo in holds and on deck and full stores and fuel; weight and height of deck cargo shall be stated.
- II. Arrival condition as in (I) but with 10 per cent stores and fuel. The weight of water possibly absorbed under the voyage by the deck cargo shall be added to its weight.

c) Passenger Vessels:

- I. Departure condition, full cargo, full stores and fuel and full number of passengers with luggage.
- II. Arrival condition, as h(i) but with 10 per cent stores and fuel.
- III. Departure condition without cargo but with full stores and fuel and full, number of passengers with luggage.

d) Arrival condition, as 3 but with 10 per cent stores and fuel.

14. Information to be Furnished to the inland Shipping Safety Administration.—

- 1) For a new vessel the following information shall be furnished to the Inland Shipp Safety Administration in triplicate:
 - a) Vessels of 24 metres or more in length
 - I. lines plan,
 - II. general arrangement drawing,
 - III. capacity plan or information on the weight and coordinates of center of gravity for light ship and volumes and centers of gravity for holds and tanks,
 - IV. hydrostatic curves or tables,
 - V. cross curves or, corresponding tables,
 - VI. Flooding angle as function of the draught,
 - VII. Corrections to GM and GZ for the effect of free liquid surfaces in tanks,
 - VIII. KM as function of draught, and of trim if the figures essentially change with the trim, as diagrams or tables,
 - IX. Heeling test report,
 - X. GZ curves and calculations for the in rule II/i of this provisions mentioned loading conditions,
 - XI. Minimum GZ curves or tables as function of draught, and of trim if the figures essentially change with the trim.
- 2) For vessels under 24 meters in length general arrangement plan and heeling test report shall be submitted.
- (3) When it is evident that some of the information mentioned in this rule is apparently unnecessary, with regard to the size, construction or intended Service of the vessel, the Inland Ship Safety Administration may exempt the vessel from the requirments of sumission of such information.

CHAPTER IV

TESTS

15. Inclining Test.—

- 1) The inclining test shall be performed with extreme accuracy and a report shall be drawn up where all measured data and the method of performance are clearly stated.
- 2) The Inland Shipping Safety Administration shall be given notice of the time and place for the inclining test well in advance. While the test is carried out the vessel shall lay free of the quay with slack moorings. The number of persons aboard shall be limited to as few as possible. The test shall be carried out in calm weather and in still water. The vessel shall not have any appreciable initial list.
- 3) The angles of inclination shall be read off with an inclination measuring instrument or with, if possible, two pendulums. The Draught shall be read off all reliable draught marks. The heeling weights and the distance they are to be shifted shall be chosen so that the angle of inclination shall be not less than 1 degree on either side.
- 4) When calculating the hydrostatic data corresponding to the inclining test condition, the draughts read shall be used taking into account corrections due to the rake of stern and stem and to the location of the draught mark. If the trim in the inclining test condition is such that it essentially effects the result, hydrostatic data shall be calculated taking trim into account. The metacentric height shall be corrected for the effect of free liquid surfaces.
- 5) The heeling weights shall be disposed so that at least two heeling moments to both sides can be produced. At least four of the recorded angles of inclination shall be fit for use in the calculations. A sufficiently accurate account shall be given of weights to be added and deducted.

16. Passenger Vessels under 24 metres in Length.—

When inclining test is made on a passenger vessel under 24 metres in length the angle of heel of the vessel shall not be more than 10 degrees nor the remaining

freeboard shall be less than 0.2 metre when the all the passengers the vessel is allowed to crowd to one side of it.

17. Requirements for Existing Passenger Vessels.—

In order to determine the maximum number passengers allowed on board according to these rules and the Freeboard Rules the following tests and calculations shall be made on all passenger vessels and launches registered before 1st of January, 1996:

- a) A heeling test shall be carried out as follows.
- b) Weights representing the number of passengers at 75 kg per passenger shall be placed on one side at half the distance between the center line and the side of the vessel.
- c) The resulting list must not exceed 10° .

If the list exceeds 10° with the number of passengers allowed by seating and/or space requirements, the number must be reduced until the list is reduced to maximum of 10°

INLAND SHIPPING FREEBOARD RULES, 2001

CHAPTER I

Preliminary

1. Short Title

These rules may be called: The Inland Shipping Freeboard Rules, 2001.

2. Definitions

In these rules unless there is anything repugnant to the subject or context-

- (a) "Inland Waterways" means "inland water" as defined in the Inland Shipping Ordinance, 1976.
- (b) "Perennially Rough Water" is that part of the inland waterways as may be declared by the Bangladesh Inland Water Transport Authority from time to time to be perennially rough and published in the Official Gazette and will be considered to be rough all round the year.
- (c) "Seasonal Rough Water" is that part of the inland waterways as may be declared by the Bangladesh Inland Water Transport Authority from time to time to be seasonal rough and published in the Official Gazette and will be considered to be rough from 15th of March to 15th of October.
- (d) "Perennially Smooth Water" is all other part of inland waterways that is not perennially rough or seasonal rough.
- (e) "Length' (L) means the distance on the load water line from the forward edge of the stern to the after edge of the rudder post or to the center of rudder stock if there is no rudder post.
- (f) "Breadth' (B) means the vessel's greatest moulded breadth measured over the outer edge of the flanking.
- (g) "Depth (D) means the vertical distance, measured at the middle of the vessel's length (L) from the upper edge of the keel to the upper edge of the main deck beam or upper edge of the vessel's side on open vessels.

- (h) "Draught" (T) means the vertical distance at the middle of the vessel's length (L) between the upper edge of the keel and load water line.
- i) "Water Tight" when refers to a deck or a device means that it shall, under all circumstances, prevent water to enter the vessel or floating equipment.
- (j) "Weather Tight" when refers to a deck or a device means that it shall prevent rain and spray water to enter the vessel or floating equipment.
- (k) "Weather Deck" means a deck below which all openings have closing devices that under all circumstances will prevent water from entering the vessel.
- (l) "Freeboard" means the distance between the depth and draught of a vessel or floating equipment with a watertight freeboard deck.
- (m) "Freeboard Deck" means the uppermost weather tight or water tight deck.
- (n) "Safety Distance" is the distance between the depth and draught on a vessel or floating equipment without a watertight freeboard deck.
- (o) "Open Vessel" means a vessel without a weather deck.
- (p) "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 and will exclude, for the purposes of these rules, a child under one year age.
- (q) "Passenger Vessel" means a vessel with a water tight weather deck, and includes any multidecked vessel, engaged for carrying more than 12 Passengers.
- (r) "Open Passenger Launch" means an open vessel, without a weatherdeck, and is engaged for carrying more than 12 passengers.
- (s) "Passenger/Car Ferry" means a vessel with superstructure engaged in ferrying 12 or more passengers and vehicles.
- (t) "Road Ferry" means an open flush deck vessel engaged for ferrying 12 or more passengers and one or more vehicles.
- (u) "Cargo Vessel" means a self propelled vessel used for carrying cargo and not more than 12 passengers.
- (v) "Tanker" means a vessel used for carrying bulk liquids in tanks.

(w) "Tug" means a vessel intended for towing or pushing other vessels or floating equipment.

(ww) "Fishing Vessel" means a vessel used or intended to be used for fishing.

(x) "Service Vessel" means a self propelled vessel constructed for special duties and that is not a passenger vessel, cargo vessel, tanker or fishing vessel.

(xx) "Dumb Barge" means a vessel, boat or floating equipment used for carrying cargo or bulk liquid, not self propelled and does not carry passenger.

(y) "Pontoon" means a dumb barge with no hatches or openings in weather deck except manholes and air pipes.

(yy) "Floating Equipment" means miscellaneous equipment used for various work afloat, such as dredger, floating crane, etc., which are not self propelled.

(z) "New Vessel" means a vessel which is registered under the Inland Shipping Ordinance, 1976 on or after 1st of January 1996.

(zz) "Existing Vessel" means a vessel that is not new.

3. Application and Commencement

Unless expressly provided otherwise, these rules shall apply to all vessels with effect from 1st of January 1996.

CHAPTERII

Marking

4. Marking

(1) The freeboard and load line marks shall be permanently marked by welding, carving or cut figures and painted on both sides of the vessel or floating equipment and be placed amidships.

(2) The marks shall be white on dark background and black on light background. .

(3) Following markings are to be applied.

(a) The Deck Line shall be a 300 mm long and 25 mm wide line with its upper edge at the upper edge of the freeboard deck on the vessel's side.

- (b) The Freeboard Line shall be a 450 mm long and 25 mm wide horizontal line with its upper edge at the maximum allowed draft in smooth water and located straight under the deck line.
- (c) The Load Line Disk shall be a ring with an outer diameter of 300 mm and 25 mm wide. The upper edge of the freeboard line shall pass through the center of the load line disc.
- (d) If the vessel has several freeboards the other freeboard/s/s shall, be marked by a 150 mm long and 25 mm wide line with its upper edge at the actually allowed maximum draft and forward of the smooth water freeboard. The different freeboard marks shall be connected with a 25 mm wide vertical line.
- (e) The different freeboards shall be marked at the forward end of the free board line with a letter. The letter shall be at least 50 x 30 mm with 5 mm thick lines as follows:
- (I) Smooth water letter S
 - (II) Rough water letter R
- (f) Draught marks shall be permanently marked vertically on the stem and the stem on both sides of the vessel: In the metric system every metre draught shall be marked with a 15 cm high and 15 mm thick Arabic number with its lower edge at the 'actual draught and every 20 cm of the draught in between shall be marked with a 10 cm high and 10 mm thick Arabic number with its lower edge at the actual draught. If the draught is marked in feet, every foot shall be marked with a 6 inches high and 1 inch thick number with the lower edge at the actual draught.

CHAPTER III

Structural requirements

5. Application

This 'chapter shall only apply to new vessels and floating equipment.

6. Doors and Sills

All doors in bulkheads or superstructure which give access to spaces below the freeboard deck shall be water or weather tight and the sill shall not be less than 150 mm high. On tugs the sills shall be at least 300 mm high.

7. Access Hatches

All access hatches to spaces below freeboard deck shall be water tight and have at least 450 mm high coamings.

8. Windows and Skylights

- (1) All windows and skylights giving access spaces below freeboard deck shall be weather tight.
- (2) There shall be no windows below the freeboard deck.

9. Cargo Hatch Coamings

Cargo hatch coamings shall be at least 450 mm high.

10. Hatch Covers

Cargo hatch covers shall be sturdy, rigid and weather proof.

11. Air Pipes

Air pipes to tanks shall extend at least 450 mm above the freeboard deck and be fitted with goose necks.

12. Scuppers and Freeing Pots

The scuppers and freeing ports in deck and bulwarks shall be of sufficient size to drain the decks of shipped water according to inland shipping construction guidelines.

CHAPTER IV

FREEBOARD AND SAFETY DISTANCE

13. Passenger Vessels and Open Passenger Launches

(1) On passenger vessels and open passenger launches in perennially smooth water and in seasonal rough water during smooth period 200 mm freeboard must remain when the vessel is heeled 12°.

(2) In perennially rough water and seasonal rough water during rough period the freeboard prescribed by sub-section (1) shall be increased by 150 mm or 10% whichever is greater.

14. Passenger/Car Ferries.— Passenger/Car ferries shall only ply in perennially smooth water. The freeboard shall not be less than 5% of the breadth (B) or 500 mm whichever is the greater.

15. Road Ferries.-- Road ferries shall only ply in perennially smooth water. This freeboard shall not be less than 5% of the breadth (B) or 250 mm whichever the greater.

16. Cargo Vessels.—

(1) On cargo vessels in perennially smooth water and seasonal rough water during smooth period the freeboard shall be at least 150 mm. If on existing vessels the hatch comings are lower than 450 mm the freeboard shall be increased with the same amount the hatch comings are lower than 450 mm.

(2) In perennially rough water and seasonal rough water during rough period the free board prescribed by sub-rule (1) shall be increased by 100 mm

17. Open Cargo Vessels.—

(1) On open cargo vessels in perennially smooth water and in seasonal rough water during smooth period the safety distance shall always be at least 250 mm

(2) In perennially rough water and in seasonal rough water during rough period the freeboard prescribed at sub-rule (1) shall be increased by 250 mm.

18. Tankers.—

- (1) On Tankers in perennially smooth water and in seasonal rough water during smooth period the freeboard shall be at least 50 mm. If the access hatch coming on existing tankers are lower than 450 mm then the free board shall be increased by 50% of the difference.
- (2). In perennially rough water and seasonal rough water during rough period the free board prescribed by sub-rule (1) shall be increased by 50 mm

19. Tugs.—

- (1) On tugs In perennially smooth water and seasonal rough water during smooth season the freeboard shall be at least 5% of the breadth (B) but not less than 250 mm
- (2) In perennially rough water and seasonal rough water during rough season the freeboard prescribed by sub-rule (1) shall be increased by 150 mm.

20. Service Vessels -- For service vessels the freeboard shall be calculated as for decked or open passenger vessels or launches (rule 13) but 100 mm freeboard must remain when the vessel is heeled 12 degrees.

21. Dumb Barge—

- (1) On dumb bdrges the freeboard shall be 5% of the breadth (B) but not less than 200 mm. If the hatch coaming/s are less than 450 mm high the freeboard shall be increased by 50% of the difference
- (2) If the barge is operated in rough water the freeboard shall be further increased by 50% of the above requirement

22. Pontoons,— The minimum freeboard shall be 5% of the breadth of the .Pontoon.

23 Floating Equipment.— The Inland Ship Safety Administration (ISSA) will prescribe the requisite freeboard from case to case depending on the type and of the floating equipment and taking into consideration the safe operation of the equipment.

Articles relevant to the requirement of the ‘Watertight of Upper deck including height of hatch coaming’

Followings are the specific Articles and their underlying important points, relevant to the requirement of the ‘Watertight of Upper deck including height of hatch coaming’.

35. Bulk Head Penetration

Except collision Bulk heads, all water tight bulk head will be set up with water tight doors and doors must be strong enough to tolerate the pressure of heavy water, but for water tight doors where stiffeners from wall will be cut, strong frame will be used to recover the full energy of the walls.

Water tight doors may be installed in all water tight bulkheads. The doors are to be of ample strength for the water pressure to which they may be subjected. Where stiffeners are cut in way of a water tight door, the opening is to be framed to maintain the strength of the bulkheads.

36. Water Tight Door Penetration

(1) The number of penetration in water tight bulkhead is to be kept to a minimum and all penetrations are to be watertight.

(2) The penetrations are to be kept as high as practicable and are not allowed in collision bulkhead except for draining/filling pipe.

37. Hull Tanks

(3) The height of the pipes from upper surface of the exposed decks is to be at least 450 mm. In case of Partial Bay crossing vessels, coaming height will be 750 mm.

41. Testing for Water Tightness

(1) All tanks are to be tested by a head of water of 1.0 m above the tank top or the highest point of overflow and air pipe whichever is greater. The test is to be carried out before any cementing or piping is done.

(2) Oil tight decks and bulkheads are to be subjected to an inspection before being tested. If, after testing tank bulk heads are pierced for pipes or other purpose, shall a second test be carried out. This test may be afloat.

(3) The tanks inside the vessel are to be tested by a head of water of 3 m above tank top or the highest point of overflow and air pipe whichever is greater.

47. Longitudinal Hatch Coaming

(2) A longitudinal coaming is to be fitted with horizontal stiffener at the smallest possible distance from the coaming's upper edge in order to prevent buckling of the fore and aft hatch coaming and the coaming's upper edge is not to be less than 450 mm above deck.

(4) Where there are cutout in the coaming upper part to make way for the hatchway beam, the edge of the cutout are to be carefully rounded and a doubling plate or a plate with increased thickness is to be provided to ensure adequate bearing capability of the hatchway beams.

(5) The expanded depth of the under deck portion of the hatch coaming is not to be less than the depth of deck web beams.

(6) The thickness of the 450mm high hatchway coaming is not less than that obtained from the following table 30.

TABLE 30

L, Meter	T, Millimeter
20	5.0
30	6.0
40	7.0
50	7.5
60	8.0
70	8.5

Where, L is the length of the vessel and t the thickness of coaming.

If the vessel is partially allowed to ply in bay crossing trade, the thickness of hatch coamings shall be increased with 10% up to nearest 0.5 mm.

55. Companionways and Doors

(2) For vessels plying in inland waterways shall the doors be weather tight and in bay crossing water tight and the door sills shall be at least 150 mm high.

(3) Weather tight doors shall be made of steel and the side of the door plate shall be shaped to prevent the water from entering indoors. The doors shall be fitted with at least 2 toggles.

56. Opening of Engine/ Machinery Room Space

(1) These openings are to be protected by steel casing of efficient construction against accommodation. The opening of the casing exposed to the weather is to be fitted with bulkhead with a height of at least 1 meter.

57. Openings to Cargo Holds

(1) Access hatches to cargo holds shall have a 450 mm high coaming and the cover shall be of steel and be shaped to prevent entry of water to the cargo hold and there shall be at least 2 toggles or bolts.

58. Windows and Side Scuttles

(1) Windows and side scuttles are not allowed below freeboard deck or in shell plating forward of 25% of the vessels length.

(2) Windows and side scuttles provided in poop deck, superstructure and deck house bulkheads are to be efficient construction and weather tight when closed.

(3) Windows and side scuttles on free board deck shall be fitted with efficient permanently attached deadlight that will be water tight when closed if the vessel intend for permission to ply in bay crossing.

INLAND SHIPPING LIFE SAVING RULES, 2001

GOVERNMENT OF THE PEOPLES REPUBLIC OF BANGLADESH MINISTRY OF SHIPPING NOTIFICATION

In exercise of the powers conferred by clause (xx) of sub-section (2) of section 82 of the Inland Shipping Ordinance, 1976 (LXXII of 1976) for prescribing the equipment, instrument and appliance to be kept and carried on board an inland ship for the purpose of safety of the ship and of the life and property on board, the Government is pleased to make and promulgate in supersession of all previous rules in that behalf, the following Rules, namely:--

INLAND SHIPPING LIFE SAVING RULES, 2001 CHAPTER I Preliminary

1. Short Name.--These rules may be called the Inland Shipping Life Saving Rules, 2001.

2. Definitions.—

In these rules, unless there is anything repugnant to the subject or context,---

(a) "Inland waterways means "inland water" as defined in the-Inland Shipping Ordinance, 1976.

(b) "Length" (L) means the distance on the load water line from the forward edge of the stem to the after edge of the rudder post, or to the center of rudder stock if there is no rudder post.

(c) "Breadth" (B) is the vessel's greatest moulded breadth measured over the outer edge of the framing.

- (d) "Depth" (D) means the vertical distance, measured at the middle of the vessel's length (L) from the upper edge of the keel to the upper edge of the main deck beam or upper edge of the vessel's side on open vessels.
- (e) "Draught" (T) means the vertical distance at the middle of the vessel's length (L) between the upper edge of the keel and the load water line.
- (f) "kW" means the total power of the main propulsion engine/s on board.
- (g) "Open Vessel" means a vessel-without a weather deck.
- (h) "Weather Deck" means a deck below which all openings have closing devices that under all circumstances will prevent water to enter the vessel or floating equipment.
- (i) "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 and will exclude, for the purposes of these rules, a child under one year age.
- (k) "Passenger Vessel" means a vessel with watertight weather deck, and includes any multi-decked vessel, used for carrying more than 12 passengers.
- (l) "Open Passenger Launch" means an open vessel, without a weather deck, used, for carrying more than 12 passengers.
- (m) "Passenger/Car Ferry" means a vessel with superstructure engaged in ferrying 12 or more passengers and vehicles.
- (n) "Road Ferry" means an open flush deck vessel engaged in ferrying 12 or more passengers and vehicles.
- (o) 'Cargo Vessel" means a self-propelled vessel which is used for carrying cargo and does not carry more than 12 passengers.
- (p) "Tanker" means a vessel used for carrying bulk liquids in tanks.
- (q) "Tug" means a vessel intended for towing or pushing other vessels or floating equipment.
- (r) "Fishing Vessel" means a vessel used or intended to be used for fishing.

(s) "Service Vessel" means a self-propelled vessel constructed for special duties and that is not a passenger vessel, cargo vessel, tanker or fishing vessel.

(t) "Dumb Barge" means a vessel, boat or floating equipment carrying cargo or liquid not being self-propelled and does not carry any passenger.

(u) "Floating Equipment" includes miscellaneous equipment used for various work afloat such as dredger, floating crane, etc., and is not self-propelled.

(v) "New Vessel" means a vessel which is registered under the Inland Shipping Ordinance, 1976 on or after 1st of January 1996.

(w) "Existing Vessel" means a vessel that is not new.

3. Application.-- Unless expressly provided Otherwise., these rules shall apply to all inland vessels with effect from 1st of January 1996.

4. Marking—

(1) All lifesaving appliances shall be marked with the name and home port of the vessel.

(2) If the vessel is plying in night time, between 6 PM and 6 am the lifesaving appliances shall be fitted with retro-reflective material on every side.

CHAPTER II

Life Saving Appliances

5. General Requirements for Life Saving Appliances.—

(1) All life-saving appliances:

(a) Shall be constructed with proper workmanship and materials;

(b) Shall not be damaged in stowed condition throughout the air temperature range up to +65° C and if they are likely to be immersed in sea or river water during their use, operate throughout the water temperature up to +38 C;

(c) Shall be rot-proof, corrosion-resistant, and not be unduly affected by sea or river water, oil or fungal attack;

- (d) Where exposed to sunlight, be resistant to deterioration;
 - (e) Be of highly visible colour on all parts where this will assist detection,
 - (f) All lifesaving appliances shall be approved by the Department of Shipping,
- (2) During surveys the surveyor shall check the condition of the life-saving appliances. If their condition has deteriorated to such an extent that they do not fulfill the requirements anymore, they shall be replaced with new ones.
- (3) The self-igniting light on life buoys must be renewed before expiry of five years from the date of manufacture.
- (4) A buoyant apparatus shall satisfy the following requirements:
- (a) It shall be of such strength that it can be dropped from its stowed position into the water without being damaged.
 - (b) It shall not exceed 120 kg in weight.
 - (c) It shall be of approved material and construction, the use of air-filled
 - (d) It shall have a painter.
 - (e) It shall be effective and stable when floating either way up or down.
 - (f) It shall be capable of supporting in fresh water 6 kg of iron attached to the line-beckets for 30 centimeters of the length of any one side, so that no part of the top surface of the buoyant apparatus shall sink under water.
 - (g) Around the buoyant apparatus there shall be a securely attached lifeline, which has a becket for each person for whom the buoyant apparatus is intended.
 - (j) The number of persons for which the buoyant apparatus is certified shall be the smaller of the numbers obtained by dividing the number of kilograms of iron by ten which the buoyant apparatus is capable of supporting in fresh water, or by dividing the number of centimeters of the circumference by 30.

6. Life Buoys.—

All life buoys:

- (a). Shall be capable of supporting a mass of 10 kg in fresh water.

(b) Shall be made of suitable materials and withstand the effects of oil and oil products.

(c) Shall be bright orange in colour.

(d) Shall have a mass of not less than 2.5 kg.

(e) Shall have an internal diameter of 450 mm +/- 10 percent and an outer diameter of not more than 800 mm.

(f) Shall be attached to an encircled rope which can be grasped.

(g) Shall be able to withstand a drop into water from 20 m height.

(h) The life buoy's lifeline shall be non-kinking, buoyant, have a diameter not less than 8 mm and have a breaking strength of not less than 5 kn.

(j) The life buoy's self-igniting light, when required, shall be such that they cannot be extinguished by water and be capable to withstand a drop into water from 20 m.

7. Life Jackets.—

All life jackets:

(a) Shall be properly designed and made of suitable materials;

(b) Shall be capable of supporting a mass of 7.5 kg in fresh water for 24 hours;

(c) Shall be capable of keeping the head of an exhausted or unconscious person above water;

(d) Shall be so designed as to eliminate as far as possible all risk of its being put on incorrectly, however, it shall be capable of being worn inside out;

(e) Shall be capable of turning the wearer's body, on entering the water, to a safe floating position slightly inclined backwards from the vertical;

(f) Shall withstand the effects of oil and oil products;

(g) Shall be bright orange in colour;

- (h) Shall be easy and quick to put on, and shall fasten securely to the body;
- (i) Shall bear the following particulars:
 - (i) Name of manufacturer
 - (ii) Type,
 - (iii) Year of manufacture,
 - (iv) Approval stamp.

CHAPTER III

Number of Life Saving Appliances and Their Stowage

8. General.—

These rules shall apply to all vessels and floating equipment:

9. Life buoys.—

- (1) Two life buoys with 30 m long buoyant lifeline shall be kept for immediate use in or at the wheel house.
- (2) If the vessel/floating equipment is operating at night, between sunset and sunrise, the life buoys shall be fitted with self-igniting lights.
- (3) If the vessel/floating equipment is more than 20 m long but less than 40 m there shall be, in addition, two more life buoys kept for immediate use, one on each side of the vessel or floating equipment. Further two more life buoys kept for immediate use, one at the stern and one at the stem.
- (5) During the voyage or operation of the vessel/floating equipment the life buoys shall be kept outside the enclosed spaces and in free floating position.

10. Life jackets.—

There shall be a life jacket for each crew member stowed in the crew cabins or in well-marked boxes outside the enclosed spaces.

11. Pyrotechnic Distress Signals.—

- (1) All vessels and floating equipment shall be equipped with 3 nos. approved parachute rockets and 2 nos. approved hand flares.
- (2) Pyrotechnic distress signals must be renewed before expiry of three years from the date of manufacture.

12. Additional requirement for Passenger Launches and Passenger/Car Ferries.—

In addition to life saving appliances mentioned in rules 9 to 11 every passenger launch and passenger/car ferry are to be equipped as follows:

- (a) A number of life buoys, which shall be not less than 10% of the number of passengers the vessel is certified to carry, shall be kept for immediate use.
- (b) Buoyant apparatus for 10% of the number of passengers the vessel is certified-to carry shall be kept on the uppermost deck in free floating position.
- (c) In vessels which are certified to carry 250 or more passengers at night there shall be, in addition, two parachute rockets and two hand flares.

13. Additional requirement for Road Ferries.—

In addition to life saving appliances mentioned in rules 9 to 11 every road ferry shall be equipped as follows:

- (a) Four extra lifebuoys up to a length (L) of 15 m.
- (b) Eight extra life buoys and buoyant apparatus for 20 persons for length (L) of 15 to 25 m.
- (c) Twelve extra life buoys and buoyant apparatus for 40 persons for .length (L) of over 25 m.
- (d) All extra lifesaving appliances shall be available for immediate use and the buoyant apparatus shall be in free floating position.

14. Additional requirement for Tankers.—

In addition to life saving appliances mentioned in rules III/2 to III/4 every tanker shall be equipped as follows:

- (a) Two life buoys fitted with self-igniting lights.

(b) Two parachute rockets and two hand flares.

15. Dumb Barges.—

Every dumb barge shall carry at least two life buoys.

CHAPTER IV

Exits

16. Ordinary Exits.—

(1) From every crew accommodation and working spaces there shall be at least one exit with a minimum of 600 mm width leading to open deck.

(2) From every passenger spaces there shall be at least two exits leading to open deck of which one shall be at least 800 mm wide and the other at least 600 mm wide.

(3) If the space is designed for 50 or more passengers both exits shall be at least 800 mm wide.

(4) One passageway or stairway leads to a space intended for passengers; the minimum clear width shall be at least 1000 mm which may be reduced to 800 mm on open passenger launches.

(5) The exit doors shall open in the outward direction.

(6) This rule shall apply only to new vessels

17. Emergency Exits.—

From every spaces where there is less than two exits, there shall be an emergency exit, at least 600x600 mm and to open outward. This rule shall apply only to new vessels.

18. Stairs.—

(1) The stairs shall have a free width of not less than 600mm at the connecting doors.

(2) The maximum angle of inclination from the horizontal shall be as follows:

- (a) 40 degrees for passenger stairs,
- (b) 50 degrees for crew stairs,
- (c) 55 degrees for engine room, pump room and similar spaces,
- (d) Emergency exits, holds and tanks may have vertical ladders.

(3) This rule, shall apply only to new vessels.

19. Hand Rails .—

- (1) All stairs with 3 or more steps shall have at least one hand rail.
- (2) If the stairs are wider than 800 mm there shall be hand rails on both the sides.
- (3) This rule shall also apply to built-in stairs.

20. Obstructions.—

- (1.) There shall be no obstructions at the exits, the emergency exits and the stairs.
- (2) Covers or canvas protection at the shell openings on passenger launches shall be easy to open or remove at emergency situations.
- (3) The openings shall not be covered by rope or netting which may obstruct escape of passengers and crew in case of emergency.

INLAND SHIPPING SAFE NAVIGATION RULES, 2001

CHAPTER I

PRELIMINARY

1. Short name

These rules may be called Inland Shipping Safe Navigation Rules, 2001.

2. Definitions

In these rules, unless there is anything repugnant to the subject or context-

- (a) "Inland Waterways" means "inland water" as defined in the Inland Shipping Ordinance, 1976.
- (b) "Perennially Rough Water" means that part of the inland waterways as may be declared by the Bangladesh Inland Water Transport Authority from time to time to be perennially rough and published in the Official Gazette.
- (c) "Seasonal Rough Water" means that part of the inland waterways as may be declared by the Bangladesh Inland Water Transport Authority from time to time to be seasonal rough and published in the Official Gazette and will be considered to be rough from 15th of March to 15th of October .
- (d) "Perennially Smooth Water" means all other part of inland waterways that is not perennially rough or seasonal rough.
- (e) "ISSA" means the Inland Ship Safety Administration.
- (f) "BIWTA"- means the Bangladesh Inland Waterways Transportation Authority.
- (g) "BIWTC" means the Bangladesh Inland Water Transport Corporation.
- (h) "Length" (L) means the distance on the load waterline from the forward edge of the stem to the after edge of the rudder post; or to the center, of rudder stock if there is no rudder post.
- (j) "Breadth" (B) means the vessel's greatest moulded breadth measured over the outer edge of the framing.
- (k) "Depth" (D) means the vertical distance, measured at the middle of the vessel's length (L) from the keel upper edge to the upper edge on the main deck beam or upper edge of the vessel's side on open vessels.

- (l) "Draught" (T) means the vertical distance at the middle of the vessels length (L) between the upper edge of the keel and the load water line.
 - (m) "Water Tight" when refers to a deck or device means that it shall, under all circumstances prevent rain and spray water from entering the vessel or floating equipment.
 - (n) 'Weather Deck" means a deck below which all openings have closing devices that under all circumstances will prevent water from entering the vessel.
 - (o) "Power Driven Vessel" means any inland vessel propelled by machinery.
 - (p) "Sailing Vessel" means any inland vessel under sail provided that propelling machinery, if fitted, is not being used.
 - (q) "Open Vessel" means a vessel or boat without a weather deck.
 - (r) "Passenger" means any person carried on board an inland ship not being the master, officer and a member of the crew of the inland ship and will exclude, for the purposes of these rules, a child under one year age.
 - (rr) "Open Passenger Launch" means an open vessel, without a weather deck, used for carrying more than 12 passengers.
 - (s) "Passenger Vessel" means a vessel with a watertight weather deck, and includes any multidecked vessel, engaged for carrying more than 12 passengers.
 - (ss) "Passenger Ferry" means a vessel with superstructure engaged in ferrying 12 or more passengers and vehicles.
 - (t) "Road Ferry" means an open flush deck vessel engaged in ferrying 12 or more passengers and one or more vehicles.
 - (tt) "Cargo Vessel" means a self propelled vessel used for carrying cargo and not more than 12 passengers.
 - (u) "Tanker" means a vessel carrying bulk liquid in tanks.
-
- (uu) "Tug' means a vessel intended for towing or pushing other vessels or floating equipment.
 - (v) "Fishing Vessel" means a vessel used or intended to ba used for fishing.

(vv) "Service Vessel" means a self propelled vessel constructed for special duties and is not a passenger vessel, cargo vessel, tanker or fishing vessel.

(w) "Dumb Barge" means a vessel, boat or floating equipment used for carrying cargo or liquid, not being self propelled and not carrying any passenger.

(ww) "Vessel Not under Command" means an inland ship which is unable to manoeuvre as required by these rules.

(x) "Vessel Restricted in Her Ability to Manoeuvre" means an inland vessel which, from the nature of her work, is restricted in her ability to manoeuvre as required by these rules.

Note: inland vessels engaged in:

(i) Laying, servicing or picking up a navigation mark, overhead or underwater cable or pipeline,

(ii) Dredging, surveying, salvaging or underwater operation,

(iii) Mine sweeping operation, shall be regarded as vessels restricted in their ability to manoeuvre.

(xx) "Underway" means an inland vessel which is not at anchor, or moored to shore or buoys or aground.

(y) "Restricted Visibility" means any condition in which visibility is restricted by fog, mist, heavy rainstorms, sandstorms or any other similar causes.

(yy) "Short Blast" means a blast of about one second duration.

(z) "Prolonged Blast" means a blast of 6 to 8 seconds duration.

(zz) Inland vessels shall be deemed to be "insight of one another" only when one can be observed visually from the other.

3. Application

Unless expressly provided otherwise, these rules shall apply to all vessels and floating equipment independent of type and size with effect from 1st of July, 1995.

4. Design and Construction

All vessels and floating equipment shall be designed, constructed and equipped observing good naval architectural practice, river worthiness, safety and

sturdiness to the surveyor's satisfaction.

5. Responsibility

(1) Nothing in these rules shall exonerate any inland vessel or the owner, master or crew members thereof from the consequences of any

(a) Neglect to comply with these rules,

(b) The neglect of any precaution which may be required by the ordinary practices of seamen.

(2) Due regard shall be had to all dangers of navigation and collision and to any special circumstances including the limitation of the inland ships involved, which may make departure from these rules necessary to avoid immediate danger.

CHAPTER II

LIGHTS AND SHAPES

6. General

(1) The rules contained in this chapter concerning lights shall be complied with in all weathers from sunset to sunrise. The lights shall also be shown from sunrise to sunset in restricted visibility. When the lights are in exhibition, no other lights which may be mistaken for prescribed lights shall be exhibited.

(2) The lights shall be type approved by the Department of Shipping.

(3) The provisions concerning shapes shall be complied with by day.

(4) These chapter shall apply to all vessels, boats and floating equipment independent of type, size or propulsion system.

7. Navigation lights

(1) Definitions:

(a) "Mast Light" means a bright white light so constructed as to show an unbroken light over an arc of the horizon of 225 degrees and so fixed as to show the light from right ahead to 112.5 degrees on each side of the vessel, that is, from right ahead to 22.5 degrees abaft the beam on either side and installed in the center line of the vessel, boat or floating equipment.

(b) "Side Light" means a green light on starboard side and red light on port side so constructed as to show an unbroken light over an arc of the horizon of 112.5 degrees, so fixed as to show the light from right ahead to 22.5 degrees abaft the beam on the starboard side and port side respectively.

(c) "Stern Light" means a bright white light so constructed that it shall show an unbroken light over an arc of the horizon of 135 degrees, so fixed as to show the light from right astern to 67.5 degrees on either side and installed in the center line of the vessel and as close to the stern as possible.

(d) "Towing Light" means a yellow light with the same character as stern light.

8. Power Driven Vessels

A power driven vessel when underway shall carry the following lights:

(a) A vessel or floating equipment with a length of 24 meters or more:

(i) A mast light on the foremast not less than 5 metres above the hull. If the vessel is without a foremast, then in the fore part of the vessel not less than 2 metres above the awning roof.

The light is to be visible at a distance of at least 3 kilometer.

(ii) Sidelights visible at distance of at least 1.5 kilometer installed astern of the mast light and at least 2 meter below the mast light.

(iii) A stern light visible for at least 1.5 kilometer.

(iv) The side lights shall be fitted with inboard screens projecting at least 1 meter forward from the light so as to prevent these lights from being seen across the bow and they shall be painted black.

(b) A vessel or floating equipment with a length of 12 meter but less than 24 metres:

(i) A mast light on the foremast not less than 3 metres above the hull. If the vessel is without a foremast, then in the fore part of the vessel not less than 1 meter above the awning roof.

The light is to be visible at a distance of at least 2 kilometers.

(ii) Side lights visible at a distance of at least 1 kilometer installed astern of the mast light and at least 1 metre below the mast light.

(iii) A stern light visible for at least 1 kilometer.

(iv) The side lights shall be fitted with inboard screens projecting at least 0.6 metres forward from the light so as to prevent these lights from being seen across the bow and they shall be painted black.

(c) A vessel or floating equipment with a length of 6.5 meter but less than 12 metres:

(i) A mast light not less than 1.5 metre above the hull.

The light is to be visible at a distance of at least 1 kilometer.

(ii) Side lights visible at a distance of at least 1 kilometer at least 0.5 metre below the mast light.

(iii) A stern light visible for at least 1 kilometer.

(d) A vessel, boat or floating equipment with a length of less than 6.5 meters:

(i) Side lights visible for 1 kilometer or,

(ii) A white light visible around the horizon for 360 degrees and 1- kilometer.

9. Towing Lights and Shapes

An inland vessel engaged in towing shall show the following lights and shapes:

(a) In addition of lights mentioned in Rule 8 following lights shall be shown:

(i) An additional mast light vertically not less than 1 meter over the first mast light;

(ii) Towing light vertically over the stern light;

(iii) The lights shall be visible at the same distance as required in Rule 8

(iv) During day time the towing vessel shall show a black diamond shape, with a height of 1 meter, where it can best be seen.

(b) When a power driven vessel is towing one or more inland vessels or floating equipment which are lashed alongside, the whole group shall be considered as one vessel for the purpose of displaying the side lights.

(c) When a power driven vessel is push-towing, the green and red side lights shall be shown from the respective sides of the foremast pushed inland vessel or vessels.

(d) A vessel or object being towed, other than those mentioned in para 2 and 3 of this rule shall exhibit:

(i) The sidelights,

(ii) A sternlight,

(iii) When the length of the tow exceeds 200 meters, a diamond shape during day time with a height of 1 meter where it can best be seen.

10. Vessel under Oars or Sail

Vessels under oars or sail shall carry one white light on the forepart, visible all round the horizon for at least 1 kilometer.

11. Road Ferries

A road ferry shall show following lights and signs:

(a) During night time three red lights visible around the horizon for at least 1 kilometer and installed in an equilateral triangle perpendicular against the center line.

The lights shall be at least one meter from each other.

(b) During day time two black balls with a diameter of at least 0.5 metre situated at least four meter over the deck, horizontally perpendicular against the center line and at least one meter apart.

12. Fishing Vessels and Boats

A vessel or boat engaged in fishing shall show following sights and shapes

(a) During night time a fishing vessel or boat in addition to lights mentioned in rule 8, shall show two lights around the horizon, one meter apart and visible at a distance of at least 1 kilometer. The lower light shall be white and the upper one red.

(b) During daytime the vessel or boat shall show a shape consisting of two cones with apexes together in a vertical line one above the other. If the length of the vessel or boat is less than 20 meters a basket may be shown.

13. Vessel At Anchor

Every inland vessel or floating equipment when at anchor or moored to a buoy, shall show by day a black ball shape at least 0.5 meter in diameter from her forepart-and by night a white light visible all round the horizon at a distance of at least 1.5 kilometer and both shall be displayed at a height of at least 5 meters from the hull or 2 meters above the awning roof.

14. Vessel Aground

(1) A vessel aground shall carry, where it can best be seen, by day, 3 black ball shapes each of not less than 0.5 metre in diameter placed in a vertical line, one over the other, not less than 1 meter apart.

(2) By night, she shall carry the white light mentioned in rule 13 and, in addition, 2 red lights visible all round the horizon at a distance of at least 1.5 kilometer vertically, one Over the other, not less than 1 meter apart, from the position where they can best be seen.

15. Vessels not under Command

(1) A power driven vessel underway when not under command shall carry, by day, 2 black balls each of not less than 0.5 metre in diameter vertically, one over the other, not less than 1 meter apart, where they can best be seen.

(2) By night they shall exhibit 2 red lights visible all round the horizon at a distance of at least 1.5 kilometer.

(3) A vessel not under command when at anchor shall only show the lights or shapes as in rule 13.

16. Vessels or Equipment Carrying Out Underwater Work

Vessel or floating equipment carrying out underwater work as dredging, diver work or equal shall show following lights or signs:

- (a) During night time two red lights vertically over each other and at least one meter apart, visible around the horizon for a distance of at least 1.5 kilometer on the side where the work is carried out.
- (b) During night time two green lights vertically over each other and at least one meter apart, visible around the horizon for a distance of at least 1.5 kilometer on the free side.
- (c) During day time two black balls vertically over each other and at least one meter apart, visible around the horizon on the side where the work is carried out.
- (d) During daytime two double cones vertically over each other and at least one meter apart, visible around the horizon on the free side.

17. Handling of Combustible Oil

(1) When combustible oil, fuel or cargo is handled following signs or light shall be shown:

- (a) At night a red light visible all round the horizon for at least 1.5 kilometer.
- (b) In day time a red flag shall be hoisted.

(2) A loaded oil or chemical tanker shall always show the light or flag mentioned in clause 1 in addition to navigation lights mentioned in rule II/1.2 or anchor lights mentioned in rule 8.

18. Search Light

(1) All power driven Vessels, plying by night, shall have a search light capable of throwing a beam at distance of at least 80 meters from the ship and such light shall have the swinging capability over an arc of the horizon from right ahead to 22.5 degrees abaft the beam on both side.

(2) A power driven ship under 6.5 meters in length shall carry a torch light and show flashes when being approached by other inland ships.

CHAPTER III

SOUND SIGNALS

19. Sound Signals in Fog

(1) In fog, mist, heavy rain and rain-storm, whether by day or by night, the signals shall

be used in the following manner.

- (a) A power driven vessel underway shall sound at intervals of not more than 1 minute a prolonged blast.
- (b) A power driven vessel underway, but stopped, shall sound at intervals of not more than 1 minute two prolonged blasts in quick succession.
- (c) A power driven vessel, when at anchor, shall at intervals of not more than 1 minute, ring the bell rapidly for about 5 seconds.
- (d) A power driven vessel aground in or near a fairway shall, at intervals of not more than 1 minute, ring the bell rapidly for about 5 seconds followed by 3 distinct strokes on the bell.
- (e) A power driven vessel, when not under command or restricted in her ability to manoeuvre, shall sound at an interval of not more than 1 minute one prolonged blast followed by 2 short blasts in quick succession.
- (f) A power driven vessel engaged in side towing or push towing shall Sound signals as mentioned in clause 1 or 2 as the case may be.
- (g) A power driven vessel, when towing one or more inland vessels, shall sound signals as mentioned in clause 5 and of the towed vessels, if more than one, then the last one shall sound 3 distinct strokes on the bell immediately after the signal sounded by the towing vessel.

20. General Warning Signal

One prolonged blast shall be given to convey a warning in the following cases:

- (a) When a power driven ship approaches her destination.
- (b) To attract the attention of other inland ships for a clear passage
- (c) On approaching a bend.

21. Sound Signals for Inland Vessels in, Sight of one Another

Every power driven ship underway shall, indicate that course by the following signals by her whistle or siren:

- (a) One short blast to mean "I am directing my course to starboard".
- (b) Two short blasts to mean "I am directing my course to port".
- (c) Three short blasts to mean "My engines are going astern".

22. Attracting of Attention of Other Power Driven Vessel

A power driven vessel shall, if required to attract the attention of another power driven vessel, sound in quick succession 5 short blasts followed by one prolonged blast.

CHAPTER IV

NAVIGATION REGULATIONS

23. Speed in Fog, etc

- (1) A power driven vessel snail, in fog, mist and heavy rain and rain storm, proceed at a moderate speed, carefully regarding to the prevailing circumstances.
- (2) A power driven vessel hearing apparently forward of her beam the fog signal of any other inland vessel, the position of which is not ascertained shall, so far as the circumstances admit, stop her engine and navigate with caution until danger of collision is over.

24. Vessels at Head-on Situation

When two power driven vessels are meeting head-on or nearly head-on involving

risk of collision, each shall alter her course to starboard so that each may pass with the port sides of each other.

25. Crossing Vessels

When two power driven vessels are crossing involving risk of collision, the inland vessel which has the other on her own starboard side shall keep out of the way of the other vessel.

26. Vessels to Avoid Crossing Ahead

Every power driven vessel which is required by these rules to keep out of the way of another inland vessel, shall, if the circumstances of the case so admit, avoid crossing ahead of the other.

27. Overtaking of Inland Vessels

Notwithstanding anything contained in these rules, every power driven vessel overtaking any other inland vessel shall keep out of the way of the overtaken vessel.

28. Responsibilities between Vessels

(1) A power-driven vessel shall keep out of way of:

- (a) A vessel not under command.
- (b) A vessel restricted in her ability to manoeuvre.
- (c) A vessel engaged in fishing.
- (d) A sailing vessel.

(2) A sailing vessel under way shall keep out of way of:

- (a) A vessel not under command.
- (b) A vessel restricted in her ability to manoeuvre.
- (c) A vessel engaged in fishing.

(3) A vessel engaged in fishing when underway shall, so far as possible, keep out of the way of:

- (a) A vessel not under command.
- (b) A vessel restricted in her ability to manoeuvre.

29. Action by Stand-on Vessel

- (1) Where one of the two vessels is to keep out of the way, the other shall keep her course and speed.
- (2) If the stand-on vessel finds that the vessel which is to give way is not taking appropriate action in compliance with these rules to avoid collision, she (the stand-on vessel), if power driven, shall attract attention of the other vessel by giving three short and rapid blasts followed by one prolonged blast on the whistle.
- (3) When, from any cause, the vessel required to keep her course and speed finds herself so close that collision cannot be avoided by the action of the giving way vessel alone, she shall take such action as will best aid to avoid collision and indicate her action by giving the appropriate sound Signal.

30. Navigation in Narrow Channels

- (1) In a narrow channel, every power driven vessel shall, when it is safe and practicable, keep to that side of the fairway which lies on the starboard side of such vessel.
- (2) When two power driven vessels, with or without side-tow, meet in a narrow channel or at a place where the presence of a third vessel makes it difficult to pass, the one going against the current shall, slacken her speed and keep close to her starboard side bank until the other has passed clear.
- (3) When two power driven vessels meet at the bend of a narrow channel, the inland vessel going against the current shall stop and remain under the point until the other inland ship has passed clear.

31. Getting Underway

No power driven ship shall get underway either from her anchor or from the river bank or jetty when another inland ship is seen approaching from either up or downstream at such a distance that it is doubtful whether the approaching inland ship can safely pass her.

32. Junction of Channels

When two power driven vessels are likely to meet at the junction of two channels, the inland vessel in the wider of the two channels shall not attempt to enter the narrower channel until the vessel in the narrower channel has passed.

33. Power Driven Vessels, Sailing Ship and Ship Engaged in Fishing

No sailing ship or a ship engaged in fishing shall have the right to obstruct the channel in the safe passage of a power driven vessel. . -

34. Clear View for Navigation

Navigation shall be controlled from a position which gives a clear all-round view as far as practicable and the view shall be unobstructed from right ahead to 22.5 degrees abaft the beam on both sides.

35. Navigation of Inland Ships within the Limits of the International Sea Ports of Bangladesh

(1) No power driven vessel shall navigate within the limit of the international sea ports in Bangladesh unless she has on board a duly qualified master having Karnaphuly River or Pussur River endorsement, as the case may be, on his certificate of competency.

(2) When crossing from one reach to another or from one side of the channel to the other, a power driven vessel shall not obstruct the safe passage or cause any risk of collision with any ocean-going vessels crossing or passing, and if necessary, shall reduce her speed, stop or reverse engines or remain at a safe distance until the ocean-going vessel has passed clear.

(3) All power driven ships navigating within the port limits of international sea ports of Bangladesh shall abide by all rules, regulations, orders and directives of the concerned port authority.

(4) All power driven vessels shall, when passing the ocean-going vessels within the port limits of an international sea-port of Bangladesh, abide by the international collision regulations.

CHAPTER V

EQUIPMENT

36. Navigation Equipment

All inland power driven vessels shall have at least the following navigation equipment:

(a) A vessel of 6.5 meters in length or more and all vessels carrying passengers shall carry one compass. If the vessel is plying at night time the compass shall be illuminated.

(b) Vessels described in clause (a) above shall carry one pair of binoculars.

(c) On passenger vessels and launches, there shall be a wind meter.

37. Signal Equipment

All inland vessels, boats and floating equipment shall have the following visual and sound signal equipment:

(a) All necessary lights and signs mentioned earlier in these rules.

(b) An electrical or pneumatic horn audible for at least 2 kilometers.

(c) Passenger vessels and tankers shall in addition have a manual horn.

(d) A brass bell with a diameter of at least 20 cm kept in the fore part of the vessel or floating equipment.

38. Internal Communication Equipment

All inland power driven vessels shall have the following internal communication system:

(a) A communication or signal system between the wheel house and the engine-room/engine.

(b) In passenger vessels with over 200 passengers, a loud speaking system.

(c) If there is an emergency steering position there shall be a communication or signal system between the wheel house and emergency steering position.

39. External communication Equipment

(1) All inland, vessels registered under ISO, 1976 and all power driven vessels and floating equipment shall have a radio receiver.

(2) All passenger vessels with over 400 passengers, oil tankers and vessels carrying dangerous cargo shall have a VHF radio telephone.

40. Mooring and Anchoring Equipment

- (1) There shall be an adequate number of mooring ropes and/or wires with sufficient length.
- (2) There shall be at least one anchor and spare anchor with adequate length of chain.
- (3) There shall be a manual or mechanical anchor windlass.

41. Bilge Pump

All inland vessels, boats and floating equipment shall have a manual or mechanical bilge pump.

42. Gangway

All passenger vessels shall have a gangway of sufficient length, at least 600 mm wide and fitted with rope rails.

CHAPTER VI

PLYING RESTRICTIONS

43. Unregistered Vessels or Floating Equipment

- (1) An unregistered vessel or a boat or floating equipment which has not been surveyed shall not ply on the main fairways stretching from Baghabari, Dhaka, Narayanganj and Bhairab to the open sea and on the fairway to Khulna, Mongla, Barisal and Chandapur, except when plying across the river or inside the same district. If considered appropriate the Principal Surveyor may issue exemption certificate in this regard.
- (2) An unregistered vessel or boat shall not carry passengers to or from official BIWTA or BIWTC landing station or ghat nearer than 1 km.
- (3) If a nonregistered vessel, boat or floating equipment is plying, fishing, working or at anchor after sunset it shall show lights as required in these rules.

44. Open Passenger Launches

An open passenger launch with a length less than 20 meter is not allowed to ply in rough water for an effective voyage time exceeding 2 hours.

45. Plying in the Open Sea

- (1) No inland passenger vessel shall ply outside the Inland Waterways.
- (2) Other Vessels or floating equipment may operate in national costal areas from 15th of September to 15th of March after receiving exemption certificate from the Principal Surveyor of ISSA.

46. Night Time Navigation

From Sun set to sun rise all vessels, boats floating equipment shall show lights as required under these rules.

47. Wind Restrictions

- (1) A passenger launch or vessel must not proceed on its voyage if the wind speed exceeds 15 m/s or exceeds the wind speed calculated by the formula in rule II/3 of the "Inland Shipping Stability Rules".
- (2) If a vessel in transit encounters higher wind speed than what is given in sub-rule (1), the vessel shall immediately seek shelter or if that is not possible the vessel shall "heave to".

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