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NAVIGATIONAL SAFETY MEASURE IN CHITTAGONG PORT AND ANCHORAGE

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ABSTRACT

Chittagong Port, Bangladesh's main seaport, is located in the Karnafuli River's estuary, which flows into the Bay of Bengal from the Chittagong Hill Tracts' northwestern slopes This port's main advantage is that it provides deep-water mooring just a few miles inland from the sea. The distance between the Bay of Bengal's outer bar and the main berths on the Karnafuli River's bank is 16 kilometres. Bangladesh's international trading activities has benefited greatly as a result of this. As a result of this, Chittagong has grown into a manufacturing powerhouse for Bangladesh its presence. The port of Chittagong is regarded by the Bangladeshi people as the economic heart of the country. It is a natural seaport, and the city's low labor costs have made it more appealing to manufacturers. However, due to a lack of planning and poor administration, it is becoming increasingly less competitive in compared to modern international port standards. The primary goal of this research is to explore navigational safety measures in Chittagong Port and Anchorage, as well as safety measures for vessels at Chittagong Port (Bangladesh) Anchorage and Chittagong Outer Anchorage.

Keywords - *Chittagong Port, Bangladesh, safety, risk, measures,* marine, *Anchorage, Outer Anchorage etc*

1. INTRODUCTION

In the marine business, ports play a variety of roles. Ports serve as a link between sea and land transportation. Port can be defined in a variety of ways. " A location where ships dock alongside land to load and unload cargo—usually a deep-water area such as a bay or river mouth " (Stopford,2009). Ports play a critical role in the global supply chain, according to the Hal et al findings from 2011. "The port is a connection in an integrated foreland to the continental hinterland, in a continuous flow of products without borders, and it is the physical expression of the logistical functions that these places provide in global commodity commerce." "Ports play an important role in base manufacturing, commerce, logistics, and data transfer, according to the (Port of Antwerp annual report Ports, 2010). Ports also provide a competitive

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advantage to the region (Lam and Yap, 2011). Ports contribute to the region's competitive economic climate, which helps enterprises acquire market share. Rivalry between port ranges is a common occurrence.

The three stages of port competition are competition between ports in the same range, and competition amongst operators in the same port (Goss, 1990). Huybrechts et al. address the trade balance between import and export, the connectivity of industries and operators, the level of competency of operators and their competitors, and the organisation of port authorities (2002).

1.1 Port development and structure

Globalization has accelerated over time, and as a result, the port's architecture, operation, and administration have transformed. Ports must enable trade according to client needs for various cargo categories (Lee and Cullinane, 2005). Market research drives port development, according to Branch (2007, pp.396), and shipping lines and port authorities must adapt their business plans to market developments (Saha, R.C., 2015). The port's degree of operation determines the amount of infrastructure, and the port's degree of operation is influenced by the density of consumers in the region. Small local ports, large local ports, major regional ports, and regional distribution ports are the four levels of port development described in the Stopford maritime economics book. (M.J.A. Sarker and M.M. Rahman, 2015)

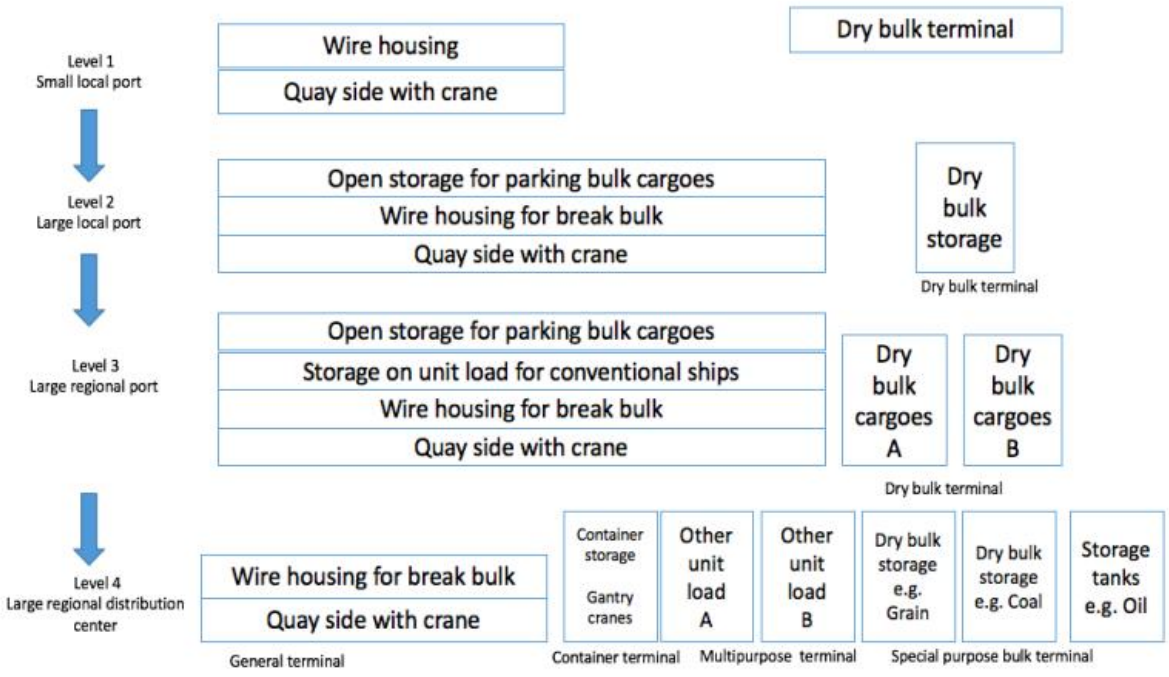

Figure 1: Four levels of port developments

1.2 Strategic Importance of Bangladeshi Ports

Information about product prices is freely available in a globalised environment with modern IT services. The task at hand is to

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organize logistics in order to deliver the product in the most efficient and cost-effective way possible. Bangladesh and its ports are the logistical gateway of a huge hinterland due to the geography of the Indian Subcontinent. By making commodities available at a lower cost, effective use of Bangladesh's ports may benefit a vast population.

2. CHITTAGONG PORT

2.1 Area and location

The Port of Chittagong is the People's Republic of The main port of Bangladesh. It's on the right bank of the river Karnafuli, about nine nautical miles from the coast of the Bay of Bengal. The River Karnafuli flows for 120 nautical miles from the Lushai Hill to the Bay of Bengal, passing through the districts of Chittagong Hill Tracts and Chittagong.

The port of Chittagong is the People's Republic of Bangladesh's main port. It's on the right bank of the Karnafuli River, a few nautical kilometres from the Bay of Bengal's coast. After a 120-mile voyage, the River Karnafuli rises in the Lushai Hills and travels through the Chittagong Hill Tracts and Chittagong Hill Tracts regions before entering the Bay of Bengal. (2019, Saha, Razon)

Figure 2: Map of Chittagong – Bangladesh Port (Google, 2019)

Chittagong Port's significance in the country's development and in fulfilling the government's goal of poverty eradication cannot be overstated. It is critical that the Port maintains its worldwide

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shipping competitiveness and that the cost to users remains acceptable. An hazardous port might make it impossible to secure tonnage to service our trade, as well as charge exorbitant freight, raising commodities prices to the disadvantage of the entire country. On the topic of whether Chittagong is a SAFE PORT or not, a number of arbitrations are ongoing in several jurisdictions. (Lloyd's List. 2020)

The following are the general policies for ships entering the Chittagong - Bangladesh Port. (Nsslbd, 2018)

- The maximum draught allowed to enter and leave Chittagong Port is 9.50 metres.
- The maximum length allowed to enter Chittagong Port is 190 metres.
- For night navigation, the maximum entry length is 170 metres.
- For Main Jetty locations, the maximum allowed draught is:
    - ✓ Jetty No.2 to Jetty No.4: up to 7.5 m
    - ✓ Jetty No. 5 to Jetty No. 13: 8.55 m

2.2 Historical Background

The following is a quick overview of the port's history:-

- In the 4th century BC, it was known as SHETGANG. This port was utilized by ships from the Middle East and China.
- In the ninth century, Omani and Yemeni traders arrived at this port. 'Samunda' was her previous name.
- Known as "PORTE GRANDE" in the 16th century. The Portuguese were very interested in using this port.
- 1887: The formal port operation began on April 25, 1887.
- Four jetties were built between 1895 and 1910 to carry 0.5 million tonnes of freight. Port Commissioners and Assam Bengal Railway used to run the port together.
- The Chittagong Port Trust was established in 1960.
- The Chittagong Port Authority (CPA) was established in 1976.

2.3 History and background of the port of Chittagong

This harbour was known as "Shetgong" from the 4th to the 9th centuries. The harbour was vital to At the period, Chittagong was a port for Arab and Yemeni traders, and their fleets used to dock there. The port of Chittagong has a long history, dating back to the 9th century, when Portuguese settlers landed and named it "Porte Grande" (a great port). The current location of the port was chosen in 1887, and four jetties were built in 1888. 1910 to accommodate 0.5 million tonnes of cargo yearly. In 1960, the Chittagong Port Trust was formed to oversee port rail. Port rail route and port commissioners managed the port during the time. Chittagong port trust was abolished after the independence war, and In 1976, the Chittagong Port Authority was established. The Chittagong Port Authority has been in charge of the port since then. (Annual report of the Port of Chittagong, 2014-2015).

Bangladesh had a population of roughly 70 million people when it gained independence, and it today has a population of around 160 million. During this time, neither the government nor the port of Chittagong have built new facilities or implemented required reforms in order to enhance foreign trade and attract more foreign

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investment to the region. We've also missed out on taking use of the port's strategic location due to bad infrastructure and poor administration. Despite the fact that Chittagong's port handles almost 80% to 85% of total traffic, According to a recent study, with better infrastructural facilities, garment exports might expand by up to 30% higher than they are now. Where clothes are the country's most exported items, with the significant increasing demand, it is imperative that the port of Chittagong be made as efficient as possible and that the port's infrastructure be utilized to its full potential. Bangladesh may considerably profit from offering transit for logistic shipping to nations such as India, Bhutan, Nepal, and Myanmar through the port of Chittagong. Bangladesh should assess the port's potential and strategic worth before taking the required steps to capitalize on its strategic geographic location. More crucially, to meet the expanding demand for consumers and export-oriented industrial manufacturers in the local market, So, in this study, we'll try to figure out how essential this port is and what function it can play in the region. (Mia, et al 2015)

3. OVERVIEW OF CHITTAGONG ANCHORAGE

The ANCH of CHITTAGONG is a Medium-sized Anchorage. Bulk carriers (51 percent), container ships (12 percent), oil/chemical tankers (12 percent), general cargo (7 percent), and oil products tankers (3 percent) are among the vessels that call at CHITTAGONG ANCH on a regular basis (3 percent). CELESTIAL BLUE was the last ship to arrive at this port, 4 hours, 1 minute, and 27 seconds ago. The largest vessel documented to have entered this port is 344 metres long. 14 metres is the maximum draught. 312679t is the maximum Deadweight. A crowded anchorage makes it difficult to find a spot with at least 5 cables of clearance from neighbouring vessels. Some v/ls do not have AIS or have turned it off or blacked it out for a few hours.

The anchoring zone around Chittagong is quite dynamic and densely populated. As a result, as vessels wait to berth or conduct cargo operations with lightering vessels, the anchorage poses numerous navigational hazards. (Praetorius G, Hollnagel E, Dahlman J 2015). The majority of collisions at the Chittagong anchorage occur when manoeuvring vessels fail to account for the variety and strength of the tide and currents, resulting in collisions between moored and embarking vessels. As a result, when approaching and leaving the port, shipmasters should be aware of these conditions. Weather and sea conditions should also be taken into consideration.

Anchoring at Chittagong port necessitates the use of well-trained and knowledgeable workers who are conversant with the port's operating procedures. The vessel faces vertical movement in the Chittagong anchorage due to very high waves dragging the anchor while at the outer anchoragexxi. Dragging of anchors at the outer anchorage due to strong underwater currents, especially by vessels with a deeper fresh water draught, is a typical occurrence. Vessels attempting to cross the bow of a moored vessel at close range have collided on several occasions. Incorrect utilisation of anchoring space and underestimating local circumstances like as wind, tides, and currents are common causes of mishaps. If the holding ground is poor and the anchorage is exposed to strong winds, a ship at anchor might be extremely vulnerable. Such conditions may force the ship to yaw violently around the anchor, perhaps breaking it

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free from the seabed (The Daily Sun, Bangladesh, 2018).

3.1 Policies and Operational Guidelines for Chittagong Outer Anchorage

Strong spring/flood/monsoon tides, as well as silted shallows, have increased the risk of collision in anchorages outside of the Bangladeshi port of Chittagong. The Chittagong port authorities offered the following guidance for master anchoring at Chittagong anchorage and entering the harbor because ship captains are accountable for anchoring outside the Chittagong port. (cpa.portal, 2017):

- If the under keel clearance is less than two meters, keep a safe distance from adjacent vessels at anchor, the anchor may be dragged. During spring tides and monsoons, this is particularly noticeable. The tide can reach speeds of up to 7 knots. If the ship is lightering alongside other vessels, the chances of dragging anchor grow.
- As a precaution, use additional chains, keep your engine running at all times, and keep the number of lighter vessels alongside to a minimum.
- Maintain a high level of anti-theft vigilance and employ onboard watchmen.
- The Ship Master should be aware that the outer anchorage is subject to high tidal conditions, and extreme caution should be exercised when anchoring or heaving up anchors.
- Crossing a bow at close range is never a good idea.
- All vessels within the Port Limit must adhere to the current Port Rules.
- Due to the strong current at the outer anchorage, ship masters approaching Chittagong Road are advised not to attempt to cross the bows of vessels at anchor or underway, as this could result in a collision. If crossing is inevitable, the Ship Master may do so with caution by providing the vessels at anchor/underway a wider berth, keeping in mind the current's minimum velocity of 6 knots and other maritime concerns.
- Vessels with a deep draught When they achieve the requisite draughts, lightering at Alpha anchorage must transfer to Bravo or Charlie to make room for freshly arrived deep-draught vessels to anchor safely.
- The vessel must have at least rope for secure berthing. At least four polypropylene ropes must be used if a tanker vessel employs wire rope.
- The mother vessel's berth master must allow a lighter tanker/fresh water barge to stay alongside as asked by the Harbor Master's office to guarantee a smooth operation.
- To have an effective steering effect, the vessel should have at least 0.20 m by stern trim for channel navigation.
- Never leave any loose mooring ropes or gear on the deck when at anchor.
- "PROHIBITED ANCHORAGE" prohibits shipmasters from anchoring their vessels near the river's inlet.
- When boarding or disembarking Pilots, the Ship Master must navigate with extreme caution.

A number of recent collision accidents have been reported at the Chittagong outer anchorage in Bangladesh, according to the Club. Interport

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Maritime Ltd., one of our Bangladesh correspondents, reports that the anchorage has being used by more ships than usual. The increased frequency of occurrences, they believe, is attributable to the increased number of vessels. (Razon Chandra Saha, 2021)

3.2 Guidelines for Members and Masterminds

Members are encouraged to remind masters of vessels calling at the Chittagong outer anchorage that they must adhere to the Chittagong outer anchorage rules:

- In best, holding ground at the anchorage is mediocre.
- During spring tides, tidal streams can reach speeds of up to 8 knots.
- Tidal streams may be significantly more powerful after heavy rain.
- Conditions are significantly tougher when there are strong winds and large surf.
- Deep draught vessels are particularly vulnerable to anchor drag.

Masterminds should be encouraged to:

- When anchoring, make sure you have enough cable.
- Keep a close eye on the anchor.
- In the event of dragging anchor, have the main engine ready to go, especially during spring tides.
- Avoid crossing ahead of anchored vessels if at all possible.

3.3 Chittagong Anchorage Area / High Risk Navigation Areas (Joshua Emmanuel Lagos and Tanvir Hossain, 2016)

The Chittagong anchoring zone, as mentioned, is quite dynamic and densely populated. The following steps should be taken to limit the danger of a collision caused by human error in such high-risk areas:

a) A steady bridge watch should be kept, and the situation of a vessel should be accurately monitored.
b) Maintaining constant awareness of the situation of the surrounding vessels
c) The primary engines should be ready to go at all times.
d) d) Powerful windlasses should be kept on hand in case the anchor needs to be raised quickly.
e) e) Anchor chains should not be over-extended to avoid the vessel swinging in a larger-than-normal arc, increasing the chance of a collision.
f) f) Keep in touch with the Port Authority in order to get the most up-to-date tide, current, and wind advisories and updates.

4. PERILS OF ANCHORAGE AT CHITTAGONG, BANGLADESH (American Club Member Alert, 2017)

Strong spring/flood/monsoon tides, as well as silted shallows, have increased the risk of collision in anchorages outside of the Bangladeshi port of Chittagong. A Member's vessel was recently struck by another vessel in the Chittagong harbour while safely anchored,

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inflicting minor damage. As ships wait to berth or execute cargo operations with lightering vessels, the crowded and heavily populated anchorage creates various navigational dangers.

Anchors can be dragged by strong underwater currents. As a result, vessels with obscured forward views or views from the starboard side of the port bridge wing are not permitted to enter the Karnapuli River channel.

The majority of collisions at the Chittagong anchorage occur when manoeuvring vessels fail to account for the variety and strength of the tide and currents, resulting in collisions between moored and embarking vessels. When entering and departing the port, masters should be aware of these conditions. A vessel's position should be precisely checked and a bridge watch should be maintained at all times to ensure that the vessel is not dragging anchor.

In addition, the location of vessels in the vicinity of a Member's vessel should be regularly observed to see if any of these vessels are dragging anchor. Should the necessity arise, the main engines should always be on standby. Should anchors need to be raised fast, windlasses should be kept ready, with power available at a moment's notice. To avoid the vessel swinging over a greater-than-normal arc and increasing the risk of collision, anchor chains should not be over-extended.

It is strongly urged that tides, currents, meteorological conditions, and wind directions and speeds in the vicinity be taken into consideration. Vessels engaging in lightering must adhere to port draught regulations and utilize adequate fendering equipment. In the event of an emergency, the crews should know how to immediately cast off the lightering vessel.

During a spring tide, main engine readiness is especially critical for a speedy response to a potential emergency. Vessels that are slow-steaming or underpowered should exercise extra caution and care when passing through relevant anchorages.

Members and their Masters are encouraged to treat the Chittagong anchorages as if they were driving through a congested city intersection. It's also a good idea to keep in touch with the Chittagong Port Authority to get the most up-to-date tidal, current, and wind advisories. Masters are specifically warned not to anchor less than 55 degrees south of Patenga Lighthouse, especially during spring tides. While navigating through the channel in and out of Chittagong anchorages, the International Regulations for Preventing Collisions at Sea (COLREGS, 1972) should be rigorously followed at all times.

4.1 Increased peril of anchorage at Chittagong (The editorial Team, safety4sea, 2017)

The Club is aware of a recent incident in which a vessel was impacted by another vessel while anchored in the Chittagong anchorage, resulting in minor damage.

The anchorage, which is quite busy and densely populated, poses several navigating hazards as ships wait to berth or conduct cargo operations with lightering vessels. Anchors can be dragged by strong underwater currents. As a result, vessels with obscured forward views or views from the starboard side of the port bridge wing are not permitted to enter the Karnapuli River channel.

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Manoeuvring vessels fail to account for the variety and strength of the tide and currents, resulting in collisions between moored and embarking vessels at the Chittagong anchorage.

As a result, the American P&I Club suggests the following:

a) When entering and departing the port, masters should be aware of the manoeuvring conditions. A vessel's position should be precisely checked and a bridge watch should be maintained at all times to ensure that the vessel is not dragging anchor.

b) The location of vessels in the vicinity of a vessel should be regularly observed to see if any of them are dragging anchor themselves. Should the necessity arise, the main engines should always be on standby. Should anchors need to be raised fast, windlasses should be kept ready, with power available at a moment's notice. To avoid the vessel swinging over a greater-than-normal arc and increasing the risk of collision, anchor chains should not be over-extended.

c) It is strongly urged that tides, currents, meteorological conditions, and wind directions and speeds in the vicinity be taken into consideration. Vessels engaging in lightering must adhere to port draught regulations and utilise adequate fendering equipment. In the event of an emergency, crews should be knowledgeable and comfortable casting off the lightering vessel rapidly.

d) Main engine readiness is especially critical during a spring tide for a speedy response to a potential emergency. Vessels that are slow-steaming or underpowered should exercise extra caution and care when passing through relevant anchorages.

e) Keep in touch with the Chittagong Port Authority to get the latest tide, current, and wind advisories and updates. Masters are specifically warned not to anchor less than 55 degrees south of Patenga Lighthouse, especially during spring tides.

f) While navigating through the passage in and out of Chittagong anchorages, the International Regulations for Preventing Collisions at Sea (COLREGS) 1972 shall be rigorously followed at all times.

5. NAVIGATE VESSEL SAFELY AT THE CHITTAGONG PORT (BANGLADESH) ANCHORAGE (Zalal Uddin Ahmed, 2021)

The article was written to provide a detailed overview of the Chittagong port anchorage region, draught restrictions, the types and strength of currents/tides encountered, lightening operations, collision avoidance precautions, and local notices/warnings issued by the local Port Authority.

Bangladesh is slightly larger than Greece, with a land size of 147,570 square kilometres. It stretches between 20°34N and 26°38N latitudes, as well as 88°01E and 92°41E longitudes. The maximum extension in the E-W direction is roughly 440 km, and it is around 760 km in the

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NNW-SSE direction. The country's southern boundary is formed by the Bay of Bengal. Bangladesh has a coastline that runs for more than 580 kilometres despite its modest size. Bangladesh's most important port, Chittagong, lies 15 kilometres from the open sea. The port is situated on the banks of the Karnaphului River. The port boundary of Chittagong port outer anchorage is defined by a radius of 5.6 nautical miles (on the west side) from Patenga light beacon at position Lat. 22 13.54 N long, 91 48.2 E. All meteorological and hydrographic information pertinent to the CPA (Chittagong Port Authority) outer anchorage has been well-documented and publicised in various nautical publications. (CPA, 2016.)

The CPA's anchorage area is split into three sections, as follows: - Anchorage A: for vessels with a draught of more than 10 metres, this is the northernmost anchorage.

Between anchorages "A" and "c," anchorage B is for vessels expected to reach the Karnaphuli river within 24 hours.

Lightering vessels and other vessels not planned to come within the next 24 hours should anchor in Anchorage C, which is the southernmost anchorage.

Areas outside of the marked anchoring are referred to as off port limitations. The anchoring is southwest of the shallow patch. This is the standard anchoring area for "A" and "B." The minimum charted depth of 7.9 m can be found at around two places along the shallow track. The majority of the dive sites are deeper than 8.5 metres. The height of the tide at low and high water varies from 0.4m to 1.5m and 2.4m to 4.6m, respectively, throughout the year. Outside of the outer anchorage, there isn't a traditional vessel waiting area. The inbound flight from KUTUBDIA Anchorage to A Anchorage takes 3 / 4 hours and requires the use of a vsl's Master or a Private Pilot if the Master/Owners so wish. The trip from Anchorage to Jetty Berth takes around 2 hours, with necessary piloting by a Port Pilot. Vessels with a draught of less than 8.5 metres can generally approach the outer anchorage of Chittagong at any time. Vessels with a draught of 8.5m to 9.5m can also approach the outer anchorage directly depending on the time of arrival and tide height. Vessels with a draught of more than 9.5 m should wait until the rising tide to enter Chittagong outer anchorage if coming on the falling tide. (Chittagong Port Authority, 2019)

Figure 3: Chittagong port

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The outside anchorage of Chittagong has a decent holding, neither good nor bad. Ships commonly have to pay for an extra length of cable due to high tides. Spring tides are very strong (6 to 8 knots) at Chittagong Outer Anchorage, and the rate may be higher during FRESHETS. It's best to maintain engines available at all times during the Spring tides, and to keep constant and efficient anchor watches. When the vessel is going slowly ahead and the anchor has been dropped, stern motions are usually required to keep the vessel afloat. Due to the strong under water current, anchor dragging by vessels, particularly those with comparatively deeper fresh water draughts, is a typical occurrence at Chittagong Outer Anchorage. A vessel with nine shackles and a high holding power anchor pulled anchor in a charted depth of 12.4 metres, requiring slow – forward on the engines (8.0 knots) to maintain her place.

The bottom near Chittagong Outer Anchorage is soft mud, making a grounding relatively safe. The holding ground is soft mud when the Patenga Light - Beacon bearing exceeds around 055, and vessels are prone to dragging anchor. The holding ground is somewhat firmer when the LIGHT– BEACON bearing is less than 055, although considerable care must be taken to check the strength of the EBB tidal, especially during the monsoon months. Furthermore, vessels using the outer anchorage have a tendency to swing in one direction only when the tidal streams shift; if this happens for more than a few tides, the anchor must be sighted on a frequent basis to avoid fouling. Due to the high current, the Port Radio Control and Agents stress the need of not going ahead of other vessels at anchor. Between 160 and 340 is the dragging line. As a result, Ship Masters approaching Chittagong roads should avoid attempting to cross the bows of vessels anchored close or underway in order to prevent drifting on them and maybe colliding / clashing with them. If an attempt is inevitable, the Ship - Master should proceed with prudence by providing the vessel at anchor / underway a wide berth, taking into account the current's minimum velocity of 6 knots and other marine considerations. Vessels at the CPA outer anchorage must maintain a forward and aft deck watch.

Bangladesh's weather is influenced by the monsoon. The prevailing wind directions are south to south east during the months of April through September. The wind turns to the northerly and north easterly directions from November to January, after first blowing easterly. Winds turn westward in February and March, returning to the transition periods between monsoon and season in May, October, and November. Extreme weather occurrences such as cyclones, with wind speeds reaching 30 knots, are common. The waves are normally small and have a distinct wind-wave interaction. A wave's period ranges from 3-4 seconds for waves under 0.5 metres to 6 seconds for swells above 2 metres. From May through October, freshets can be expected. Freshets are created by the EBB tide's typical velocity of flow, which is reinforced by the passage of additional volume of water from catchment regions into the river Karnafully. Freshets are likely when rainfall intensity surpasses 200 mm in 24 hours. Each turn of the tide, which is semi-diurnal yet has a substantial diurnal effect, changes the density of the water. As a result, the masters are advised to double-check. The density of water near the CPA's outside edge anchorage (Ahasan, et al, 2011).

The maximum draught a vessel can have when entering a port changes from day to day. The highest point is 9.14 metres above sea level. The

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maximum authorised draught for the river passage is 9.14 metres, however only 8.53 metres are allowed beside the discharging dock. As a result, if a vessel enters with a draught greater than the permitted port entrance draught, cargo will almost certainly have to be lightened at Chittagong's outer anchorage.

The outer anchorage in Chittagong is an open anchorage that is frequently utilised for lighterage. Such lightering is done EX- vessels with draughts bigger than the port entrance allowable draught, and the lightering is done within the commercial limit of the anchorage. Vessels in the CPA outer anchorage stay on their own anchor and are usually tide ridden, swinging around with the tide. A strong under water current of 6/7 knots exists near the outer anchorage, and vessels with deeper draughts regularly draught. When lighter vessels approach mother vessels, they are linked to them. The lighter vessels use a sufficient quantity of fenders to prevent ranging harm to the mother vessel as well as causing damage on it when berthing / unberthing and remaining alongside. At the anchorage, high waves and long swells are prevalent, and lightering becomes difficult and uncertain at times during bad weather. The mother vessels drag anchor because to the powerful submarine current, but they have taken necessary safeguards. Allowing a sufficient length of anchor, say nine (9) shackles, and having watches on the bridge around the clock, including engine movement, can prevent anchor dragging.

The beginning of the monsoon season makes cargo lightening at Chittagong's outer anchorage more challenging, and the monsoon season runs from May through October. At any moment throughout this period, rough waves and bad weather are common elements of the weather, and the weather frequently deteriorates so quickly that occurrences like the one in question become unavoidable. Lighter vessels anchored alongside the mother vessel endure considerable rolling and pitching during this time, causing hard scarping, bending, and indentations in the mother vessel's railing and hull. This is despite the fact that most lighter vessels have fenders made of old mooring ropes wound around wooden spars or secondhand automobile tyres. The top shell plate of the forecastle deck, bulwark gunwale, bulk head (both port and STBD side), and brackets underneath and horizontal to gunwale, as well as the hull in general, are the regions of the mother vessel that are prone to contact damages produced by lighters. Because lighter vessels lack winches fore and aft to immediately heave up berthing ropes, the situation frequently deteriorates.

It is true that lightering at Chittagong outer anchorage is difficult during the yearly monsoon season, but this is only during certain seasons. Collisions of the type in question can be avoided if adequate precautions are taken. However, due consideration must be given to the facts and circumstances that led to the specific incident. When a lighter vessel approaches a mother vessel, the free board of the former is usually much higher than that of the latter. This is because the lighter vessel is in light condition while the mother vessel is fully loaded. To avoid contact damage in such a situation, close communication / coordination between both the lighter and mother vessel involved is required. (Jurkovič V, John P, & Suban V 2019)

5.1 Safe Port, safe navigation

As a result, Ship Masters approaching Chittagong roads are urged not to attempt to cross the bows of vessels anchored nearby or

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underway in order to avoid drifting on them and perhaps colliding with them. If making such an attempt becomes unavoidable, the Ship Master should proceed with prudence by giving the vessel at anchor/underway a wide berth, taking into accounts the current's minimum velocity of 6 knots and other maritime considerations. Vessels at the CPA outer anchorage must keep a forward and aft deck watch. (**Chittagongpilots.com/navigation**)

Nonetheless, we maintain our conclusion that CPA outer anchorage cannot be considered risky for all intents and purposes, given all climatic/hydrographic information pertaining to CPA outer anchorage is widely documented and disseminated by many maritime publications.

6. REGULATIONS OR MEASURES FOR SAFE NAVIGATION

6.1 Measures for Safe Navigation

The master of the vessel is advised to heed Admiralty Notices describing prohibited and proposed anchorages. When the vessels arrive at the outer anchorage, they should proceed to the marked anchorage, clear of the prohibited anchorage, and contact the signal station Port Radio Control on VHF-ch-12 to indicate the time and position of the vessels anchored. This signal station, Port Radio Control, keeps a constant watch, records vessel arrivals and departures, and transmits and receives advance information of an urgent nature (Vries L 2015). The Chittagong Port Authority's official website, www.cpa.gov.bd, contains detailed instructions for Mariners; however, relevant navigational information as per Chittagong port regulations is provided below and must be followed for safe navigation:

- SHIP MOVEMENT starts about 4/5 hours before the day's high water.
- MOVEMENT OF VESSELS on the days marked AM & PM is determined by draught, tide rise, berth availability, and available day light. All parties involved must consult the Harbour Master 24 hours before the movement. In such cases, ships with a maximum draught for the day will be handled in the morning or afternoon, depending on the availability of daylight hours.
- DURING the spring tide/freshets/foul weather, vessels under 7 knots will not be handled normally, and all such vessels will be classed at GRADE-II for operational purposes and will be handled conveniently. Agents of such vessels must consult with the undersigned well in advance.
- The port will not be held liable if the declared draught is reduced due to freshet effect conditions or other unforeseeable causes. Owners and their agents are advised to consult the undersigned in advance regarding deep-draught vessels.
- Vessels entering or leaving port must have full power on the main engine and deck machinery, and both anchors with full chain length must be available at all times.
- All vessels entering and exiting port must display their signal letters.
-

  ✓ Shipmasters must anchor clear of the "PROHIBITED ANCHORAGE."
  ✓ Shipmasters are not permitted to anchor their vessels near the River's mouth.

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- ✓ Shipmasters must exercise extreme caution when embarking/disembarking pilots. d.A pilot ladder in accordance with the regulations must be provided.
- ✓ Shipmasters should be aware that strong tidal conditions exist at the outer anchorage and utmost anchorage.
- ✓ When manoeuvring anchors or heaving up anchors, extreme caution is required.
- ✓ Close-range bow crossing shall never be attempted.

- While the vessels are at outer anchoring, ship masters are urged to keep an eye on the Fo'castle and poop for their own safety.
- Shipmasters must provide the undersigned with their ETA, DRAUGHT, and other pertinent information well in advance.
- All ships docked in port must have "RAT GUARDS" in their mooring ropes.
- Ship masters must ensure that the vessel's draught markers are readily visible on arrival and prior to departure so that Pilots can read the draught appropriately.
- While their vessels are in port, ship masters must guarantee that no major chipping of the ship's side occurs.
- Unnecessary "smoking" by ships in the port area is absolutely prohibited.
- WATER DISCHARGE ON THE Jetty and vessel listing when alongside are absolutely banned.
- Because the Karnafulli River is a tidal river, yachts entering the harbour must have six good ropes (HAWSER & WIRE) ahead and six comparable ropes aft for mooring.
- IN THE EVENT OF AN EMERGENCY, the signal for a tug in port consists of four extended whistle blows.
- IN THE EVENT OF AN EMERGENCY, CALL THE FOLLOWING ON PHONES:
- A VHF(R/T) watch is kept in the Port Administrative Building 24 hours a day, 7 days a week, and can be reached at any time of day or night. A channel-12 (Frequency 156.6MHZ or Channel-16, Frequency 156.8 MHZ) watch is also kept on 2182 KHZ.
- Ship masters approaching the Chittagong Road are recommended not to attempt to cross the bows of vessels at anchor/underway in order to avoid drifting on them and causing a possible collision, given the strong current at the outer anchorage. If crossing is unavoidable, the shipmaster should proceed with caution, giving wide berth to vessels at anchor/underway and taking into account the current's minimum velocity of 6 knots and other maritime considerations.
- If a vessel is given standby by Radio Control for entering Port and the Pilot is on his way, the ship master should heave up anchor and wait for the Pilot steaming the tide near about location, Patenga Lighthouse bearing 0.45^{o} (T) distance 2 miles, if it is deemed safe to do so.
- Vessels with containers on deck that block a clear view of the forward and or starboard sides when viewed from the

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port bridge wing and vice versa will not be allowed to navigate in the Karnafulli River channel. Small craft passing the bow of the vessel should be considered while determining unobstructed visibility.

- Ships arriving for demolition should drop anchor north of Lat: 22o 16', which is north of Alfa Anchorage.
- Under all circumstances, the 1972 International Regulation for the Prevention of Collisions at Sea, as amended in 2002, must be adhered to as strictly as practicable while navigating within the CPA Port Limit.
- Admiralty Chart No. 859 "Elephant point to Matla River": Bay of Bengal Folio, Admiralty Chart No. 84 "Approaches to the "Karnafuli River" Bay of Bengal Folio These graphs must be taken into account.

6.2 Chittagong Port Authority Issues New Directive In Order To Improve Navigational Safety

The Chittagong Port Authority (CPA) published Circular No. 25 of 2018 on September 19, 2018, with a new instruction targeted at increasing navigational safety in the port. In response to an increase in the frequency of navigational incidents, accidents, and near-misses in recent years, particularly in the Chittagong outer anchorage, the local authority has drafted new regulations and guidelines, which take effect on October 1, 2018, and provide as follows: (American Club Member Alert, 2018)

- ✓ Any vessel with a draught greater than 9.5 metres must notify the CPA outside anchorage cell at least three (3) days before arriving at Chittagong outer anchorage. The availability of suitable sea room and the bathymetry (depth and extent of water) at the anchorage will determine whether permission to proceed is granted.
- ✓ Pilotage is strongly advised for vessels with a draught of more than 9.5 metres, as well as all other vessels navigating in the Chittagong outer anchorage region.
- ✓ Chittagong Port Radio will direct vessels with a draught of more than 9.5 metres to an anchorage that is suitable for them.
- ✓ The outer anchorage cell of the CPA will track and steer vessel movements. It will also oversee the Chittagong outer anchorage area's voluntary pilotage service.

7. SAFETY MEASURES AT CHITTAGONG OUTER ANCHORAGE (The editorial Team, safety4sea, 2017)

The average number of ships anchored at any given time last year was between 60 and 90. The increased number of ships in the anchorage opens up to the SW Monsoon, where strong prevailing currents (between four and six knots) and weak holding ground have resulted in numerous accidents. The consequences of such incidents range from minor collisions with other ships to groundings and the pollution problems that come with them. (BSS, 2018)

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Figure 4: Measures at Chittagong Outer Anchorage

As a result, the Club reminds masters anchoring in Chittagong Outer Anchorage of the Chittagong Port Authority's requirements:

i. Anchor far enough away from other boats in the anchorage.

ii. If the under keel clearance is less than 2m, the ship may drag anchor. During spring tides and monsoons, this is particularly noticeable. The tides can reach speeds of up to seven knots. If safe circumstances are to be maintained throughout, the ship's draught should be decreased to less than 10.5 m at Kutubdia before arriving at the Chittagong Outer Anchorage. Until the ship is adequately lightened, UKC will be minimal and the risk of dragging will be greatest as the tide shifts from low to high water. (Md. Motiur Rahman and Md. Shahjahan Ali, 2018)

iii. The risk of dragging anchor is even higher for ships with lightering vessels nearby. Use more chain (at least nine shackles in the water) as a precaution, maintain the main engine on standby at all times, and limit the number of lightering vessels nearby.

iv. Never attempt to cross the bow of another ship at close range when dropping anchor or picking up a pilot. Please keep in mind that the current is really powerful. You can take a trip on the rope of another ship.

v. Deep draught ships lightering at Alpha Anchorage should move to Bravo or Charlie once they reach the requisite draught to allow enough room for freshly arrival deep draught ships to anchor safely.

vi. Masters must anchor away from the forbidden anchorage.

vii. Boats must not be anchored near the river's mouth.

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viii. When embarking and disembarking a pilot, masters must exercise extreme caution.

ix. Make that the lightering vessels assigned to the STS operation have enough fenders and moorings, which should be checked on a regular basis. If the weather worsens, lightering vessels should be cast off quickly.

8. CONCLUSION

Bangladesh is a populous country located in the northwestern region of the Bay of Bengal. It has a massive sea area that is 1.5 times the size of the land area. Around 36,000 sq km of land near the coast make for 25% of the country's total land mass. There are around 200 rivers in the country, which cover an area of 22,155 sq km, or over 11% of the total land area. As a result, the maritime industry is an important part of Bangladesh's economic development (Monir, M. M. I. 2017 Chittagong port, one of the Bay of Bengal's seaports, is in a beneficial position to cover Asia's largest spatial transit. Chittagong port has a large hinterland potential to serve neighbouring countries in South Asia and Myanmar, as well as China's southwest region. Due to geopolitical concerns, China's envisioned Marine Silk Road (MSR) under the umbrella of the Belt and Road Initiative (BRI) may have neglected Chittagong port as a maritime load centre in the South Asian region. The Bangladesh government, the World Bank, the Asian Development Bank, and other private investors such as China and Japan have long been concerned in improving port efficiency in both operations and inland transportation and port governance. A port is a crossroads between sea and land where cargo and services must flow freely. Any disruption in freight movement or service can wreak havoc on the supply chain as a whole. (Carbone, V., De Martino, M., 2003)

With the growth and development of the jute trade in Eastern Bengal beginning in the mid-nineteenth century, merchants approached the Bengal government to survey the river Meghna and declare it safe for navigation, allowing sea-borne vessels from Indian and foreign ports to access Narayanganj to trade in the eastern region's products. The Bengal administration declared Chittagong as the most suitable port for the shipment of produce from eastern areas, the produce being conveyed down the Meghna in flats towed by small draught river steamers, because the navigation of the river Meghna was too difficult for ships from Britain.

9. RECOMMENDATIONS

- Identify the present difficulties that restrict the East Port Said-Port Said Port's performance and work to solve them (strengths, weaknesses, and threats) in order to continue to improve the port's efficiency and effectiveness.
- Our bilateral relations with our neighbours, particularly with India, must be enhanced in order for our port services to be utilized by our neighbours. Without India's cooperation, it would be impossible to serve Nepal and Bhutan.
- A proper traffic control system is required to ensure the safety of the channel in the Gupta route and the cutting bend.
- At the outer anchorage, the maximum draught and number of vessels should be strictly regulated.
- The receivers should be required to accept delivery of all cargo, including

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damaged cargo, and storage facilities should be given.

- Government officials who import cargo on a daily basis should be taught on how to legally secure their claims.

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