Global Trends of Berth Depths for different facilities

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ABSTRACT:

Because of the dynamic changes that are occurring in the maritime shipping industry, it must be study the Impacts of Navigation Trends on Channel and berth depth, the aim of the study how future maritime and Suez Canal Economic ports.

An analysis of current trends within the international shipping industry has been conducted. Growth in world trade, increasing containerization, changes in the world fleet, vessel design trends, operational and organizational changes of the maritime industry have been evaluated. An assessment of future trends resulting from these dynamic changes occurring within the international shipping industry are identified and assessed for their potential impact on SCZ ports.

INTRODUCTION

At the study we explain and analyze the vessel characteristics and trends over the past thirty years and show future vessel design issues and corresponding navigation channel design, for example, it is shown that the average beam-to-draft ratio has significantly increased over the past thirty years for all merchant vessel types investigated.

This vessel parameter trend most directly impacts channel width and layout. Channel width and channel layout features such as bends must enlarge (for same depth) in order to accommodate ships with these changing proportion trends. Channel depth, for this type of vessel change, is impacted to a much lesser degree; an increase in beam-to-draft ratio does not impact typical design conventions for channel depth nearly as significantly. The effect of an increased vessel blockage factor within a channel cross-section also contributes to higher vessel squat experienced and may likely result in decreased vessel speeds within channels.

MAIN CONTENT

1) An overview and analysis of international trade on a global, national and regional level.
2) A description and analysis of the type and sizes of ships in the world merchant fleet.
3)Analysis of world merchant fleet 2017.
4) traffic forecast of Suez Canal and SCZONE ports.
5) A projection of ship draft trends at Suez Canal ports.

The study provides a wealth of information regarding commodity flows and predictions SCZ port traffic for the next twenty years and includes more than. an extensive database of the compiled information.

1. OVERVIEW OF INTERNATIONAL TRADE

1.1 Global seaborne trade

Global seaborne trade is doing well, supported by the 2017 upswing in the world economy which is shown in figure (1) Expanding at 4 per cent, the fastest growth in five years, global maritime trade gathered momentum and raised sentiment in the shipping industry. Total volumes reached 10.7 billion tons, reflecting an additional 411 million tons, nearly half of which were made of dry bulk commodities. Global containerized trade increased by 6.4 per cent, following the historical lows of the two previous years. Dry bulk cargo increased by 4.0 per cent, up from 1.7 per cent in 2016, while growth in crude oil shipments decelerated to 2.4 per cent. Reduced shipments from exporters of the Organization of Petroleum Exporting Countries were offset by increased trade flows originating from the Atlantic basin and moving eastward towards Asia.

UNCTAD analysis is pointing to continued growth in world seaborne trade that hinges on the continued improvement of the global economy. In line with projected growth in world gross domestic product (GDP), UNCTAD expects global maritime trade to grow by another 4 per cent in 2018. Further, world seaborne trade is projected to expand at a compound annual growth rate of 3.8 per cent between 2018 and 2023 which is shown in figure (2). Volumes across all segments are set to grow, with containerized and dry bulk commodities trades recording the best performances. Tanker trade volumes are also projected to increase, although at a slightly slower pace than other market segments, a trend that is consistent with historical patterns.

1.2 Trends in different shipping sectors

The growth rate of containership size has accelerated over the last decade . It took one decade to double the average container ship capacity from 1,500 to 3,000 TEU, but almost 30 years to get to 1,500 TEU. This has been driven by large increases in the maximum capacity of container ships, especially in the last decade. These increases in maximum capacity have accelerated the growth of the average ship capacity. The average age of newly built container vessels had been oscillating around approximately 3,400 TEU between 2001 and 2008 but increased significantly since then reaching a mean of 5,800 between 2009 and 2013. The average size of a newly built containership has soared to approximately 8,000 TEUs in 2015.

1.3 Main trade lanes and ports for mega-ships

The largest container ships are used on the Far East-North Europe trade route; this is the main maritime route between Asia and Europe. The average ship capacity on this route is 11,500 TEU (Figure 3.1), an increase of 62% between 2007 and 2014, one of the largest increases in ship size. Other trade lanes with large ships include the Far East-Med and the Transpacific (West Coast), figure (3) shows ship size on main trade line. Also, on these trade lanes, the average container ship size has increased quickly over the last years, in particular on the Far East-Med trade lane, where the average container vessel increased by 79% in size over 2007-2014.

The larger ships on the Far East-Europe routes has cascading effects on other trade lanes, with vessels previously used on the Far East-Europe route, being redeployed on Transpacific routes. The average growth in container ship size between the Far East and the West Coast of North America was 54% over 2007-2015; this growth was less pronounced on the route between the Far East and the East Coast of North America (31%), because of the constraints of the current Panama Canal that put a limit on the cascading to this trade lane.

The container ports system has over the last decades become more concentrated. This port concentration has led to some sort of hub and spoke-network, consisting of a limited number of large ports included in main intercontinental trade lanes, with a lot of smaller feeder ports connected to, and in some sense dependent on, this larger port. The emergence of such a hub-and-spoke network is connected to increasing vessel size in the past. This is well illustrated by looking at the main ports that are included in the routes of the largest containerships in Asia and in North Europe, where the majority of calls is concentrated in a select number of ports. E.g. in North Europe approximately four fifth of the direct calls from Asia are in six main ports. More or less similar concentration of calls in a selected number of ports occurs in the Far East However, the picture is more fragmented in the case of the Mediterranean ports, with a relatively large set of ports having a fairly low market share, figure (4 ,5) is shown Major container trade routes 2010 and 2030.

1.4 The demand for mega-ships

The development of ever larger ships is driven by the search of economies of scale by shipping companies. Considering that the container shipping industry is mainly driven by price competition – and not very differentiated with respect to other aspects – the decision by one shipping line to increase ship size leads to a wave of similar decisions by competing shipping lines in order not to "stay behind" by not reaping the same economies of scale. The result is a wave of investments in new very large containerships that might make sense from the perspective of an individual company vis-à-vis its main competitors, but less so for an industry as whole, as it results in growth of fleet capacity that is not in line with demand.

Most other actors in the transport chain are not necessarily favourable to mega-ships. Shippers are interested in frequent and reliable maritime transport links, but bigger ships would reduce the service frequency, unless cargo streams growth at the same pace of ship size development; moreover,
large shippers might have a preference to hedge risks by parceling out deliveries in different ships rather than concentrating everything in one ship. Terminal operators are confronted with the need to adjust equipment and to handle peaks that are challenging within current configurations Similar story for ports confronted with new requirements on port-related infrastructure and transport ministries with regards to port hinterland infrastructure and connectivity. Freight forwarders and logistics operators will be concerned with any disruptions or delays of mega-ships that might cause additional transaction and coordination costs. Finally, the peaks associated with mega-ships could cause congestion and delays for truckers, barge and railway companies.

A more detailed analysis of the impact of mega-ships on these different elements of the transport chains is provided throughout this study.

Shipping lines generally do not consult with the other actors in the transport chain on their projects. We have not found any evidence of attempts of coordination or prior warnings in this respect. Even container terminals operating within conglomerates with shipping lines have at some occasions been
surprised by the ship orders of their mother company – which required them to do retrofits of terminal equipment that was just acquired. One could say that shipping lines have imposed their standards on the wider transport chains, ordering ships with dimensions that other transport actors now have to deal with it. There has been no planned transition. Considering the character of ship size development (in leaps, rather than gradually), what is needed in the related transport chain is a revolution rather than an evolution.

2. THE TYPE AND SIZES OF SHIPS IN THE WORLD MERCHANT FLEET

2.1 Defining Vessel Requirements

Deep-draft ships and shallow-draft vessels:
Navigation projects are designed to accommodate vessels of a desired size. Key vessel dimensions are length, beam (width), and draft. These dimensions are defined in several different ways to characterize the curved, three-dimensional vessel form. Vessel dimensions, especially for commercial ships, are often presented in terms of standard acronyms defined. Terms are explained in the following paragraphs.
The shape of a typical commercial ship is depicted in Figure (6), The LOA is an important measure of length for evaluating ship clearances in confined navigation project areas. For example, a turning basin would be sized based on the design ship LOA. The LBP is a more meaningful measure of the effective length for concerns such as ship displacement and cargo capacity, table (1) shows acronyms commonly used to describe ship size and function.
Design draft:
freeboard and beam are illustrated in. Molded beam is the maximum width to the outer edges of the ship hull, measured at the maximum cross section (usually at the ship waterline at midship). Design draft is the distance from the design waterline to the bottom of the keel. Ship depth is a vertical dimension of the hull, as shown in the figure, and it should not be confused with ship draft.
Draft may not be uniform along the vessel bottom for both deep- and shallow-draft vessels. For example, draft near the vessel stern (aft) is often greater than near the bow (fore).
Two useful indicators of such variations are: trim - difference in draft fore and aft
list - difference in draft side to side.
ship planning and design may include the following considerations, most of which are discussed in subsequent sections which are Site characterization, Design criteria, Defining vessel requirements, Entrance channel configuration, Inner harbor configuration, Navigation structures, Harbor and channel sedimentation and maintenance and Physical and numerical modeling.

2.2 Size categories

Cargo ships are categorized partly by cargo capacity, partly by weight (deadweight tonnage DWT), and partly by dimensions. Maximum dimensions such as length and width (beam) limit the canal locks a ship can fit in, water depth (draft) is a limitation for canals, shallow straights or harbors and height is a limitation in order to pass under bridges. Common categories include:

2.2.1 Dry Cargo

- Small Handy size, carriers of 20,000–28,000 DWT
- Seawaymax, 28,000 DWT the largest vessel that can traverse the St Lawrence Seaway These are vessels less than 740 feet (225.6 m) in length, 78 feet (23.8 m) wide, and have a draft less than 26.51 feet (8.08 m) and a height above the waterline no more than 35.5 metres (116 ft).
- Handy size, carriers of 28,000–40,000 DWT
- Handymax, carriers of 40,000–50,000 DWT
- Panamax, the largest size that can traverse the original locks of the Panama Canal, a 294.13 m (965.0 ft) length, a 32.2 m (106 ft) width, and a 12.04 m (39.5 ft) draft as well as a height limit of 57.91 m (190.0 ft). Limited to 52,000 DWT loaded, 80,000 DWT empty.
- Neopanamax, upgraded Panama locks with 366 m (1,201 ft) length, 55 m (180 ft) beam, 18 m (59 ft) depth, 120,000 DWT.
- Capesize, vessels larger than Suezmax and Neopanamax, and must traverse the Cape of Good Hope and Cape Horn to travel between oceans

- Chinamax, carriers of 380,000–400,000 DWT up to 24 m (79 ft) draft, 65 m (213 ft) beam and 360 m (1,180 ft) length; these dimensions are limited by port infrastructure in China.

2.2.2Wet Cargo

- Aframax, oil tankers between 75,000 and 115,000 DWT. This is the largest size defined by the average freight rate assessment (AFRA) scheme.
- Q-Max, liquefied natural gas carrier for Qatar exports. A ship of Q-Max size is 345 m (1,132 ft) long and measures 53.8 m (177 ft) wide and 34.7 m (114 ft) high, with a shallow draft of approximately 12 m (39 ft.
- Suezmax, typically ships of about 160,000 DWT, maximum dimensions are a beam of 77.5 m (254 ft), a draft of 20.1 m (66 ft) as well as a height limit of 68 m (223 ft) can traverse the Suez Canal
- VLCC (Very Large Crude Carrier), supertankers between 150,000 and 320,000 DWT.
- Malaccamax, ships with a draft less than 20.5 m (67.3 ft) that can traverse the Strait of Malacca, typically 300,000 DWT.
- ULCC (Ultra Large Crude Carrier), enormous supertankers between 320,000 and 550,000 DWT

Figure (8) shows the size classification.

3. ANALYSIS OF WORLD MERCHANT FLEET 2017.

this section provides a picture of the world's merchant fleet in 2017, derived from data contained in the Equasis database. It examines the structure and characteristics of the fleet and its performance. The statistics are grouped into themes which could be of interest to the industry and regulators.

Ships are grouped by size into four categories: Small ships 100 GT to 499 GT, Medium ships 500 GT to 24.999 GT, Large ships 25.000 GT to 59.999 GT and Very Large ships ≥ 60.000 GT.

The small ships size category reflects the main tonnage threshold for merchant ships to comply with the SOLAS Convention. This category also includes many ships which do not trade internationally and therefore are not covered by the International Conventions or the port State control regimes, but for which some flag States require the same standards.

Types have been aggregated into 12 main types (General Cargo Ships, Specialized Cargo Ships, Container Ships, Ro-Ro Cargo Ships, Bulk Carriers, Oil and Chemical Tankers, Gas Tankers, Other Tankers, Offshore Vessels, Service Ships, Tugs and Passenger Ships) but this paper analysis the main types of ship which are General Cargo Ships, Container Ships, Ro-Ro Cargo Ships, Bulk Carriers and Chemical Tankers.

Figure (9) shows that, by number, the Equasis fleet is dominated by small and medium sized ships up to 24.999 GT (80%). Small ships alone represent 37% by number, although around only 1% by tonnage. Tugs (20.4%), general cargo ships (17.9%), oil and chemical tankers (14.8%) and bulk carriers (13.0%) are the four most common ship types by number, representing about two thirds of the Equasis fleet. Most of these are small and medium sized ships. It should be noted that the 2017 data does not include fishing vessels with an IMO number – these vessels were only added to the Equasis database in 2018 and will be incorporated in next year's review.

Within the large and very large categories, bulk carriers (43.0%), oil and chemical tankers (25.2%) and container ships (16.4%) represent approximately 85% of the fleet in number in these ship size categories. In terms of tonnage, the large and very large size categories represent 82% of the Equasis fleet figure (2), with oil and chemical tankers, bulk carriers, and container ships jointly dominating both categories at 84.3% (large) and 82.5% (very large).

From this data figure (11) represent no of ship General Cargo Ships, Container Ships, Ro-Ro Cargo Ships, Bulk Carriers and Chemical Tankers, as shown the analysis of data illustrate the biggest fleet in the world is general cargo then chemical and bulk carrier ship.

3.1ANALYSIS OF VESSEL TRENDS BY TYPE:

3.1.1 Container ship

Containerships are a very unique vessel type for many different reasons. They are clearly the youngest vessel type of the present maritime trade fleet – first appearing less than 50 years ago. Containerships are also the vessel type whose dimensions are most directly and remarkably constrained by shoreside facilities. In contrast to their general cargo vessel cousins, containerships (especially the largest vessels) typically do not have their own cargo loading and unloading cranes and must rely on the shoreside facilities.

Figure (12) show containership construction activity during the past thirty years. Through these figures, it is clear that the total number of ships, the total DWT, and the total TEU has been increasing, and most remarkably within the past decade.

3.1.2Roll-on/roll-off vessels

(RO/ROs) are often included in the general cargo category but here are treated separately because their dimensions and overall vessel characteristics are usually significantly different from those of other types of general cargo vessels. For example, B/T ratios for RO/ROs commonly fall between 2.5 to 4.0, while for general cargo vessels, the range is significantly lower – typically between 2.0 and 3.0. Also, L/T ratios for RO/ROs commonly fall between 15 and 25, while for general cargo vessels the range is typically between 12 and 20. The reason for these differences is usually cargo density and ease of arrangement with respect to loading practices. It is by and large much easier to arrange a general cargo ship to effectively utilize cargo space below the waterline, whereas it is more difficult to effectively utilize space below the waterline within RO/ROs since series of interior ramps must be constructed to reach lower decks. RO/RO cargo also tends to be less dense and not pack as tightly as general cargo. For these reasons, RO/ROs generally have shallower drafts for equivalent length and beam dimensions than general cargo vessels.

Figure (13) show roro ship construction activity during the past thirty years. Through these figures, it is clear that the total number of ships, the total DWT, and the total TEU has been increasing, and most remarkably within the past decade.

3.1.3General Cargo/Breakbulk

Figure (14) illustrate vessel trends and characteristics of general cargo vessels. Interestingly, the predominate size range of general cargo carriers has decreased from 1020,000 DWT in the early 1970's to less than 10,000 most recently. This is mostly because the majority of large-volume cargo transport is done through specialized vessel types, e.g., containerships.

Temporally, L/B for these vessels is clearly significantly decreasing, B/T is increasing, and L/T is decreasing. A decreasing trend in B/T is also evident with respect to DWT. Each of these trends seen in general cargo/breakbulk cargo vessel characteristics is more significant than those seen for other vessel types.

3.1.4BULK CARRIER

Figures (15) illustrate vessel trends and characteristics of bulk carrier vessels. Interestingly, the predominate size range of bulk carrier carriers has decreased from 1020,000 DWT in the early 1970's to less than 10,000 most recently. This is mostly because the majority of large-volume cargo transport is done through specialized vessel types, e.g., containerships.

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3.2 ANALYSIS OF VESSEL TRENDS BY DRAFT

According to the analysis of ship merchant fleet 2017 the result of classified ship according to depth and building year illustrate that the trends of ship draft less than 4 m as shown at Figure (16). Illustrate the ship fleet less than 4m draft was built before 1990 s is 45% of total no of ship , from (1991-2001) s is 17% of total no of ship that draft less than 4 m, from (2002-2011) s is 25% of total no of ship that draft less than 4 m and from (2012-2016) s is 13% of total no of ship that draft less than 4 m.

the trends of ship draft 4 m to 10.5 m draft as shown at Figure (17)Illustrate the ship fleet was built before 1990 s is 35% of total no of ship that draft 4 m to 10.5 m, from (1991-2001) s is 18% of total no of ship that draft 4 m to 10.5, from (2002-2011) s is 36% of total no of ship that draft 4 m to 10.5 m and from (2012-2016) s is 11% of total no of ship that draft 4 m to 10.5 m.

the trends of ship draft 10.5 m to 14 m draft as shown at Figure (18)Illustrate the ship fleet was built before 1990 s is 4% of total no of ship that draft 10.5 m to 14 m, from (1991-2001) s is 17% of total no of ship that draft 10.5 m to 14, from (2002-2011) s is 55% of total no of ship that draft 10.5 m to 14 and from (2012-2016) s is 24% of total no of ship that draft 10.5 m to 14m.

the trends of ship draft more than 14 m draft as shown at Figure (19) Illustrate the ship fleet was built before 1990 s is 2% of total no of ship that draft more than 14 m, from (1991-2001) s is 14% of total no of ship that draft more than 14 m, from (2002-2011) s is 57% of total no of ship that draft more than 14 m and from (2012-2016) s is 27% of total no of ship that draft more than 14 m.

on the important side of analysis the ship draft, it should be classified the ship draft according to ship type which guide the port developer to the depth of berth will construct or reconstruct, at the figure (12,13,14,15) the result of analysis no. of ship according to type and draft for container ship is 45% of the fleet is medium size that draft (4-10.5) m and 55% of the fleet large and very large size that draft > 10.5 m , RO-RO ship is 43% of the fleet is medium size that draft (4-10.5) m and 45% of the fleet large and very large size that draft > 10.5 m general cargo ship is 99% of the fleet is medium size that draft (4-10.5) m and 1% of the fleet large and very large size that draft > 10.5 m and bulk carrier ship is 33% of the fleet is medium size that draft (4-10.5) m and 64% of the fleet large and very large size that draft > 10.5 m, Figures (20) summary of ship fleet by type and draft.

4.TRAFFIC FORECAST OF SUEZ CANAL AND SCZONE PORTS.

4.1 SHIP SIGHTED TO MEDITERRANEAN SEA

Since the last edition of the annual statistics a new section has been introduced – "figure (21) – Ship Sightings by Geographical Area". Ship sightings are provided to Equasis by AXS Marine, Vessel Tracker and Marine Traffic.

At least one ship sighting was recorded for 65% of the active fleet of Equasis.

The figures presented in this section are strongly dependent on the coastal and satellite coverage of AIS data guaranteed by the abovementioned data-providers. Table 21 suggests that the majority of maritime traffic occurs in the Mediterranean Sea (13.1%) and Asia (37.5%), with both geographical areas accounting for 50% of the total sightings reported to Equasis. In respect to ship size, small sized ships were predominately sighted in the Mediterranean Sea (24.7%) while very large ships in Asia (40.2%).

4.2 SUEZ CANAL FORCAST

The Canal makes a significant contribution to the economy of Egypt and is the key economic enabler in the transport and logistics sectors. Around 17,000 vessels conveying 754 million tonnes of cargo use the Canal in both directions every year figure (22) – No. of ship and net ton evolution (1975-2018) On average, these vessels pay USD 330,000 per ship. As shown in Table 6-1, revenues earned from the Canal have increased steadily, reaching over 5 billion USD in 2013. This increase has not matched the number of vessels transiting the Canal however, which has seen a decline since 2008 (except for 2010). In 2013, the Canal achieved an average of 45 transits per day.

Figure (23) shows Suez Canal traffic as a percentage of world seaborne trade and highlights significant growth over the last 14 years, from 6.15% in 2000 to 7.9% in 2013.

Table (2) indicates that since 2005 there has been no direct correlation between world trade volumes and Suez Canal traffic, almost certainly a function of the increasing importance of Inter Asian and Asia – N. American trade in shipping volumes.

This is perhaps most strongly demonstrated by the 2009 data. Then overall trade reduced by 3% whereas the effect on the Suez Canal was a reduction of 29% and an actual reduction in cargo of 23% versus the prior trading year.

Figure (24) % of ship by type at Suez Canal, Figure (25) shows the forecast of Suez Canal according to (DAR ELHANDSA),

From the all previous analysis of merchant fleet and trends of ship industry for every type of cargo and all the effected factors on the berth depth Figure (26) result of analysis required depth according type.

5) A PROJECTION OF SHIP DRAFT TRENDS AT SUEZ CANAL PORTS:

5.1 PORT ANALYSIS

5.1.1WEST PORT

Port Said West Port (WPSP) is located in the heart of the urban area of Port Said and is heavily constrained by
surrounding development. The JICA report of 2012 drew a number of conclusions relating to Port Said West as
follows:

- There was insufficient space at the Container Yard
- The berth lacked depth
- Port Operations were heavily restricted by Suez Canal operations.

Nevertheless, the JICA report recommended the construction of a deep berth to receive larger container vessels, Figure (27) the current master plan of west port, West Port Said Port Authority also has plans to modernize the port facilities, including the container terminal through investment in handling equipment such as gantry cranes, and other yard equipment and in Sept 2014, MOT proposed a Port development, For the following reasons these recommendations are not endorsed by this study.

- Suez Canal Convoy constraints cannot be overcome and would remain irrespective of any port-based investment.
- If the proposed developments are approved for EPSP it would be expected that container handling activities would be better consolidated there owing to its natural advantages and superior capabilities.
- In addition to vessel limitations West Port Said Port has significant land side access constraints with trucks delivering and/or collecting containers causing serious congestion in the city of Port Said. There are plans to build a bridge south of the terminal, connecting to the South Gate that would ease traffic in the city, but the other constraints of the port would remain.

- Finally, the scope for further non-port but related development at WPSP is extremely limited in comparison to that which could be developed at EPSP.

Overall, it is felt that if Port Said East Port is further developed with additional terminals and the required navigational and land connectivity components then, even with the proposed investment, Port Said West would be at a significant disadvantage from a range of perspectives not least of which would be the constraints of the surrounding conurbation. The Consultants therefore can find no rationale for the further development of existing WPSP proposals and would strongly recommend the concentration of investment in EPSP, including the re-location of cargo-related port operations and industrial activities, including container activities, from WPSP. This should not involve compulsory re-location as it would be expected that the greater efficiencies and lower costs of EPSP would generate a trend to move activities without them being imposed. The initial trigger for this shift would be the completion and operation of the enhanced connectivity arrangements at EPSP and activation of at least one new terminal facility at EPSP **Figure (27)** Development master plan of west port.

The result of studying and evaluate the development of west port is to develop ABBAS berth(the main berth of general cargo and multi-purpose) at port said which is the construction condition is bad and it wasn’t develop since 20 years ago , the current berth depth is less than 8.5 m and it can’t keep pace with the world development of the general cargo fleet and the international general cargo port Therefore it is necessary to develop it to 15.5 m depth Figure (28) suggested Abbas berth depth development according to trend ship draft , at the same SHERIF basin is shallow depth less than 7.5 m which will be used at the port development mutli purpose berth so it be recommended to develop it to 14 m , **Figure (29)** suggested shereef berth depth development according to trend ship draft.

5.1.2 EAST PORT SAID PORT

East port has a distinguished location east of the Northern entrance of the Suez Canal, at the confluence of three continents, and at the crossroad of the most important world sea trade route between the East and the west.

The port is bordered from the North by the Mediterranean Sea, from South by the industrial zone, from East by El-Malaha Lake, and from the Western verge of Suez Canal inside the frontiers of Port Said Province,

The Port Specifications are total Area is145 sq. km (145.100.000 m2),Water Area is1.5 sq. km (1.500.000 m2),Land Area is70.6 sq. km (70.600.000 m2),Total Customs Zone is 33.5 sq. km (33.500.000 m2),Total Yards Area is 0.6 sq. km (600.000 m2),Maximum Port Length is 10 km (western port boundary) and Maximum Port Width is 8 km (southern boundary).

There is an existing 2400 m long berth at the Eastern side of the East Port Said port current basin (Maersk Berth) that is used for containers. South of Maersk berth there is a berth that is currently under construction (the Naval berth) and the port extension starts at the Southern end of existing berths. The location of port extension was selected to form a channel extending south of the existing port basin with a width of 550 m that will be tested through navigational simulations at a later stage, thus allowing for convenience in navigation and port operation,

Figure (31) Development master plan of EAST PORT, Figure (31) Development stages of EAST PORT.

The result of studying and evaluate the development of EAST port which is designed by DAR ELHANDSA consultant the design depth of container terminal, general cargo terminal and roro terminal is sufficient to the current and future development of the global trend of the berth depth , the berth is designed to 22.5 m but at the first stage it will be dredged to 18.5 which is enough at this stage, Figure (32) section of development berths of EAST PORT.

CONCLUSIONS

(1) it should be development the Egypt port specially SCZ port for Its great importance according to many influence factors which is one of the important factors the trends of the ship draft to every facility in order to be capable to compete the international port and comply the ship industry.

(2) the berth is designed to 100-year life time, so it should be taken at consideration the future prediction of the maritime cluster to reduce the possible errors at the berth design which will return negatively at feasibility study of port and cause financial loss to redesign the berth according to the world tends

(3) It is imperative that channel design and maintenance be intimately linked to channel usage and vessel design. When there is a disjoint between channel design or maintenance procedures and channel usage or vessel design, the safety or economics of shipping will be compromised. A simplified schematic of the interrelation between channel design, vessel design, channel usage and safety/efficiency issues.

(4) container ship is the rapid development at the last 20 years and according to DAR ELHANDSA study of SCZ forecast the predict forecast until 2050 will be rapidly increase at the container contrariwise general cargo and roro.

(5) ship that draft is less than 4 m will disappear with time because the fleet that depth less than 4 m is more than 30 years old and not recommended to the main facility of port.

(4) ship that draft is (4-10.5) m will be the medium priority at the future time and it not be important for the hub port such as SCZONE ports.

(5) ship that draft is (10.5-14) m will be the high priority at the future time specially at container, roro and carrier ship but it is low priority at general cargo.

(5) ship that draft is more than 14 m will be the high priority at the future time specially at container, roro and carrier ship but it is low priority at general cargo.

(6) according to west port said analysis and evaluation it should be develop the port as soon as possible because it's the importance of geographical location and the bad construction situation to be the main arm of east port which is develop going with fast steps and best vision.

REFERENCES

1. EQUASIS, "The World Merchant Fleet", European Maritime Safety Agency (EMSA) ,2017.
2. UNCTAD, REVIEW OF MARITIME TRANSPORT, 2018.
3. All About Shipping (2018). Cyberrisk exercises marine insurers. 7 February.
4. OECD, "THE IMPACT OF MEGA SHIP",2015.
5. Allianz Global Corporate and Specialty (2017). Safety and Shipping Review 2017. Munich.
6. BCG (2015), "The Transformation Imperative in Container Shipping; Mastering the Next Big Wave", Boston Consulting Group
7. Bierwirth, C., and Meisel, F. (2010), "A survey of berth allocation and quay crane scheduling problems in container terminals", European Journal of Operational Research, 202(3), 615–627
8. Chen, F., Zhang, R. (2008), "Economic Viability of Mega-size Containership in Different Service Networks, Journal Shanghai Jiaotong University, 13:2, 221-225

Figure 1. world seaborne trade in 2017

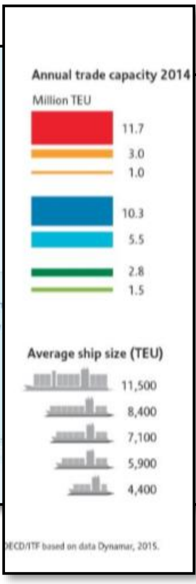


Figure 2. world seaborne trade by country group in 2017

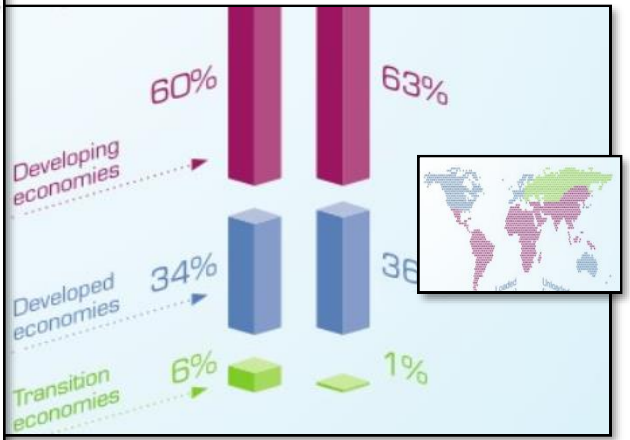


Figure 4. Major container trade routes 2010

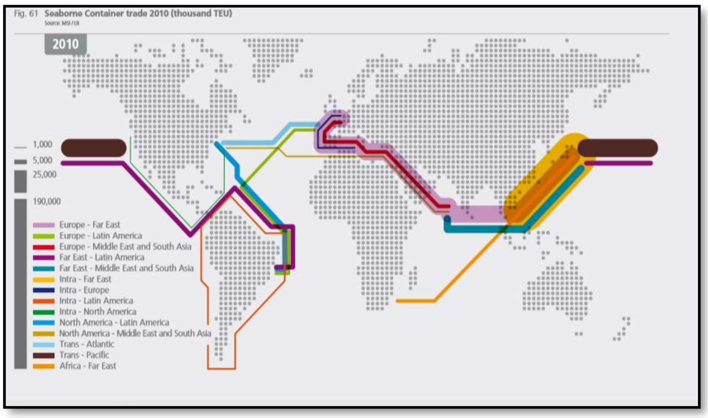


Figure 3. ship size on main trade line

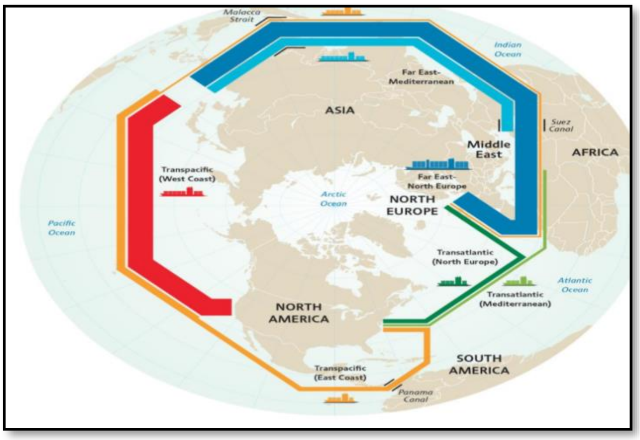


Figure 5. Major container trade routes 2030

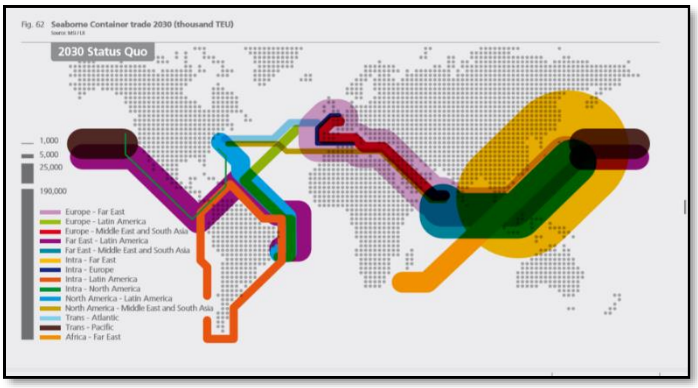


Figure 6. Ship dimension definition

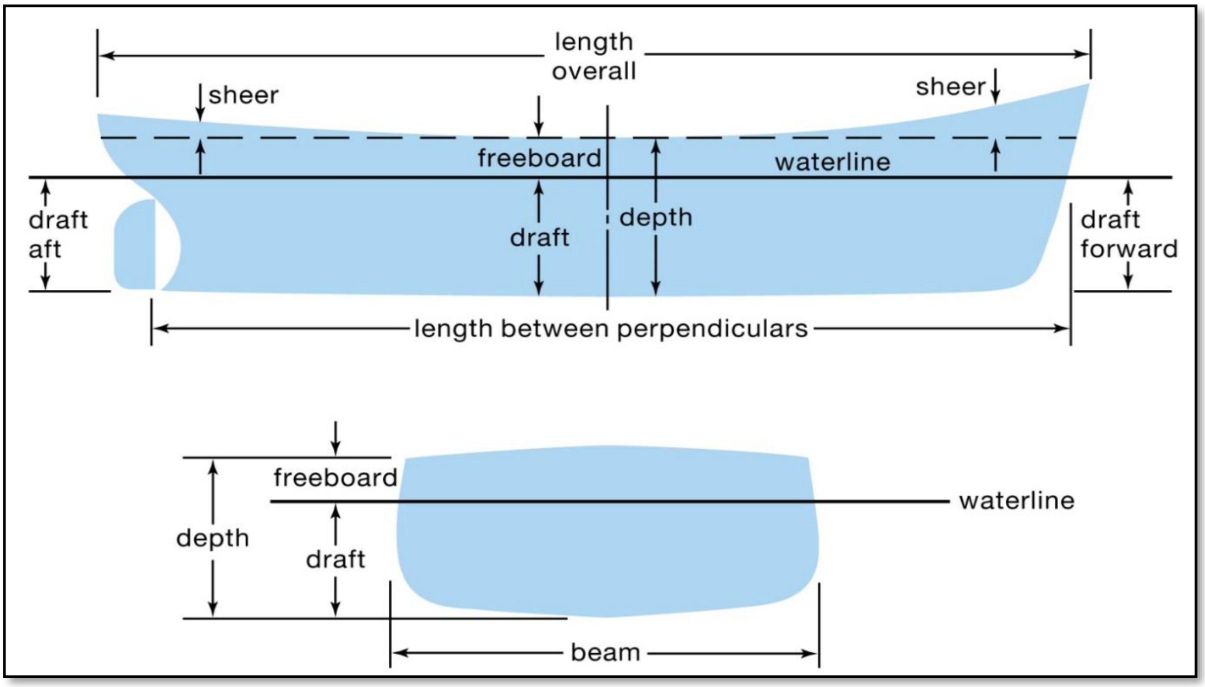


Figure 7. Ship planning and design requirement

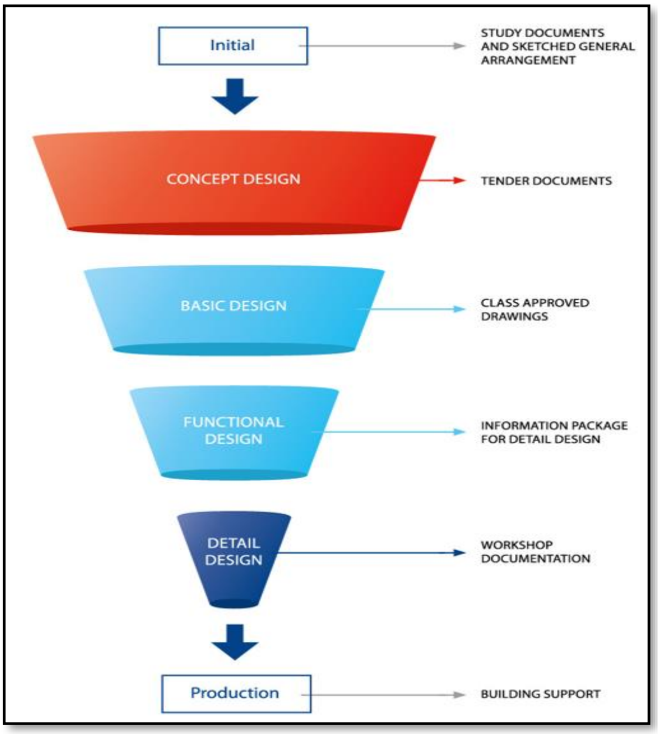


Figure 8. Ship size category

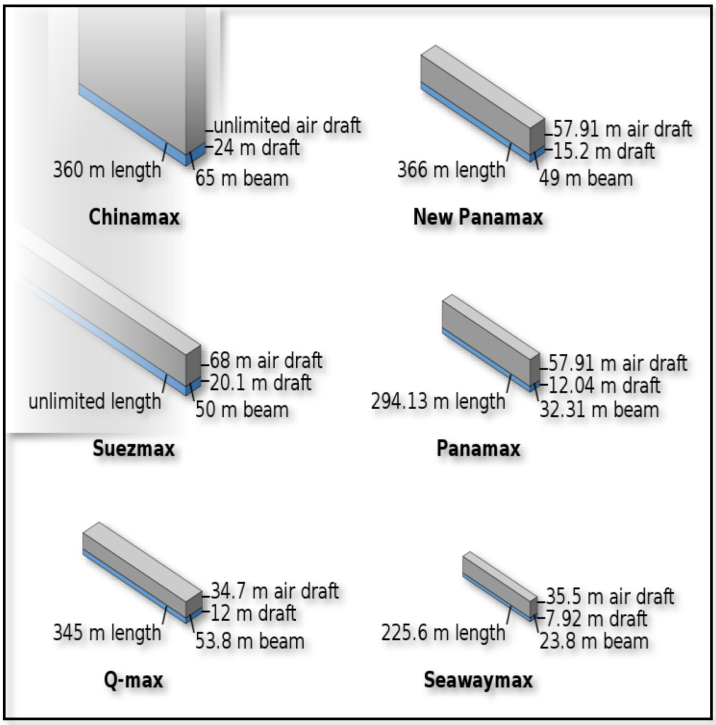


Figure 9. world fleet total number of ships by size

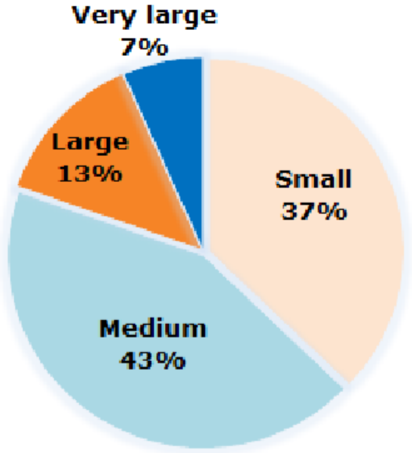


Figure 10. world fleet gross tonnage by size

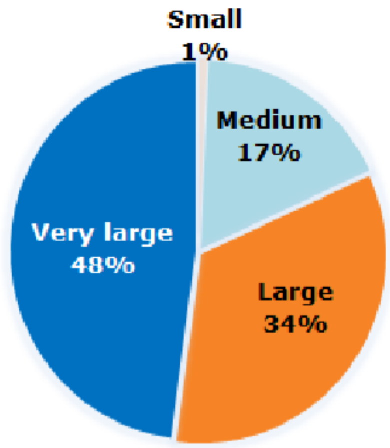
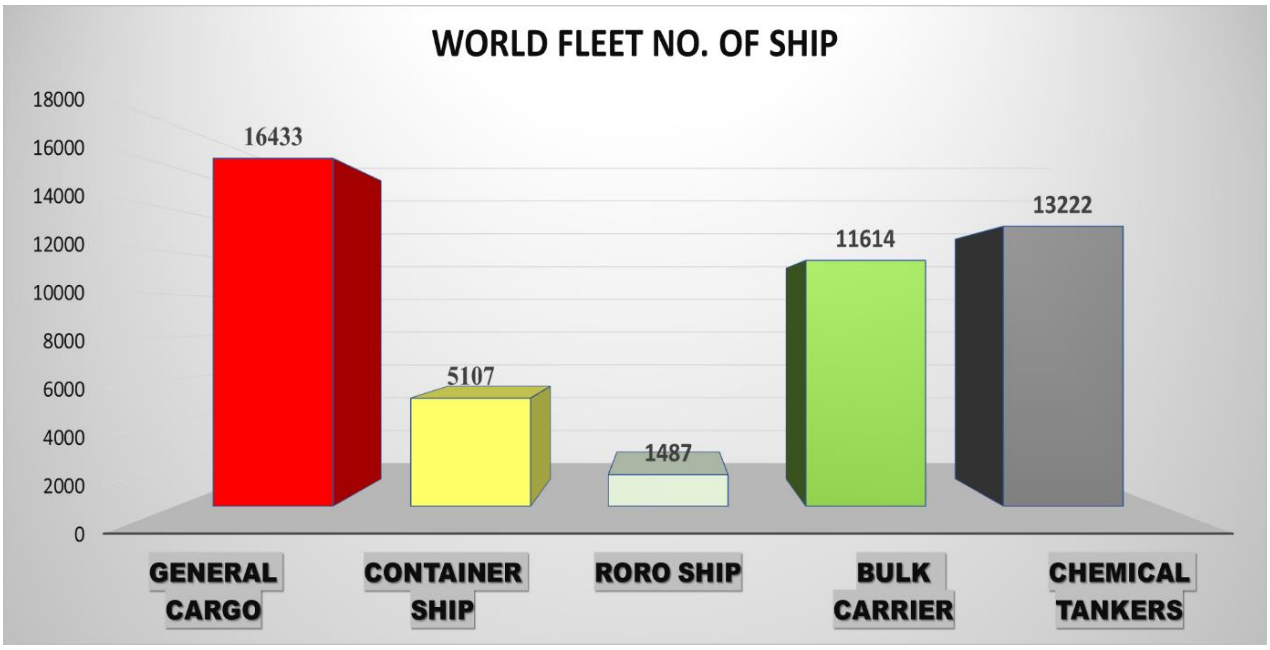
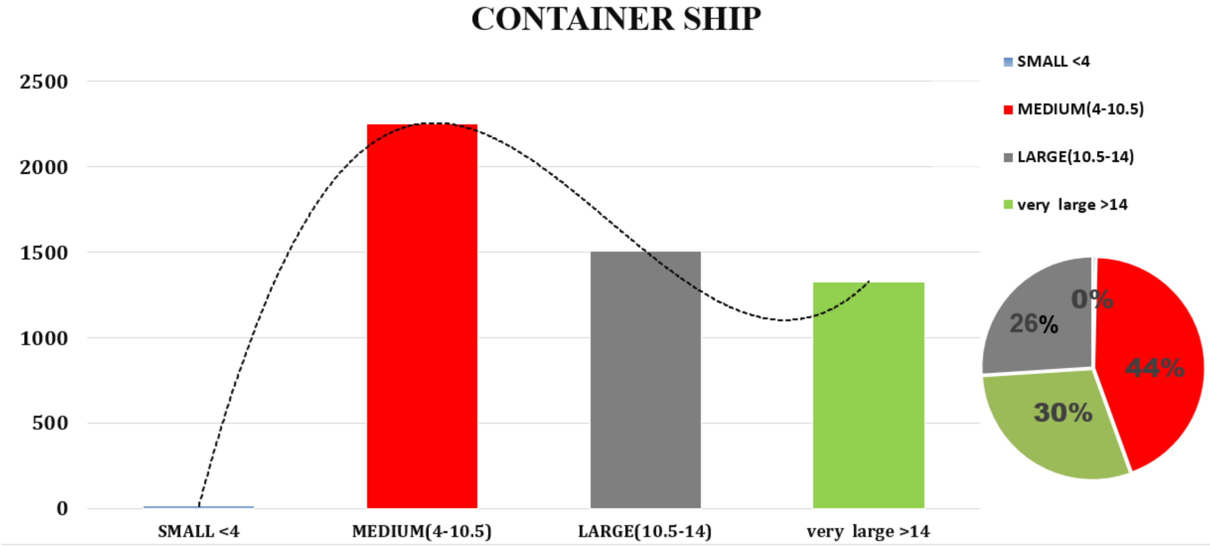


Figure 11. world fleet represent no of ship General Cargo Ships, Container Ships, Ro-Ro Cargo Ships, Bulk Carriers and Chemical Tankers

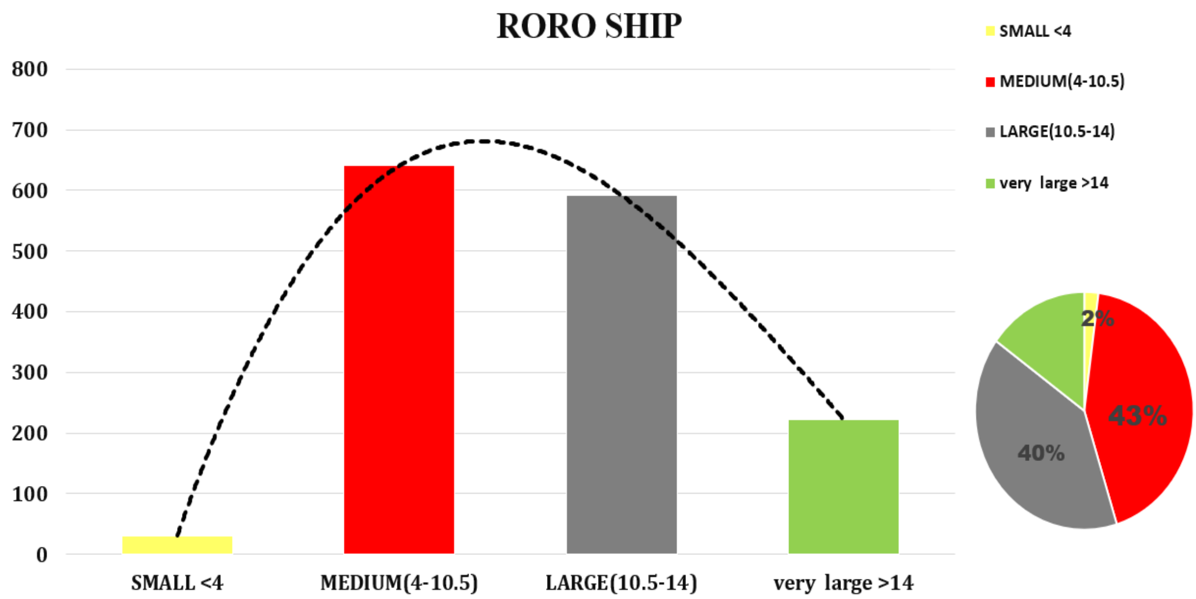


(1) GT<500 (2) 500≤GT<25.000 (3) 25.000≤GT<60.000 (4) GT≥60.000

Figures (12) show containership constru ction activity during the past thirty years

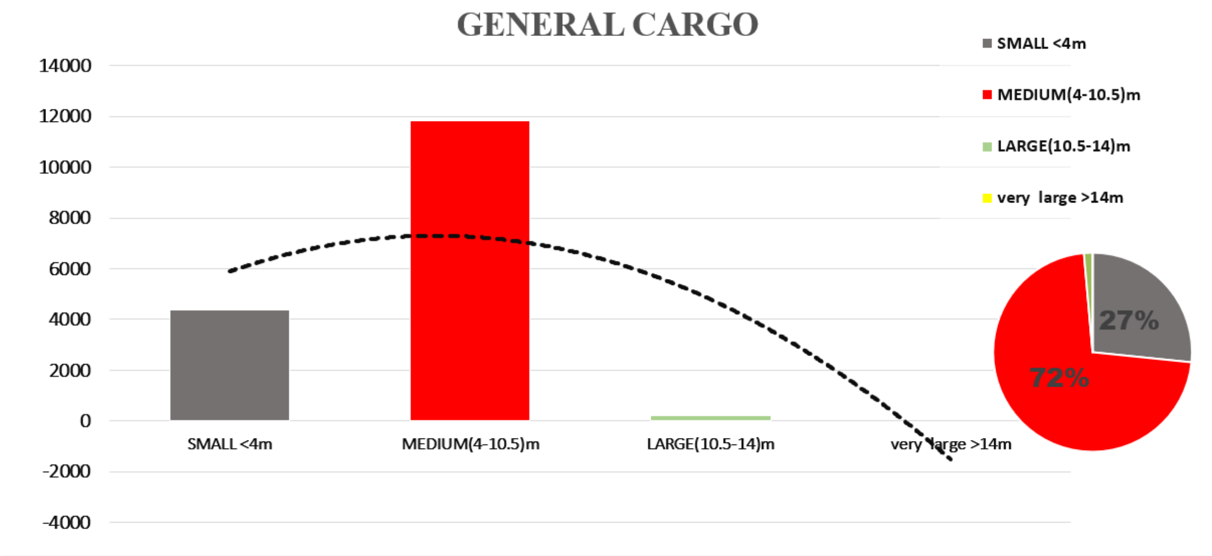


Figures (13) show roro ship construction activity during the past thirty years

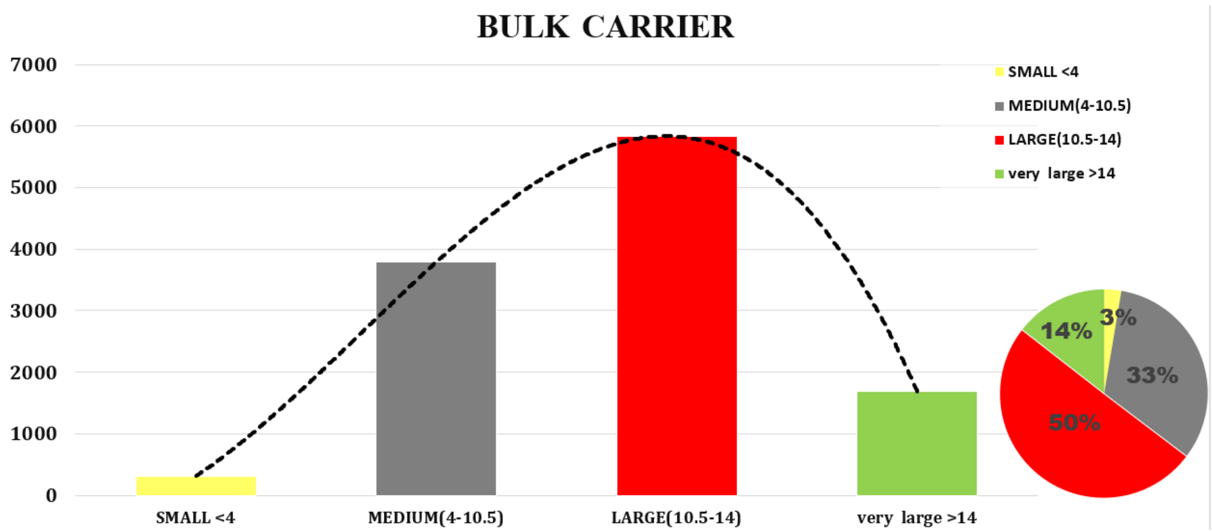


(1) GT<500 (2) 500≤GT<25.000 (3) 25.000≤GT<60.000 (4) GT≥60.000

Figures (14) show general cargo ship construction activity during the past thirty years



Figures (15) show bulk carrier ship construction activity during the past thirty



(1) GT<500 (2) 500≤GT<25.000 (3) 25.000≤GT<60.000 (4) GT≥60.000

Figures (16) the ship fleet less than 4m draft

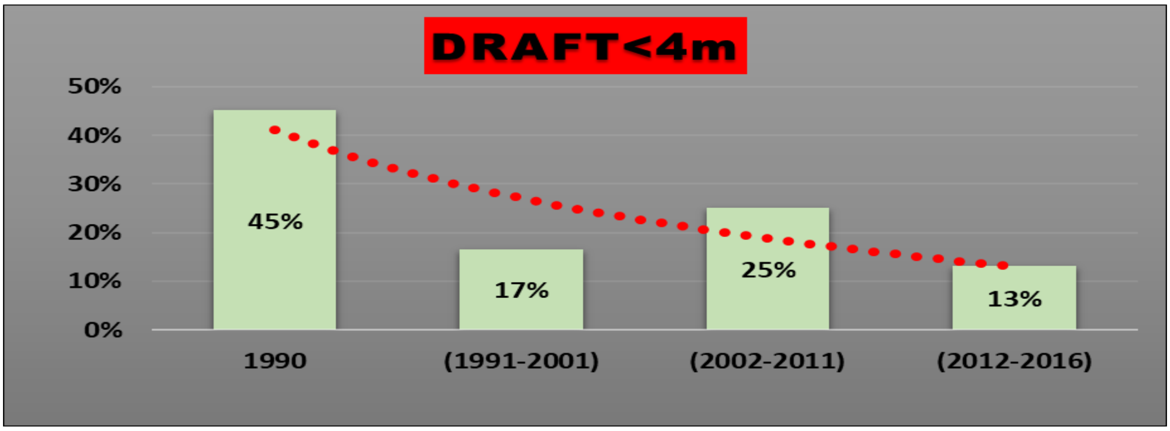
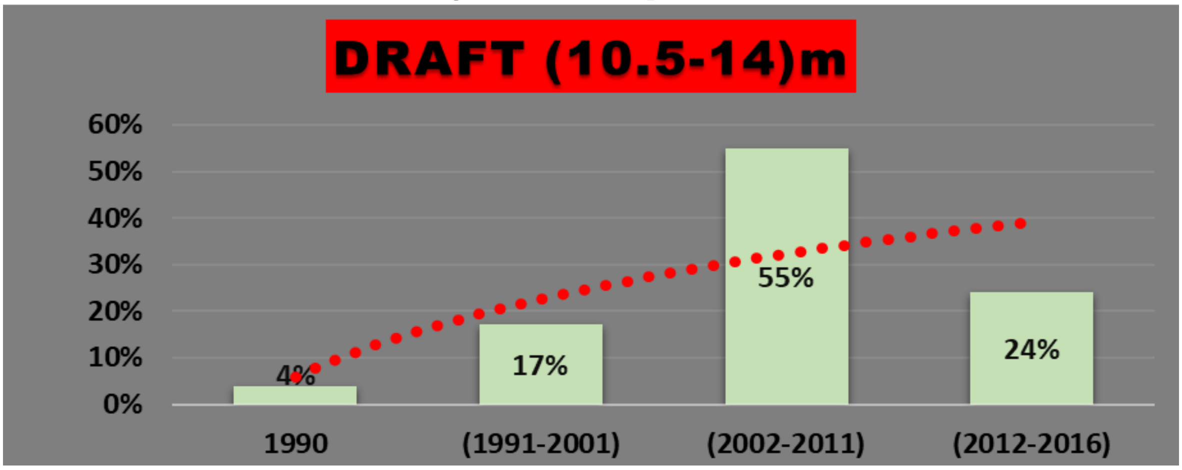
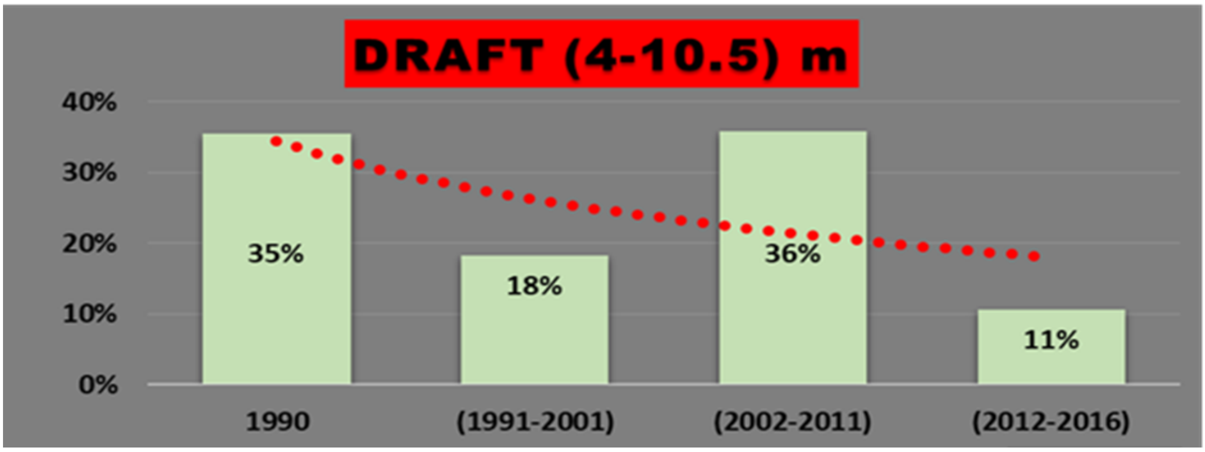


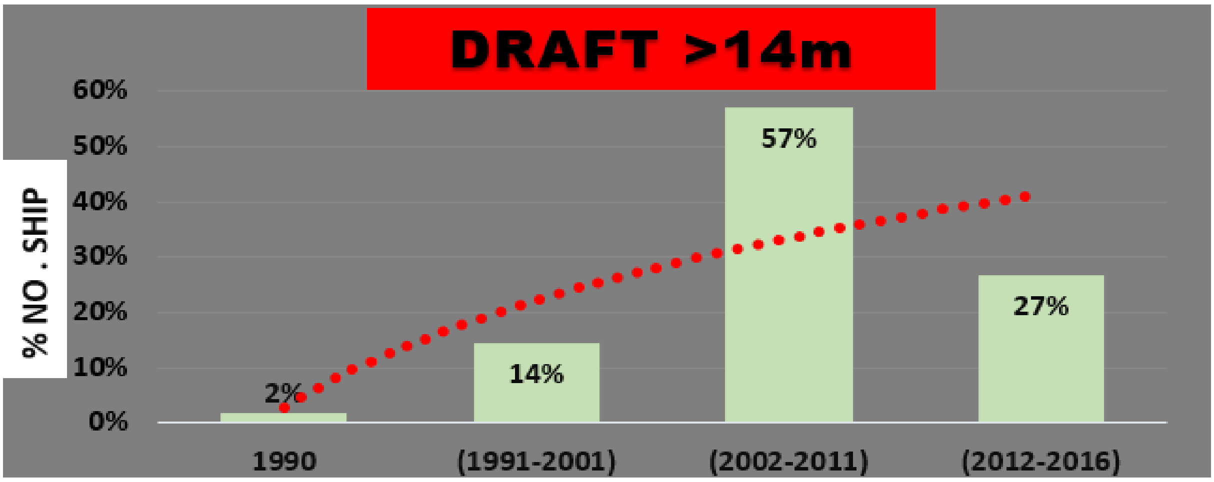
figure (17) the ship fleet (4



Figures (18) the ship fleet (10.4-14) m draft



Figures (19) the ship fleet more than 14 m draft



Figures (20) summary of ship fleet by type and draft

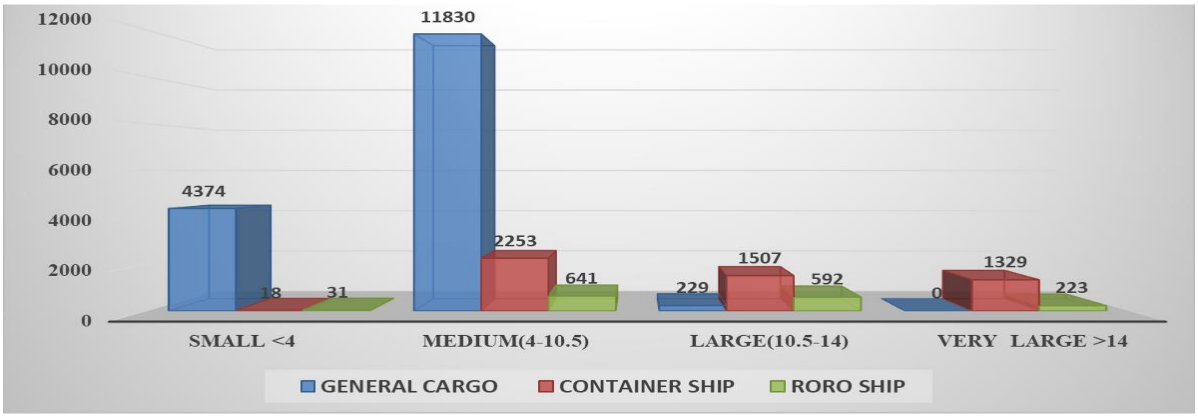


figure (21) – Ship Sightings by Geographical Area 2017

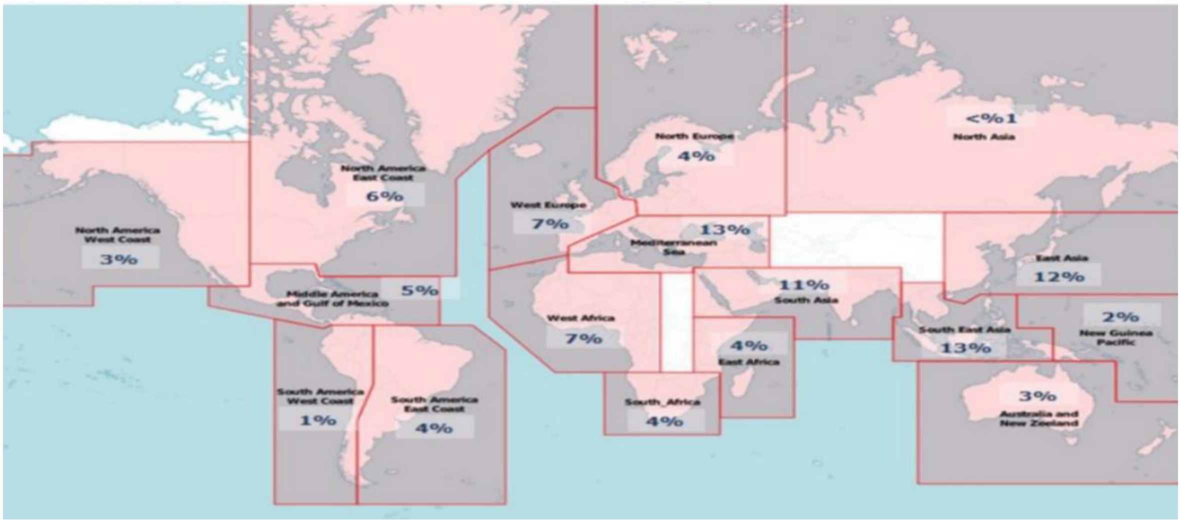


figure (22) – No. of ship and net ton evolution (1975-2018)

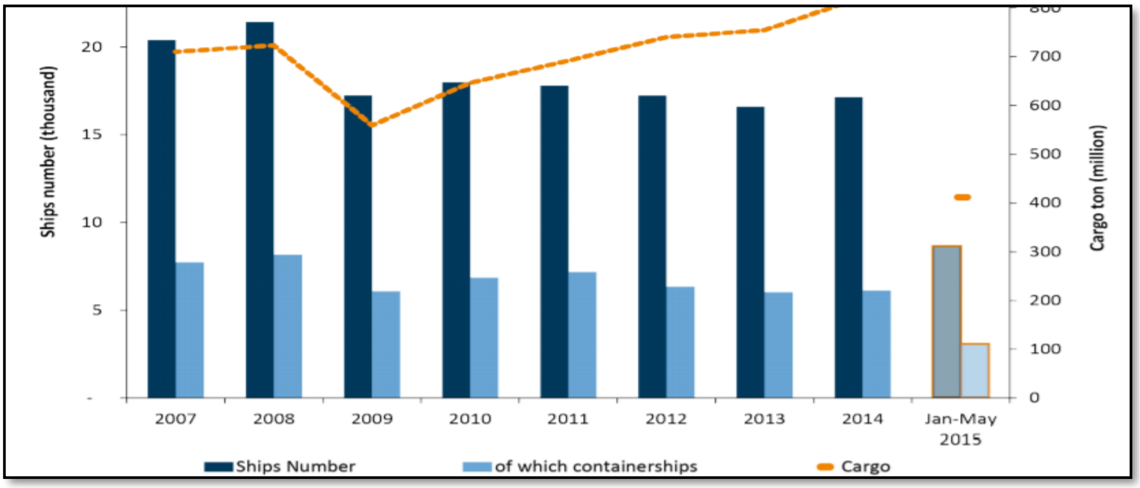


Figure (23) shows Suez Canal traffic as a percentage of world seaborne trade

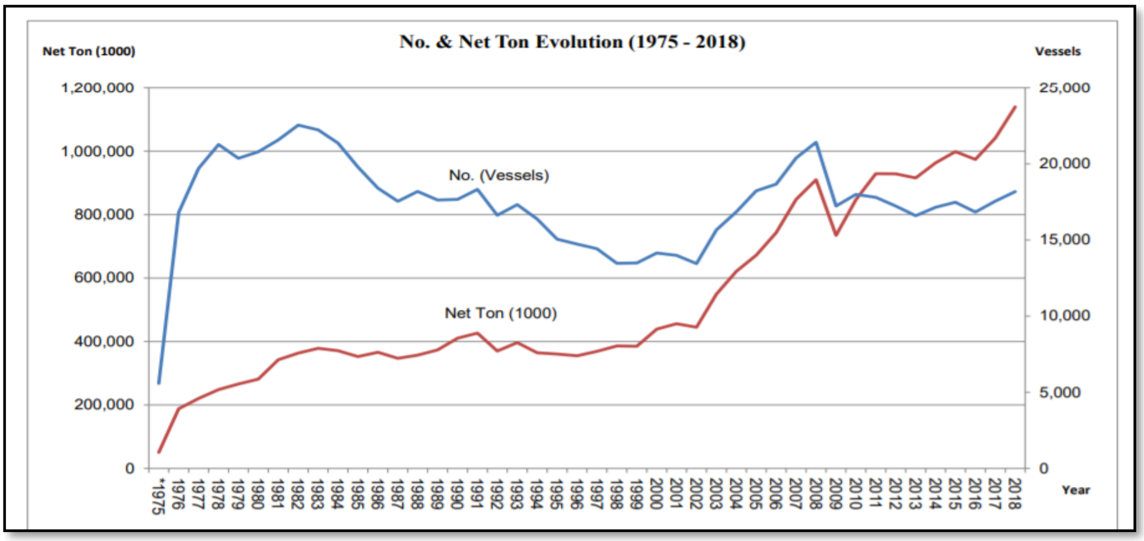


Figure (24) % of ship by type at Suez Canal

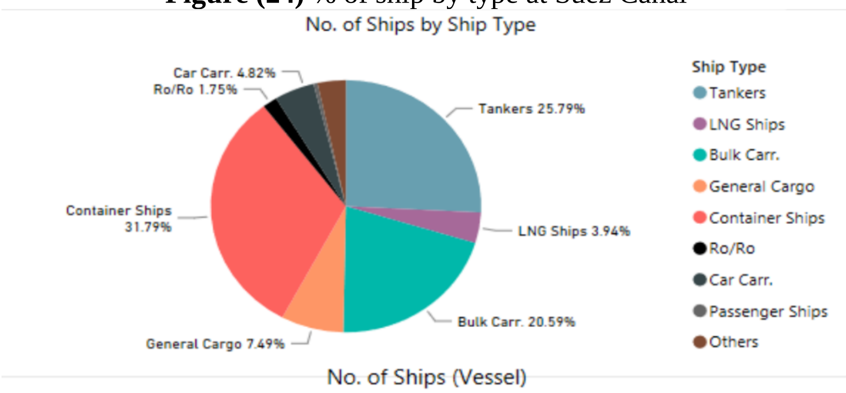


Figure (25) shows the forecast of Suez Canal according to (DAR ELHANDSA)

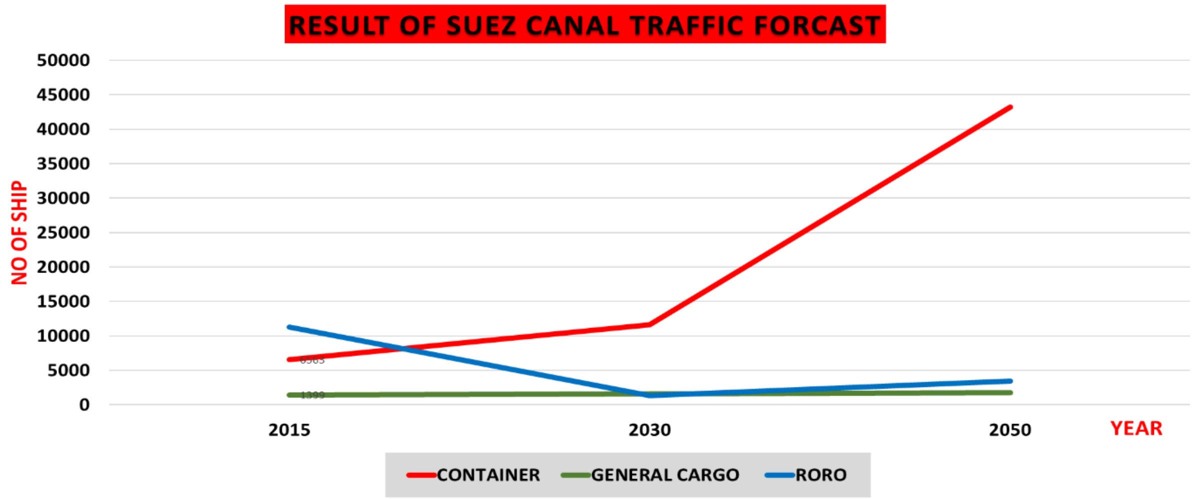


Figure (26) result of analysis required depth according to type

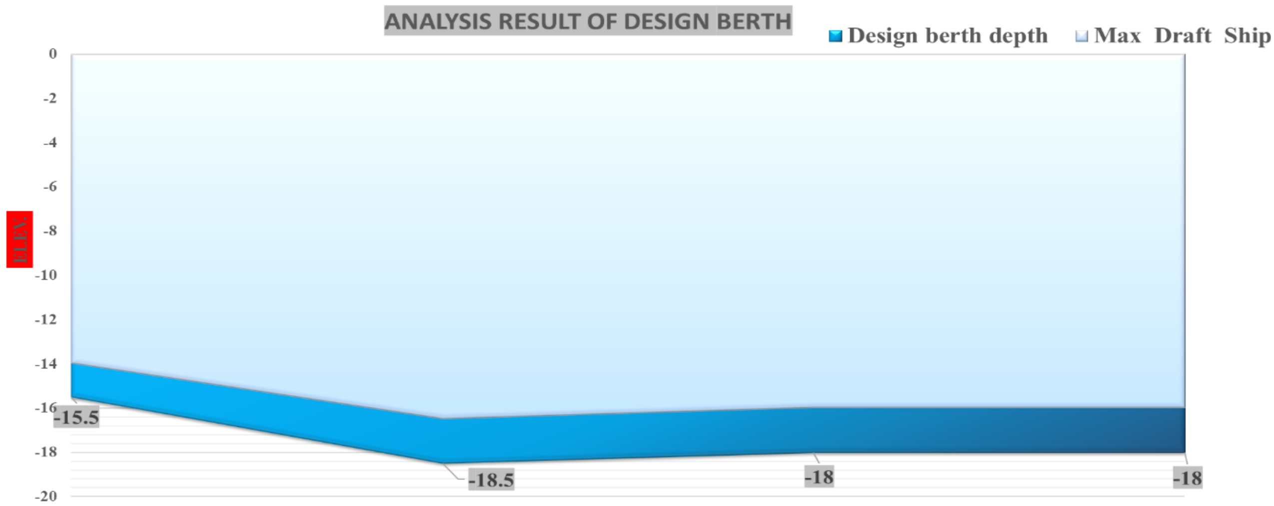


Figure (27) the current master plan of west port.

Figure (27) Development master plan of west port

Figure (28) suggested Abbas berth depth development according to trend ship draft.

Figure (29) suggested shereef berth depth development according to trend ship draft.

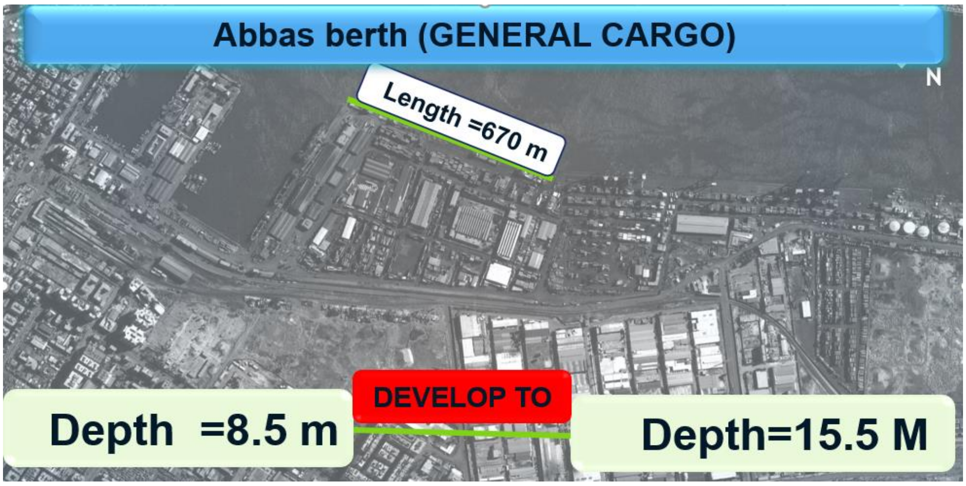


Figure (30) Master Plan of EAST PORT

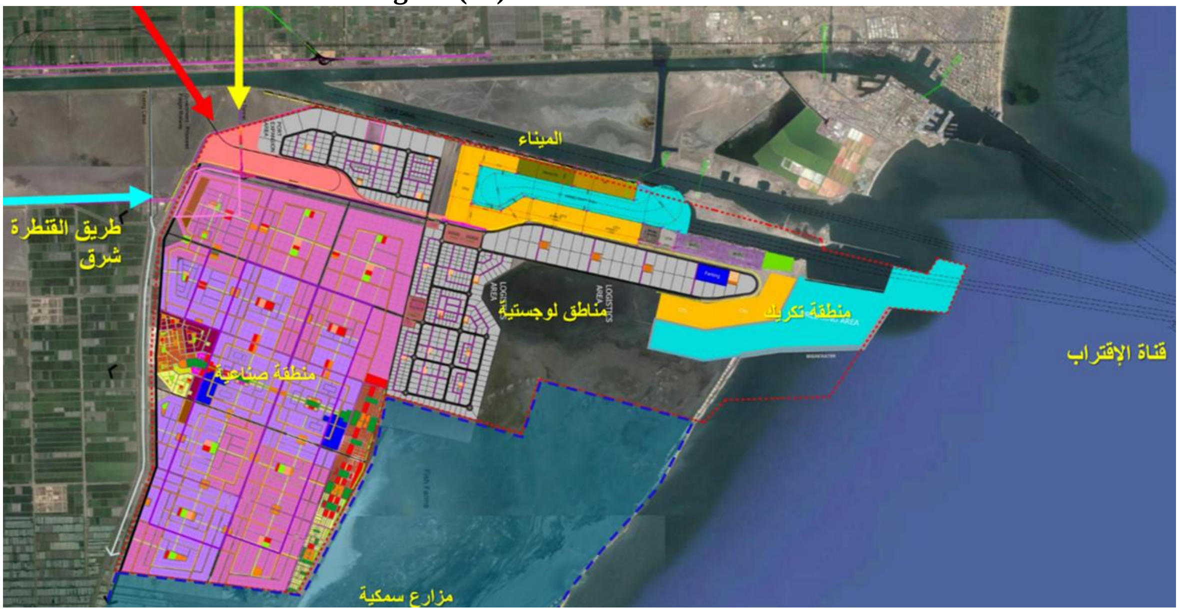


Figure (31) Development stages of EAST PORT

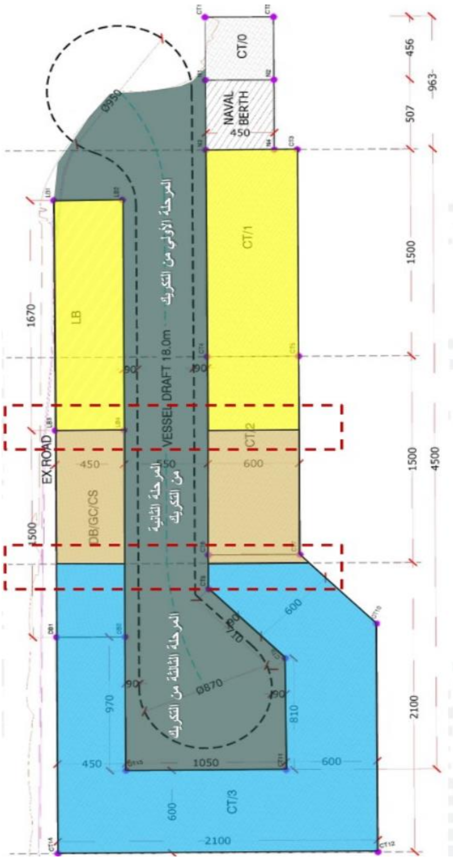


Figure (32) section of development berths of EAST PORT