

STUDY ON DEVELOPMENT OF BENGHAZI PORT.

MANAL SALEM ALI ABMDAS

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MANAL SALEM ALI ABMDAS

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by
MANAL SALEM ALI ABMDAS

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MANAL SALEM ALI ABMDAS, a Ph. D. student of Piri Reis University Maritime Transportation and Management Engineering ID 158015003, successfully defended the thesis entitled

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BİNGAZI LİMANININ GELİŞTİRLMESİ ÇALIŞMASI

APPROVED BY

Assoc. Prof. Dr. Ergun Demirel
(Thesis Supervisor)

Assoc. Prof. Dr. Metin ÇELİK.....

Asst. Prof. Dr. Dinçer BAYER

Asst. Prof. Dr. Mücahit ŞİŞLİOĞLU.....

Asst. Prof. Dr. Yavuz YÜCESOY

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DEDICATION

I dedicate this work to my beloved city of Benghazi my precious city that gave me existence.

MANAL ABMDAS



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This thesis was written for my Doctor of Philosophy degree in Maritime Transportation and Management Engineering, Piri Reis University.

To begin with, I might want to thank my family, who bolstered me to begin my instructive adventure. I recognize with appreciation the job of my companions, particularly the most seasoned, who were the principle driver of my prosperity , extremely exceptional on account of my dearest child for his boundless persistence, self-control and support amid this strenuous excursion.

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ABSTRACT

STUDY ON DEVELOPMENT OF BENGHAZI PORT.

As result of the Civil War and Foreign Intervention in Libya in 2011, damage and disorder from war has been considerable. There are frequent electric outages, little business activity, and a loss in revenues from oil by 90%. A third of country's population has fled to Tunisia as refugees. Main source of country, oil production has fallen from 1.6 million barrel per day to 900,000 in five years of war and civil disturbance. Despite periodic economic and political crisis, a considerable emerge of economic activity is expected in the near future in particular reconstruction of urban areas and infrastructure is expected soon. Shipping is one of the most important forms of transportation for global trade. Ports play an important and vital role in maritime transport chain, because it represents the link between road transport and maritime transport, in addition cannot be global trade that have an affair in absence of ports.

Benghazi port acquires importance and distinction of being a key ring and a centre link between many of regional countries in field of various economic transactions. Benghazi port is the second largest ports in Libya after the port of Tripoli and advantage of the port it serves a wide and large area includes eastern and southern Libya, and extend to west (Ras- Lanuf area), because importance economic and commercial of Benghazi city and as the largest also most important east cities of country and the second Libyan cities in terms of population

The aim of study is preparation of studies to improve Benghazi port in particular in civil works, to meet existing and future requirement of the Libya.

This study starts evaluation of economic activities which lead in understanding the logistics requirements of Libya as well as major difficulties in the different type of logistics operations. Then role of Benghazi Port in Libyan economy will be discussed to define port development requirements. In the light of these requirements an architectural design Study will be improved to shape future posture of the port. Based on this future posture possible civil work requirements will be considered.

This is an initial study which aims to define future works for development of Benghazi port to meet requirements of Libyan economy in next decade.

Key Words: Benghazi Port, Port Development, Maritime Transportation in Libya.

ÖZET

BİNGAZİ LİMANININ GELİŞTİRİLMESİ ÇALIŞMASI

2011 yılında Libya'da iç Savaş ve dış Müdahale sonucunda savaştan kaynaklanan büyük bir hasar ve yıkım ortaya çıkmıştır. Sürekli elektrik kesintileri nedeniyle, işletme faaliyetlerinde ve petrol gelirlerinde% 90'lık bir kayıp vardır, Ülke nüfusunun üçte biri mülteci olarak Tunus'a kaçmıştır. Ülkenin ana gelir kaynağı olan petrol üretimi günde 1,6 milyon varilden beş yıl süren iç savaş ve sivil düzensizlik sonucu 900 bin varile düşmüştür, Periyodik ekonomik ve politik krizlere rağmen, yakın gelecekte ekonomik faaliyetin yeniden düzene gireceği beklenmekte olup, özellikle kentsel alanların yeniden inşası ve altyapı tesislerinin süratle onarılması beklenmektedir.

Deniz ulaştırması bir ülkenin küresel ticarete katılabilmesi için hayati öneme haizdir. Limanlar ülke taşımacılığında hayati bir rol oynamaktadır, Çünkü limanlar deniz taşımacılığı ülke içindeki taşımacılığın bağlantı noktasıdır, Limanlar olmazsa ne ülke içi ne de küresel ticaret olamaz.

Bingazi limanı Trablus limanından sonra Libya'nın ikinci en büyük limanı olup; doğu ve güney Libya'yı kapsayan geniş bir alana hizmet vermektedir, Bingazi kenti ticaret ve nüfus bakımından ülkenin doğudaki en büyük şehri ve bölgenin hinterland merkezidir.

Çalışmanın amacı Libya'nın mevcut ve gelecekteki gereksinimlerini karşılamak için, özellikle inşaat işleri alanında Bingazi limanının iyileştirilmesi için gerekli çalışmaların hazırlanmasıdır.

Bu çalışma, Libya'nın mevcut ve gelecekteki lojistik ihtiyaçlarının karşılanmasına yönelik bir değerlendirme ile başlamaktadır. Daha sonra Libya ekonomisinde Bingazi Limanı'nın rolü dikkate alınarak, liman geliştirme gereksinimlerini tartışılacaktır. Bu gereksinimler ışığında, limanın gelecekteki görünümünü şekillendirmek üzere bir Mimari Tasarım Çalışması geliştirilecektir, Bu çalışma ışığında mümkün olabilecek inşaat gereksinimleri göz önüne alınacaktır.

Bu çalışma, önümüzdeki on yılda Libya ekonomisinin ihtiyaçlarını karşılamak için Bingazi limanının gelişimine yönelik gelecek çalışmaları tanımlamayı amaçlayan bir başlangıç çalışmasıdır.

Anahtar Kelimeler: Bingazi Limanı; Liman Geliştirme, Libya'nın Deniz Taşımacılığı.

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LIST OF ABBREVIATIONS

Libyan Marine Transport and Ports Authority	LMTPA
Foreign Direct Investment	FDI
Liquefied Petroleum Gas	LPG
Ports and Maritime Transport Authority	PMTA
Libyan Maritime Administration	LMA
State Port Company	SPC
Misurata Free Zone	MFZ
Rail-Mounted Gantries	RMG
Rubber Tyred Gantries	RTG
Electronic Data Interchange	EDI
International Ship and Port Facility Security Code	ISPS
Documentations Centres	D.C.



1. INTRODUCTION

1.1. General

This thesis discusses port development and improvement. It focuses more on developing one of Libyan ports (port of Benghazi). Argument in this thesis is that the port can greatly benefit from its strategic location on road to World Trade Asia, Europe and homeland expansive. It can become important logistics chains of soft regional and international trade, linking trade in the region to global supply chains. Thus, purpose of this research is to understand current situation of the port and to make recommendations on amendments to develop and improve architectural design and civil works at Benghazi port to compete with Mediterranean ports as well as to serve the eastern and south-eastern Libya.

Ports form the key facilitating nodes in international trade making them crucial for national and regional economic prosperity (UNCTAD, 2011a). Maritime transport is the dominant transport of international trade; it is the most cost-effective means of cargo transportation (UNCTAD, 2012). Additionally, demand for container-based trade continues to grow. This is due to its advantages, including cost and time efficiency (BLONIGEN, & WILSON, 2008). This escalating demand has influenced the size of container ships and consequently, ports' roles and specifications.

This study will say that ports that contribute most significantly to development of economies of countries.

Previous studies have shown it can benefit from greater connectivity to global markets,

Improve trade, through the development and improvement of port facilities. So, can the port to be a contract may be important for international trade among regional land-locked countries and rest of the world. Moreover, it can become important commercial centres in region, due to strategic locations.

As such, context of this research is Libyan ports industry. Libya is a spacious

developing country that occupies a strategic location at centre of south coast of Mediterranean Sea, along the key Asia-Europe international trade route. Its coastline is about 1,970 km in length. Libya is surrounded by six countries: Egypt, Sudan, Chad, Niger, Algeria and Tunisia. Two of these countries (Chad and Niger) are land-locked and depend entirely on transit countries such as Libya, Nigeria and Benin for sea transportation access.

In total, Libyan ports industry comprises 20 ports. Seven of these ports are general cargo ports, which handle containers, bulk cargo, and roll on/ roll off (RO/RO) and dry bulk. These include Tripoli, Benghazi, Misurata ‘Qasr Ahmed port’, Khoms, Tobruk, Derna and Zuwarah. They are all state owned and operated by two public companies under authority of the Libyan Marine Transport and Ports Authority (LMTPA). Other 11 ports are oil and petrochemical ports, which handle all oil trade, main driver of Libya’s economy. Another port, called Misurata Steel port, handles steel trade through the Misurata Steel Complex.

Ninety percent of Libya’s international trade, which mainly comprises imports, is processed by its ports (BANK, 2014). Table 1.1 shows the significant difference between Libyan exports and imports during the period 2005-2014.

Despite dramatic increase in demand for containerization (BEŠKOVNIK, 2008), the maximum container throughput of all Libyan ports has not exceeded one million TEUs per year since being built. This indicates that Libyan ports are underperforming.

To achieve development in Benghazi port, including containers must adopt strategies such as new designs of port infrastructure and sophisticated, long-term planning, cargo handling equipment more effectively, the largest storage yards, and advanced information technology, programming and software.

Factors with an impact on successful port development – forecast of (handling) potential and its implication – land strategy – transport planning, hinterland connections and modal split.

Port development planning relies on in-depth knowledge about future development of all major influencing factors. It relies on surveys to obtain information, and assessments to be able to set realistic expectations, a number of challenges have prevented Libyan ports from taking optimal advantage of location opportunities; literature specifically notes that these challenges have undermined Libyan ports from efficiently facilitating regional trade

movement, particularly to the land-locked countries south of Libya. Moreover, these challenges have undermined Libyan ports from becoming trading hubs to facilitate transshipment of international trade cargo, thus, Libyan ports are ranked poorly internationally.

Table 1.1. Regional Trade Value Statistics in US Million Dollars (Source: ITC (2015) and UNCTAD (2011c)).

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Libya	Imports	5,033	6,196	6,749	9,116	12,859	17,674	7,114	19,719	24,417	25,623
	Exports	30,948	31,632	32,503	44,696	27,256	36,440	18,734	58,267	42,221	44,567

All these failures seem to be due to deficiencies in capacity of Libyan logistics related institutions, including ports. Conclusion is that they are caused, directly or indirectly, by persistent political and economic mismanagement. In this regard, much blame can be laid on constant conflicts between Libya and its neighbouring countries during Gaddafi's regime. All of these political issues led to Libya's isolation from international community, along with a lack of economic cooperation between Libya and international community in general, and neighbouring countries in particular. Examples include Libya's failure to establish effective trade corridors with its land-locked neighbours because of political conflicts between Libya and its southern neighbours-no railways or roads. Likewise, there is very little hinterland connection infrastructure with any of neighbouring countries. This is mostly because of political instability in region. During Gaddafi's regime, in addition, sanctions implemented by international community between 1992 and 2003, because of internationally condemned behaviour of the regime, affected all aspects of economy thus greatly undermining Libya's international trade capacity, capacity of its ports to grow.

Considering that all ports in Libya are state owned and operated, political and economic mismanagement has resulted in a failure to invest in vital economic infrastructure, especially ports. Desire to retain power and control of all aspects of country meant that state, particularly Gaddafi regime, refused to allow private sector participation in port development and management. This has had an influence on decisions regarding port resourcing and management.

With regard to economic factors Libya and focused on oil exports, the main engine of its economy. Payment of interesting ports of oil more than ports of cargo and containers,

and public ports. This has reduced the volume of cargo handled by the Libyan ports, and limited performance of port capacity of the port of effects in both developed and developing economies. Proof of this is that container ships of new generation are served by a small number of container ports. Although literature contains a number of studies on factors that affect the performance of container port in advanced economies (STATES, 2015) Moreover, literature shows that very few of these studies have focused on Libyan ports. So this study plays an important role in preparation of studies for development of main port of eastern Libya respects the architectural and civil works. In addition, results of this study contribute to providing effective steps to develop the port to align ports of southern Mediterranean and opportunity can also be used as a tool to support decision making for development of the port.

1.2. The Importance of Libya to Africa and Importance of Benghazi Libya

Based on its privileged location, if some developmental steps are taken, particularly in field of infrastructure, and supported by rational economic policies, Libya is qualified to be the gateway to North Africa on Mediterranean. It is based in North Africa with a coast of more than 1,900 km on Mediterranean. This coastline is connected (east to west and south) with a network of roads and a range of ports and airports that, if developed, can increase importance of this site and its strategic dimension to African continent, Libya even though its commercial trade with Africa is low, has potential to be a conduit for transit trade linking many African countries, especially those in middle of continent, which have no sea ports and world. These countries are within the ground area (import and export back) of Libyan ports. A non-simple part (which cannot be estimated in absence of data) of imports of some of these countries passes through Libya informally. This is in addition to relief shipments that come to these countries (in times of crisis and disaster) from donor countries. In all crises that took place in Central African countries, Libya was open in all its ports and airports (especially in Benghazi port and its airport) to world for relief of these countries. Volume of trade exchange of African continent with outside world is large and increasing.

This confirms unequivocally the importance of the role that Libya can play in the transit trade, from and to the African continent, especially in the centre and south.

With regard to the city of Benghazi is one of the cities of Libya is one of cities of Libya, overlooking coast of Mediterranean, and away from capital Tripoli about 1023 km, and is believed to be beginning of its establishment dates back to fifth century BC, the second largest Libyan cities in terms of population, and the number of 631.555 people according to statistics in 2011, in addition to its strategic location and density of its population. Therefore, a number of institutions and organizations were selected as capital and headquarters of Benghazi, notably Libyan Parliament, National Library, Libyan Airlines and National Oil Corporation, as capital of Libyan culture, and increased importance of the city to population after 1964 after discovery of oil (COMBAZ, E. 2014).

1.2.1. Libyan Economy Situation

Economy of Libya depends primarily upon revenues from petroleum sector, which contributes practically all export earnings and over half of GDP. These oil revenues and a small population have given Libya the highest nominal per capita GDP in Africa.

After 2000, Libya recorded favourable growth rates with an estimated 10.6% growth of GDP in 2010. This development was interrupted by Libyan civil war, which resulted in contraction of economy by 62.1% in 2011. After war economy rebounded by 104.5% in 2012, but it has yet to achieve its pre-war level (BANK, 2014).

1.2.1. Geography and Population

Libya is mediating north coast of African continent. Its Mediterranean coastline is about 1,900 km long. It also has a depth of 1200 km south, where it occupies a large share of desert area in heart of continent, this vast location and geography of 1.75 million km² give Libya a diversity of nature and climate, enchanted by charm of coast and desert, making it an attraction for a wide range of visitors, tourists, businessmen and investors. For population, Libya is a country with low population density. At independence 1951, population was about 1.5 million people. Following results of ten-year population statistics, the size of Libyan population grew during last half of last century (1954-1995) by more than 3.6% annually. In period 1995-2006, however, population growth rate declined to 1.9%, by all accounts, given size of 5.3 million Libyan population in 2006, Libya remains a country with relatively low population density 3 people in one km²

(BANK, 2014).

1.2.3. Gross Domestic Product

Despite money spent on development (both economic and social) over last four decades, and policies decided to diversify sources of income and find alternatives to imports, Libyan economy still depends mainly on oil sector, which produced more than 30% of output Gross domestic product during 1990s. Moreover, relative importance of this sector has increased significantly over years, in last five years, where average contribution of this sector to GDP was about 51.7% during 2000-2004; GDP grew at a modest rate during the same period. Average growth rate in real GDP was about 4.4%. Average annual growth rate in GDP at market prices was about 2.7%, in addition, average per capita income of Libyan current prices jumped from 2431.2 dinars in 1995 to 10243.6 in 2006 (ALAM et al, 2009).

1.2.4. Manpower and Employment

- The main source of employment in Libya appears to have been (and remains) in public sector. Only 54% of Libyan workers were in public administration. This percentage increased to 60% in 2003. Not to mention large numbers working in institutions and institutions and companies owned by community, whose, employees account for more than 10% of volume of use.
- Unemployment rate in 1995 was about 11%, and rose to about 17.3% in 2003.
- Share of women in labour force remains modest, ranging from 14.4% in 1995 to 19.3% in 2003.
- By tracking unemployment data during last three decades of last century and first decade of this century, we can conclude following conclusions:
- Lack of an effective economic policy to address problem of unemployment in Libyan economy.
- Lack of understanding of the economic authorities of causes and roots of this problem, and hence absence of proper diagnosis of all dimensions to ensure development of policies and take action to ensure their elimination, Benghazi is the second largest population group after Tripoli. At 2006, population of Benghazi reached 670,797 people

(620,247 Libyans and 47,950 foreigners). Total population of Benghazi is about 11.8% of total population, in economic and social survey carried out by National Information and Documentation Authority in 2003, unemployment rate in Benghazi was 21.6% (20.2% among males and 26.2% among females).

1.2.5. Foreign Trade, Tourism and Libyan Investment Policy

Foreign trade sector is highly interested in economic policy agenda because of its significant role in economic activity in Libya. Economic and financial policies have given special attention to this sector over past five years by reviewing legislation and procedures governing this activity in order to liberalize and develop it in line with economic developments at local and international levels, volume of foreign trade (exports and imports) between Libya and world has shown different growth rates fluctuating between negative and positive over the past 11 years. However, final result of developments in this sector was a net increase of 30.5%.

All these fluctuations in volume of foreign trade during period mentioned can simply be attributed to acquisition of oil to share of the largest exports that are affected by conditions of international oil markets, data of Oil Ministry shows clearly relative importance of oil exports to total Libyan exports. Percentage of oil exports to total exports exceeded 90% in all years, but averaged 95% during the period; through Ministry of Oil data show impact of fluctuations in crude oil prices on volume of Libyan trade with abroad, where period 1995-2003 showed a significant fluctuation in volume of trade exchange from year to year. This observation confirms sharp increase between 2003 and 2005 (an increase of 157%). This is all due to fluctuations in crude oil prices. It is clear that improvement in oil prices in international markets since end of 2003 led to an increase in export revenues from 11487.4 million \$ in 2003 to reach 28848.8 million \$ in 2005, it should be noted that favourable developments in oil market contributed significantly to increase in external current account surplus, which amounted to about 24% of GDP and led to an increase in international reserves reaching about 24 months of imports in 2005.

The Degree of Openness of the Libyan Economy: to identify the importance of foreign trade sector and role it plays in national economy, an important indicator is ratio of foreign trade to GDP; this indicator is sometimes referred to as degree of exposure to outside world, sometimes called degree of openness. In all cases, it is a measure of degree

of correlation between national economy and global economy, and sensitivity of national economy to fluctuations in international markets (LIBAYAN ECONOMY. 2000).

Geographical Distribution of Foreign Trade: geographical distribution of Libyan exports and imports shows that European Union is Libya's most important partner in its foreign trade, both in terms of exports and imports.

At 2005 Libya's exports to accounted for 91% of total exports. European Union is ranked second, followed by Asian countries, followed by Arab countries, followed by Latin America 4th, African countries, with exports and imports at 0.3% and 0.4%, respectively see Fig.1.1.

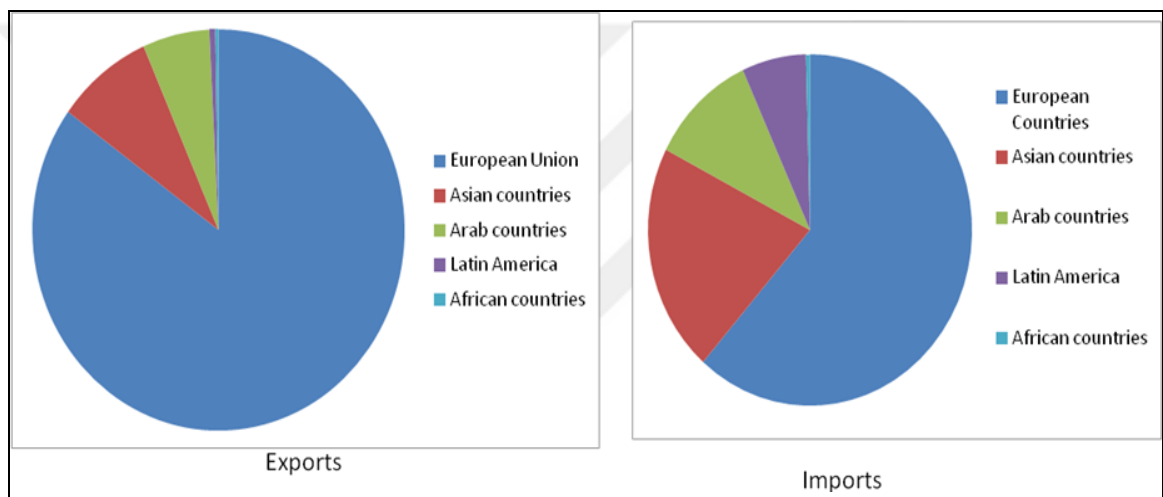


Fig1.1. Geographical Distribution of Libya's Exports and Imports (Average 1995-2005).

Trade Policy: in terms of trade policy, in 2005 Libya took some measures on path of economic reform and opening up. It has simplified customs tariffs, relaxed restrictions on foreign trade by reducing the negative list of imports from 31 items to 17 items, reduced tariff items to two items (10% on tobacco and 0% for all other products), and all imported goods were subject to a service charge 4%.

Tourism is one of fastest growing services of this century. Growth is expected to increase in coming decades. All countries compete to create an attractive tourist environment.

As tourism is an export activity, it plays an important role in creating and increasing employment opportunities and in correcting balance of payments imbalances. Therefore, all

countries are racing to develop their resources and tourism potential, one of structural changes that can be said to have taken place in Libyan economy in past five years is attention and focus on tourism sector.

It is a large country with a diverse tourist map. As we mentioned previously, Libya has a long coastline on Mediterranean and its beaches are charming and attractive (EUROMONITOR 2011).

Also extends more than 1200 km in heart of African continent gives it advantage of attraction for lovers of desert tourism. In its west, there are traces of Roman civilization (Lebda and Sabrata), in east there are traces of Greek civilization (in Shehat), and valley of Morcos, one of holy places in Christianity, for those who wish religious tourism.

A country in which all these large and diverse tourism possibilities are available has right to develop and exploit them. Tourism is one of the most promising areas in Libyan economy to which foreign and domestic investment can be directed. It can become an important source of income and employment for a large number of manpower, in addition to being an important source of foreign exchange, tourism is part of many different sectors. It is part of an integrated and interconnected fabric of various products and services, such as various types of transport services, hotels, restaurants, entertainment, museums, retail and other telecommunications services, banks and traditional industries. Demand for tourism is a demand (direct and indirect) for all these different services and products, some North African countries, such as Egypt, Tunisia and Morocco, have benefited greatly from tourism impact of their economies, helping them to solve (even partially) problem of unemployment and their balance of payments. Libya is also able to benefit from its tourism potential and to develop it in a way that contributes to solving the problem of unemployment and diversifying sources of foreign exchange.

The eighties and nineties, of last century were characterized by full state control over economic activity. State was the main but only investor in economy, and private sector had little to do with either current restrictive investment laws or uncertainties and uncertainties of country's economic policies. Even with trend to revive role of private sector in economic activity, which emerged in late 1980s, private sector structures remained weak, their role in economic activity was generally weak, and their contribution to investment was small (GHASHAT, 2011).

Libyan economy underwent an appalling experience during 1980s: a scarcity of financial resources due to a sharp drop in oil prices or a vast public sector, massive unemployment in all sectors of the economy, very low productivity; a structural deficit that cannot be dealt with under available financial resources and a balance of payments imbalance has led to a severe shortage of foreign exchange reserves, all these problems have been exacerbated by long-standing economic and air embargo. This experience has created panic among competent authorities in Libyan state, fearful of repeating it again, especially as the most important reasons (at all) were unfavourable conditions in the global oil market. This excessive fear of jurisdiction has also engendered the concern of foreign exchange that it has become the main constraint on development. Result was that state adopted a tight monetary policy and adopted a number of austerity measures, even reaching point of extremism in rationalizing public expenditure. Development spending was the most utilitarian tool in hands of state. The largest share of reduction and rationalization process was achieved. Implementation of many public development projects in economy was abandoned and process of development became almost complete (UNCTAD, 2012).

The first of these are infrastructure projects such as airports, ports, roads, housing projects, utilities and other infrastructure projects such as education, health and telecommunications, role of investment in promoting growth and development: investment generally represents an increase in composition of fixed capital, and investment is generally not self-demanding but is required as a means of development, that is, an effective tool for achieving a range of important objectives (U.S. DEPARTMENT OF STATE. 2011).

Firstly: investment is main driver of development, because it is recognized that economic growth movement of any society, and hence development movement in it, is closely related to pattern of investment in quantity and quality. No economy (developing or advanced) can grow and achieve development unless there is a net increase in volume of its investments. Investment can increase productivity in economy, leading to production of more goods and services, thereby increasing national output and raising standard of living of community (LIBYAN GENERAL NATIONAL CONGRESS 2013).

Increase in population requires provision of more private consumer goods and public goods, such as health, education and other infrastructure services. Production of such goods and services should grow at least at rates similar to those of population so that level of well-being of individuals is not affected, as Libya's population continues to grow, it must

be matched by a higher rate of growth in GDP. However, rate of growth in GDP at constant prices (1986) grew at a rate of 2.2% annually during period 1985-1995.

While increase rate in population was 3.3% annually, during same period, resulted in a decrease in real per capita income, and thus decrease in goods and services, and consequently the low standard of living and well-being, reversal of this downward trend in standard of living of members of society can only be achieved through production of more goods and services. This will only be achieved by increasing investment spending; whether in form of increased public sector investment or by allowing domestic private investment to operate, foreigner enters.

Given scarcity of financial resources in public sector and own level of its performance; the best option on road to development is domestic and foreign private investment. Therefore, interest in investment and prospect of its prospects is a matter of interest in economic growth and economic development. *Secondly*: the large expansion of economic role of state during 1980s was, of course, at expense of private sector and marginalization of its role in production process. This has led to two fundamental problems:

a. Significant increase in volume of employment in public sector, which has become only source of employment in Libyan economy.

b. General budget deficit is aggravated by: growing increase in spending Lack of sovereign resources due to decline of the most important sources, private sector, here, perhaps, it would be useful to revive and encourage role of private investment. If it does its full role and increases its revenues, it will be alternative vessel that provides potential for absorbing surplus labour in the public sector and new entrants into labour market in Libyan economy, to emphasize importance of role of private investment in providing jobs in Libyan economy, despite many constraints that still constrain the start of this sector, its role was to absorb a significant part of significant increase in labour supply during period 1984-1995. Number of private projects increased from 45630 in 1984 to 139710 in 1995. This increase contributed to absorption of 20,642 workers, equivalent to 45% of increase in labour supply during period of 45,647 workers, while state-owned enterprises, which are supposed to be main employer in Libyan economy, absorbed only about 10% of this increase.

Thirdly: contemporary economic development literature gathers that foreign direct investment can play an important role in development strategy adopted by any developing country. Most developing countries, if not all, seek to attract foreign direct investment as an integral component of domestic investment, to achieve the most important elements or components of economic development, which these countries seek to achieve their priorities, although it is difficult to assess the effects of FDI in these countries precisely because they are multiple and spread in large areas, many of which are inherently non-quantifiable, it is certain that foreign direct investment can bring more benefits to host country than just flow finance resource, these benefits, which constitute a basket of important assets provided by FDI and enhance its development role in host country, are provision of capital, advanced technology, strengthening of country's competitive capabilities, enhancement of technical and administrative capacity, preservation of environment and provision of foreign exchange, thus, FDI can provide more than just providing financial resources to host country. It can also establish practical linkages between host country's business and foreign partners. These foreign partners, with investment and technology expertise and access to markets not available in host country, can increase productivity and efficiency of these institutions. Economy of host country also benefits from additional economic activities, job creation and tax revenue levied on such activities. Entry of foreign companies into local economy increases level of competition in local markets, reduces monopoly exploitation, and stimulates all companies operating in sector concerned to improve quality of products and services. 1995 study of 69 developing countries showed that FDI stimulates economic growth and has a greater impact on domestic investment. It also showed that it appears to complement domestic investment, and it does not compete at all, these and other considerations should encourage domestic and foreign investment, by creating an appropriate investment climate. Investment climate is a set of laws and economic institutions that enhance investor confidence, and convince them to make investment decisions. An important factor in this mix, which is investment climate, is country's fiscal policy, although all elements of fiscal policy (Spending, Taxes and Budget) are important in antiquities.

Availability of infrastructure, with necessary quantity and quality, will increase competitiveness of economy in foreign markets. In order to increase export potential, country needs to link its economy to external economies through a good network of airports, ports and roads, and a network of fast and sophisticated communications, for all

this, state will continue to play an essential role in providing infrastructure facilities and services. Infrastructure services would be truncated if left unattended. And market is not eligible to provide them efficiently, for reasons related to characteristics of infrastructure projects, including:

a. Infrastructure projects require large, indivisible investments with many implementation and management problems.

b. Some of these commodities (e.g., Electricity, Ports) have characteristics of natural monopolies.

c. Pricing of these services, through market, is very expensive from an economic point of view.

d. Market price may be high from a justice perspective, the state's spending on these projects and providing them with required quantity and quality is one of prudent financial policies required by current stage of Libyan economy. Several field studies have shown that spending on infrastructure has a positive impact on private investment and growth. Idea of displacement is not included in this type of public expenditure, Since Libyan state is still in the first position in terms of privatization and transition to a market economy, it has one option: either to continue to spend on these services through public budget programs or to produce some of these services (e.g. Electricity, Telecommunications) to private investment, whether foreign or national.

1.2.6. Geography of Libya, Ports and its Hinterland

Libya is one of the creating nations situated amidst the southern shoreline of the Mediterranean Sea, with an aggregate region of 1,759,540 m² (Alazabee, 1997).) And encompassed by six nations: Egypt, Sudan, Chad, Niger, Algeria and Tunisia (see fig. 1.2). Libya is positioned seventeenth as far as territory around the world. For Africa, it is the fourth biggest nation on the African continent, and 4,348 km of land fringe it imparts south to outskirts of Chad with a length of 1,055 km with Chad, 354 km with Niger and 383 km in the east, it imparts 1115 km to Egypt and 982 km with Algeria; and with Tunisia in west, it shares 459 km.



Fig1.2. Libya's Geographical Location

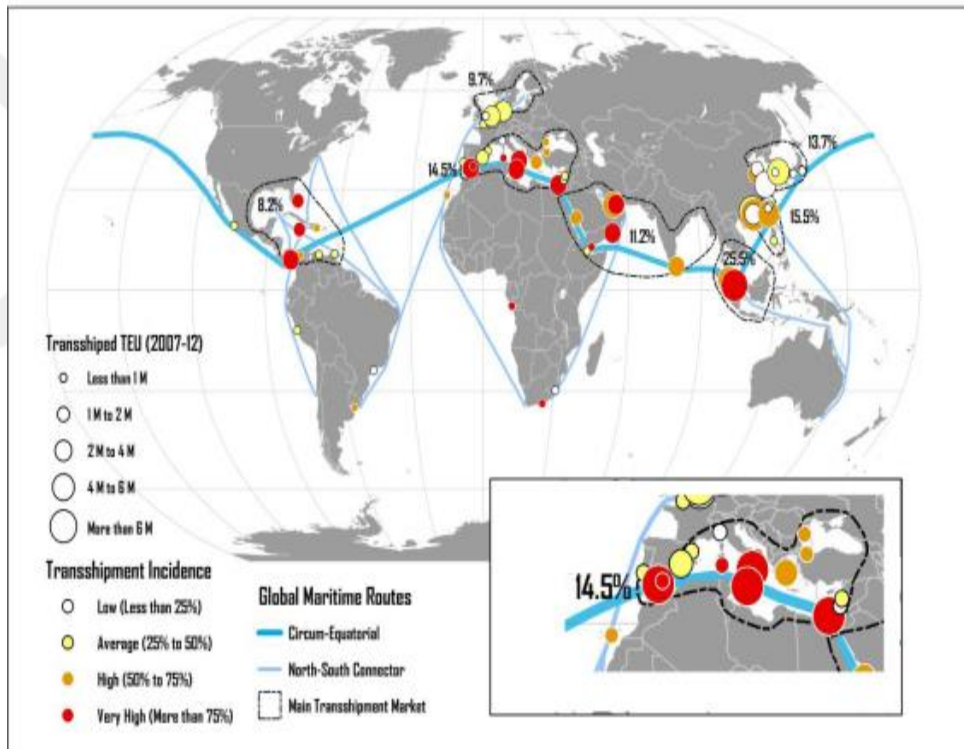


Fig1.3. International Trade Routes

Libya has 20 on the Mediterranean drift, around 1770 km long. The primary business ports are Benghazi in the east and Tripoli, Khomes and Misurata in the west. These ports will be ports of Libyan urban communities and towns and are managed amid Libyan worldwide exchange. Tragically, all Libyan ports are not centres.

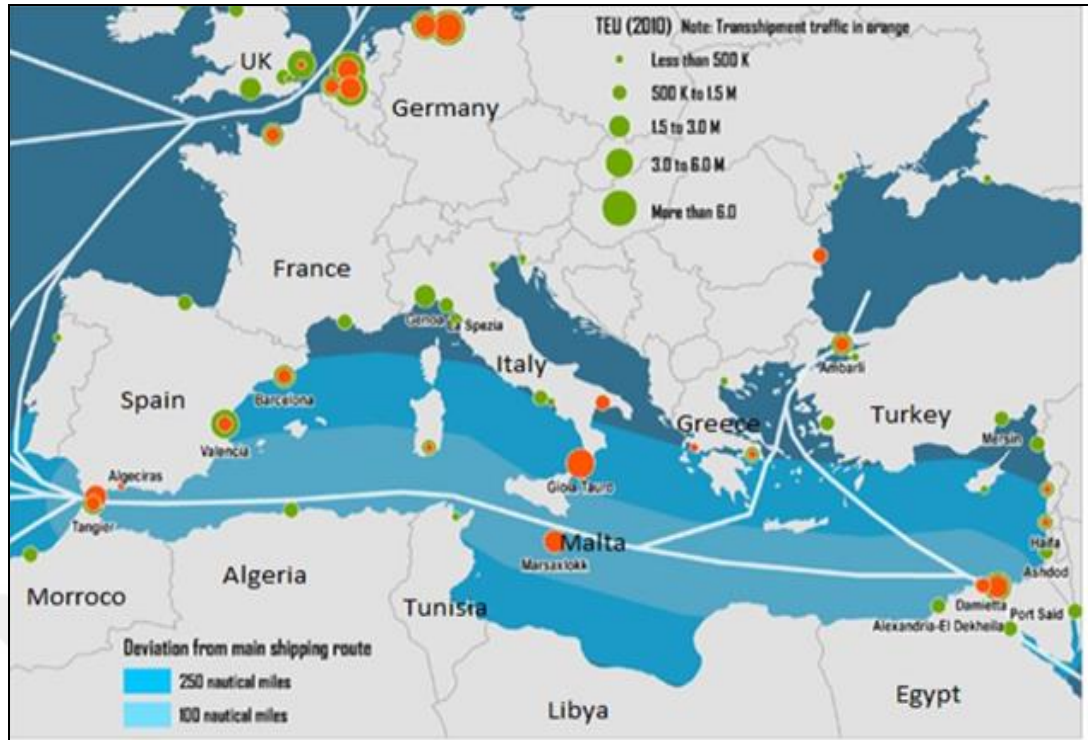


Fig1.4. International Trade Routes and Ports in Mediterranean

Libyan ports are a potential outlet for remote areas in landlocked neighbouring countries. In addition, it has a vital area near global exchange course among Asia and Europe (see Fig 1.3. what's more, Fig 1.4.), which goes through Mediterranean (Abomadena, 2000), and also among Europe and Africa. Can possibly assume a noteworthy job as strategic directs in area.

1.2.7. Libyan Transport Industry

The Libyan Ministry of Transport has three main types: land, air and sea, to provide all these services. Because of the absence of rail networks, land transport is a key element in Libya. Traveller transport is utilized for air transport, notwithstanding just a little level of universal exchange via air. Sea transport is predominant as a result of its cost effectiveness and the capacity to transport expansive amounts of products utilizing common passageways.

a) Land Transport in Libya

The port should be strategically located near the major international commercial lanes, with good ground connections, and must give essential necessities to port users. Successful

port area determination and framework are the primary drivers of the coordination's execution record for progress in middle and low-income countries.

Paved roads reached about 34,000 km at 1986 to connect their ports, cities and agricultural areas, as well as transient routes among south and north.

However, as it may, because of the global authorizations forced on Libya, all parts of its foundation stayed immature.

Expansion of road network, which lasted until 2003, made situation worse, as of beginning of 2008, authorities responsible for roads, bridges and road transport began to keep up old streets and cleared some other new streets.

On regional level, highway project linking Tunisian border with Egyptian border began for 1,700 km. unfortunately; Libyan ports are as yet isolate from Chad and Niger. This makes transportation costs very high, separating Libyan ports from landlocked countries (RPEMB, 2013).

As for the transport of land cargo, arrive transport administrations are given by little privately owned businesses that vehicle 80% of the merchandise. There are no state-claimed organizations to transport products in Libya. (Esaheri, 2012).

The remaining 20% are transported by the shipping companies themselves. For this reason, the land transport is expensive in addition to the length of the conveyance time.

This is because of the nonattendance of rail transport and roads high crowded, especially in the large cities due to lack of public transport, the flow of goods to and from Libyan ports.

b) *Air Transport in Libya*

Libya has 16 airplane terminals, seven global air terminals and three national air terminals, six air terminals and air transports. All affable and air terminals are national air terminals, aside from an airplane terminal situated in Tripoli, called Charter Airport, which is utilized globally, Libyan airports are used primarily for passengers, and small air freight.

Libya has neglected the development of this sector, which led to the deterioration in addition to the Libyan fleet lost five aircraft during the revolution in 2011 and there are still 15 aircraft in operation. It is regrettable that in 2014, 12 more planes were decimated when Misurata volunteer armies assaulted Tripoli airplane terminal, and Tripoli air terminal was

totally shut because of damage (LIBYAN CIVIL AVIATION ASSOCIATION. 2012).

c) Maritime Transport

As for the maritime transport and ports sector, Libya has shown little interest in comparison with other coastal countries, including small ones. Libya has unquestionably been influenced by universal endorses that have abandoned the nation slacking in all parts of its framework, including ports. Therefore, the absence of foundation has contrarily influenced the creation of Libyan ports contrasted with different ports in North Africa.

In addition, policies, bureaucracy, commercial productivity of region and port communication have significantly affected of capacity Libyan trade, affecting productivity of Libyan ports. Note that private sector is not in ports of Libya, shipping department, which includes about 300 local companies, as well as private have an increasing an expanding nearness in sea transport. National Shipping Company was just national delivery organization until 2003.

Likewise with some other Libyan industry, organization has sanctions of 2009. This company has gone bankrupt. Organization hoarded sea transport division. It had 38 ships; there were thirteen general freight ships, with four RO/RO vessels, 17 oil tankers and four traveller ships. In any case, since previous administration depended on oil as principle motor of national economy, organization concentrated on oil and oil based good oil. Organization attempted to spare circumstance by owning 14 oil tankers, seven item transporters and two melted oil gas (LPG) bearers. A portion of these vessels were in association with Arab Maritime Transport Company, Overall, despite the fact that Libya has a long coastline on Mediterranean and close global exchange paths, its business armada comprises of just 167 boats. These incorporate 19 oil tankers, nine general payload ships and 139 different vessels, for example, pontoons, pilot water crafts and other administration vessels.

During 2011 revolution, international community implemented a series of sanctions and freezing Libyan assets. As a result, several carriers from Singapore and Malta, 24 carriers entered again after their proprietors paid the operational expenses of some ship administration organizations, add up to tonnage of Libyan armada is 865,000 tons, Oil tankers rule this volume by 788,000 GTs. Different sorts of tankers and general payload ships are provided with 50 GTs because of their high numbers.

The least for the general load armada is 27,000 GTs, notwithstanding enormous interest

for containers in ongoing decades and increment in number and limit of holder vessels (see Fig 1.5.), Libya does not have any such ships, and it is surprising that Libya has only two specialized dock cranes, which were deployed in palace of Ahmad in Misurata.

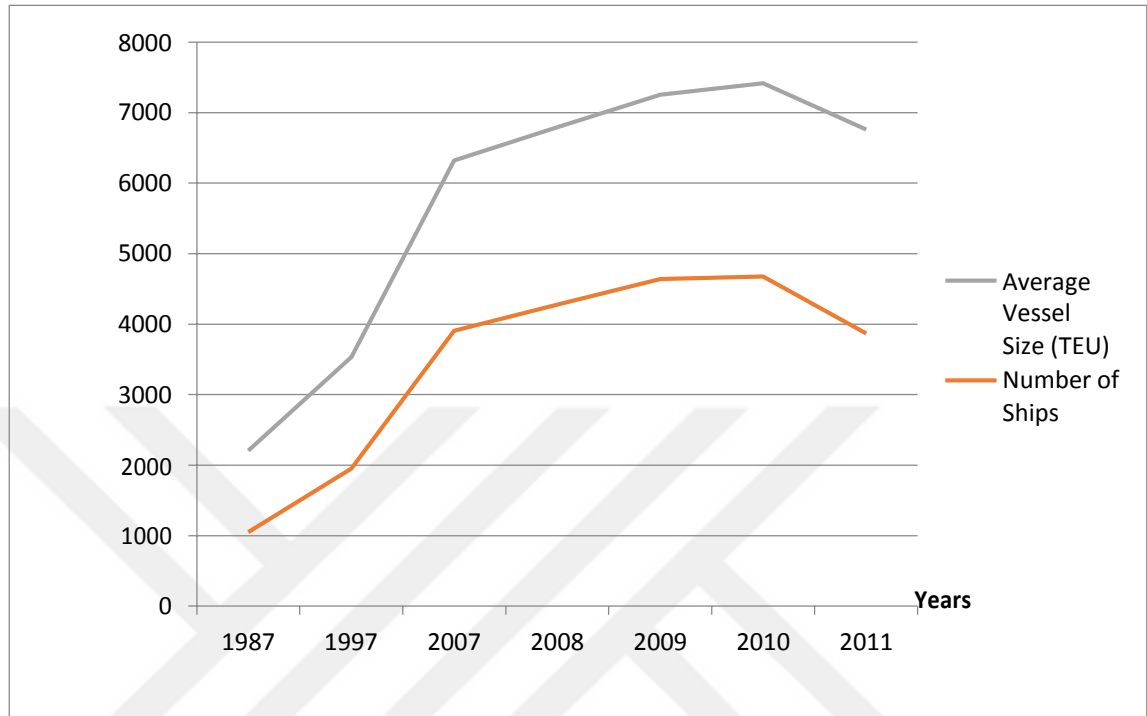


Fig1.5.Total World Number of Ships Average Size (UNCTAD, 2011b)

At 2009, Libya's container traffic in containers recorded 0.03 % of total world trade value and 0.19 %, measured in US dollars, which contributed 0.11 % of world's total gross domestic product. In 2010, Libya did not record any shipping point, container vessels using ozone-equivalent containers and ship breaking, while 0.11 % recorded ship registration, 0.08 % of officers and 0.09 % of staff.

1.3. Port Design

Successful port construction requires careful planning based on detailed reconnaissance. Reconnaissance continues until actual occupation. Planning may appear complete before occupation, but last-minute enemy action may necessitate a major change in plans.

Port design includes a number of disciplines including ship handling and marine

engineering for design of waterways to the required level of navigation and safety. This requires assessment of a number of key elements, including vessel size and behaviour, human factors in vessel handling and physical environment.

The design of waterways in harbour involves planning the layout and dimensions of main water area of the port with reference to: alignment and display channels approach and port entrances, depth channels approach, size and shape of manoeuvring areas within the port, with particular reference to swing and swing zones, services and activities other than manoeuvrability studies, is focus of port design study on effects of physical environment, In addition to facilities and tools.

To develop the port, consider estimated logistic requirements and current and expected physical conditions of the port to be filled in addition to the port valuation according to quantity and potential nature of goods and individuals who will deal with them. This stage of planning is often adopted on first survey. With relative value of rehabilitation and construction, and value of facilities specified for required construction efforts.

And about standards for estimation are summarized below:

a. Port Capacity, Estimated amount of dry cargo, containerized cargo, and bulk and roll-off equipment. It is usually expressed in weight, measurement tons, or number of containers per day that can be discharged onto available piers, wharves, quays, jetties, moles, and beaches of a port.

b. Standard Minimum width. Wharf width for deep-draft no containerized ships using one-side discharge is 60 feet, or 90 feet for two-side discharge. Container ships require 80 feet, and lighter ages either 35 or 42 feet.

c. Minimum Required Depth below Mean Low Water. Depth required by draft of a ship. For deep-draft no container ships, minimum required depth is 30 feet. For high-speed container ships, it is 40 feet. Shallow-draft crafts require a minimum of 12 feet.

d. Wharf Systems. Wharves include any extensions built from shore to water of minimum required depth to provide direct contact for handling cargo between deep-or shallow-draft ships and shore. "Wharves" also include structures described as quays, piers, or marginal wharves.

Designs should take into account effects of vessel berthing, crowd surge, vehicle breaking, scour, flood, cyclic loading, fatigue, temperature effects, existing or planned water pipelines, power and telecoms cables and any other special performance requirements.

1.3.1. Location of the Port (Concept of Location Theory)

Site theory is part of theory of development planning, including the comprehensive theory of planning and theory of independent accumulation as a way to expand delivery of economic and social services. Importance of site theory is that it takes into consideration spatial dimension of the site when planning. Essence of this theory is based on idea that level of development varies according to location and distance between urban centres, and that site has a large and influential force in level of development, regions near urban centres developed more likely to grow and change from those distant, given importance of Benghazi city as a cultural centre, it may be useful to define it as a civilized city that can affect development of surrounding areas and cities nearby.

1.3.2. Specific Criteria for Port Location and Expansion

a. *Geographical Characteristics of the Site:* Benghazi has a distinct geographical location, located on the northern coast of Africa overlooking the Mediterranean Sea, which is the largest commercial lake in the world. It is the middle of continents of ancient world, which includes three continents of Europe, Asia and Africa, through which bulk of trade of these continents passes with each other, as such, the city is facing the most important European ports which receive Europe's trade from Africa, the Middle East, East and Southeast Asia via the Suez Canal, such as the port of Genoa, Italy, port of Marseilles, France and port of Barcelona in Spain. Malta, By virtue of this unique geographical location, Benghazi was also the focal point of trade that passes through desert convoys to Africa through its convoys; the city of Benghazi has a mild climate most of year, making its port not exposed to high winds, hurricanes or currents, in addition to being adjacent to international shipping line.

b. *Natural Characteristics of the Site:* nature of the land of port area is flat, semi-slippery, with a natural slope towards seashore. Land does not suffer from any steep slopes or differences in the levels. In general, area is flat in nature, free from geographical faults,

with open space spaces allowing for the possibility of expansion in all directions.

Availability of infrastructure and public services, port provides all necessary equipment and equipment for loading, unloading and storage yards, suitable berths for ships, availability of a nearby international airport, and provides some auxiliary services such as warehouses for goods and cooling stores, availability of engineering and technical services, an efficient information system, and a good bureaucratic system are all factors of success, Benghazi port is Libya's second largest commercial sea port, which has three separate ports: Old Port, Jilayana Commercial Port and Jilayana Fishing Port, each with its own berths and gates (see Fig 1.6. and Fig 1.7.).

The port has four docking yards with a surface area of about 170 hectares, sinks range from 4.5 to 12.5 m in these basins. Port's storage yards are more than 76 hectares distributed among container storage yards, open storage and covered storage. In addition, port area is characterized by following:

* The port is close to airport of Beninah in addition to possibility of developing agricultural airport located in area of Tikka, which works on port service in all commercial purposes.

* The port is close to a public utility network that can help to develop city without significant costs these utilities are in:

- The port is located within high voltage lines of electric current, which helps to extend city with electricity easily.

- Adopting site of construction of a water desalination and electricity generation plant in area of Boufakhra near the port, in addition to its proximity to industrial river system, facilitates supply of water and electricity to proposed city without significant additional costs.

- The port is located near storage area of Benghazi city.

Location of site shows easy access to area, the site is close to land transportation lines which are coastal road connecting east of country to west and south, and neighbouring countries, in addition to availability of many agricultural roads subsidiary, and internal roads linking all regions of country. According to this criterion:

- The area is close to Beniene International Airport, which is located in the middle of the crossing points between two continents of Europe and Africa and between the east and west of Arab world, and between East and West Libya, Which can be utilized for commercial purposes.

- Near area of land, sea and air links, it is located to southwest of Benghazi city on coastal road Benghazi - Qamenis, and about 20 km away from Benghazi.

- Area is located near the proposed train line and station. Therefore, availability of a network of air, sea and land transport routes will help the port to succeed.

Either by availability of employment, housing and market, availability of an appropriate factor and low cost of employing it are important elements to attract foreign investment. Foreign companies seek to reduce production costs to the lowest possible level in order to achieve maximum competition. However, importance of low labour cost costs is becoming less important as an important component Success, as opposed to other elements such as transport costs, and conditions for establishing economic activities, proximity of the site to international market centres in Africa, Europe and the Middle East ensures low transport costs for each raw material needed for production, adoption of new housing schemes in Benghazi city and rapidly growing urban activity in this city will provide necessary housing for workers in the port, in addition, proximity of the port from Benghazi city helps to develop economic activities of city, with its geographical location close to markets of Africa, Europe and rest of Middle East; it is expected to be a link to trade relations between these markets ,in addition both political and economic stability and commitment to economic freedom are important factors for success of the port to achieve its objectives.

From point of view of political and economic stability, Political stability is one of the most important factors that encourage attracting capital for investment. Investors in general and foreign investors in particular do not wish to invest in politically unstable areas. Economic stability and an appropriate economic environment play an important role in success and achievement of expected objectives of development of port; hence political and economic stability of country is an important factor for success of port industries, Libya is a country in West region of North Africa, bordered by the Mediterranean Sea to the north, Egypt to east, Sudan to southeast, Chad and Niger to south, and Algeria and Tunisia to west. As a result of the 2011 Libyan civil war, there are two entities claiming to de jure

governing authority of the country.

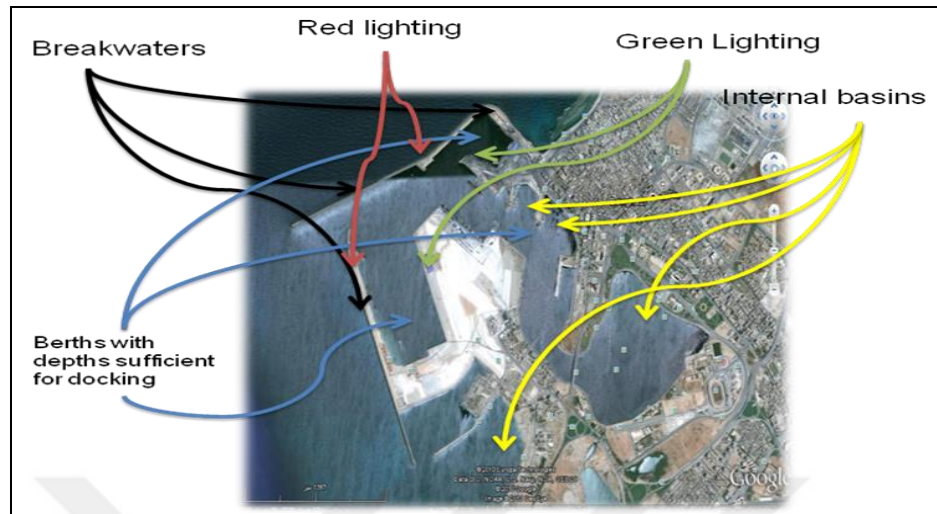


Fig 1.6. Current Status of Benghazi Port.



Fig 1.7. Benghazi Port.

1.3.3. Factors Affecting Port Planning

To create port, there are numerous elements that influence port arranging and advancement must be examined and these variables that rely upon format of the port:

- Characteristics of ships are calling at the port.
- Nature of proposed site for establishment of the port and prospects for natural prevention.
- Purpose, which was created for him the port.

- Various natural phenomena construction area.
- Water depths and shape of shore line.
- Constituting bottom of soil type.

Characteristics of Ships:

Like length of ship, presentation and draft of when they are loaded with maximum load, floating above water and exposed to wind pressure area when ship is empty, it is an empty vessel weight and maximum load her up loading mark, number of ships expected nearness inside the port whenever, sort of exchange to and from the port and the amount and seasons dispatched or emptied, likewise delivers calling at Benghazi port, Passenger boats and Cargo ships (BURNS, 2015).

The Nature of the Site:

Ports are divided into several types According to nature of area, location and amount of protection bestowed nature of area of water of harbour, into three sections:

- Normal Ports: the port that protect nature and water area without need for industrial action.
- Natural Harbours Half: and where natural protection is partial and need to protect me complete industrial facilities.
- Industrial Ports: it arises on coast in open places and requires a complete industrial work to protect them, and this type also enclosed basins that cut in neighbouring beach line ground.

Internal Roads:

Elements to be considered when planning the port:

- Shipping lanes from entrance where depth and breadth.
- Entrance to seaport in terms of identifying location and depth and breadth of its aspects and, if necessary.
- Water area to ensure ease of movement within the port without increasing area and exposed to waves.

- Division of the port to private places according to needs.
- Sidewalks planning and determine sizes and depths of water in front of her.
- Roads and railway lines inside port planning.
- Determine dimensions of storage space required and handling.

Various Natural Phenomena Construction Area:

Study of natural phenomena in environment includes:

- Tides.
- Winds.
- Other weather phenomena such as temperature, humidity, rain and fog.
- Waves.
- Water currents near coast and away from it.
- Sedimentation and beating on beach.
- Aquatic organisms and their damage to different construction materials.

The Water Depths and Shape of the Shore Line:

- Marine and land surveying of site and beaches (adjacent beaches)
- The work of converging approaches to determine depths of water and changes that occur in knowledge of tendencies of beaches and submerged islands.
- To do research on hydraulic models when choosing proposed layout of the port or to choose a certain type of surf barriers and so on.

Constituting the Bottom of the Soil Type:

To do work of necessary probes to know layers of earth and its properties and durability of the facilities that will be built on them in the sea or land and know nature of bottom and extent of its impact with marine currents, it is also necessary to know elements that must be provided in the port:

- Build up sidewalks of sufficient depths of docking ships and warehouses for storing goods for temporary or long-time according to the requirements of case.

- Port processing basins maintenance of floating dry basins and tubs as well as reform of steamers and launches locomotive workshops.

- It must take care of illuminating the harbour and accessories supplied with fuel, food, fresh water supply and electricity and telephone ships.

- To study development of the port, you must know items that must be contained in the port site to be considered during development studies of these Items:

- Be protected from waves and storms in full so that the ships do not move during loading and unloading.

- Tidal tide is not significant, and its water is calm, even if it is necessary to create internal basins.

- Docks with deep depths for docking, ships and warehouses shall be established for supply of goods for a temporary or long time as required by conditions.

- Equipping the port with maintenance basins from dry basins and floating basins as well as workshops for repair of vessels and locomotives.

- Lighting of port and supplies of fuel, food, fresh water, catering, electricity and telephone should be taken care of.

- Development studies of the port must also meet planning considerations and requirements:

i. Marine Segment:

- Characteristics of ships are calling at the port.

- Nature of proposed site for establishment of the port and prospects for natural prevention.

- Purpose, which was created for him the port.

- Various natural phenomena construction area.

- Water depths and shape of shore line.
- Constituting the bottom of the soil type.
- Be protected from waves and storms complete so as not to move ships during loading and unloading.
- Extent tide them imperceptible and quiet waters if it necessitated establishment of an internal basins.
- Port processing basins maintenance of floating dry basins and tubs as well as reform of steamers and launches locomotive workshops.
- You must take care of illuminating harbour and accessories supplied with fuel, food, fresh water supply and electricity and telephone ships.

ii. Ground Segment:

- Port Based in urban area of city.
- Choose with ingredients to attract in terms of location services.
- To be close to industrial areas and places of storage.
- That there is a balance between residents in motion movement needs in surrounding areas with the entry and exit of cargo traffic.
- Region is diverse means of transport.
- Safety and security and that there be close points police to maintain security.
- Taking into account visual sequences of area and it does not interfere with planning and shapes of buildings with sky line of surrounding area.
- Attempt to control pollution.
- Prospects for future expansion.
- Geological and hydraulic problems.
- Materials and stability.

- Impact on the natural environment.
- Solving transportation problems.
- Take into account effect of different climatic factors that affect site.
- Availability of infrastructure services (exchange network & freshwater feeding & power plants).

iii. **Climate Segment:** (Climate Factors):

• **Ocean Currents:** Benghazi, a city in north-western part of the top of mountain green, where water flowing collide constantly from north-west, which are launched from Atlantic Ocean through Strait of Gibraltar and while area between Tunisian territory and land Italy where it descended direction of current in south-eastern direction (Show Fig 1.8.).



Fig1.8. Currents marine affecting for Benghazi Port.

Tides: it changes every six hours up and down vertical movement and by simple does not exceed an average year-round 20-25 cm, and is used to determine pavement heights.

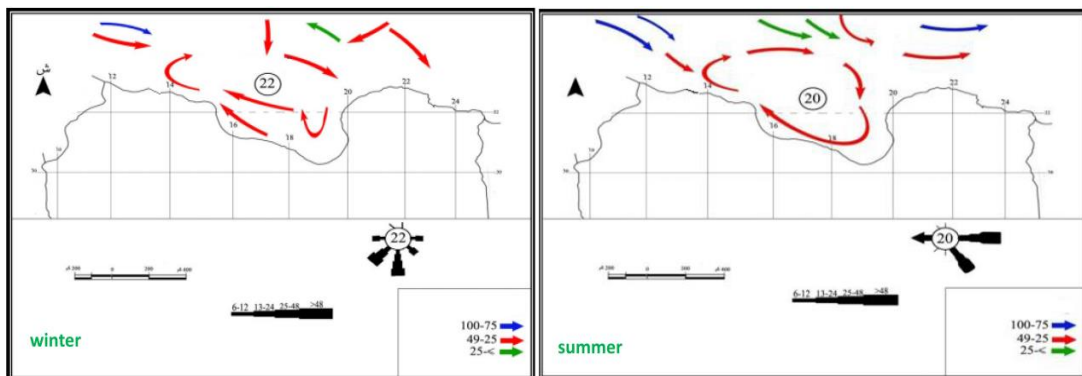


Fig1.9. Trends of Maritime Currents in Front of the Libyan Coast.
(The existing number inside the circle indicates the degree of silence marine currents)

- **Temperatures:** average temperatures exceed 25 during summer months and reach extreme daily temperature of 31-28 in t warmer months, average daily temperature for 8-6 during winter (Show Fig 1.10.)

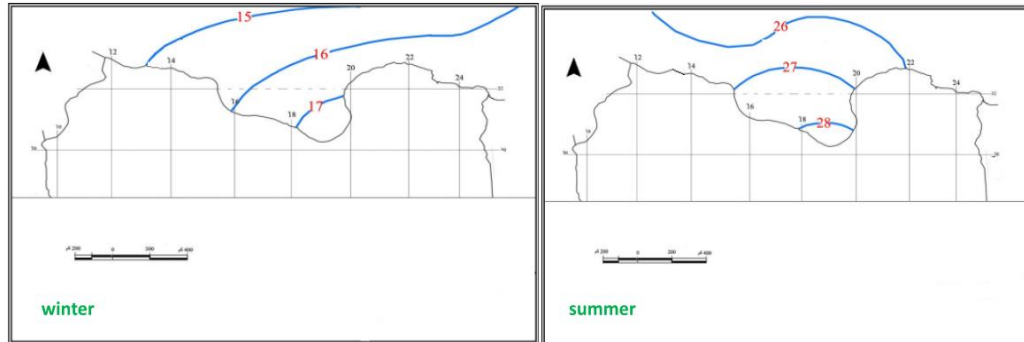


Fig1.10. Water temperature.

- **Rain:** Rainfall between October, April and is happening at a rate of 284 mm while July drier and without rain and average rainfall of between 200 mm - 300 mm and runs from April to July (Show Fig 1.11.).

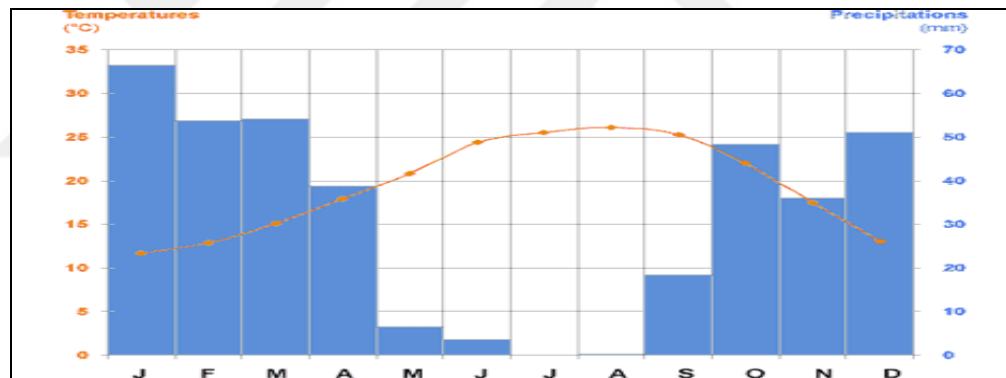


Fig1.11. Rainfall rate.

- **Waves:** Waves off coast of Libya are quiet as their speed is at least 5 miles per hour (Show Fig 1.12.).

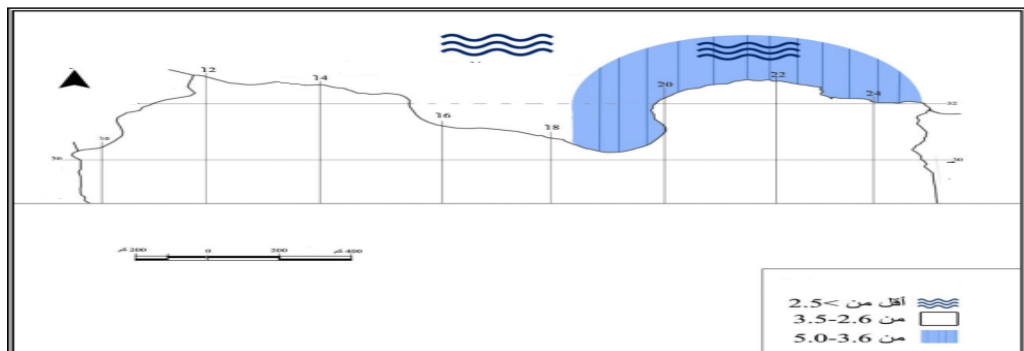


Fig1.12. Wave Movement in Front of the Libyan Coast

• **Topography of the Earth:** Geographically Libya has a place completely with desert Range framing northern area of African Shield. Aside from a couple of Precambrian outcrops, involving schist, gneiss and foliated granitites, nation is for the most part secured by Palaeozoic, Mesozoic and Cainozoic, predominantly marine, dregs with privately created territories of break related Neogene volcanic in focal piece of nation (Show Fig 1.13.).

As well as the port area contains two types of mud and sand soil, dominated by sand dunes.

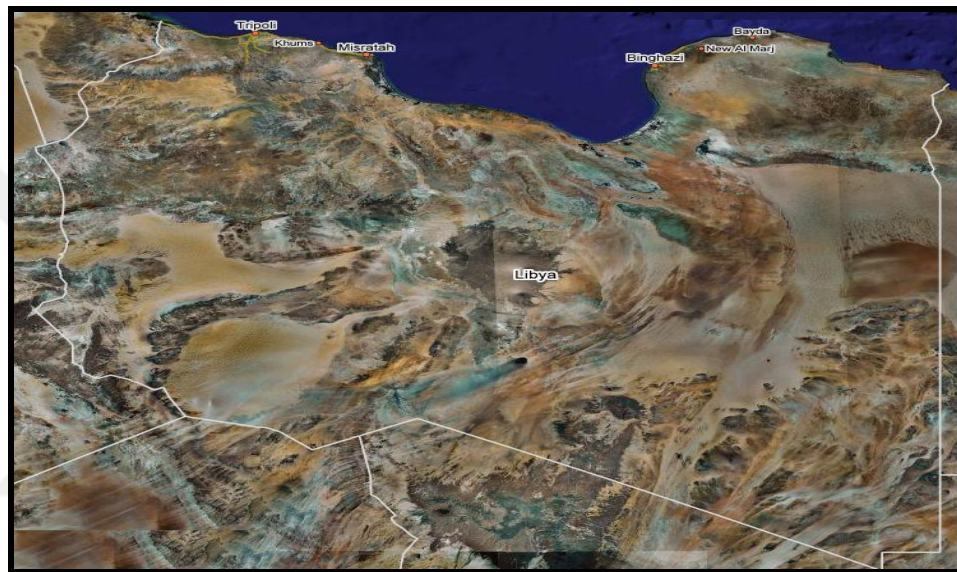


Fig1.13. Libya Geographical Map

Plain extends in Tukra at place where lower slope of Mount Al-Akhdar gradually rises from coast of Tukra to a distance of 25-300 km south-east of Benghazi in triangular area that is formed between slope line of slope and coastal line in name of Benghazi Plain.

Geological boundaries of this plain are not clearly defined. Area extends from 120 km to 4 km wide and gradually begins to widen from areas of South Benghazi, advantages of this plain are simplicity and low geographical appearance. Slope between slopes of the mountain and coast is simple and regular and provides many valleys, most notably Wade Qattara. It is characterized by presence of some lakes including Sebkhah al-Tama and Sulaymaniyah and Lake 23 July, which is connected to the sea through natural septic barrier, which is old port now. Location of the port after study of natural topography was determined naturally due to one of common geological phenomena on coastline between two sand dunes interior and exterior formed Sabkha and the port came to an end.

The port is part of a group of Sabkha lakes formed in this layer of fossilized sand dunes around top of end of shallow gradient towards the sea. As a result of developments during these decades, these lakes were separated by roads and buildings and some of them are clear from so-called seventh lakes.

Area surrounding the port is a cultural area of Benghazi and old district, and city centre is on east and south sides and north-east.

Figure shows most important natural features and surrounding conditions, Fig 1.14. It shows topography of Benghazi city, which is a carbonized sand land, Marl, Kelso, sedimentary deposits, Most of port area is carbon sand.

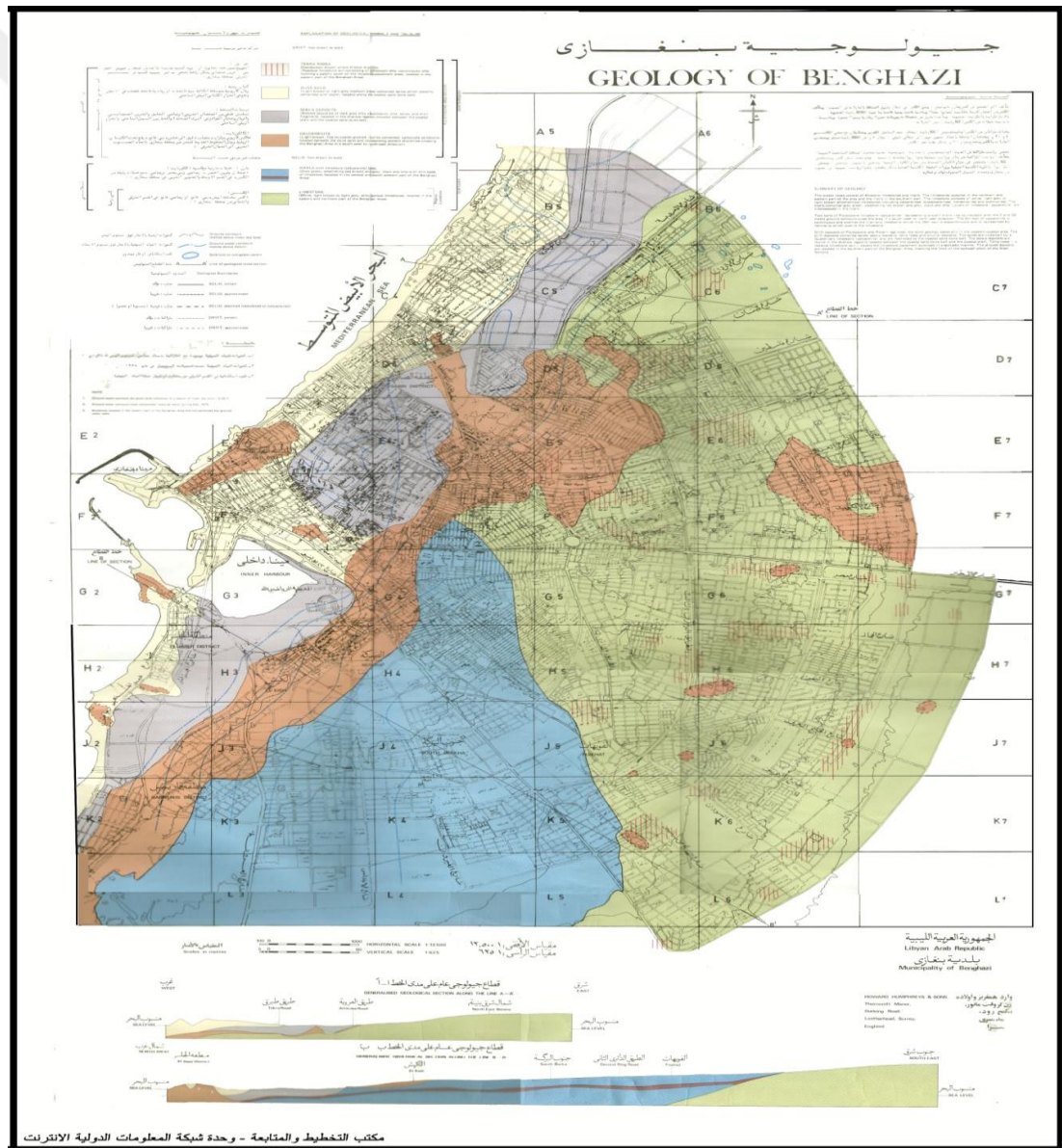


Fig1.14. Libya Geological Map

1.4. Port Requirement

Port design requires thorough and proper assessment to ensure safety and efficiency. Investing in a new port or redesigning current port is significant, so it is critical to check harbour outline, which is additionally observed from Mariner's perspective, before it is built. By approving format of the port seen from Mariner's perspective, it is ensured that planning is possible for vessels that are designed for. In addition, limited environmental conditions depend on navigator's experience and skills rather than theoretical calculations. There must be sufficient space to stop and manoeuvre, realistic environmental constraints, means of assistance necessary for navigation, adequate pull ability and so on. At same time, it is important that the port is effective with respect to the economy.

1.4.1. How to Give the Port a Competitive Advantage

From perspective of sea carriers, shipping companies and others, efficiency indicator of the operation of the port lies in time factor, namely total time spent by ship at the port from moment of arrival to moment of departure. In other words, shorter ship's time at the port, more efficient service would be. This would give the port a competitive edge and the port could be described as distinct and efficient. Time at carrier means only money (time is money) to sail ship and additional fuel consumption along with many other elements. On this basis, the port authorities must take all measures that contribute to reducing period of stay of ship at the port, this is necessary if the port wants to gain competitive capabilities over other ports. In best way to achieve this (according to the specialists of port), modernize and develop the port infrastructure and supply it with all requirements, technical equipment and specialized human capacities, global experience specialized in port industry for the port captures advantage and competitive advantage of other ports.

At a minimum, and in order to take advantage of the port in its current status after expansions carried out on its maritime facilities, port specialists believe that following should be done:

First: Old Port (Downtown)

Due date of establishment of Benghazi port to ancient times, and there is a belief that Greeks founded first to set up the port when five towns ((Josberides - Cyrene - Tocra -

Tolmeita - Apollonia)) (Sousse now) have directed their attention since they come to Libya in in 639 BC to create ports. Where it founded the Greek city of Josberides (name of former city of Benghazi) in 515 BC and was site of the city in the first place on north end of swampy, marsh is used as a port for city which is a lagoon connected to the sea and are valid for navigation of boats and small ships and was the port acts as a trade mainly during Greek government with Libyan coastal areas on one hand Mediterranean sea and ports of other.

During Italian occupation of Libya 1911 was Benghazi port great interest from Italy for approval to the port in military transport operations. It has Italians to implementation of a series of works to develop Benghazi port and turn it into a major port serving military purposes, starting from 1913 until 1941, has been robbed several thousand made up of livestock, grain and wool medicinal herbs and export through the port.

In World War II Benghazi port suffered heavy damages due to military operations between warring forces; it has been outer pier of the port for a lot of destruction due to operations of air and sea during war. British administration has in Cyrenaica after war to work on cleaning up harbour and remove many of mines and bombs On 01/11/1945 AD received a naval officer British responsibility for port management and in 1946 added paving pontoon was deepening waterway and raise breakwater and raised vessels sunk to deepen corridors and managed so big ships from entering the port one Quay and British ships in 1954 by CE occupies first place in traffic in harbour was it about half the ships arriving at the port, as well as Italian, Dutch, German, Greek and French ships load.

Due to presence of entrance of the port (entrance and exit gate) in the downtown area, and suffering of downtown area of traffic congestion large, because of movement of trucks loaded with goods to and from the port. Taking into consideration development of old port for large amounts to be used as a commercial port for general cargo, it is more efficient to develop and adapt old port so that it is exploited and used as a tourist port, which is specialized in receiving passenger ships and is used as a yacht and sailing port. This will provide an aesthetic view of the city centre and the coast, and will undoubtedly reduce congestion and traffic congestion in the city centre. If we go beyond this view and want the port to reach local model as a minimum and not international, port needs to: concrete maintenance of port berths, maintenance and modernization of lace plugs, supply of standard rubber protectors and gaskets, and avoidance of primary solutions such as truck

tire waste.

Open storage areas are fully paved bonded and provides adequate lighting. Construction of public goods stores equipped with advanced sprinkler systems and equipped with smoke detection systems, establishment of an integrated and equipped maintenance basin that managed by qualified and competent staff, a high pressure water network for firefighting, water network for ship supply and for internal use also Restrooms and restaurants for producers.

Increase water depth to the extent that new generations of ships can be received. Providing refrigerated warehouses for store refrigerated goods, construction of a grain silo equipped with suction tools and a permanent dock for bulk grain vessels.

Create towers for observation, Provide automatic detection of container content. Provide a modern ground balance for cars for transporting goods inside and outside the port

Create enough lighting on sidewalks, warehouses, squares and roads, Provide rodent / quarantine control office, provide high power generators, constructing bridge cranes operate on rails, so that they move along the pavement, and have a large carrying capacity to handle containers with different weights on shelves of container vessels, create a various load-bearing levers on commercial vessels, Provide tubular springs for handling all kinds of containers, Provide forklifts to handle different weights for general merchandise. Provide earth levers with different weights, provide means of manual communication for use by specialists on ships, pavement or management, and provide mobile workshops for immediate maintenance to ensure continuity of shipping or unloading provide adequate and adequate handling equipment, provision the tractors, surfaces and headers to other handling equipment. Provide high horsepower locomotives to handle large vessels in sufficient numbers, Provide spare parts for all locomotives, providing an ambulance to deal with cases outside the port (ships on ship or in transit), provide instruction boats and connecting boats in sufficient numbers, provide floating lights for corridor leading to port entrance lit at night, provide a buoy waiting outside the port near area of shoulder; provide a tanker to supply vessels and a fuel tanker, establishment an integrated and equipped maintenance basin also managed by good and specialized competencies, Provide firefighting equipment on sidewalks, provide large capacity pumps to take advantage of seawater to combat fire, provide pollution control equipment for commercial platforms and oil platform, provide sensors covering walls, storage yards and sidewalks, establishment of a database and an

information network for the exchange of data and information electronically, create a fully equipped passenger lounge; create a bank and a post office.

Second: Port of Island / Jiliana (port development project): Planning studies for development of Benghazi port completed and adopted during 1973. These studies included the outline. Detailed plan for second phase (buildings, roads and services) was approved in 1976 (this stage has not yet been implemented). In our estimation, Studies and designs developed at time were not developed so that the port had opportunity to compete with neighbouring ports. Therefore, when discussing importance and necessity of embarking on second phase of port development project (buildings, roads and services), consideration must be given to reviewing designs of many marine civil facilities and constructions to extent that it is in line with Libya's aspirations in port industry generally , what is to be provided at the port of island / Jiliana lies primarily in completion of second phase of port development project (buildings, roads and services) in its entirety:

- Administrative Buildings Port Management Passports & Customs Security Authorities Ambulance & Fire-fighter - Restaurant Producers Marina Building & Control Tower Payable Bank & Mail Some Sub-Building Buildings For Warehousing & Marine Workshop Building and Ground Workshop Building Marine Gas Station Ground Gas Station Washing Station and Libra Building.

- Sporadic warehouses for transit goods and long-term storage.

- Utility works include roads, electricity, lighting, water drainage, port distribution network, and upper and ground water tanks.

- Pavement opens storage areas for goods.

- Pavement storage containers; as well as a passenger terminal building and a grain plantation, in addition the old port is connected to the port of island / Jiliana by an internal bridge.

Keeping in mind the end goal to have the capacity to exploit compartments and sea works completed by moving development of boats and dealing with merchandise from old port, taking into account congestion in centre of city due to presence of port gate in this region, where exit of goods from the port of island to areas of storage back, imported, will be easy and unhindered for traffic flow away from downtown area.

2. METHODOLOGY

2.1. Aim of Thesis

The aim of this thesis is the preparation of studies to improve the Benghazi port in civil works, to meet existing and future requirements of the Libya hinterland. This thesis is a discussion and evaluation of the study of the development of the Benghazi port. The first phase of the thesis will include a literature review that will consist of statements and statements of other peoples. Also, interviews will be conducted with a number of people working at the Benghazi port. What is more, after collecting all necessary information there will be an examination of those data in order to understand that create problems related to the development of the Benghazi port and analyse all development problems in order to find appropriate and realistic solutions. In the end, the third step is to study the current situation and spatial profiles as well as voice analysis to identify strengths and weaknesses and then opportunities and threats and try to mitigate threats using opportunities and create new elements to overcome threats, also create new innovative approaches to the quality of investigation, after analysing needs, successful port development needs to be considered by many different stakeholders. Ideas and arranging of the port business ought to be orchestrated with ideas and arranging of general and utilized foundation quite far, factors that have an impact on the development of successful port prospects (dealing) and their impacts and land strategy are also transport planning, remote connections, an architectural design for the port site follows: (data collection - data analysis - concept - basic solution - value), then study civil works in the port, including: hydraulic engineering: marine-related construction works, port development, immersion basins and storage tanks, water treatment infrastructure: collectors, sewage systems, sewage treatment plants and plants for production of drinking water.

Transport infrastructure: railways and road traffic, buildings for all purposes. At the end of this thesis, after examining and analysing all data and after evaluating all possible solutions to problems, necessary civil work will be identified: an analysis of

(Applicable – Acceptable- Suitable) and then definition of basic civil action (see Fig 2.1.)

And in this way we can increment freight throughput, handle bigger vessels, productive payload dealing with, proficient terminal design, solid administrations and advancement on existing impression, because, Benghazi port is the biggest area in Libya, and handles 45% of import, and export cargo. It is an important port for East and Central Libya as it handles transshipment cargo from and to Southern Libya. Hence, it has strong cross border trade links and shortest and most direct access to sea based transport. It is presently suffering from insufficient port capacities

- Dry bulk and general cargo capacities have to increase.
- Growth in trade and changing shipping technology necessitates an increase in capacity ahead of demand.

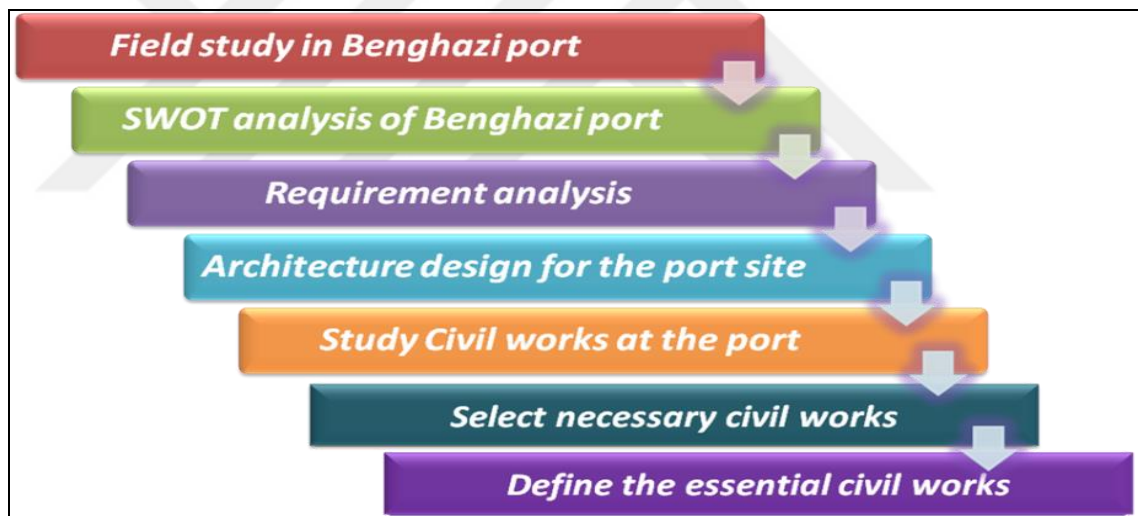


Fig 2.1. Research Methodology of the Thesis.

2.2.Objectives

The Aim of Thesis is Preparation of Studies to Improve the Port of Benghazi in Civil Work, to Meet Existing and Future Requirement of the Libya Hinterland.

In order to prepare and deliver a sound and successful project, there should be a number of goals and targets that will act as guidelines. This thesis is one goal and this is to study development of Benghazi Port, first objective of this thesis is to identify important factors in development and expansion of Benghazi port. Next objective is to study these

factors in order to identify factors that create development problems. Third goal is to break down those issues with a specific end goal to build up various arrangements. Ultimate goal of thesis is to evaluate those solutions so that there can be a clear vision of problems and how to deal with them.

The Libyan ports assume an indispensable job in worldwide exchange from North Africa and the Mediterranean Sea, as well as their role as contractual entry points for landlocked countries, and could be an important contract in the future and reach the landlocked and southern Mediterranean countries. In spite of this, Libyan ports performance was low contrasted and whatever is left of the ports on the northern shoreline of the Mediterranean.

The inspection shows that a large number of small ship and container calls are from the Libyan port of equivalent size and that large ships do not call the Libyan port; Of Libyan ports.

As a result of the lack of poverty studies on the Libyan ports, it is important to investigate the problem of the performance of Libyan ports is important to reach the level required in the development of regional and global economy.

The Reasons to choose search current bad situation of Benghazi port compared to neighbouring ports in Mediterranean basin, especially after recent war.

And need scientific overview for study port in terms of layout of port site and its needs, as well as study of development of e mechanisms used to keep pace with development, and give more effective for port.

The research aims to assess current situation of port location and to identify strengths and weaknesses, as well as identifying threats and opportunities, then analysis and study site elements, engineered services and development port plan location in accordance with engineering standards and ports specifications.

Economic Objectives Expected from the Development of Benghazi Port: desired objectives may vary from developing ports from one country to another, but many goals may be similar. In general, desired objectives can be divided in terms of time period to: *First:* desired objectives in short period of time, namely to increase exports, increase

country's foreign exchange earnings, create jobs and stimulate investment, and accelerate the development of area around the port.

Second: Objectives desired during long period of time: host country aims to develop port to transfer technology, and acquisition and development of management skills. In addition, ports are starting point for industrialization by attracting investments.

- Attract foreign investment (capital flows), and increase country's foreign exchange earnings, developing countries seek to develop their exports and enter world markets. Cooperation with foreign investors through capital flows or through management and marketing is an appropriate method. Good-quality ports, in addition to the incentives and facilities that host country can provide, attract foreign investment.

Ports in developing countries, especially their commercial areas, can increase capital flows. In many of these countries, regulations and protection laws are one of the most important barriers to flow of foreign capital. This is reflected positively on the level of economic growth, and then on the level of economic welfare of host country.

- Encourage the localization of export-oriented industries most developing countries suffer from a deficit in their balance of payments, usually resulting from imbalance of their trade balances. Policy of industrialization with a view to restructuring export structure is one of the most important policies that developing countries should follow to solve problem of their balance of payments deficit. Is one of tools that can help achieve the goal of reforming its balance of payments deficit and increasing country's foreign exchange earnings?

- Transfer technology, working to gain modern management skills many economists believe that foreign trade is a positive factor in economic growth as a tool and means of economic growth. It can achieve many objectives, such as disseminating technological knowledge, transferring ideas, expertise, skills and managerial capacities, as well as organizing and establishing projects.

- Creating jobs business, service or industrial projects in ports need a certain quality of employment. Therefore, one of objectives that developing countries seek to achieve through port development, especially those with abundant labour, is job creation.

- Creating a mutual link between port industry and local economy one of main objectives expected from port development is to create a kind of mutual link between economic activities of the port and the local economy.

Also conceptualization about equipment and machinery port needed, all this must be according to study population and areas served by the port.

There for the Objectives of the Research:

- To define existing situation of Benghazi port.
- To define existing and future requirements of future Libya.
- To define factors effect of Benghazi port development hinterland, topographic, geographic, economic, social, transportation structure of area, to define limitation.
- Redesign for models of an architect design study for Benghazi port.
- To define civil work for Benghazi port.

To address these destinations, this investigation was created in two stages. I examined The First Stage, and featured the present status of Benghazi port for exchange of holders, general load and its effect on Libyan economy and world exchange as a methods for connecting east and south-east of Libya, to accomplish the reasons for study should lead field examination, examination of site is imperative to achievement of undertaking. General

- Hydrographical and topographic surveys
- Meteorological survey.
- Coastal hydraulic survey
- Hydraulic model studies
- Geotechnical survey

The Second Stage of study is concerned with assessing current status of ports. And it dealt with this phase of architectural design and infrastructure compared with port authority. As indicated by consequences of first stage, factors identified with framework

and superstructure impact on execution of biggest port of the port.

The second phase of study is architectural design of Benghazi port and modifies it so that it complies with the requirements of current stage, redesign general location of the port, with its events and make them commensurate with international ports.

Transportation lifeline, which are essential and necessary for success of economic and social development in any country is way the link between various regions and concomitant establishment of a reconstruction and link between production and consumption areas, especially in a country like Libya, where vast open spaces in addition to diversity of nature of a desert and mountainous and coastal , port is one of important economic returns to support general income of the state, Libya has come to be given its share of global transport chain as to what to Libya of elements of site so that Libya owns long coastline on Mediterranean Sea, which make it a point link between Africa and Europe.

2.3.Reasons for Selecting the Project

Current Site Ideas for Elements That Help Make Them Relevant to Turnout Destinations around the World also Increased Passers Trade Which Claims to Expand the Current Location, Also Gives the Possibility to Provide the Greatest Possible Anchors and Events of Interest to Traders.

The importance reasons for selection this subject is: *(The Importance of Developing Benghazi Port for Libyan Economy)*, discovery and export of oil at end of 1950s and early 1960s has had a significant impact on Libyan economy. Libyan economy is no longer a model of a backward and underdeveloped economy that lacks the financial resources to start development process, as in most developing countries, but has become a model for an underdeveloped economy with more financial resources.

Which can be invested domestically (i.e. an economy with weak absorptive capacity), since oil revenues are directly attributable to State, many economic and social development plans were implemented during period 1963-1985 and for varying periods of three to five years per plan. However, international economic and political changes during the 1980s, especially with regard to oil prices, negatively affected ability of the state to continue to

finance public expenditures, especially programs of transformation plan. In addition, 1980s witnessed a state of economic reform and restructuring for all developing and developed countries alike, therefore, development of Benghazi can achieve many benefits that can be summarized as follows:

- a. Development of Benghazi port opens up new investment opportunities that serve as a magnet for foreign capital, except that they are owned by national or foreign elements that help in achieving economic and social development goals.
- b. Although Libyan trade balance has not suffered a significant deficit since beginning of oil export except in some years, development of Benghazi port will lead to diversification of sources of foreign income by encouraging the establishment of export-oriented industries based primarily on local raw materials, and to reduce dependence on oil as sole or main source of national income.
- c. Development of Benghazi port helps to transfer technology and gain modern management skills.

Information indicates that Libyan economy during the 1990s witnessed a phenomenon that had disappeared during the 1970s and 1980s and that this phenomenon has become a problem that threatens economy and Libyan society. This problem is especially unemployment among young people and graduates. Development of Benghazi port can reduce unemployment rate through the expected demand for all types of labour.

- d. Libyan economy can achieve objective of mutual link between port industries and local economy as necessary economic reforms have been implemented.

2.4. Target of Preparing Studies for the Development of Benghazi Port

Targets of this examination are to decide current status of Benghazi port and then to determine current and future requirements of Libya in future. This study examines factors that affect development of Benghazi port such as remote, topographic, geographic, economic and social areas and transport structure in region, this enables us to redesign architectural port of Benghazi and identify civil works that are necessary and necessary for Benghazi port to be at level of neighbouring ports in southern Mediterranean, (show Fig

2.2.)



Fig 2.2. Benghazi on Mediterranean.

2.4.1. Main Factors for Selection Benghazi Port

Benghazi port was selected for development studies due to the following reasons: Benghazi port Maritime, the second Libyan ports of importance and space, which is one of the most important vital facilities in the city and eastern region in general with weak infrastructure. However, it is only port that serves eastern and south-eastern regions of Libya and extends services westward to Ras-Lanuf (see Fig 2.3.). This will make it possible to obtain excellent results from development studies.

Libya is also seeking to develop Benghazi port to become a medium commercial port by acquiring land areas, developing roads, entrances and exits, planning development of port berths and developing a container terminal.

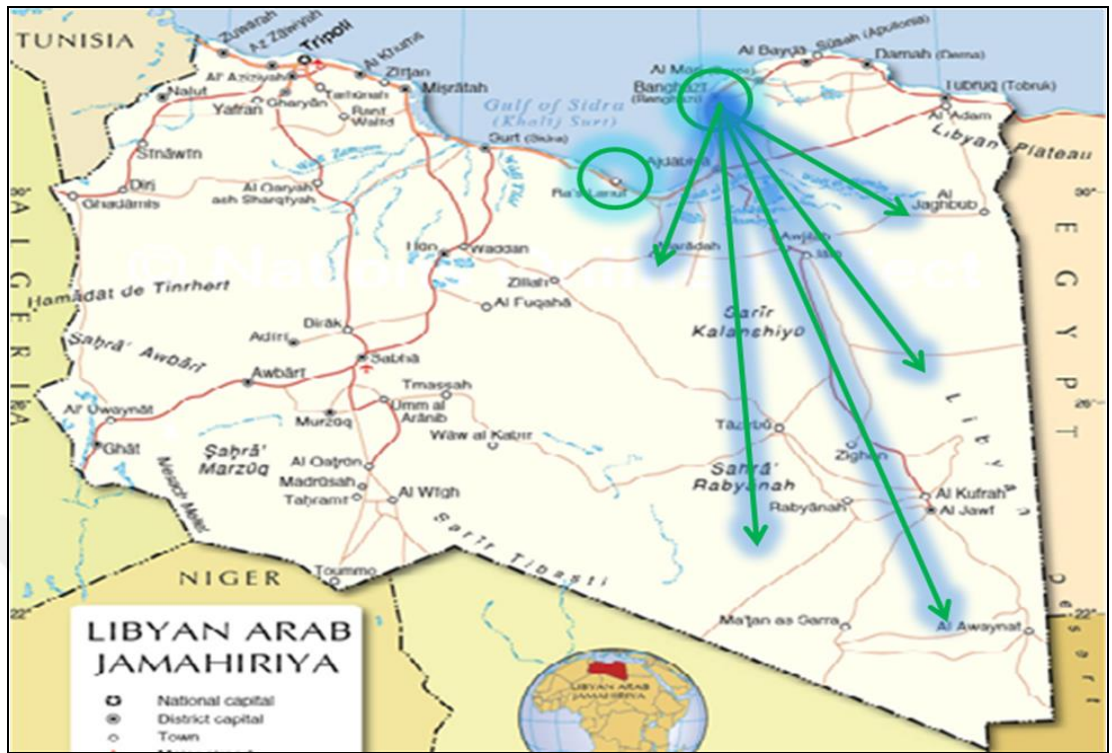


Fig 2.3. The Area Served by Benghazi Port.

Benghazi port is located in southern Mediterranean on eastern coast of Libya, and because of its urban areas, which limits physical expansion. Port overview is shown in Fig 2.4.



Fig 2.4. General View of Benghazi Port.

2.5. The Main Structure of the Thesis

In this thesis, a methodology was used to combine field studies by interviewing and gathering information from competent authorities about Benghazi port and its potential, and then analysing these data in order to reach a reduction of threats through opportunities and to discuss new elements to overcome the threats, for quality of investigation.

For this purpose, it was decided to address the problem by examining the analysis requirements. Successful port development needs to consider many different stakeholders and, where conceivable, ideas and arranging of port industry ought to be orchestrated with ideas and making arrangements for general and utilized framework, in order to know the factors that have an impact on development of successful ports and thus get an architectural design of port site by using stages of architectural design and study of civil works in the port and then choose civil works necessary to be applicable, acceptable and Suitability also define the essential civil work at Benghazi port.

Several surveys were conducted at Benghazi port site to obtain knowledge of container port operations and historical data relating to vessel movements during period from 2010 to September 2014. Data were statistically analysed to obtain future projections for Benghazi port services.

In preparation of the general outline of Benghazi port, technical guidelines prepared by technical committee of the General Authority for Maritime Transport and the "former" facilities were used at 2000 AD and technical reports prepared by committee of the Socialist Company of Ports at 2005 and technical report prepared by Committee formed to conduct a detailed and accurate study of facilities and constructions of Benghazi port at 2005.

Study began with a general definition of project within the general concept and importance of studying modernization of general layout of the port.

Studying and surveying general components of plan and its natural, functional, economic, facilities and services related to future modernization of port. Analytical

studies of information gathering and evaluation stages and access to future trends (functional), kinetic and aesthetic, with determination of design criteria and provision of expected needs targeted by scheme.

And then set up idea of future update, components of project, and proposed services.

2.6. Structure of the Thesis

The Thesis is divided into five chapters (see fig 2.5.). The first chapter deals with the importance of Libya and its ports, especially the port of Benghazi, and then addressing the design of ports and their requirements. The second chapter deals with the procedure and determines the means and strategies used in this test. It is characterized by a systematic model and explains the underlying explanations behind the use of the chosen method. It also examines the important factors, the information collection strategy, and the most appropriate testing strategies that fill the need for this investigation. The third chapter contains a preliminary study on the port of Benghazi, beginning with the importance of the port of Benghazi between Libyan ports as well as the performance standards of the Libyan Maritime Ports and Transport Authority in addition to studying the current situation of the port, and then analysing the voice of the port to identify the strengths, opportunities and threats, also study of Benchmark Port (MARPORT.)

Chapter 4 studies the architectural design of Benghazi port some of the port's statistical information also presents problems and difficulties faced by port operators, as well as port performance of Benghazi port and obstacles to the development of Libyan maritime transport. In addition to the general requirements of Benghazi port in order to reach the design proposal

Finally, chapter 5 presents the final results of the study as well as summarizes the proposal, Fig 2.6. , abridges flowchart of proposal.

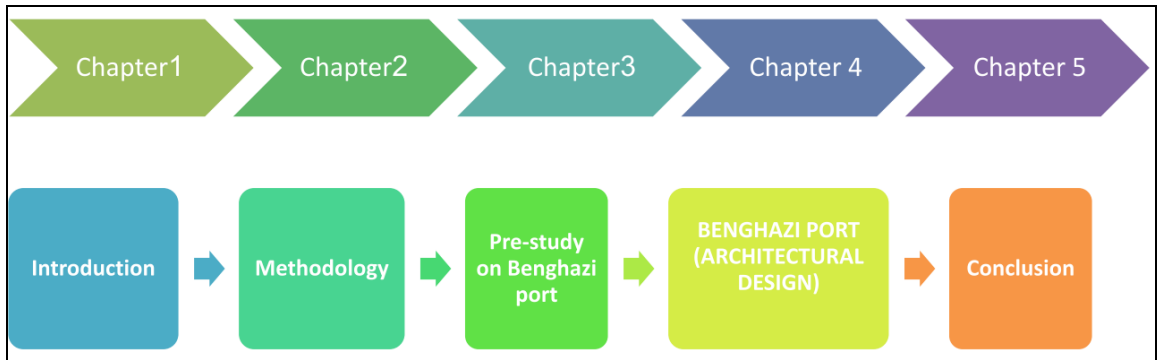


Fig 2.5. Thesis Structure.

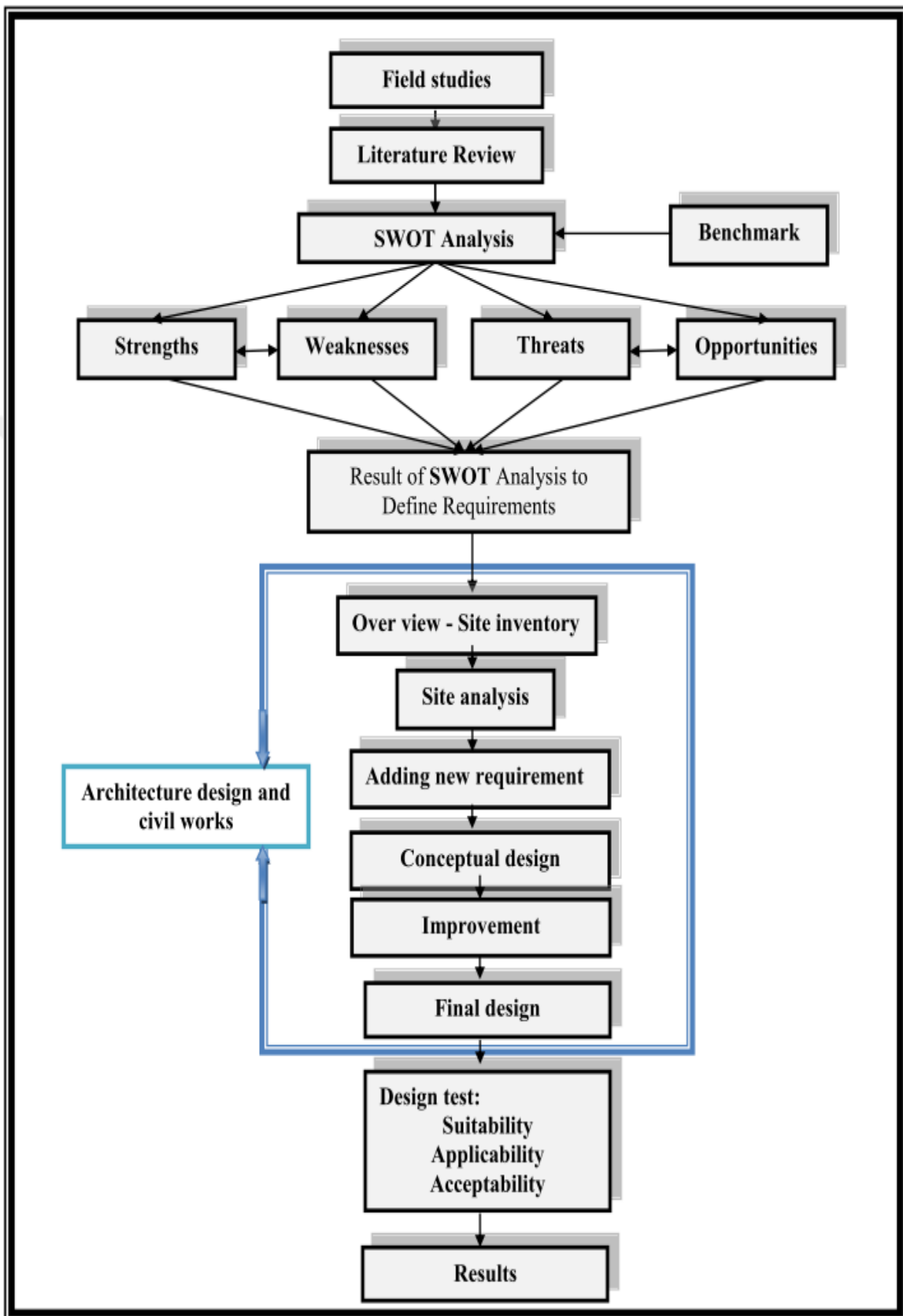


Fig 2.6. Flowchart of the Thesis.

3. PRESTUDY ON BENGHAZI PORT

3.1.General

Shipping is a way of means to activate exchanges as one of the most important and cheapest means of global and external transport of goods and passengers, and is considered ship and sea port two main axes which revolve around shipping activity sector.

Maritime transport sector importance in economic development processes in both developed and developing countries that have coasts suitable for such activity as services provided by sector, which is complementary to productive activity provided by other economic sectors, whether industrial or farm tourism or internal transport sectors, and play sector shipping key roundabout in food security and social development processes , in addition to its impact on movement of foreign trade and balance of payments and therefore we find that shipping industry is one of leading in developing countries and national economy in dire need of industries such industries improve their economies.

Expansive worldwide ports are assuming a focal job in many supply chains as strategic doors, however littler territorial ports have been more dormant and have not achieved same level of improvement as the bigger ports. Research writing in connection to port advancement is likewise intensely cantered on bigger ports. The littler ports don't have similar assets and learning to actualize strategies that have been produced for the bigger ports, as these techniques regularly are extremely unpredictable in nature. Late ports don't have financial aspects of scale to help more intricate improvements.

3.2.Literature Review

Ports play a vital role in economic development. As in most developing countries, ports have found increasing interest in recent years as one of the cheapest and

environmentally friendly methods of bulk transport. Port performance is greatly affected and significantly affects the pace of development of the country's economy. As a result of the globalization policy and the growth strategy, the seaports are undergoing a renewal process to renovate and develop the ports. In this context, the port of Benghazi is addressed for this study. The focus is twofold.

First, the port of Benghazi as a port of trust is examined for the location of the second and second, for its contribution to the service of remote areas. The first attempt in this study is to review the literature, in order to obtain it adequate knowledge of the role and nature of the port.

This review will be useful in defining specific objectives and hypotheses and determining the scope of the study to focus on port design. The literature review is contained in this paragraph.

Study of the development and Mediterranean ports 2000, the study focuses on the competitive position of the Mediterranean ports through their response to competition factors from other ports in the region to determine the general framework for their modernization and development in the future in the form of SWOT identification. The study analyses the need to adopt the competitive form of competitive management with emphasis on the importance of developing ports to increase efficiency.

Re - Planning and Development of Port Said Container Terminal 2002, in light of the suffering of the Port Said Container Terminal from the lack of possibility of horizontal expansion under the current restrictions and taking into account the successive increases in the container containers expected to be transported through the station, a study was required to re-plan and develop the Port Said Container Terminal and study the possibility of increasing the capacity of the station and prospects for horizontal expansion And the possible heads for now and in the future.

Study of the development of the back areas of Egyptian ports 1999 an analytical study applied to the Egyptian ports in terms of the back areas known as the ports and the best methods to improve the link between ports and areas inhabited by the back and neighbouring countries through integrated transport networks.

Study of transit container trade 2010, the purpose of the study is to determine the current volume of transit container trade in ports and to determine the future expectations, as well as to identify the problems and information facing them and identify methods of encouraging the industry related to the storage of goods and support of value added activities, with the study of the case of East Port Said Port.

Feasibility Study of East Port Said Port 2010, an economic and technical feasibility study was prepared for the construction of a pivotal port in the north of Port Said city within the framework of the general plan of Port Said Port. The study dealt with several dimensions related to the volume of container handling in the Mediterranean Sea, the major shipping lines on the Egyptian ports, and the capacities of container handling in other competing ports. Based on a study of the current situation, a forecast of the movement of containers in the area and the port proposed for construction. The study recommends the feasibility of the project technically and economically. In this framework, the study proposes a general model for the establishment of modern port and modern administrative systems, so that it works with the latest methods of operation and operations management and modern technological techniques. The Maritime Research and Consultancy Centre is responsible for following up the progress of the construction works and the work of constructing the pavement barrier as well as the trenching works.

Proactive study for the construction of a container terminal in Port Said Port 1997, the study aims to identify the economic prospects for investment in the project of establishing a new container terminal at East Port Said Port.

A design study for the construction of the container trading terminal in Safaga Mining 2010, the objective of this study is the architectural design of the port of container trading in Safaga for mining.

- Study and estimate the number of containers expected to be handled.
- Technical study plant construction of container handling in Safaga mining.

Study of container transit containers in Egypt 2011, The purpose of the study is to determine the current volume of transit container trade in Egyptian ports and to determine the future prospects for them, as well as to identify the problems and information facing them and identify ways of encouraging the industry related to the

loading of goods and supporting value added activities.

The study of maximizing the capacities of the circulation and storage of containers at Port Said Container Terminal 2011, in view of the large increase witnessed in Port Said container terminal in the number of containers handled, which exceeds the capacity of the plant and also because of the continuous increase in the number of containers handled by the station, the study came to look for methods of horizontal and vertical expansion of the station to accommodate the increase in volume in the coming years and also to diagnose and propose appropriate solutions Of the current operating problems of the station.

3.3.General Over View in Libyan Ports

Ports are used to facilitate vessels used in the international trade transfer. It is one of main contract of international trade, which. Similarly, most Libyan exchange is dealt with by Libyan ports. This search centres on port of Benghazi and current circumstance and probability of advancement in framework and superstructure. Utilizing ports for instance, the thesis explores how political trends influenced economic performance, and hence portability. Following section provides information on Libyan ports.

This administrative division illustrates the relationship between several offices in terms of carrying out similar functions. The hierarchy does not appear within the PMTA. In fact, all departments and offices are under the direct supervision of the PMTA Chair without any mediation offices facilitating the follow-up of sub-offices and submitting their final reports to the President, who is supposed to have a role in strategic decision-making. Every single Libyan port are claimed and worked by the sector of public, under the expert of the Libyan Maritime Administration (LMA) of 20 ports (see Table 3.1). The business ports are not oil, which is seven of these ports, and it works in the administration of general freight, compartments, RO-RO and dry bulk. These ports are Tripoli, Benghazi, Misurata port, Qaser Ahmed, Khomes, Derna, Tobruk and Zuwara, notwithstanding a little business port close to the port of Darna, called Ras Al-Hilal, which is utilized for recreation water crafts.

A state-owned company called SPC operates all these outlets. This organization was built up as per Law No. 21 of 1985. Nonetheless, the port of Qasr -Ahmed in Misurata is the main autonomous port, which is worked straightforwardly by Misurata Free Zone Company (MFZ) under Resolution No. 33 of 2006. Qasr -Ahmed Port is situated inside the Free Zone. Accordingly, MFZ administration is near activities and port clients. Thus, Misurata Free Zone succeeded in making the port the highest port in Libya. This is thanks to the updated MFZ management of port performance and customer needs. Because of the operation of one port only and own its own budget, also because of the strategic plans was able to free zone of the directorate of borders. In addition to the use of the most progressive load taking care of hardware that is unique in relation to that utilized in different ports worked by SPC. Compared with other ports, this affects the volume of goods traded. In addition, in 2014 after the war, a new 804 m (ZAROOG, & WESTCOTT, 2014.) was opened. Future plans include the construction of a new port and a 20-meter container terminal near Ahmed's Palace. MFZ has possessed the capacity to screen the execution of these ports and to react to any requirements or shortcomings that operating ports operate close to each other. While the SPC was unable to do so because all its ports are far from the central administration, which has caused poor response to port needs, working hours from 8 am to 5 pm for all Libyan ports, including the operation of customs goods and services and some other major facilities.

11 port, oil port and petrochemicals are utilized basically for the fare of Libyan oil, gas and petrochemicals. Conversely, the port of Ras -Lanuf handles general freight and port of Mersa Brega as a by-product of general load, RO/RO and dry solidified, and uses the steel port in Misurata just to get unrefined for the Misurata steel complex. It is noticed that all entrances and pivotal ports are situated in Europe.

Albeit worldwide exchange courses go through a comparative separation among Africa and Europe due to the nonattendance of real ports in North Africa to serve the region and serve the landlocked countries of southern Libya (SAUL, 2011) For example, 86.84% of Chad's imports and 78.08% of its tolls were sent through Cameroon in 2009 while just 8.86% of its imports and 8.33% of its fares were sent through Libya (Ministry of Infrastructure and Utilities, 2011). So also, the European

Union, Japan and the United States of America are the fundamental exchanging accomplices of Niger, who utilize the ports of Nigeria and Benin (UNCTAD, 2012).

Particularly in Libya, the absence of effective ports in North Africa, making shipping lines stay away from Libyan ports and utilizing European ports., the efficiency of the port is related to the handling equipment technology used in that port, regardless of port connectivity.

With the increasing use of containers, worldwide, most container ports, regardless of whether self-automatic or automatic, utilize dock holder cranes of various sorts and details to manage seaward activities. Also, completely mechanized holder ports utilize AGVs to transport compartments from ocean to capacity yard and the other way around. The compartment is then stacked in the capacity yard utilizing RMG or RTG, contingent upon the affirmed gear. Inside self-loader holder ports, SCs are utilized to transport and store compartments.

Table3.1. Libyan Ports (Source: Maritime Database, 2012).

	Port's name	Cargo type	Operator	Location
1	Tripoli	Container, GC, dry bulk & RO/RO	SPC	32° 54.0' N, 013° 11.0' E
2	Benghazi	Container, GC, dry bulk & RO/RO	SPC	32 ° 07.0' N, 020 ° 05.0' E
3	Qasr Ahmed	Container, GC, Dry bulk & RO/RO	MFZ	32 ° 21.0' N, 015 ° 13.0' E
4	Khoms	Container, GC, dry bulk & RO/RO	SPC	32 ° 40.0' N, 014 ° 15.0' E
5	Derna	Container, GC, dry bulk & RO/RO	SPC	32 ° 46.0' N, 022 ° 39.0' E
6	Tobruk	Container, GC, dry bulk & RO/RO	SPC	32 ° 04.0' N, 024 ° 00.0' E
7	Zwara	GC & bulk	SPC	32° 55.0' N, 012° 07.0' E
8	Ras el Hilal	Small GC		32° 55.0' N, 022° 11.0' E
9	Misurata	Industrial 'ORE'	Misrata Steel Co	32 ° 22.0' N, 015 ° 14.0' E
10	Marsa al Hariga	Petroleum	Arabian Gulf Oil	32 ° 04.0' N, 024 ° 00.0' E
11	Mellitah	Petroleum	ENI Oil Ltd	32° 53.0' N, 012° 15.0' E
12	Es Sidra	Petroleum	Waha Oil Co of	30° 38.0' N, 018° 21.0' E
13	Zawia Terminal	Petroleum	Zawia Refining Co	32° 47.0' N, 012° 42.0' E
14	Bouri	Petroleum	ENI Oil Ltd	33° 54.0' N, 012° 39.0' E
15	Aljurf Terminal	Petroleum	Mabro uk Oil	
16	Marsa El Brega	Petroleum, other liquid, GC, dry bulk, RO/RO	Sirte Oil Co & SPC	30° 24.0' N, 019° 35.0' E
17	Ras Lanuf	GC & petroleum	Veba Oil Operations	30° 30.0' N, 018° 33.0' E
18	Rasco Harbour	Petroleum	Ras Lanuf Oil & Gas	30° 30.0' N, 018° 33.0' E
19	Zueitina	Petroleum	Zueitina Oil Co	30° 51.0' N, 020° 04.0' E
20	Abu Kammash	Petrochemicals	Abu Kammash	33° 04.0' N, 011° 49.0' E

Table 3.2. Cargo-Handling Equipment at Libyan Ports in 2010(SPC, 2011, Ghashat, 2011, Esaheri, 2012, Misurata Free Zone, 2013, Libyan Maritime Administration, 2013).

Port's name	Crane no.	Type of crane	Truck	AGV	Forklift	Trailer	Tractor	SC	Reach stacker	RMG	RTG
Tripoli	3	Boosting Telescopic mast 40 T	0	0	43	22	24	0	20	0	0
	6	Boosting Telescopic mast 50–80 T									
	4	Fixed mast crane 60–100T									
Benghazi	3	Boosting Telescopic mast 50–80 T	0	0	45	17	21	0	17	0	0
	3	Boosting Telescopic mast 30–40T									
	3	Fixed mast crane 60–100 T									
Brega	1	Boosting Telescopic mast 50–80 T	0	0	15	3	1	0	0	0	0
	1	Fixed mast crane 60–100T									
Tobruk	1	Boosting Telescopic mast 50–80 T	0	0	13	3	2	0	1	0	0
	2	Boosting Telescopic mast 30–40T									
Derna	2	Boosting Telescopic mast 50–80 T	0	0	14	3	3	0	0	0	0
	2	Boosting Telescopic mast 30-40T									
Qasr Ahmed	2	Panamax quay container cranes	0	0	26	30	30	0	12	0	2
	12	Boosting Telescopic mast 50–80T									
	11	Fixed mast crane 60–100T									
Khoms	2	Fixed mast crane 60–100 T	0	0	18	14	18	0	16	0	0
	1	Boosting Telescopic mast 50–80 T									
	1	Boosting Telescopic mast 30–40 T									
Ras Lanouf	1	Boosting Telescopic mast 50–80 T	0	0	24	3	3	0	1	0	0
	2	Boosting Telescopic mast 30–40 T									
Zwarah	1	Boosting Telescopic mast 50–80 T	0	0	9	2	2	0	0	0	0

In Libya there is no such equipment in any of the Libyan ports. Conventional payload dealing with gear keeps on being utilized by every single Libyan port to deal with containers, other than Qasr - Ahmed port (Table 3.2). Where the port of Qasr Ahmed has two specialized quality control cranes and two RTG, due to the shortcomings of this container handling equipment caused some limitations on its recent capacity.

Therefore, it is the best-prepared Libyan business port, as a port in the area. Because of the absence of gear and the absence of proficient and adequate dealing with hardware adversely influenced the quantity of vessels calling for Libyan ports and the yield of these ports. For instance, in connection to the quantity of ship calls, Libyan business ports (rather than oil and steel ports) served 3,128 freight dispatches in 2008 (SPC, 2011, Misurata Free Zone, 2013). The quantity of ship brings in 2010 expanded to 3,961 (SPC, 2011, ESAHERI, 2012, Misurata Free Zone, 2013).

Because of the nation's unsteadiness in 2011, this figure tumbled to 3557 vessels contrasted with 2010 (Libyan Maritime Registration Department, 2013, Misurata Free Zone, 2013) (see fig 3.1). In any case, this number was low in 2011 because of few Libyan vessels (UNCTAD, 2011b); Libyan ports cannot oblige bigger boats of this class because of water profundity constraints.

A large portion of the vessels that were reviewed at Libyan ports were remote boats (CETMO, 2010). What's more, the biggest holder vessels that can visit Libyan ports are third-age Panamax ships. The profundity of the most profound Libyan ports is the port of Qasr Ahmed and the ports of Khomes, with a greatest water profundity of 13m (Libyan Ports Company, 2013, Misurata Free Zone, 2013); Panamax Container Terminal Project is 12 m.

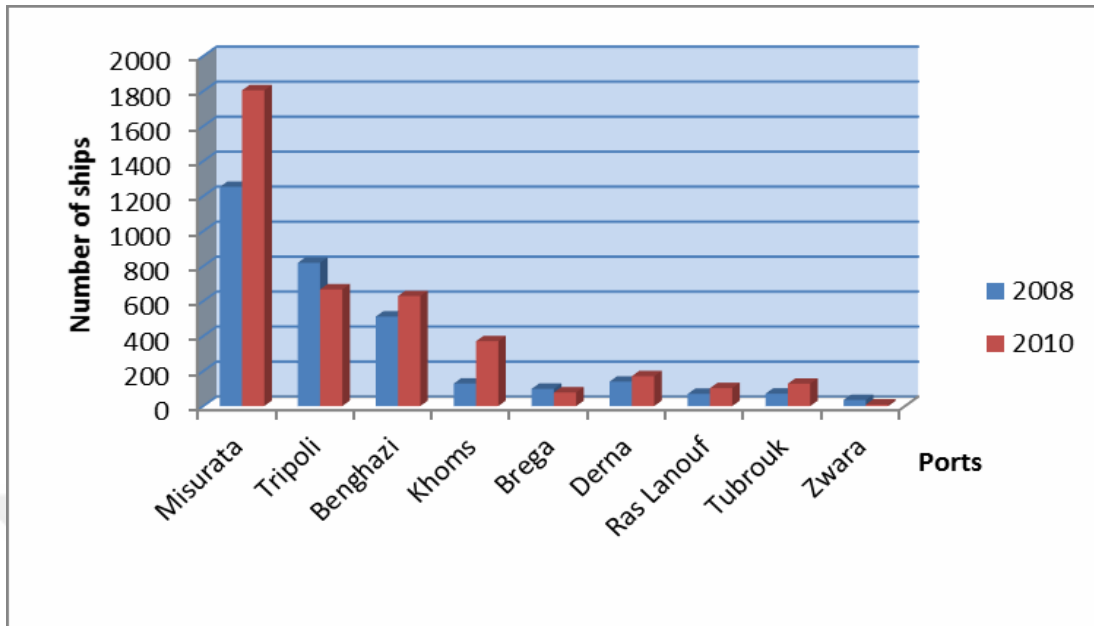


Fig 3.1. Number of Ships Calling at Libyan Ports in 2008, 2010 and 2012 (Ghashat, 2011, SPC, 2011, Esaheiri, 2012, Misurata Free Zone, 2013, Libyan Maritime Administration, 2013).

Fig 3.2 shows the four major Libyan commercial ports and contact numbers in 2008, 2010, where it ranked first in Ahmed Palace in Misurata, taken after by Tripoli, at that point Benghazi, and after that khome. In 2010, similar ports of a similar rank proceeded. A change happened in light of the Prime Minister's choice to stop compartment dealing with in Tripoli causing a decrease in the quantity of calls. Tripoli port saw 18.6% diminishing in the quantity of calls contrasted with 2008. Conversely, Khome port enrolled more than twofold of every 2008 of every 2010. What's more, to anticipate activity blockage in Tripoli. The utilization of Khome port rather, in 2012, the expansion in deliver brings in Tripoli port, and khome, and Benghazi nearly as they were, while the port of Qasr Ahmed got 1,244 vessels in 2012, nearly a similar number of 2010. The profitability of every single Libyan port is low contrasted with other global ports in the area as far as volume of products. For instance, there has been an adjustment in the worldwide compartment exchange, which came to around 150 million TEUs in 2010 and keeps on developing. Also, Libya saw an expansion in compartment exchange from 320,609 TEUs in 2006 to 614,041 TEUs in 2010. It at that point diminished to 358171 TEUs in 2012 (see Fig 3.2).

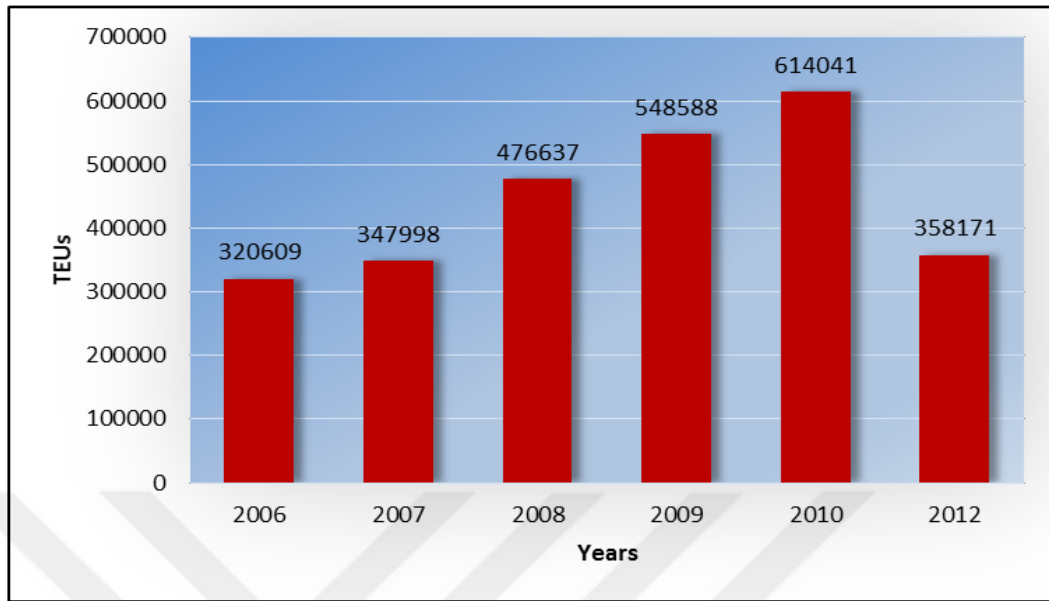


Fig 3.2. Total of TEU Volumes Handled by Libyan Ports (2006–2012) (SPC, 2011, Ghashat, 2011, Esaheiri, 2012, Misurata Free Zone, 2013, Libyan Maritime Administration, 2013).

Because of security precariousness and changing interval governments amid these two years this led to a decrease in TEUs. The total production of all Libyan ports in equivalent containers between 2004 and 2012 amounted to one million units per year (SPC, 2011), which appears to around 0.03% of the world aggregate (UNCTAD, 2011b).

It is detectable in the insights that the aggregate sum of products sent by Libyan ports in 2008, 2010 and 2012 is significantly higher than anticipated merchandise (see Fig 3.3 and 3.4), also through the statistics, we note that the total cargo loaded at the port of Qasr Ahmed Palace during the same period did not exceed 1.5 million tons. Although the port of Qasr Ahmed is a dominant port in freight forwarding compared to other ports.

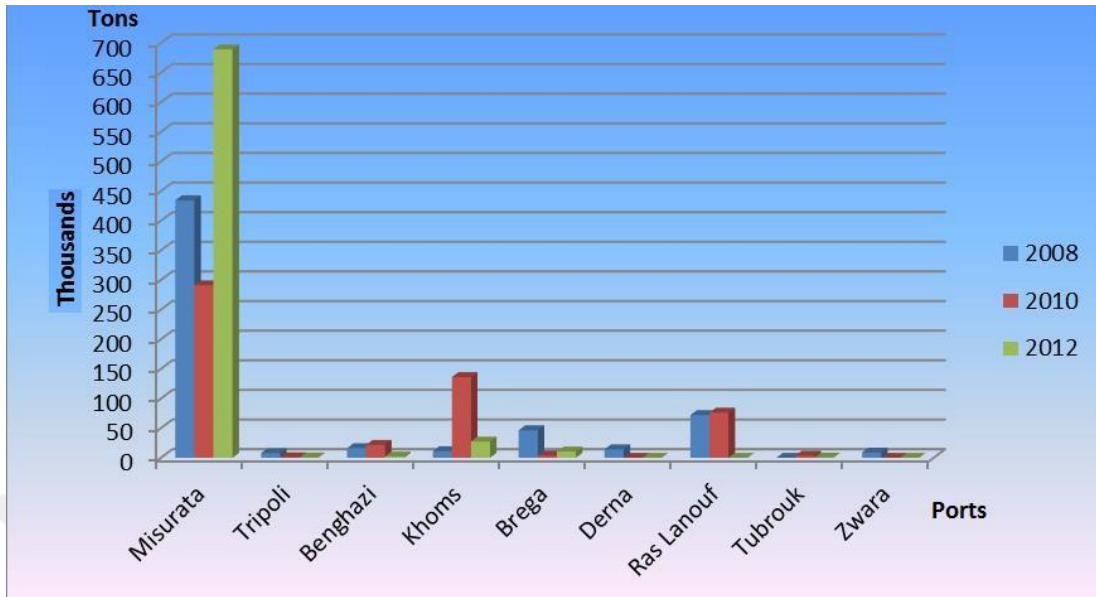


Fig 3.3.Total Cargo Off-Loaded by Libyan Ports in 2008, 2010 and 2012 (Thousand Tons) (Ghashat, 2011, SPC, 2011, Esaheri, 2012, Misurata Free Zone, 2013, Libyan Maritime Administration, 2013, Libyan ports company, 2013)).

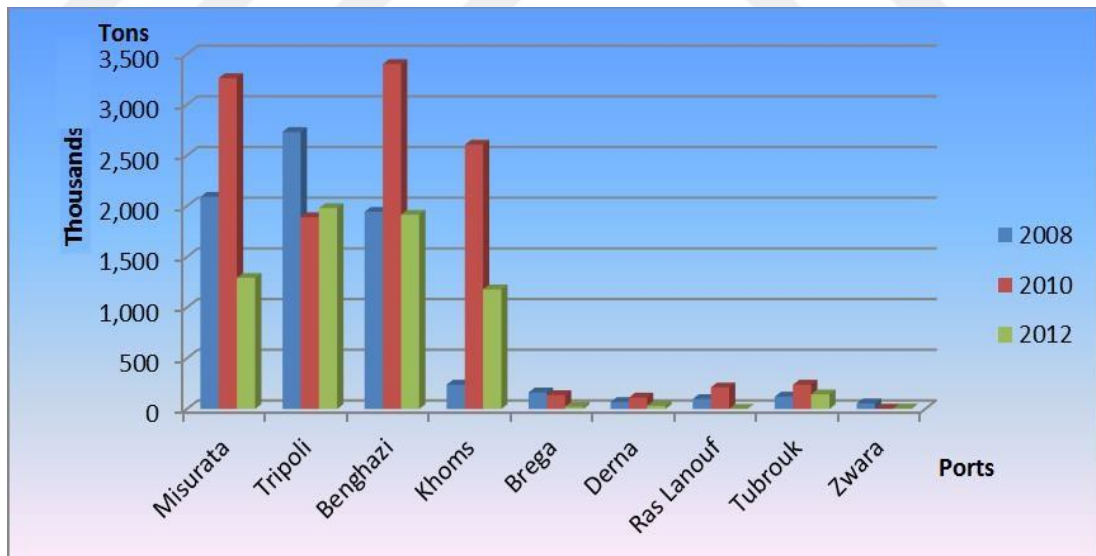


Fig3.4. Total Cargo Loaded by Libyan Ports in 2008, 2010 and 2012 (Thousand Tons) Ghshat, 2011, SPC, 2011, Esaheri, 2012, Misurata Free Zone, 2013, Libyan Maritime Administration, 2013, Libyan ports company, 2013).

3.3.1. Performance Standards of Libyan Ports and Maritime Transport Authority

(PMTA) Effectiveness of PMTA's work in achieving and implementing objectives and roles entrusted to it: according to the administrative control authority report, there are some problems facing the work of PMTA and its affiliates such as Libyan Ports Company. Among these problems are:

- Expanding administrative divisions and failing in re-examining organizational structure.
- Not activating inventory system to monitor traffic of goods in ports.
- Halting work in some projects and delays in taking over others Performance Assessment of Libyan Ports & Maritime Transport Authority (PMTA) ability of PMTA to manage its financial allocations as required according to the reports of the audit bureau issued during years 2014 and 2015, there are some observations about work of Ports and Maritime Transport Authority, which are as follows:
 - Poor preliminary studies and detailed designs for some projects resulting in many amendments orders.
 - Not starting the implementation of projects contracted by PMTA and not taking legal actions towards companies which infringed the contracts with it.
 - Poor implementation of some businesses which are not conforming to technical standard stipulated in contracts concluded with various companies.
 - Repeating same activities and business lines in different contracts conducted with several companies, creating contradictions and squandering public funds. This occurred in projects aimed at developing several ports.
 - Slow implementation of several projects despite having a timetable for completion of these projects.
 - Contracting with consulting offices to develop Libyan ports while these offices neither have an adequate expertise nor an evidence of their professionalism such case of new port of "Sirte".

- Contracting to supply sophisticated radar systems and systems that track ships without a comprehensive development of infrastructure in Libyan ports which reduce effectiveness of these various systems.

- Failure in carrying out different technical studies to reduce sand encroachment inside harbour of port in "Sirte".

- Not performing regular maintenance for many ports, which threatens existing structure and increases cost of future maintenance. Some General Observations about Performance of Libyan Ports and Maritime Transport Authority (PMTA) (AAPA. 2008b).

- PMTA seeks to unify the forms in place in order to increase its role and effectiveness and establish clear standards through which it enhances performance and communication with other units and agencies it deals with on Libyan ports and maritime transport.

- In 2013, PMTA issued a decision to activate role of college of technology and maritime studies. It is noted that PMTA's work mechanism is based on forming committees to solve crises; however, work of these committees is not effectively followed-up.

- PMTA delays issuing some visas and permits to companies affiliated with it which delay and reduce its work effectiveness. All this data shows importance of PMTA given that it is responsible for a vital artery that will contribute to supporting Libyan economy through having ports and sea crossings. In addition, having a Libyan maritime transport sector will contribute to supporting Libyan maritime industries and increase opportunities for Libyan presence in this sector at regional and international levels; especially that Libya enjoys a long coastline on the Mediterranean. Therefore, several important oil ports could be improved to turn them into strategic areas that deal with all maritime transport services, and not only ordinary ports (ALAM, MILOUD, & NAJAH. 2009). However, this requires conclusion of a set of recommendations that must be put into practice to raise capacities and abilities of PMTA:

- A stability on political and security levels and then stability on

administrative level that is followed by an administrative reform revolution.

- Fighting corruption in all State's sectors especially vital sectors on which Libyan economy depends to advance and make progress such sector of maritime transport and ports.

- Strengthening and activating relation between PMTA and Ministry of Transportation through having an effective work and follow-up systems and complementary coordination between both sides in order to ensure the full control over all State's ports. This coordination and cooperation would also serve to develop ports in a comprehensive manner which supports maritime transport sector and thus boost the oil sector through supporting the means used to transport oil products via the ports.

Relation of PMTA with Ministries, and Competent Local and International Bodies: There are several links that govern relationship of PMTA with Ministries and competent bodies. In fact, PMTA is affiliated to Ministry of Transportation, in accordance with a legal association through which work in PMTA is organized within Ministry's framework (ALAFI, 2010). Ministry of Transportation puts development of maritime transport sector and enhancement of PMTA's work, under its strategic plan. PMTA is also associated with Libyan bodies and ports through a technical regulatory relation. In fact, it follows up with performance and development of work in new projects, especially in the various Libyan ports. PMTA also has solid relationships with regional and international bodies competent in field of maritime transport. Below are examples of such relationships:

- In framework of joint cooperation between Libyan State Institutions in maritime field, a joint cooperation agreement was conducted between Navy forces, General National Maritime Transport Company and PMTA. Agreement stipulates training and rehabilitation of Navy forces personnel, developing their human resources in technical fields, and awarding them with certificates of eligibility.

- PMTA began confining and auditing sovereign debt owed to public treasury represented in fees and sovereign returns of ships arriving in Libyan ports. In order to obtain dues and tighten internal control over ports, PMTA instructed all administrations of commercial, trade, industrial and oil ports to freeze some

maritime companies and corporate activities, which are in debt to PMTA, in ports until they settle their financial situations.

Enhancing future work of Ports and Maritime Transport Authority (PMTA) and reform priorities:

By and large, improving execution of ports and sea transport area when all is said in done and the PMTA's work, specifically, which should be possible through the accompanying recommendations?

- Re-examining PMTA's structure and its way of work through developing effective mechanisms to achieve main objectives assigned to it.
- Enabling PMTA to carry role of control over Libyan ports and enhancing maritime transport sector through financial and human resources.
- Developing plans for training and raising capacities of PMTA's workers.
- Considering the recommendations of Audit Bureau and Administrative Control Authority, especially those related to lack of follow-up with projects or any other comments related to corruption or failure in performance.
- Developing an effective system to better coordinate with Ministry of Transportation and PMTA to support latter and providing it with all it needs of resources to promote the financial, administrative and human resources as well as consolidating its role.
- Creating a new department responsible for maritime pollution and developing infrastructure to fight oil pollution and creating a centre specialized in developing human resources in field of protection of maritime environment.
- Working on attracting major navigation lines for transport with container vessels.
- Using marketing mix (especially pricing) to ensure development of an effective marketing plan.
- Focusing on the third generation components of ports which contain value added

services such as insurance companies and banks.

- Adopting a program for developing technology, design, and manufacturing of first models of equipment to fight problem of pollution.

- Obliging oil companies that are manufacturing petroleum products to submit a monthly report about quantitative and qualitative characteristics of discharged fluids and efficient treatment systems.

- Encouraging establishment of companies to address pollution loads of solid materials and sewage of the fixed and mobile installations in various seaports.

- Need for providing an internal integrated network with need to use high technology.

- Developing simplified procedures to ensure fast and easy flow of goods between ports and logistics centre.

- Creating a legislative environment consistent with objectives of logistic centres and adopting clear marketing policy.

- Providing modern requirements set by international Maritime Organization to ensure security and safety of ports (International Ship and Port Facility Security Code (ISPS)) and all international conventions.

- Providing necessary legislative, administrative and investment requirements to facilitate performance inside ports in accordance with modern logistics concepts, achieving required integrity between containers terminal operations and activities supporting trade.

- Long-term arranging in nearness of different plans existing for a significant lot of time; it is though important for these plans to be associated with a clear and comprehensive study of State's needs and available resources in this current phase along with resources that could be provided on medium and long-terms. Thus, sound plans could be fully implemented instead of developing plans based more on ambitions than on real work and available resources.

- Coordinating and cooperating with international and regional organizations working in field of developing ports and maritime transport sector to raise capacities of Libyan stakeholders, and to work on implementing international conventions and treaties efficiently and effectively.

- Setting an Integrated Strategy for Development of Maritime Transport Sector through the following: Improving productivity and service capabilities of Maritime Transport Industry.

- Encouraging private investment in maritime transport sector and developing activities associated with it.

- Rehabilitation of some ports and their integration in their environment in order to contribute to overall sustainable development of ports in local community and environment.

- Facilitating foreign trade procedures and bring about a professional environment in port community.

- Creating a data bank for maritime transport such as those that exist in many countries, amongst which is Egypt. This bank is supposed to offer prominent information services based on accuracy and speed of performance, as well as regular updates to be official information source on maritime transport for State. This bank aims at providing all information for decision makers, those concerned with maritime transport industry, and researchers through a centralized database and through an effective role in enhancing performance of Libyan maritime transport sector (Alazabee, 1997).

Furthermore, it would provide all workers in this sector, decision makers, planners, are all those dealing with it with accurate and documented information (printed or visual) of high quality through using latest information technologies.

- Thinking about the best ways to ship and deliver goods to markets and in some cases, maritime transport would be only available alternative. When choosing maritime transport option, exporter or shipper takes into consideration delivery time, as it is important to satisfy the customer. Moreover, cost should be minimal for a good service,

and it should include capital cost benefits and capital inflows and its association with time spent during transportation, cost of insurance, wrapping which has to be suitable to all means of transport used (AQUAVIÁRIOS, 2012).

Setting up an integrated strategy to develop Libyan ports and making use of international and regional experiences. In this regard, the following can be done:

- Improving services provided to ships and traded goods.
- Increasing storage capacities, expanding use of dry ports, and creating logistic centres.
- Using information technology and exchanging information with customers.
- Relying on electronic exchange of documents instead of manual exchange.
- Using automated control and management systems for movements of ships, goods cargo hatches, and water bodies.
- Accessing periodic reports from Documentations Centres (D.C), explaining and analysing them by using graphs and curves to better assess performance.
- Reviewing fees and cost of stay in Libyan ports and other offered services by ports as this factor is important in attracting international ships. In this context, several ports reduced their fees amongst which were "Italy" and port of "Singapore."
- Controlling movement of incoming and outgoing goods along with having a database that allows instant monitoring of these movements.
- Applying international Ships and Ports Security Code (ISPS).
- Studying new logistic areas inside and outside of ports.
- Encouraging public and private sectors through investing in field of owning and renting ships along with providing attractive facilities.
- Giving more attention to ports' revenues and developing a strategic plan to increase these revenues, especially since countries of region are seeking to increase

their non-oil revenues, and consider ports' revenues as one of future sources of income, and thus, must be focused on (BANK, 2015)

- Revitalizing and strengthening shipbuilding and repair industry and complementary industries.

- Tending towards integrations and alliances between companies in field of maritime transport to create globally competitive entities.

- Continuous monitoring of evolution of management systems, engineering and information technology in sector of maritime transport and ports. Maintaining partnerships with international ports to exchange experiences in field of safety and security of ports.

- Developing training programs in each unit to be offered by international experts in sector of ports.

- Outsourcing private sector to handle ports businesses and services through concession contracts.

- Emergence of value-added projects which will maximize transit and open employment opportunities.

- Continued development of services and technical services in ports to cope with needs of transit ports.

- Encouraging joint foreign and Arab investment to develop containers terminals.

- Giving flexibility and more decentralization to administrations responsible for ports and containers terminals.

- Increasing Libyan ports trading equipment especially modern ones along with upgrading information systems for modernizing ports and electronic data interchange (EDI).

- Need to develop costs systems in all ports authorities and companies.

- Reassessing assets of ports authorities and service companies considering assets

current values and pricing relative change in various activities.

- Creating a committee in each port to introduce services and solve customer problems.
- Following up with development of transport and distribution of transit containers in countries of the Middle East, Red Sea and Arabian Gulf.
- Speeding up restructure process of Libyan ports to raise efficiency of its operation.
- Forming work groups responsible for implementing and following up with developments in transit containers at ports and ground crossings that are currently under construction and which represent a competition to Libyan ports.

3.3.2. Benghazi Port

Benghazi port and its ability to serve target area, in view of great importance that ports occupy in transport and distribution chain of goods and goods and in determining cost of these goods and thus affecting their competitiveness, development of Benghazi port in order to benefit from city's distinctive location, which supervises most important trade routes between east and west and between north and south, it has all the conditions and services required to attract shipping lines and international companies to benefit from advantages of this site.

3.3.2.1. The Current Status of the Benghazi Port

Benghazi port is second largest port of Libya after Tripoli port and port is located in the northern outskirts of the city of Benghazi between lines of length and width: Linear width 32:07, 32:11 North, Linear length 19:56, 19:59 East.

The main components of any port are in ports, wave barriers, and sidewalks. Shapes and sizes of basins vary from port to port depending on geographical conditions. Benghazi port is available with 3 basins:

The old port basin (downtown) has 6 berths with lengths ranging from 75 to 235 meters and a total length of 782 m, representing 17 % of total lengths of berths in the port, from 5.00 - 6.50 m , new port basin (city centre) has 3 berths with lengths ranging from 285 to 355 m and a total length of 958 m long, representing 21% of total lengths of berths in the port, from 8.40 - 9.00 m, basin of the Middle Port (Jilliana) has 9 berths with lengths ranging from 150 to 520 meters and a total length of 2765 m. It represents 61% of total berths in the port. Depths range from 6.50 - 12.50 m, total area of the port 300 ha represents land 43% of total area, equivalent to 130 ha. (Maritime, Database, 2012).

- **Surfaces:** the port protects two main barriers to break the waves, which are more than 10 m high. One north and another one west with a total length of 9039 m. It provides protection for the port from northern, north-western and western winds. Entrance is at bottom 180 m and depth of the port entrance 13.5 m. Access channel is located between main barrier and secondary barrier, and its distinctive navigational markings are site of green and red lighting with coordinates: Green lighting, Red lighting, diameter of outer circulation circle is 200 m and inner circle is 130 m.

- **For Oil Pavement:** the port has an oil platform belonging to Brega oil marketing company, which is located within the water boundary of the port and extends underground pipes from platform site to Ras Al-Munqar depot within 10 km east of Benghazi port. Platform is dedicated to anchoring oil and gas tankers, 200 m long and 11.5 m deep. The port, in its present state and through the available resources, cannot in any way cope with any growth in movement of incoming ships as a result of the great shortage of all possibilities, whether related to technical aspects of operation or related to infrastructure facilities this is normal for a port that has not experienced any integrated development for more than 30 years. Current situation of the port can be assessed in terms of available capabilities and capacities as follows:

Firstly: civil and marine construction in old main port (downtown).

I) Docks: construction of pavements is medium and some require concrete maintenance, ponds need deep water work, so they can receive new and larger generations of ships, all bunkers and girders are outdated, worn and not in accordance

with required standards, and are now installed as old truck tires, the rafters for pavements do not perform required purpose in full, and require maintenance work and modernization of some of them, waiting area of ships (area of shoulder) lacks marks that must be marked, which is important in extension process, lighting on both sides of entrance to the port is very weak and inadequate.

II) Stores and Yards : (4) Warehouses with a total area of 7770 m² are iron gallons (only stores that are employed to store the goods). Construction condition is very bad, especially the stores (2, 3) and requires urgent and urgent maintenance works for roofs, as it is in its current situation is not suitable for safe storage of goods.

There are (3) other stores (4, 13 and 14) with a total area of 7050 m², which is dedicated to storage of tools, equipment and spare parts for the port. Technical condition is very poor and decision to remove storehouses (13, 14), while store no. (4) Is used as a carpentry workshop and headquarters of civil maintenance Unit., all stores lack automated fire extinguishing systems.

Open storage areas in the port, unpaved and unfenced and lack sufficient lighting - except one square area 40000 m² for general goods.

Port land area is 22 ha, area of paved squares 17.4 ha, area of paved squares 4.60 ha, roads and corridors leading to storage areas and all sites of the port are abundant drilling and bumps and need to work for maintenance and restoration, which in current situation is a major cause of destruction and destruction of machinery, there are no cold storage warehouses for refrigerated goods in the port. The alternative is to supply containers that contain refrigerated goods.

III) Different Facilities: water network at the port is worn out and has not been in operation for more than half a century. This makes the water supply of water vessels primitive by bringing water trucks from abroad; the port has no sewage and storm water drainage network, there are many administrative buildings in the port staff to manage field, scattered and far from each other, which are old buildings and need to work for maintenance and restoration, lighting of the port is generally weak and does not meet requirements of work at night as well as security and safety requirements, (outer fence of the port is a temporary fence and is easily accessible security, and is expected to start

construction of a new wall during near future).

Secondly: marine civil construction in the middle port (port of the Island / jleiana) (Port Development Project), with the aim of expanding old port (city centre) and increasing its absorptive capacity. Ports represent a vital and important role in development of national economy through provision of services and facilities that directly contribute to recovery and raise level of national income to society. This expansion was aimed at raising capacity of the port from 2 million tons to 4 million tons in the first phase and 7.5 million tons in the second phase. Project was divided into two main stages:

- Phase I: Contract of Civil Works.
- Phase II: Contract Buildings, Roads and Services.

Libya contracted with Yugoslavian company Ivan Milutović / Pem for the implementation of the first phase (civil works contract) in late 1978, the first phase (Marine Civil Works Contract) consisted of marine works only. Main wave barriers were constructed with a total length of 6500 m long, as well as sub-barriers with a total length of approximately 2,600 m long, 4100 longitudinal meter, including quays of fishing port length 500 m. Among works carried out in the first phase are excavation of port basin to provide suitable depths for entering vessels and linking them to the berths, where drilling works were carried out about 8 million m³, as well as the implementation of landfill works behind sidewalks, it is clear that work of the first phase of development project of Benghazi marine port is purely maritime works, in sense that no civil works have been carried out on land such as buildings, roads, services, warehouses, workshops, pavement, water, electricity, lighting, drainage and other necessary works, to operate the port properly and properly. All these works are planned as part of the second phase of the development of Benghazi Maritime Port (contract of buildings, roads and services).

After completion of the first stage (civil works contract), some temporary solutions and procedures were implemented and implemented with the aim of exploiting new facilities available in area of expansion of island / Ships arriving at Benghazi port to island area in order to reduce quantity of goods handled in current port (old port),

especially direct delivery goods. A fully integrated administrative building (port management building) was also built and a 50 meter (50 x 50 m) covered warehouse was also built. There is a main square with an area of 10.2545 m², a part of which is paved with concrete with dimensions of 158x148 m and the rest is a ready-made paved area. Parallel part of 15 berths is 529 x 20 m long. However, situation of region in general and land areas in particular (sand-filled areas where it is impossible to move or store them), lack of necessary services and facilities for operation, and lack of warehouses, workshops or facilities necessary for work of producers, the first phase is not economically feasible.

Thirdly: technical equipment of land and sea:

I) Wild Equipment: loading and unloading operations of the port depend on a variety of equipment and machines with different specifications and capacities commensurate with the nature and type of goods handled. Level of port services depends on efficiency and strength of machine. The port administration was keen to provide necessary machinery and equipment. However, as a result of several successive decisions issued in recent years concerning structure of the port and change of its administrative and legal structure, the port did not settle administratively, and the port was not supplied with new generations of machinery and equipment accordingly. Therefore, the port suffers from a severe shortage of handling mechanisms, such as cranes, forklifts, and boats, which may cause the port to stop completely from discharging and unloading services. Following tables illustrate available port of ground machines and equipment:

Capabilities Port of Benghazi:

a. Forks and Forklifts:

Table 3.2 summarizes the small number of forks and forklifts at Benghazi port.

Table3.2. Forks and forklifts.

Type	Number	Load in ton
Container pickers	5	48 - 42
Forklifts	31	30 - 3
Total	36	----

b. Winches:

Table3.3. is shows Cranes, the total number does not correspond 36.

Table 3.3. , Winches.

Type	Number	Load in ton
Container pickers	5	48 - 42
Forklifts	31	30 - 3
Total	36	----

Note: Efficiency and capacity of cranes are weak, and cannot handle their design loads, and current load does not exceed 10 tons. This situation makes the port unable to handle loads of more than 10 tons. This is considered very dangerous and threatens the port to stop handling the general cargo, especially as many ships return to the port without their own means of unloading or their cranes are old and have many holidays and stops, of suffering of the port in this aspect

▪ Trailers, Tractors, Headers, Connectors :

A trailer, tractors, heads and connectors according to Table 3.4., the total number is 26 and this number is very small to serve the port.

Table 3.4.: Trailers, tractors, headers, connectors.

Type	Number	Load in ton
Trailer Roll type 40 feet	2	40
Trailer Roll type tow 20 feet	4	10

Trailer Type Mafi	3	25
1 Grab your roller type	2	40
Head of a tow truck	3	30
Head of tow type ATA	2	KW64
Massey Ferguson Agricultural Tractor	3	---
Tractor tractor trunk	4	---
The link of the neck is the type of your roll	2	---
The link of the neck is the type Mavi	1	---
Total	26	---

- Grain Hoods:

The grain hoods according to Table 3.5. Their number is 26 and the capacity range from 10 to 40 tons.

Table 3.5.: Grain hoods.

Type	Number	Load in ton
Neuroblood Aspirator	4	80 tons / hour
Neuroblood Aspirator	3	80 tons / hour
Neuroblood Aspirator	4	120 tons /hour
Central Vijian Veal Pump	1	300 tons /hour
Total	12	

- Assisting Equipment and Equipment:

A set of auxiliary equipment used for loading and unloading (such as hooks, chains, nets, metal wires, and other auxiliary equipment). Most of available equipment is

old and insufficient, use of equipment from ships and shipping agents in unloading some goods, specifically large containers 40 feet.

II) Marine Equipment: it includes various types of locomotives (Boats), floating cranes, inbound and outbound signs and marine communication and observation equipment. Specifically, the port has: service locomotives are used in guide ships number is 3, ranging from (1880 - 3222) horsepower, and they work well, number 1 instruction boat, used in transporting guides to and from ships, works well, the number of 2 boat ties, used in work of connecting vessels on sidewalks, works well, the number of 1 service locomotive, power is 2880 horse, it need maintenance work is out of service now, the port has a floating sea crane with a load of 200 tons. It has been idle and has been engaged in refrigeration and maintenance work for over a year, the port has a dedicated wireless communication system for maritime communications and other land communications system. However, there is a significant shortage of equipment and communication devices especially mobile devices. The port lacks a radar system and a tower to monitor maritime movements, in view of current situation of the port and possibilities available at present time, which was reviewed in previous section we can draw some performance indicators, which can be judged on efficiency and ability to serve the target area can be identified in following indicators:

- Available operating ratio of available equipment: due to lack of specialized loading and unloading mechanisms of various weights and sizes of earthmoving cranes, forklifts, forklifts and other handling mechanisms and equipment, and even available ones suffer from frequent failures and in light of this, available ratio of available equipment does not exceed 40% .

- Loading and unloading rates for goods and containers: as it is known, rates of loading and unloading depend on the size and quality of the vessel (traditional - horizontal) in terms of available facilities and modern technical equipment (cranes) on one hand, and the technical port facilities on the other hand, and average rates of shipping and unloading according to possibilities currently available:

- a) There are 200 containers per day during a continuous working period from sunrise to sunset (5-6 containers per hour). (Minimum universally accepted limit is 25

containers per hour).

- b) For general goods, 200 tons per dungeon per group during full working day from 07:00 to 19:00.
- c) 200 tons of volume or weight of 4000 bags per cubic meter during the period of work 8000 bags per day, noting that most ships include 4 dormitories, and average working hours up to 10 hours per day per square meter, and rate increases according to number of ship's hulls and the extent to which they are ready to operate all the cranes and their wings and recipient's readiness to receive in three periods or not.

III. *Timeout for Goods and Containers at The Port:* duration of the goods' stay in the port after being unloaded from the ships depends on several factors, some of which relate to recipient in terms of readiness and speed in documentation cycle for customs release of goods, others related to efficiency and speed of administrative bodies and competent authorities to clear and release goods (customs, environmental protection, etc.), in normal circumstances and without any problems associated with procedures for customs release of goods, time of survival of goods ranges from one to two weeks.

IV. *Volume of Vessels Received by the Port in Terms of Length's and Load :*

a. The submersible ranges from 4.80 to 10.50 m. (with the modern generation of container ships up to 16 m long).

b. Load ranges from 1000 to 6000 tons, and may reach 35000 tons of bulk goods.

c. Ships received by the port limited to 200 m, based on previous indicators and after studying current situation of Benghazi seaport and possibilities available to it, we can judge efficiency and capacity of this port. We can say that the port of its current status cannot in any way give any competitive advantage due to the problems it suffers, which are mostly related to capabilities and capabilities of the port itself, in addition to other factors related to procedures of authorities that complement work of the port (maritime inspection, customs administration, customs clearance companies, quarantine and agricultural departments, food control, suppliers, shippers) in addition to security controls (internal security, external security, police and other security services).

All these episodes and their money from roles adversely affect efficiency of the port and all this has led to following main problems:

- High waiting times for vessels dealing with the port and difficulty of allowing ship to enter the port as well as non-punctuality to extent that it is difficult for ship, exporters and importers to set specific timetables for delivery and export of goods.

- In view of poor condition of the equipment used in the port, such as cranes, etc., and sometimes lack of availability, as well as the scarcity of trained workers, the loading and unloading rates at the port are much lower than those accepted at similar ports. This would increase duration of ships' goods and damage they suffer and high costs.

- Weak storage spaces for containers and inability of the port to cope with emergency breakdown of ships because there are no shipyards of all kinds.

- Due to development of container transport and development of its types, this has led to a similar development in container ships which developed a tremendous development, which led to inability of the port to receive modern generations of narrow berths in the port and depth of permitted submersible and availability of giant cranes to deal with such these ships.

- The next ship to the port to deal with many entities such as socialist company for ports and quarantine and quarantine and security of the port and passports, etc., and all these contribute to issuance of entry permits for ships, which may take several days.

Benghazi port is inefficient; reducing these inefficiencies has been a priority in recent national strategies. However, implementation of necessary policy reforms and investments has been slow.

Lack of enthusiasm for reforms is explained by asymmetric distribution of benefits and costs associated with current inefficiency of the port, which is exploited by a handful while costing multiple consumers. If current situation is not remedied, the port of Benghazi might lose its existing market share in regional trade, particularly when other ports and railways become operational in neighbouring countries.

The performance of Benghazi port has varied over time. But its performance

deteriorated gradually up to the mid-2000s. Inefficiencies result in long delays, first at anchorage, and second in series of operations necessary to exit merchandise from the port.

A number of recent initiatives indicate political willingness to implement reforms. The port authorities have recently renewed endeavours to implement reforms aimed at Infrastructure repairs and civil works. If further momentum can be achieved and the port improved, this would result in a brighter future.

Also key inefficiencies hindering effective operations at Benghazi port are presented below.

- Port Congestion - need to increase capacity ahead of demand.
- Changing shipping technology - need to accommodate larger vessels.
- Need to improve interfaces across transport modes.
- Need to create rail for smooth linkages.
- Land use planning is poor.
- Own investment funds is inadequate.
- It must increasing competition.

In addition network-based descriptions of ports, shipping networks are important in regional development outcomes because they influence which markets are accessible, at what rates/costs and time scales, how regularly, and with what levels of reliability. These factors are crucial in investment decisions and market penetration prospects of both importers and exporters. In short thus, ports are one of nodal points in trade networks through which the region can connect to the global economy. What has been happening in these networks of trade we must discussion of changing port fortunes and the implications of these changes for local and regional economies since 1980 needs to start with a consideration of impacts of containerization. Three interrelated issues bear further elaboration.

First, changes in shipping technology, specifically containerization (referring to the fact that containers can be moved on ships, road and rail) have dramatically reduced the cost of shipping many goods. Costs savings associated with containerization include: cutting the need for port labour to handle diverse cargo moving between transport modes, allowing larger vessels and thus economies of scale, reducing ship waiting times, and reduced theft and damage. Containers carry high-value to weight ratio goods efficiently and safely.

Second , containers also require particular land-based and other port facilities to serve ever larger ships carrying containers – large amounts of land for stacking containers, specialized container-handling equipment, cranes, information systems, and deeper and wider shipping channels . This has given rise to new forms of risk and uncertainty in port investments. Maritime trade is highly variable –general increase in trade value and volume since 1970 includes some dramatic boom-bust cycles in maritime shipping rates and volumes. Investments in ships and port facilities are lumpy and subject to long lead times. Other sources of variation include seasonal variations in many primary commodities, global and national business cycles and short term political and other shocks.

Third, shipping industry has reorganized itself to respond to changed environment,

- Intensifying competition between ports.

In light of the importance of beneficiation in Libya as part of economic policy, an impact assessment of full scale beneficiation on the port development plans is described below. Assessment ensures that proposed Benghazi port development plans are robust enough to absorb this potential additional demand.

Scale beneficiation developments have been considered, based on following considerations:

- Significant potential impact on economy of country;
- The project is in public domain and some sources of information exist;
- It is viable in terms of finance and the supply of sufficient raw materials to

beneficiate;

- The knowledge-base that could secure successful implementation of such a project exists or can easily be acquired, port property planning, most of ports are subject to significant growth which requires a property response to meet optimistic projected volume growth. Older ports are surrounded by adjacent urban landscape thereby severely limiting spatial expansion and land acquisition prospects.

Notwithstanding, there are latent opportunities for Brownfield related development where new-order freight handling demands replace old and obsolete activities. For instance, the conversion and upgrade of multipurpose terminals into dedicated container or Ro-Ro facilities.

Port land is defined by port limits. Port development framework plans show development of the ports from their current status, through short, medium and long term. Land within port limits is zoned according to port land use categories. Principle lands uses are those relating to freight activities, i.e. c containers, break-bulk, dry bulk, liquid bulk and automotive.

3.4.Benghazi Port SWOT Analysis

SWOT analysis is an important component of strategic planning (long-term) and is a widely recognized strategic tool. In addition, SWOT analysis is a method that provides a balance between internal capabilities and external capabilities. From another point of view, it is a set of logical methods used to assess the target's abilities and identify deficiencies as they illustrate opportunities and threats in the environment.

Extended SWOT analysis consists in a cross-analysis of four elements (strengths, weaknesses, opportunities and threats) and how they can contribute among each other for obtaining, in addition to diagnosis, strategies "macro and micro integrated" and actions to be considered by strategic direction of Benghazi Port . In this section each point of extended SWOT table, will be explained, as well as its relevance for the internal and the subsequent strategic analysis of Benghazi port.

The study of SWOT analysis of Benghazi port was conducted in cooperation with a group of specialists in fields of economy, environment, port engineering, transportation, architecture, and urban planning.

In this study MARPORT in Istanbul/ Turkey is selected as a benchmark for SWOT analysis. The reason to select this port is; It is not easy to reach real figures belong the ports. But detailed data provided from the Doctorate Thesis (ŞİŞLİOĞLU, 2017) helped us to make planning as well as the configuration, capacity and characteristics are very similar to Benghazi

➤ *Weaknesses*

Libya's maritime transport sector suffers from many problems including few ships owned by national companies, high maintenance and operating costs, old and destructive operating vessels, the accumulation of goods in ports in some seasons, difficulties in obtaining spare parts as a result of economic blockade in past or weak funding at present and weak policies and lack of sound management plans for this sector.

1. Absence of maritime shipping lines for some countries: container movement was a revolution in transport of goods, allowing for division of goods, cost savings, and inter modality. Currently Benghazi port is not specifically dedicated to this type of traffic. With regard to container traffic, development of more port infrastructure and consolidation of new shipping lines will help them to grow and increase competitiveness at national and international levels.

2. High bargaining power for port service providers: This factor for the Benghazi port is a threat and a weak one: the threat side by the large force of other competing ports. The weakness is due to the inability of port companies to negotiate with local port suppliers.

3. The lack of coordination of procedures between the operators of ports: This is because of the difficulty in coordination of all procedures necessary for the loading or unloading of ships (docking, non-uniformity, guidance, handling of goods, scheduling, and identification of necessary personnel) without any error or problem which cause delay. In order to reduce the expected lack of coordination between port operator procedures, information technologies should be introduced to encourage improved processes and

services.

4. Incomplete development of Jilayana basin: development of Jilayana basin is incomplete, with a business currently occupying about 20% of total area.

➤ *Strengths*

1. Strategic location of the port: Benghazi port has an enviable geographic location in middle of Mediterranean development zone. Moreover, it has excellent transport links by land with direct access to Mediterranean highways and various national roads. It is a gateway hinterland in south-east Libya.

2. Highlighting importance of Benghazi port of in the largest port in eastern Libyan.

3. Benghazi port is close to the largest planned industrial zones in eastern Libya.

4. Libya and African continent: based on its privileged position, Libya is qualified to be gateway to North Africa on Mediterranean. It is based in North Africa with a coast of more than 1,900 km on Mediterranean Sea. This coastline is connected (east to west and south) with a network of roads and a range of ports and airports that, if developed, can increase importance of this site and its strategic dimension to African continent, Libya, even though its commercial trade with Africa is low, has potential to be a conduit for transit trade linking many African countries, especially those in middle of continent, which have no sea ports and world. These countries are within ground area (import and export back) of Libyan ports. A fraction of imports of some of these countries passes through Libya informally. This is in addition to relief shipments that come to these countries (in times of crisis and disaster) from donor countries. In all crises in Central African countries, Libya was open to all the ports of sea and air (especially in Benghazi port and its airport) to world for relief of these countries.

➤ *Threats*

1. High level of competition between ports in Mediterranean region: rise of Asia since 1960s has opened a new phase in which Pacific Ocean on one hand and Mediterranean on other, as transit routes from Asia to United States and Europe, respectively, serve as world's busiest shipping route. Mediterranean becomes an essential part of a major route, in

this case, coming out of Far East, passing through Indian Ocean and Red Sea to reach Mediterranean through Suez Canal.

This route is the busiest in maritime trade, associated with traffic Asia and Europe, compared with other major sea routes across Atlantic and Pacific.

This is why there is strong competition among ports in Mediterranean, where ports have a significant weight in maritime trade.

2. High power and volume of traffic from direct ports: there is strong competition in Mediterranean basin, where Benghazi port is considered to be one of weakest ports in the southern Mediterranean because of devastation caused by war, as well as the weakness of infrastructure and great need for development to cope with competition.

3. Effects of the economic crisis on the port industry.

4. Improve infrastructure of competing ports: particularly in terms of number of traffic and frequency services, where rest of ports have a higher level of infrastructure, by increasing diversity and quantity of traffic, and increasing desire for public investment compared to other ports less important.

5. Lower expectations for public investment: high investment capacity of port system in the last decade attracted many operators and made them settle in southern Mediterranean ports.

However, unfavourable economic situation of recent years, with a sharp drop in port traffic, has led to excessive overcrowding in many ports, and this situation will reduce prospects for public investment in coming years at Benghazi port.

➤ *Opportunities*

Opportunities include expansion of port to accommodate large vessels, establishment of container storage areas, construction of new berths to accommodate vessels of various sizes, increase in storage space, and construction of floating ponds for large vessels and paving of roads within the port.

As well as possibility of developing services and infrastructure within the port, and

rehabilitation of workshops and cranes to facilitate work and upgrading the port, modernize and develop the systems operating in the port and rely on digital and technological management in administration and qualified cadres working in continuous training to raise efficiency of work and achievement.

1. Upward trend of Libyan exports and imports, in years prior to war in Libya, there was a positive development in national exports and imports with positive expectations of an increase in post-conflict exports and imports.

2. Diversification, e maritime trade and traffic diversification always offers a real opportunity, as requirements and availability change in global market. However, in the event of a desire to develop the port, it must first be confirmed by conducting a study and ensuring that this development will provide port profitability.

The diversity of traffic in the port shall be in accordance with capacity of the port and its infrastructure, customer diversity, and labour relations.

3. Availability of space: area of Benghazi port is 300 hectares, with land covering 43% of total area, equivalent to 130 hectares.

The port of Benghazi sea (3) basins:

Old port basin (city centre) has 6 berths with lengths ranging from 235-75 m and a total length of 782 m, representing 17% of total lengths of berths in the port is 5.00 m .New port basin (downtown) has 3 berths with lengths ranging from 355-285 m and a total length of 958 m long and representing 21% of total lengths of berths in the port and depths ranging from 9.00- 8.40 meters, basin of middle port (Jleiana) has 9 berths with lengths ranging from 250-150 m and a length of 2765 m, representing 61% of total lengths of berths in the port. Depths range from (12.50 - 6.50 m).

The oil pavement:

The port has an oil platform belonging to Brega Oil Marketing Company, located within water boundary of the port and extending through underground buried pipes, from platform site to depot of beak head within 10 km east of Benghazi port. Platform is dedicated to anchoring oil and gas tankers. It is 200 m long and 11.5 m deep.

Stores and yards:

* Stores of goods covered by four 4 stores with a total area of 7770 m², which are iron gems, which are the only stores that are employed to store goods.

* There are 3 other stores (14-13-4) a total area 7050 m², which is dedicated to the storage of tools, equipment and spare parts for the port.

* Open storage areas in the port.

* Land area of the port 22 ha.

* Area of paved squares 17.4 ha.

* Area of unplanned squares 4.60 ha.

4. Development of new information technologies in logistics: information technology is one of the most important elements on which the competitive ability of any economic, commercial or professional activity depends. In this respect, Benghazi port is a raw material for use of information technology, and therefore this is an opportunity for the port.

5. Area of logistics activity, connection with the Mediterranean corridor, road and rail: development of the logistics activity area in Benghazi port area, one of Benghazi term projects, is an opportunity to determine production environment and logistics of great importance, where industrial activities, tourism and business. This fact is an opportunity because ports increasingly tend to integrate into supply chains of production, transport and distribution, becoming real value-added centres.

Development of roads and railways is an opportunity for the port as there will be direct access to trucks passing through remote areas, moreover, it allows cost savings and environmental policies by combining the most efficient means of transportation; coupled with truck traffic will reduce container traffic, the traffic scarcity of freight lines is one of weak points of the port.

3.4.1. PESTEL Analysis

Once SWOT analysis is completed, analysis consists of cross-sectional analysis of

four elements (strengths, weaknesses, opportunities and threats) and how they can contribute to each other in addition to diagnostic, integrated and partial strategies and integrated actions that will be considered by the strategic direction of Benghazi port, an analysis of general environment (macro environment) will be conducted, which, through PESTEL analysis, will identify opportunities and threats at political, economic, social, cultural and technological levels that affect or will affect the development of Benghazi port or Libyan maritime transport, in addition to analysing specific environment (small environment), with an analysis of five competitive forces porter.

➤ **Political and Legal Factors**

Maritime transport is characterized by a high level of regulation, both at national level and in community legislation. This is due to large economies of scale and barriers to entry, and need to ensure the safety of users. However, Libya does not have a clearly defined port policy which allows coordination of various management and administration systems for Libyan ports, due to nature of maritime transport, state has issued a number of internal laws and regulations to regulate this area on one hand and on other comply with international legislations, including:

- Maritime Law and its Amendments.
- Law of fees and its amendments 1970.
- Law of Port, 1970.
- Law of General Organization of Ports and Lighthouses, 1970.
- General Organization Maritime Transport Law 1970.
- Law of Socialist Company Ports 1985.
- Establish companies for shipping agencies 1983.
- Encouragement of foreign investment law.
- Economic activities exercise Law.
- It is noted that these legislations do not keep pace with some of maritime transport

activities and ports currently and cancel other.

- With regard to future, the struggle between Mediterranean ports is more obvious, with some retaining current trade and others in order to own current traffic.
- At national level, Libyan ports are currently submerged in times of war and internal strife.
- This uncertainty about next government and current state of recovery from economic crisis may lead to changes in legislation regulating state ports.

➤ **Economic Factors**

Among economic factors, contraction in international trade is result of economic crisis and consequently decline in imports and exports, there is an impact of economic crisis around the world, and we face a broad process of globalization, assuming continued increase in trade by sea. Similarly, we are witnessing a sharp increase in competition because of greater integration of new countries into world trade. This fact opens possibility of new markets.

Globalization of port industry has significantly changed traditional practices in which a country's traffic lines and transport companies favour some ports. Container access to global shipping has broken the traditional concept of scale. At present, there is only one acceptable standard for contractors and shippers, which means that their trafficking moves in ways that provide the best results in terms of service delivery globally, particularly in economic terms, other economic factors are projected upward trend of shipping in future.

➤ **Social Factors**

92 % of the Earth's population is concentrated in Northern hemisphere, what conditions figures of freight traffic and explains the importance and transport volume on routes that plough through as small areas as Mediterranean.

They are also social factors job creation projects in ports linked to renewable energies; absence of a Community framework for job training, health and port safety; and trade unions for fact of creating social and support networks among port workers, as well

as for creating collective strength to demand their rights.

Ports are also a social factor in terms of image and prestige that give to the city or town where they are located, what is called port-city relations. They may also have strong historical and cultural roots, as well as a role as an agent of social and business fabric development in region.

➤ **Technological Factors**

In field of maritime transport, growing use of ICTs is emerging. In addition, widespread use of internet has become a major technological factor for shipping and port companies, which enable proper control and communication with customers, management and port community.

Technology has evolved in such a way that transport units are becoming larger when they try to respond to the container process, and this requires the development of ports.

In maritime sector, there is also considerable risk of obsolescence due to frequent need to modernize the fleet of vessels, equipment, navigation systems, shore, machinery and technology for proper loading and unloading. This necessity arises not only to meet environmental and safety requirements, but also to maintain some levels of efficiency in order to remain competitive in market.

➤ **Environmental Factors**

In past decade, there has been greater interest in environment, and as a polluting means of shipping, environmental factors should be an important factor, and introduction of eco-efficiency as a commercial value in this sector has been shown, while this is true, shipping is much less polluted than rail and land transport, in this type of transport, hazardous operations and dealing with hazardous goods may affect environment, placing importance on standards and preventive measures for proper development of such processes. In shipping must be pollution, releases and residue controls. With this achieved, in addition to commitment and respect for the environment, increase efficiency of operations.

3.4.2. Results of SWOT Analysis and Test of the Results (Suitability, Applicability and Acceptance)

Results

(1) The significant missing point is lack of container storage and handling facilities. The Libya exports petroleum but imports every type of goods mainly transported in containers. There is no container handling facilities in the old port.

(2) The new port is suitable to establish a container port and this reduces the costs as well as facilitates forthcoming civil works. There is an area next to the old port to be constructed as new port (Juliana) but no facilities is settled on this port area

(3) The existing new port area is sufficient to meet today's and future requirements for container operations, but if the requirements of the trade connected with Central African countries new area requirements may arise.

(4) Geographical situation, road connections, sea and meteorological conditions are suitable for construction of a mid-size container terminal.

(5) The size and capacity of the container terminal is compatible with MARPORT. It is not possible to make a sensitive calculation for dimensions of wharfing loading and warehousing areas. So we assume the same capacity of MARPORT and our Architecture design study is based on this figures.

(6) The eastern and southern regions of Libya need an outlet for the import of building materials, equipment and machinery in the post-war and reconstruction period. This requires a port that serves containers and heavy equipment.

(7) Lack of storage facilities and container handling. Areas surrounding the storage of materials in large quantities in addition to the warehouses of frozen goods warehouses and storage yards of the port, so the storage facilities must be designed to conform to the specifications of modern equipment.

(8) Development of new and modern passenger terminal to enjoy Libya and its large tourist areas, especially in the eastern region, so that it is fully compatible with the standards and all the services crisis. Passenger terminal must include facilities that allow

the efficient management and arrival of passengers.

(9) The urgent need to develop the port to serve the future strategic projects of the state such as the industrial zone proposed by the Libyan state east of the city of Benghazi in addition to the proposed free zone west of the city (Al-Maresa)

(10) Proposed future container terminal aims to integrate the port system in the multimodal transport network in order to improve the market access and service of some Central African countries ease trade and integration in the industry network. In this context, the port must be confronted between the major maritime trade and the economic activities of the port and inland terminals.

Test of the Results (Suitability, Applicability and Acceptance)

Here, one must make sure that several elements such as suitability and applicability are also acceptability

In terms of the suitability so that design meets everything that needs Libya in general and Benghazi city in particular, Libyan maritime transport sector is facing major external and internal challenges, which are characterized by increasing global growth rates and rising energy prices. Internal difficulties facing it are related to the rapid development of Libyan ports to meet needs of development plans and need to create new job opportunities for young people.

Given the size of current internal challenges and difficulties faced by this strategic industry in Libya in this important period in which port authorities shift from role of operator to role of controlled and regulated owner, which is applied globally, maritime sector has many strengths and opportunities due to location which helps national economy to quickly integrate with the global economy and facilitate the movement of foreign trade, also importance of focusing on transit trade to exploit the unique location of Libya and growing growth in global trade growth rates Libra around Libya.

State hopes to develop some ports to fifth generation to be logistics centres and a series of multi-media transport to qualify Libya to compete globally for the use of modern electronic management systems and expansion of information technology applications.

The development of the relationship between Libya and other countries in the global community in recent times allows for a lot of potential to strengthen the country's position in the international market.

As many ports are striving to attract a high proportion of transport operations to become trading centres between East and West and North and South, the Mediterranean basin is thus considered one of the most competitive. As a result of the large space and the vast distances between hub ports and landing ports, it is difficult for these ports to operate as a hub for the entire basin. The Mediterranean basin is divided into three regions: the western, central and eastern regions. Where the basin handles about 22 million TEUs annually and there are many important ports located in these areas which operate as centres: Algeciras, Valencia and Barcelona in the western regions, Gioia Tauro, Marsaxlokk and Taranto in the central region and Piraeus, Izmir, Limassol, Damietta, Port Said and Alexandria in the east. Mediterranean ports compete with eastern ports.

This means that the country is within the most competitive basin area. Elsewhere, Libya is located within a triangle of major ports in Egypt, Malta / Italy, and Western Basin ports. However, the country's ports are not in competition with the rest of the ports in the region, where Libya relies mainly on ships that feed the country's trade. The sector is losing a large portion of its share in neighbouring ports.

Over the last decade, the region has seen huge expansions. Recently, many countries have been trying to turn their ports into centres, including Tunisia, which has reached the final stage of tenders to build 5 million TEUs. The port of Tangier in Morocco is another recent example, in addition to Algeria and Syria, where one of its ports was designated as a container terminal. These developments make the environment more dynamic and highly competitive.

Libya is seeking to turn two of its main ports (Benghazi-Misrata) into a regional centre, thus opening up competition with neighbouring ports to re-trade cargo. This competition will therefore make the external operating environment of selected ports more dynamic and highly unstable. Therefore, the development of Benghazi port and the conversion of a new part of it to a container terminal are very suitable for the ambitions of Libyan growth.

Therefore, considering the development of Benghazi port and turning new part of it into a container terminal is very suitable for growth aspirations.

As a result of development of port demand and result of the state's policy to try to integrate the Libyan economy into local and international markets, development of concept of the axis (containers and non-disabled goods) can provide many local or external opportunities. It serves a vast area in eastern and southern Libya and is likely to evolve to serve Central Africa.

In terms of geographical specifications and location, Benghazi port of, depths and number and lengths of berths are suitable and therefore considered fertile environment for development process.

Finally by acceptance Benghazi port is one of first Libyan ports and it is located in midst of a population of about 600000 people. The most important aspirations of urban population to create a more harmonious relationship between city and port to follow port and urban development are a source of difficulties both portability and portability through lack of smooth transit or urban development itself (Urban congestion, limited development of urban infrastructure, increasing inconvenience). This harmony is also necessary for development of tourism and for protection of environment as well as to avoid increasing number of conflict areas between the port and other urban or tourist activities.

3.5. Benchmark Port (MARPORT)

MARPORT is one of the most influential Turkish container terminals located on Marmara Sea. Close Istanbul, which is the most developed commercial centre in the region.

It has 7 numbers of berths with total length of berths 1.560 m, terminal area 310.000 m², and annually handled 1.685.504 TEU containers.

MARPORT was selected as a reference port because of following reasons:

- The port size is relatively small with medium infrastructure.
- MARPORT reached the highest annual rate (1,685,504 TEU) in Turkey with relatively lower infrastructure capacity. This is a highly operational indicator of efficiency.
- Since it is situated at intersection of essential sea exchange between Black Sea and Mediterranean Sea.

- The main function of MARPORT is that it is a container terminal and in direction of Benghazi port to turn it into a container terminal serving the eastern part of Libya.

MARPORT is located on European continent side of Istanbul, surrounded with urban areas, which limits physical enlargement. It has two main terminals, namely Main and West Terminals.

3.5.1. Comparison of MARPORT (Benchmark) and Benghazi Port

Comparison of MARPORT (Benchmark) and Benghazi Port is introduced in the TABL3.6.

Table3.6. Comparison of MARPORT (Benchmark) and Benghazi Port

	MARPORT	BENGHAZI
Total Area	340.000 m ²	300.000 m ²
Stacking Capacity	25.040 TEU	10.000 TEU
Handling Capacity	1.99.000 TEU/Year	4.5 million tons per year
Refrigerated Container Capacity	492 TEU (380 V)	-----
CFS Area	17,425 m ²	3,725 m ²
Warehouses	4,480 m ²	3,570 m ²
Covered Area	5,674 m ²	3,550 m ²
Length of Piers	1,560 m	4,630 m
<i>Number of Gates</i>		
In	8	2
Out	10	3
Pier Cranes		
Ship to Shore Gantry Crane	10	1
Mobile Harbour Crane	5	3
<i>Yard Equipment</i>		
Rubber Tired Gantry Crane	35	-----
Top Lifter	10	4
Slide Lifter	8	2
Spreader	24	3
Terminal Trucks	82	10
Pilotage Times	24 Hours	24 Hours

3.5.2. Finding of the Comparison of MARPORT (Benchmark) and Benghazi Port

There are the main outcomes of MARPORT (Benchmark) and Benghazi Port. These are;

- The area is approximately same.
- Stacking Benghazi port is 60 % less than MARPORT
- Handling Capacity of existing Benghazi port is 90 % less than MARPORT.
- Refrigerated Container area existing Benghazi port is 100 % less than MARPORT.
- CFS area in the existing Benghazi port is 77 % less than MARPORT.
- Covered area in the existing Benghazi port is 37 % less than MARPORT.
- Ware houses area in the existing Benghazi port is 37% less than MARPORT.
- Length of Pier area in the existing Benghazi port is Three times longer than MARPORT.
- Draft area in the existing Benghazi port is 80% less than MARPORT.
- Gates (In out) in the existing Benghazi port is 70% less than MARPORT.
- Gantry cranes, mobile port cranes and yard equipment are very weak compared to MARPORT.

3.5.3. Outputs of Comparison of MARPORT (Benchmark) and Benghazi Port

In this study we considered two issues: Existing and Future requirements of Libya and, capacities in two ports. As a result of this study the findings are as follows:

- The area is approximately same and configuration of existing and new Benghazi Port is very similar. This may facilitate our Architecture Design Study (ADS) taking into account equipment and facilities in the port.
- Stacking capacity of existing Benghazi port is not sufficient. Concerning future

requirements we can consider same capacity with MARPORT .

- Handling Capacity of existing Benghazi port is very weak compared to MARPORT in addition to the lack of a container handling station.
- The current Benghazi port is not equipped with the refrigerated container area. This is one of the basic necessities, especially since the country imports most of its needs, so the design should contain a refrigerated container area.
- The area of CFS in the current port of Benghazi is small compared to Benchmark, so this area should be increased.
- - The covered area and the warehouse area in the current port of Benghazi is not sufficient to cover the current requirements either compared to MARPORT, this area should be increased if Benchmark level.
- - The length of Pier in the current port of Benghazi is suitable and in the case of looking for a capacity of more possible increase lengths.
- Gates (In out): The geography of Benghazi Port is suitable to at least 3 in and 3 out gates for each new and old port.
- Cranes (Gantry Cranes, Mobile Harbour Cranes): The study made by Şişlioğlu (2017) has proved that the number of the cranes is suitable for cost effectiveness for a 170 meter pier/quay. So same number may also be applied for Benghazi.
- Yard Equipment: The study made by Şişlioğlu (2017) has proved that the number of the yard equipment is suitable to support the same of cranes and a 170 meter pier/quay. So same number may also be applied for Benghazi for the initial ADS.

4. BENGHAZI PORT (ARCHITECTURAL DESIGN)

4.1.General

Ports are the most important authorities in any country, especially that Libya is an oil country, which increases the importance of ports as well as the maritime transport sector, which is also important in Libya, the security and political situation in Libya has increased ports during ongoing political division between parties to the conflict in Libya, leading to neglect of economic and social aspects that are important and have an impact on the future of state, therefore, issue must be tackled and aim of strengthening and strengthening the maritime transport sector in general and Libyan ports in particular, so that Libya enjoys an advanced position that allows it to be among advanced maritime countries , as well as protection of life, property and marine environment. And improve port services in accordance with international standards and standards and increase contribution of the Libyan fleet in global trade exchange in order to diversify sources of income and convert revenues of natural resources of limited duration oil and gas to productive sustainable development projects.

As regional landscape of sector, which has undergone many changes, status of Libyan ports has changed accordingly. Number of container handled in ports in Middle East increased by 33% from 2008 to 2013. Containers number handled in ports of region increased from 42 million containers to 55.8 million containers during same period, containers number in the world increased by 26% to 561 million TEUs. Trading activity in ports of region grew significantly during 2010 and 2011 to reach a growth rate of 9%, but declined to 5% in recent years after recent events in region (BANK, 2014).

There are statistically significant differences between ports in Arab region, where ports of Joined Arab Emirates were among the best ports in world as far as infrastructure. UAE ranked third among 140 countries. It scored 6.5 points out of seven, while Qatar, Bahrain, Oman and Saudi Arabia ranked 40th among world's best. Morocco was ranked 41, Egypt 55, Kuwait 74, Lebanon 80, Tunisia 92 while other Arab countries ranked in the worst place globally, such as Algeria, which ranked 111 in terms of quality

of port infrastructure, while Mauritania ranked 113, while Yemen and Libya out of classification because Lack of data (BANK, 2014).

While Libya has progressed according to "International Linkage Index of Sea Freight" in the report of the United Nations Organization of UNCTAD. Vessels number and port vessels, ships capacity, size of ships, services and facilities provided for shipping operations, also the number of containers and shipping companies operating. Despite security chaos and instability, Libya has made nine places between 2010 and 2013, ranking 104th globally.

The port must have(wharf - berth - quay - pier - jetty - dock - mole - breakwater - dock basin)

Port parts Connected directly to the Sea:

Wave Breakers: main purpose of a breakwater or breakwater system is to protect closed water area from waves and storms

Port Entrance: entrance of port is the most exposed part of port, so depth of water and width of entrance must be greater than in the navigational corridor leading to the port.

Port Campus: it is land area of the port surrounded by fencing and related to ponds and is ready to practice operations of freight and unloading and placement of goods and passengers and passengers.

Protected Basin: it is protected area of breakwater and coast, other port elements such as anchorage and berths are found in this basin.

Rotation Basin: this is area vessel needs for manoeuvring, when entering or leaving berth and volume of rotor is dependent on size of vessel.

Docks and Berths: docking works on them and works in style of iron curtains or concrete blocks according to architectural design and type of soil. Lengths of berths are determined according to requirements for docking, housing load and submersible docking station. Such as passenger ships, which must have a large depth and long

enough, cargo ships must take into account load of vessels and submersible required for them, and berths must be equipped to receive cars needed to transport goods.

Dry Docks and Ship Docks: main purpose is to maintain, repair and repair small and medium vessels and qualify for the manufacture of small vessels.

Installations: they are closed basins, where ships can be anchored, and their entrances are controlled by a special gate. Level of water within these ponds is not affected by changes that occur to water level outside.

Ship refuelling facilities: this is either a special berth for this or through a lorry while passing without having to provide a place to stop at the port.

Scaffolding: are wooden sails on iron bars used to leave fishing vessels or to receive tourist trips where vessels that exceed depth of depth of water near quayside waiting in docking port and landing of tourists port machine by boats and boats and depth of water in front of head of Grocery large.

Observation Tower: works to guide entry of ships to the port, placed in places dedicated to places of guidance for ships to enter safely, placed at barrier or in a high place in the port.

Port Parts not connected to the Sea:

1. Port building: (Administration - Transport - Customs).
2. Freight Building: (Administration - Warehouses - Transportation).
3. Port Services: (Security Building - Firefighting Building - Ambulance Building - Maritime Rescue Unit).

4.2. Current Architectural and Operational Details of Benghazi Port

Benghazi port is worked under control of Socialist Ports Company. Comparative dock office gives load conveyances and huge compartments, and is managed through eight travel sheds covering the region of 17,500 m².The fundamental fare items

incorporate developed from fleece, cowhide, sheep, goats, and hair textures and made of fleece made of fleece built from fleece mats. Essential imports incorporate sustenance, materials, workmanship, cigarette cigarettes smoking cigarettes and concoction products. Sectors Industrial divisions Companies created inside the opening interface dock incorporate oil modernity, nourishment refinement, salt, solid floor fabricating, sport angling, aging, and tanning. Also the dock is one of major desalination plant life crops in the world.

4.2.1. Port Overview

Following tables describe port information as well as port performance and Berthing Specifications.

Table 4 .1. Port Information.

Port Location and Contacts	
Country	Libyan Arab Jamahiriya.
Province or District	Benghazi Governorate.
Town or City (Closest location) with Distance (km)	Name : Ajdabia. km: Ajdabia South 160 Km and Almarj North 100 Km.
Port's Complete Name	Port of Benghazi.
Latitude	32.11667
Longitude	20.05
Managing Company or Port Authority (If more than one operator, break down by area of operation)	Socialist Ports Company.
Management Contact Person	n/a
Closest Airport and Frequent Airlines to / from International Destinations	Airport Name: n/a Airlines: n/a

Benghazi port is located at latitude (32° 06') north and at a longitude (20° 3') east. Geographical location is water area located within current wave barrier and that area which falls within any new barrier to the waves. Located in the eastern region and water area known as the navigation corridor outside the port, starting from entrance to the port along navigational marks characteristic of shipping corridor to a distance of 2 Km, old port was

built on a land area of 12 ha.

Anchorage area is area between latitudes (32° 7') - (32° 11') north and longitude (19° 56') - (19° 59.2') east, and where information available about it, its bottom is sandy and its depths are suitable and there are some obstacles and need to process survey.

Navigation signs and lighthouses and their condition, signs of entry green mark at the port entrance work well, but red mark does not work at moment. As for floating navigational markings, there is no floating navigational mark (sign of approach) to determine navigational safety of ships when entering the port, despite their presence on maritime maps and declared internationally. As for lighthouse it is a very old building and needs maintenance, knowing that lighthouse works perfectly.

Surf Barriers:

- The northern wave barrier consists of four-size lists 16 m³ from outside and 8 m³ from interior and size of 20 m³ at head of circular entrance is in good condition and there are no problems and length 2800 m.
- The western wave barrier consists of main protection units 10 m³ and length 2070 m, in good condition.

Pavements:

The number of berths is 20 berths with one floating berth and Table 4.2., and Table 4.3. , showing its specifications, Fig. 4.1. , it also shows port berths.

- Berths (1-2-3):

These berths are built on concrete blocks topped by a pavement built on concrete pillars near the sea level. They are 1000 m long and 9 m in diameter. Most of rubber and rubber fittings are missing. Truck tires have been installed for this purpose.

- Berth No. (4):

A quay is established on concrete blocks topped by pavement on concrete pillars near sea level, which is 120 m long and 5 m., and pavement needs to replace slab.

- *Berth No. (5):*

The pavement is built on concrete blocks above pavement. Pavement is built on concrete pillars near sea level. It is 100 m long and 5 m deep. Pavement needs to replace slab.

- *Berth (6-7-8-9):*

It is 500 m length and a submersible 6.5m. These berths are new and in good condition and have no problems except for paving of the squares behind them.

- *Berths (10-11-12-13):*

It is 1120 m, and submersible 10.5 m. These berths are new and in good condition are temporarily occupied in handling of direct delivery goods, and part of these berths is exploited by naval forces.

- *Berth No. (14):*

A berth with a length of 160 m and a drip 12.50 m is built on concrete blocks and is originally designated as a permanent oil rink and is currently used in winter to lay gas tanker and area behind paved pavement.

- *Berth No. 15:*

520 m and submersible 12.5 m are built on concrete blocks and are in good condition, except for some rubber bumps, which are now used for handling negative grains and area behind pavement is unpaved.

- *Berth No. (16):*

150 m and submersible 12.5 m are built on concrete blocks. There are no problems except for deterioration of some rubber bumpers and now exploiting an oil pavement temporarily and requires some maintenance for surface slab to collide with some ships.

- *Berth s (18, 17):*

800 m and a submersible 6.5 m, is built on concrete blocks and is in good condition and is fully exploited by the naval forces.

- *Berth No. (20):*

160 m and a submersible 9 m are produced on concrete blocks and are in good condition.

- *Floating Docks:*

The port has one floating dock, which is in poor condition and damaged by an old foot, and is used to link a damaged oil tanker for several years in a critical condition.

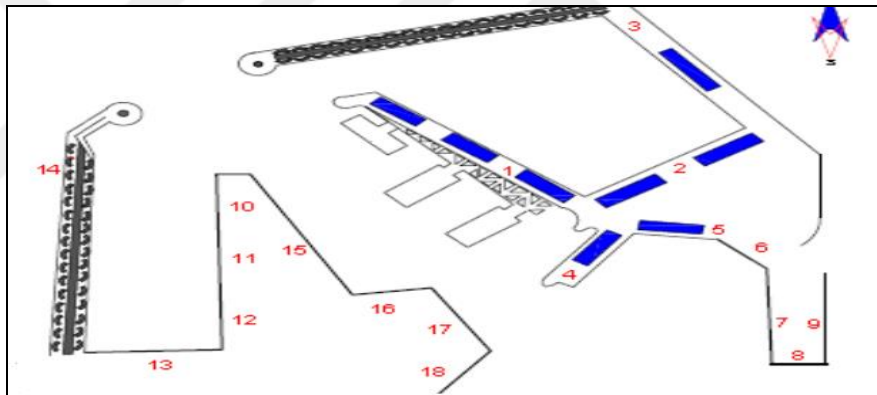


Fig4.1. Pavement of Benghazi Port

Table 4.2. Pavement Specification

Pavement	Type or name of pavement	Length of pavement (m)	The depth of the pavement design(m)
1	(1-2-3)	1000	9.0
2	(4)	120	5.0
3	(5)	100	5.0
4	(6-7-8-9)	500	6.5
5	(10-11-12-13)	1120	10.5
6	Pavement tile (14) (Allocated as an oil reserve)	160	12.5
7	Pavement tile (15) Bulk grain handling platform	520	12.50
8	(16)	150	12.50
9	(17-18-19)	800	6.50
10	(20)	160	9.0

Berthing Specifications:

Table 4.3. Berthing Specifications

Type of Berth	Quantity	Length (m)	Maximum Draft (m)
Conventional Berth	11	3009	5 : 12.5
Container Berth	6	1316	6.5
Silo Berth	n/a	n/a	n/a
Bulk Oil Jetties	1	175	12.5
Berthing Tugs	n/a		
Water Barges	n/a		
Pilot Boats	1		

Stores:

There are 10 stores in the port and Table.4.4 shows store areas in the port

- *Store No. (1)* .With an area of 1440 m², which is an iron gallery used for storage.
- *Store No. (2):* 1440 m², which is an iron gallery used for storage and needs maintenance.
- *Warehouse No. (3):* 1440 m², this is an iron gallery used for storage and needs maintenance.
- *Store No. (4):* With an area of 3450 m², this is an iron gallery used for storage and needs maintenance.
- *Store No. (5):* With an area of 3450 m², which is an iron gallery used for storage.
- *Store No. (6):* With an area of 2640 m², which is a metal gallery and have a number of internal divisions are:
 - The Sea Guests Club building, its condition is good and covered with a concrete roof.
 - Forklift warehouse.
 - Handling and storage equipment division.
 - Break for producers and assembly to distribute to work points, the store is generally much damaged.

- *Store No. (7)*: With an area of 1400 m², which is a metal gallery used to store luggage and goods of passengers and his condition is poor and needs maintenance.
- *Store No. (8)*: 1440 m², which is an iron gallery used for storage and needs maintenance.
- *Store No. (9)*: (1440) m², which is a metal gallery used for storage, building and roof in the case of medium.
- *Store No. (10)*: With an area of 1440 m², which is an iron gallery used as a warehouse for port tasks such as spare parts, tires and objects of relatively large size and needs maintenance.

Table 4.4. Stores Area.

Store number	Area m ²
1-2-3	(1440) *3
4-5	(3450) * 2
6	2640
7-8-9-10	(1440) * 4

Open Spaces:

The area covered by the port is about 6.5 ha. Most of these areas are in an acceptable condition and need simple maintenance. Area of squares is not paved with about 4 ha and it needs an integrated paving for use as storage areas.

Port Facilities:

Benghazi port is divided into two parts old port and new port as shown in Fig 4.2.

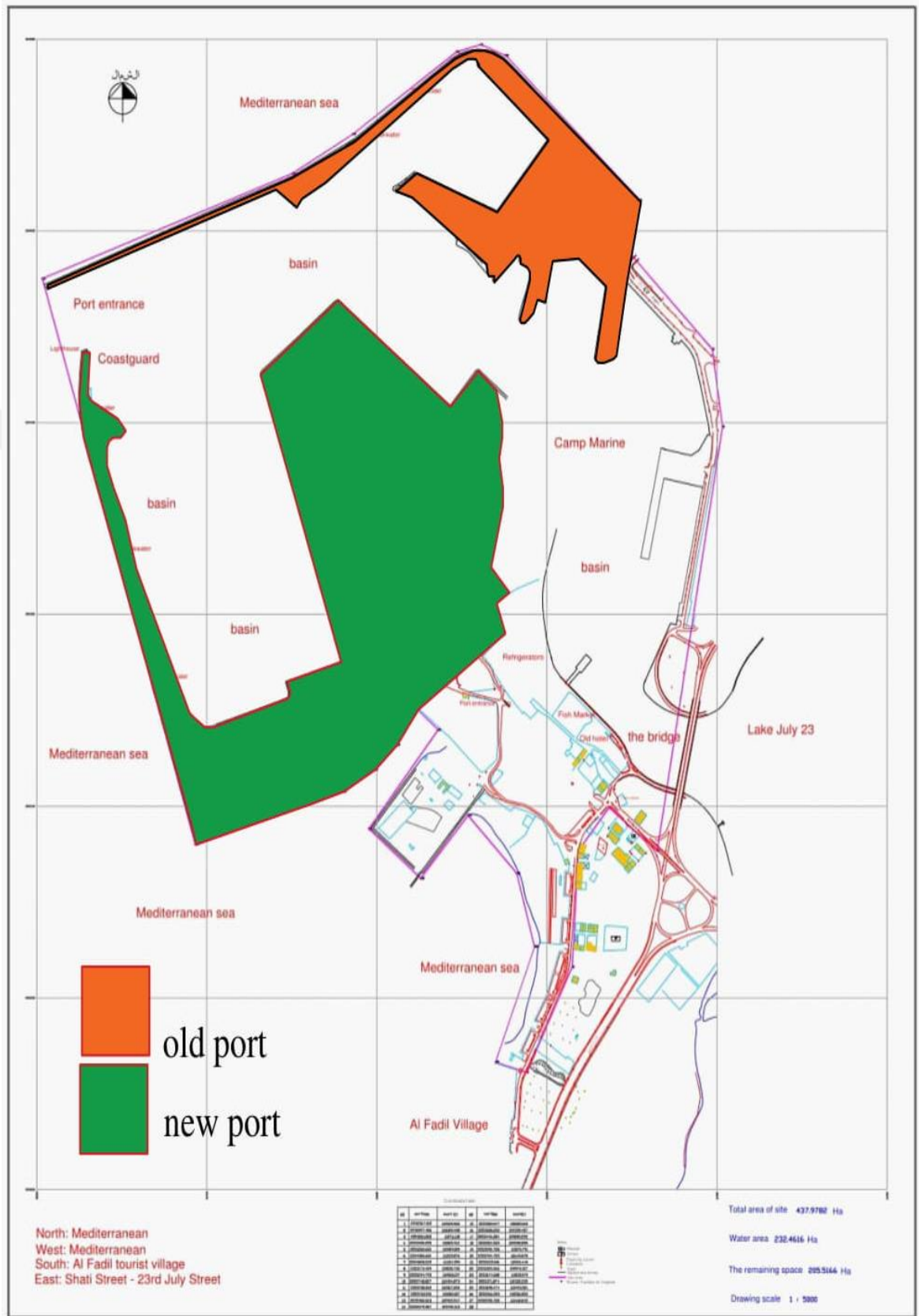


Fig4.2. Benghazi Port

a. The Old Port

- The main gate is an old building equipped with security offices to control the passageway and exit of the port.
 - The fence is full of the port surrounded by a fence in a medium condition.
 - The old administration building consists of two floors with an area of 780 m²
 - Sidewalk Store, which is a building attached to ground floor of administration building area 175 m².
 - The passenger terminal is a building of a new steel structure with a number of offices divided by walls with a waiting hall for passengers and the end of their security procedures.
 - The customs building has a group of offices for this purpose.
 - The customs warehouse is a newly built ground building.
 - The naval workshop is a steel structure with an area of 780 m² attached to a number of offices and rooms. It is equipped with some equipment and equipment. It is used for maintenance of marine engines. The building is small in size and has no modern equipment for maintenance of ships.
- The ground workshop is an old concrete structure with an area of 1798 m². It is dedicated to repair and maintenance of the ground equipment and machinery at the port. It has some simple equipment and is equipped with a mobile crane and areas surrounded by workshop.
- Carpentry workshop an old building 592 m² consisting of two floors, ground floor used carpentry workshop equipped with a number of necessary equipment for carpentry.
 - Technical section and dispensary an old building consisting of two floors with an area of 336 m² and the ground floor clinic and the first part of the technical department and building.
 - The building of handling and storage consists of two floors with an area of 252 m² and its condition is good.
 - An old maintenance store with an area of 126 m² for storage purposes.
 - Archive of an old building with an area of 133 m² that is exploited for the purposes of movement and handling archives.
 - The movement section is a square area 1600 m², which has a set of iron masts in good

condition and floor is not paved and used this arena in parking of trucks and buses of the port.

- The veterinary quarantine is very old for animal's 1750 m² and its condition is dilapidated. A new building is being used for the Veterinary Quarantine Department
- Agricultural quarantine a ground floor with an area of 559 m² with a number of offices allocated for quarantine purposes and control of goods received from the port.
- Assembly building, marina and wireless building is an old building consisting of three floors 394 m.
- Seafarers' building and crane building a ground floor with an area of 48 m².
- Mosque of the port, an area of 40 m².
- Building industrial security and safety building consists of two floors with an area of 203 m², there are two fire stations in ground floor and the first floor with a group of industrial security and safety offices.
- The building of electricity department and coastal lighthouses is a very old warehouse, part of which is dedicated as an electricity department and other part of coastal lighthouses and state of warehouse.
- Restaurant and cafe building is a very old warehouse with an area of 648 m² attached to a number of small offices for the purposes of the port facilities and its condition needs to be maintained.
- Training and Studies Centre Building: A new building of 792 m² of steel structure divided into offices and halls and currently used as a financial department.
- Military exit building consists of two floors, with an enclosed courtyard surrounded by a special fence used for purposes of military exits.
- Police and treasury building an old building of two floors with an area of 299.5 m² ground floor has a cafe and safe deposit box and the first floor has a number of offices of port police.

- Offices of different parties there are a number of mobile offices dedicated to various entities that have a direct relationship with the port, such as ration goods and others.
- Passport and security building new building with an area of 272 m².
- Naval base barracks building is a ground floor with an area of 240 m² dedicated to local defence headquarters of the port and its condition is good.

- Office of entry permits office area 16 m².
- Offices of shipping companies there are (2) mobile offices dedicated to shipping companies.
- Balance is an old and small building with an office and a balance for weight of empty and loaded trucks.
- Fire station building a small car for fire extinguishers 59 m².
- Umbrella hoods umbrella open hoods with an area of 168 m².
- Umbrella of cars open umbrella for trucks port area 357 m².
- Room of diver's room 19.4 m² dedicated to the presence of divers.
- The water supply headquarters of a small room 20.25 m².
- Chamber of electrical transformers room 34.3 m².
- Power stations, there are two stations in the port area of each station 40 m².
- Lighting towers all lighting towers in the port are almost non-existent.

b. The New Port (Island)

The port has 5 buildings for toilets; area of each building 48 m², the first phase of the port was carried out in implementation of berths (10-11-12-13-14-15-16-17-18) as well as the existence of some facilities, as follows:

- Main gate has 3 offices with an area of 60 m².
- Office of auxiliary handling equipment is a ground building with an area of 300 m² and it is used as an equipment store. It has two work rooms, two warehouses, a desk and a waiting room.
- Ground floor building with an area of 220 m².
- Ground floor clinic building with an area of 160 m², also office of project engineer.
- Ground floor clinic building with an area of 235 m².
- Balance building with an area of 30 m² and balance works well.
- Vacuum store building 940 m², which is an old store and needs maintenance.
- Handling office is a ground floor with an area of 230 m².
- Rest of squares in harbour are a space.

The Back Yard of the Port:

This area is located in an area called Qnofhh area of about 30 ha and part of it is

fabricated and rest is surrounded by containers noting that part of the fence is damaged and rest is not completed and there are 2 warehouse space of each store 1500 m² is in good condition, it is completely paved, part of which has been levelled, and there is a small customs building, a mobile office for ports, and another for security guards, this yard is used in container storage.

4.2.2. Problems and Difficulties Faced by Benghazi Port Operators

Benghazi port was to transfer all commercial port traffic to island area and to dispense with old port and exploit it for tourism purposes, fishing and anchoring the port.

With regard to difficulties facing current port, their views can be summarized as follows:

- Sedimentation or failure to conduct deepening work on a regular basis, resulting in inability to use sidewalks according to their design depths.
- Non-availability of rubber bumpers and spark plugs resulting in the difficulty of anchoring and connecting ships.
- Lack of paving of the internal roads in the port, which resulted in great difficulty in movement of trucks loaded inside the port.
- Lack of paving of squares and sidewalks has resulted in great difficulty in handling of cargo trucks.
- Lack of sufficient lighting in areas resulting in inability to control guarding of stored goods.
- Lack of maintenance of warehouses completely resulted when difficulties or problems in storage of goods and damage caused by weather factors.
- Arrival of large numbers of private cars supplied by citizens in a short period of time and lack of special storage areas and integrated and completion of second phase of port project resulted in a large congestion at port gate in the island and disrupts the movement of exit of trucks and goods and gas trucks (GNMTC, 2009).
- Failure to complete the implementation of storage area in background and form of a great difficulty in storage process movement in this area, especially in winter and summer, in addition to lack of fence and integrated guarding resulted in thefts and loss of stored goods.

- As a result of drainage and drainage of Benghazi city inside lake adjacent to the port and arrival of this water to old port basin resulted in deposition of large amounts of dirt, in addition to impact of this water on floating pieces of the port and disruption due to arrival of dirty water to engines and erosion of hull.
- As a result of weakness and consumption of water network inside the port, it has been difficult to collect water for supply of ships coming to the port.
- Road leading to central port area (island area) is in an exceptionally poor condition because of absence of connecting net sewage to city roads, which resulted in difficulty of port entry and exit, in addition to fall of bags of direct delivery goods as a result of not paving the road and paving, in dealing with large truck drivers for refusing to work in island area for this reason.

4.2.3. Benghazi Port Performance

Execution can be characterized as the dialect of industry that assessment is an association's accomplishment in accomplishing a specific level of its key destinations (LIU, 2010a). The degree to which the organization's targets can be accomplished can be characterized as the coordination execution. There are no criteria or port execution factors that are utilized as determinants of port limit and in this way influence port competitiveness (GHASHAT et al., 2011). Performance can be defined as evaluating the success of the organization and enabling it to achieve the desired level of its strategic objectives (LIU, 2010a). According to the definition of logistics performance, it can be defined as the extent to which the company's objectives can be achieved. The ability of the port to compete, as well as factors to influence competitiveness, are determinants of the port (GLOBAL TRADE. 2013). There is only one measure of performance that has many dimensions. Thus, we can measure port performance through quality of service, port access, sea access, ground connectivity, storage and capacity facilities, duration of goods, port efficiency, technology, transaction processes, cost, delivery time and other services (CHANG et al, 2008.). Performance factors can be categorized into three categories: production, efficiency and quality. Table 4.5 shows performance of Benghazi port during 2012. The information introduced in this section is provided by Benghazi Port Administration during visit the port authority.

Table 4.5. Port Performance

Handling Figures	Year 2012
Vessel Calls	470
Container Traffic (TEUs)	156275 / TEU
Total Cargo Handling Figures	Year 2012
Total Cargo Handling	2,500,304 MT

Rates and terminal handling fees for warehouse or truck: 3000 / day for bulk, 2500 / day for packed.

4.2.4. Berths Used for General Cargo Handling

The berths number of compartments is 18 with an aggregate length of 4,490 m including the oil port billets. As of now, the port of Benghazi is under upkeep. There is a suspended venture for the usage of new billets, the port's supply yards with the most recent emptying hardware for holders and mass and general load. The Port Authority plans to make Benghazi Port the advanced holder terminal.

- Transit berth: comprises of 3 steel floats and utilized by little cargo shipments straightforwardly on trucks for conveyance to the agent. Max LOA 60m, draft 4.3m. What's more, there are 3 skim billets where ships work in stack utilizing lighters.

- Container Docks: Containers work close to open billets.

- Tanker berths: Two compartments are utilized in tanks, floats toward the finish of Juliana Kwai's boats, regardless of whether 107 m, draft 7.3 m. The 229-meter-long dock at the external harbour can oblige up to 7.3 meters of tanks.

- Ro-Ro billets: Ro-ro boats can be obliged.

- Facilities: There are two coasting cranes lifting 80 m t and a few versatile cranes limit of 30 m t (LIBYAN MARITIME ADMISNISTRATION. 2013).

- Storage: 8 travel sheds give 17,500 square meters of secured storage room and abundant open storage room.

- Boats: Lighters are accessible to work the merchandise anyway from October until the finish of April.

Table 4.6. Types of Berths at Benghazi Port

Container berths	Containers are worked alongside the general berths.
Pontoon Berths	Formed by 3 steel pontoons and used by small charge cargoes directly onto trucks for delivery to consignee. Max LOA 60m, draft 4.3m. In addition 3 buoy berths are available where vessels work cargo using lighters.
Tanker berths	There are 2 berths used for tankers. A buoy berth at the end of Juliana Quay vessels up to LOA 107m, draft 7.3m. A quay 229m in length in the Outer Harbor can accommodate tankers up to 7.3m draft.

Table 4.7. Type of Cargo Handling at Benghazi Port

Cargo Type	Berth Identification
Imports - Bagged Cargo	n/a
Exports - Bagged Cargo	n/a
Imports and Exports – Ro-Ro	Ro-Ro vessels can be accommodated
Other Imports	n/a

- *Port Handling Equipment*

The port equipment is managed by the government or the private sector. Details of equipment are shown in the Table 4.8.

Table 4.8. Type of Equipment at Benghazi Port

Equipment	Available (Yes / No)	Total Quantity and Capacity Available	Comments on Current Condition and Actual Usage
Dockside Crane	n/a	n/a	n/a
Container Gantries	Yes	1 - 100 Tons	n/a
Mobile Cranes	Yes	3 - 30 Tons	n/a
Reach stacker	n/a	n/a	n/a
RoRo Tug master(w/ Trailer)	n/a	n/a	n/a
Grain Elevator w/ Bagging Machines	n/a	n/a	n/a
Electric Overhead Cranes	Yes	4 - 55/60 Tons	n/a
Tractors	Yes	9 - 10 : 40 Tons	n/a
Transtrainer	n/a	n/a	n/a
Forklifts	Yes	47 - 2.5 Tons : 30 Tons	n/a

- *Container Facilities*

There are two floating cranes, which also lift 80 metric tons. Several mobile cranes are 30 metric tons, in addition to 45 forklifts, 12 trailers and 11 trucks (six of them in good condition). There is also a ship to refuel the port, where the capacity of the ship is 3000 tons of fuel (LIBYAN MARITIME ADMINISTRATION. 2013). Type of Facilities at Benghazi port is introduced in the table 4.9. Land and Marine units are described in the Tables 4.10 and 4.11.

Table 4.9. Type of Facilities at Benghazi port

Facilities	20 ft	40 ft
Container Facilities Available	Yes	Yes
Container Freight Station (CFS)	Yes	Yes

Facilities	20 ft	40 ft
Refrigerated Container Stations	Yes	Yes
Other Capacity Details		
Daily Take Off Capacity (Containers per day)	65	
Number of Reefer Stations (connection points)	n/a	
Emergency Take-off Capacity (Give an indication)	n/a	
Off take capacity of gang shift (in Containers per shift)	n/a	n/a

Table 4.10. Land Unit

Vigan pneumatic conveyors 300 t/h	Nuero pneumatic conveyors 180 t/h	Tractors 10 t	Trailers 40.25 t	Cranes			Fork lifts						Reach stacker
				30 t	55/60 t	100 t	2.5 t	3 t	7 t	12 t	16 t	30 t	
1	6	2	6-7	3	4	1	1	18	14	4	2	7	14

Table 4.11. Marine Units

Name of unit	Type	Horse power	Year of build
Erada 1	Tug Boat	1800	1997
Geliana	Tug Boat	3500	2008
Erada 6	Tug Boat	3500	2009
Zwara	Float Crane	200	1979
Morshed 5000	Bilot Boat	1100	1996
Erada 3	Bilot Boat	1100	1999
Solog	Bilot Boat	1100	2008
Mawani 4	mooring boat	140	2003
Berneeg	Tug Boat	3300	2012

- Terminal Information:

The port contains 3 silos, the maximum storage capacity is 40000 tons.

- Internal storage area is 7,500 m².
- Open storage area of 444,500 m².
- Annual capacity is 4,000,000 m t.

Table 4.12. Berths

Depth m	Height in meters	Issue	Anchorage
5-12.5	3009	11	General cargo
6.5	1316	6	Berths services
12.5	175	1	Liquid products

Table 4.13. Total Cargo Handled During January 2012

Total cargo handled during JANUARY / 2012												
Goods												
Name of port	NO. of vessel calls	Unloaded genral cargo/Tons	Unloaded bagged cargo/Tons	Unloaded bulk cargo/Tons			loaded genral cargo/Tons					
				All kinds of erians	Bulk cement	Gravel and other						
Benghazi	40	162,142	10,000	35,800	0	0	56					
Containers												
Name of port	No. of delivered containers		No. of unloaded containers			No. of full containers loaded			No. of empty containers loaded			
	1,817	1,318	3,135	1,393	1,680	3,073	3	8	11	1,090	1,354	2,444
Benghazi												
Machinery & Automobiles												
Name of port	Uncontainerised cars		Containerised cars		Machineries & Trucks		Total					
	New cars	Used cars	New cars	Used cars	New Machinery	Used Machinery						
Benghazi	0	9,975	0	352	0	0	10,327					

- Piers: It consists of 3 steel buoys and is used by small cargo shipments directly on trucks to be delivered to the consignee. Max LOA 60m, draft 4.3m. In addition, there are 3 float berths where ships operate in load using lighters.

- Container berths: They operate alongside public berths.

- Tanker berths: where two berths are used in tanks, buoys at the end of the Juliana berths, even if 107 m, draft 7.3 m. The 229-meter pier at the outer harbor can accommodate tanks up to 7.3 meters high.

- Ro-Ro berths: Ro-ro ships can be accommodated.

- Facilities: There are two floating cranes with an 80 meter lift and many mobile cranes weighing 30 metric tons.

- Storage: 8 transit sheds provide 17,500 square meters of covered storage space and ample open storage space.

- Barges: For lighters available for work despite shipping from October until the end of April.

Table 4.14. Performances

Performance Type		Year
Vessels Calls	470 Vessel	2012
Container traffic (TEU's)	156275 / TEU	2012
Total Cargo Handling (m t)	2,500,304 MT	2012

Table 4.15. Capacity

Capacity Type	Bulk (mt/year)	Container (TEU's/year)	Conventional (m t/year)
Export activity of the Port	670 MT/2012	45800 TEU/2012	
Import activity of the port	2,375,304 MT/2012	110,400TEU /2012	120,000 MT/2012

These tables show Benghazi port equipment is better than some other Libyan ports. This fact is introduced in the Table 4.16.

Table4.16. Comparison of nearest Ports with Similar Facilities

	Benghazi	Zueitina	Marsa El Brega	Ras el Hilal	Ras Lanuf	Es Sider	Derna
Airport	✓				✓		
Bunkers	✓						
Containers	✓						✓
Dry Bulk	✓		✓				✓
Dry Dock							
General Cargo Bulk	✓		✓	✓	✓		✓
Other Liquid		✓	✓				
Petroleum	✓	✓	✓		✓	✓	
Ro/Ro	✓		✓				✓
Towage	✓		✓				✓

4.2.5. Capacity of Benghazi Port during the Period from 2010 to September 2014.

All statistics were collected in order to reach Benghazi Port during period from 2010 to September 2014 through statistics on number of ships unloaded, loaded and freight weights, as well as the number of containers unloaded and shipped to Benghazi port, as in Table 4.17 (ZAROOG & WESTCOTT, 2014).

We can shows through the fig 4.3. to Fig 4.7., number of vessels unloaded during 2010 to 9-2014, highest value during 2013 and lowest value of 2011, as for number of vessels delivered has reached lowest levels in 2014 but opposite happened for number of shipping vessels, which increased during 2014, number of livestock vessels increased gradually to 2013 and dropped suddenly during the 2014, concerning the number of bulk vessels were in highest value in 2010 and then fluctuated decreasing (Libyan Maritime Administration, 2013).

Table 4.17. Statistics Show Number of Ships Unloaded, Loaded and Cargo Weights at Benghazi Port during Period from 2010 to 09 / 2014.

	unloaded Containers		Number of recharged containers		Number of packed containers is packed		Number of refrigerated containers		Number of containers inside cars		Number of cars with wheels
	20	40	20	40	20	40	20	40	20	40	
2010	22931	21209	22980	24698	281	357	56	232	53	2535	5440
2011	13220	11669	13022	12279	960	392	16	87	18	968	22598
2012	24522	34936	24204	36337	382	436	37	836	9	4355	109575
2013	26599	38420	26721	43453	453	256	29	732	4	2323	39629
2014-09	16389	22502	16851	23582	306	205	2	47	0	333	11653

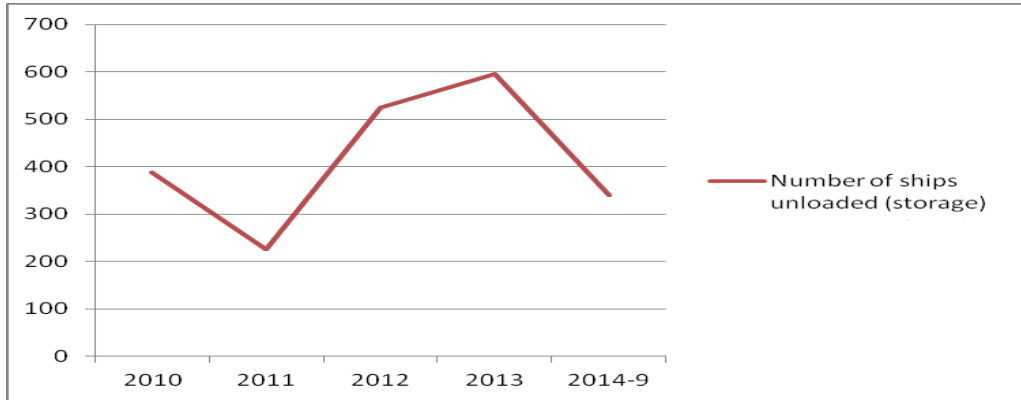


Fig4.3. Number of Ships Unloaded During 2010 to 9/2014.

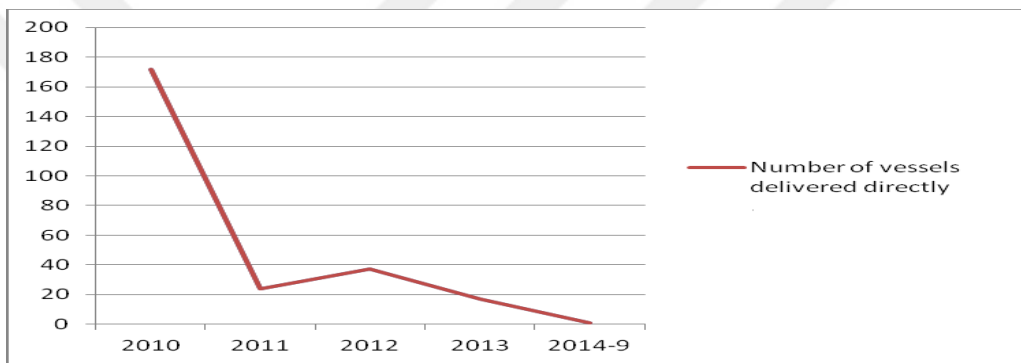


Fig4.4. Number of Vessels Delivered During 2010 to 9/2014.

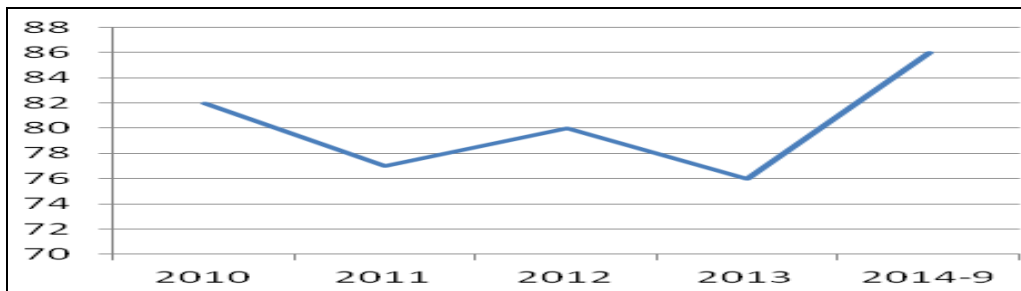


Fig4.5. Number of Cargo Ships During 2010 to 9/2014.

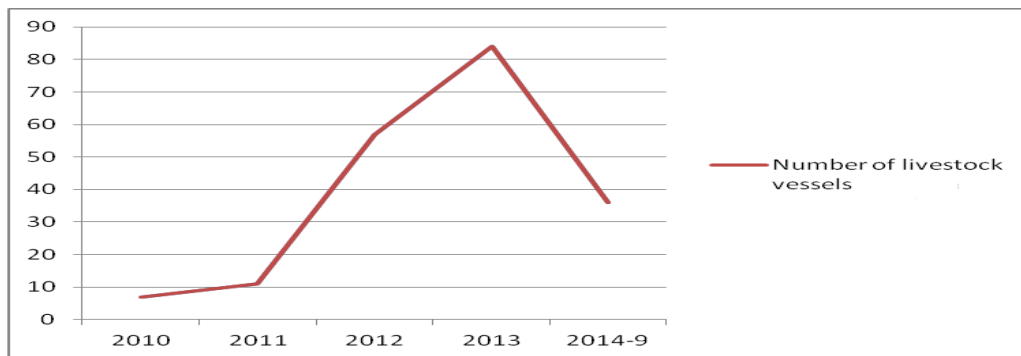


Fig4.6. Number of Livestock Vessels During 2010 to 9/2014.

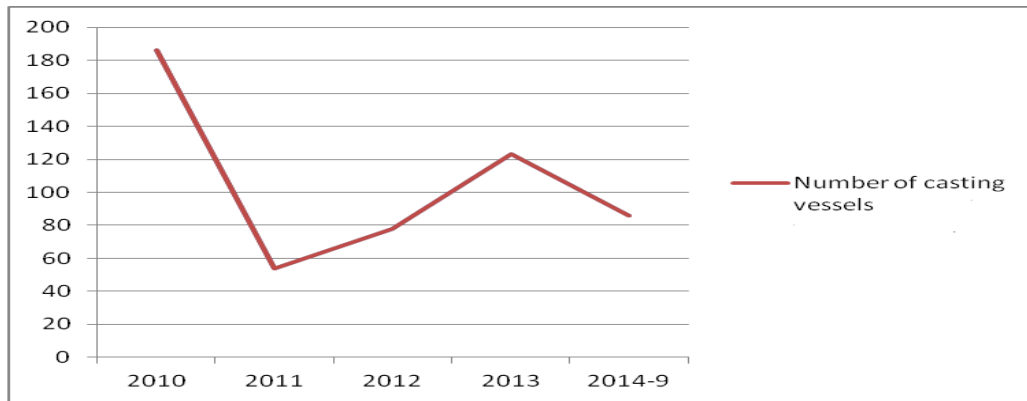


Fig 4.7. Number of Casting Vessels During 2010 to 9/2014.

Table.4.18. shows statistics of number of containers that were unloaded 20 or 40, and of the Figures 4.8. - 4.13 were unloading containers at highest values of 2013 as well as status of containers recharged either the containers filled up to reach a value during 2011, for containers containing cars and number of cars with wheels reached highest value during 2012(SPC 2011).

Table 4.18. Statistics Show Number of Containers Unloaded and Shipped Benghazi Sea Port during Period from 2010 to 09 / 2014

	unloaded Containers		Number of recharged containers		Number of packed containers is packed		Number of refrigerated containers		Number of containers inside cars		Number of cars with wheels
	20	40	20	40	20	40	20	40	20	40	
2010	22931	21209	22980	24698	281	357	56	232	53	2535	5440
2011	13220	11669	13022	12279	960	392	16	87	18	968	22598
2012	24522	34936	24204	36337	382	436	37	836	9	4355	109575
2013	26599	38420	26721	43453	453	256	29	732	4	2323	39629
2014-09	16389	22502	16851	23582	306	205	2	47	0	333	11653

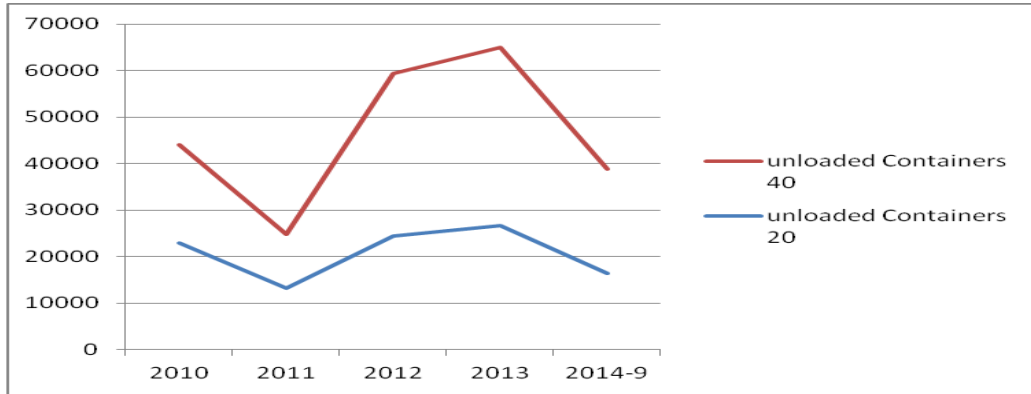


Fig 4.8. Unloaded Containers during 2010 to 9/2014.

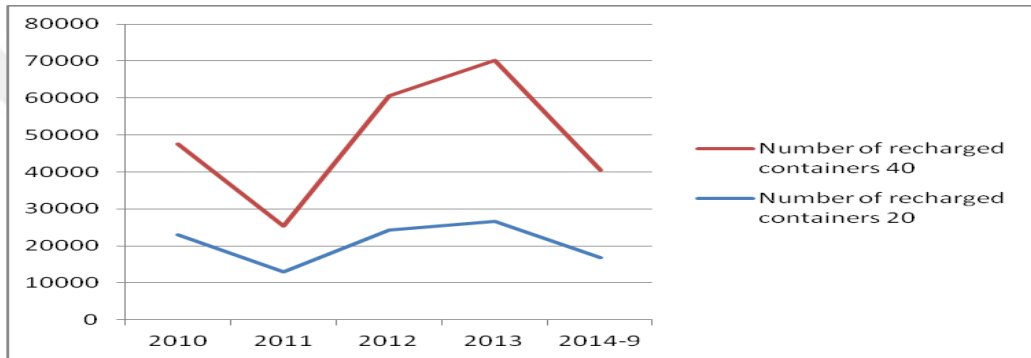


Fig 4.9. Number of Recharged Containers during 2010 to 9/2014.

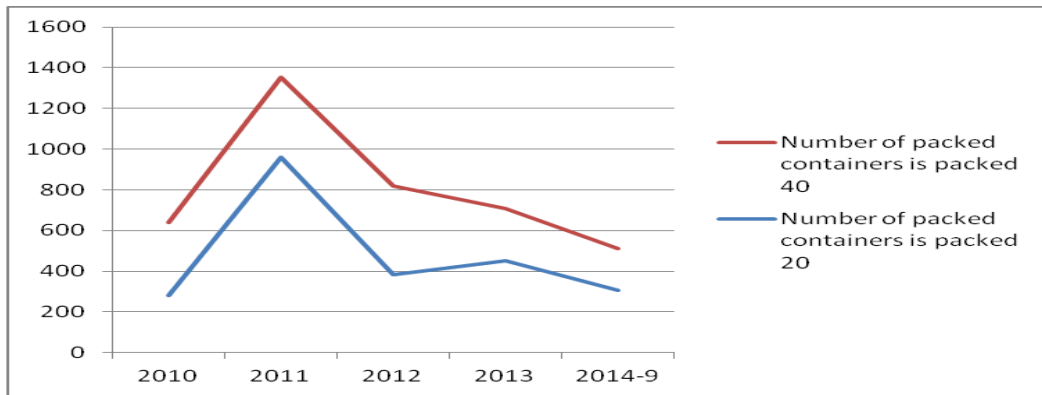


Fig 4.10. Number of Packed Containers during 2010 to 9/2014.

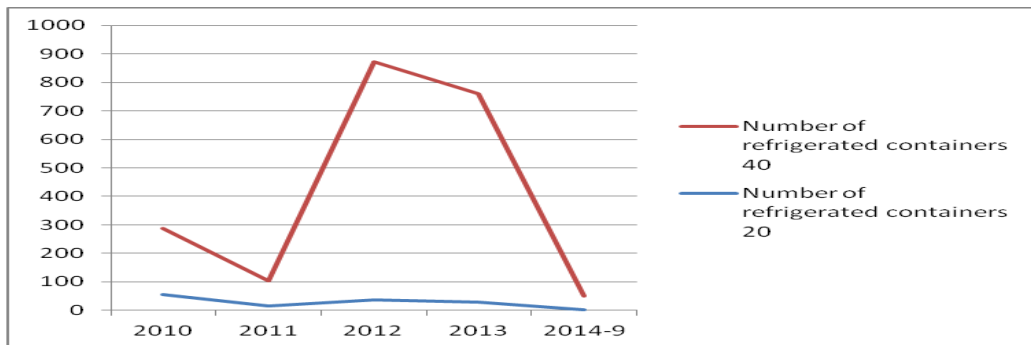


Fig 4.11. Number of Refrigerated Containers during 2010 to 9/2014.

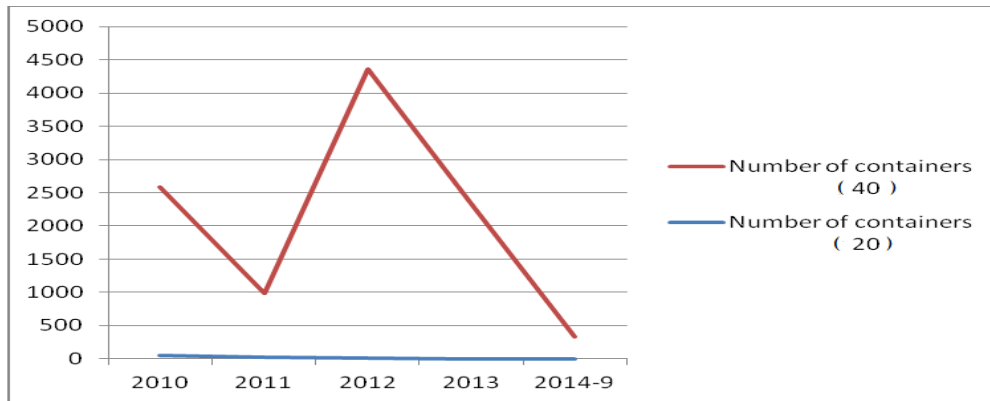


Fig 4.12. Number of Containers Containing Cars during 2010 to 9/2014.

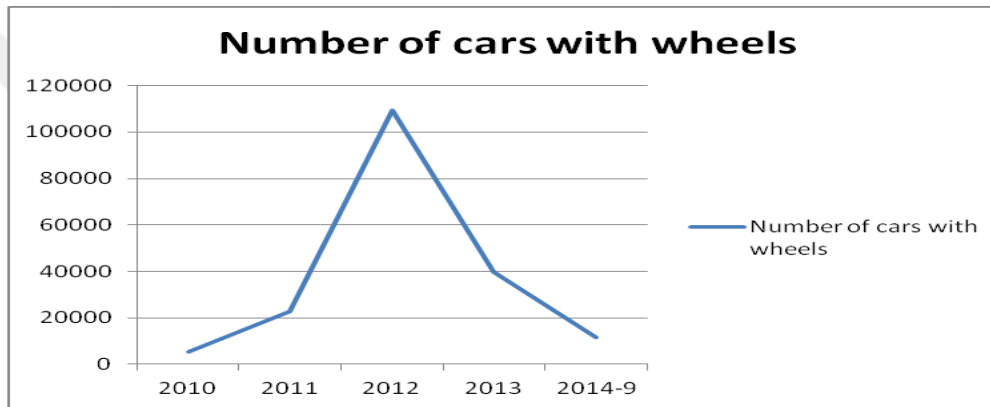


Fig 4.13. Number of Cars with Wheels during 2010 to 9/2014.

In general, previous statistics show that all shipments declined significantly during 2011. A slight improvement was achieved during the years 2012/2013 and then returned to a severe decline in 2014 due to closure of oil fields and closure of ports.

4.3. Results of SWOT Analysis for Benghazi Port

A survey of the port site was conducted (15 January, 28 February and 06 March 2017). We are an interview with office of Benghazi port manager and head of technical department as well as a group of professionals in technical departments. Data on port's operations were obtained in the last five years before the port stopped, as well as current infrastructure such as number of length and draft of berths as well as equipment available. Before each interview, a question was sent to managers in order to focus on main

requirements of thesis.

4.3.1. Obstacles to Development of Libyan Maritime Transport

Despite the fact that Libya has a long life, an excellent strategic location, and natural, human and financial resources that contribute to the improvement of maritime trade, the reality of the situation indicates the existence of obstacles that limit the possibility of upgrading this vital sector, including:

1- The economic obstacles where the weakness of the contribution of the private sector in the investments of maritime transport is the most important obstacles due to the existence of some challenges, such as the legislation expelling foreign investment.

2. Administrative constraints despite the existence of agreements, the reality of implementation indicates that there are many limitations in administrative and bureaucratic procedures.

3. Legislative constraints Legislation usually comes to make development plans and hopes effective. Therefore, development of the maritime transport sector requires a modern and developed legislative structure.

4. Other constraints related to high operating costs, difficulty and complexity of procedures, low volume of traffic, low handling rate, poor human resources capacity, etc.

4.3.2. General Requirements of Benghazi Port

Through discussing the operators and port managers in terms of the difficulties and problems facing them, it was their opinion that the optimal solution for Benghazi port is to develop the new port (Jilliana) and transfer all the movement of the commercial port to the island area and dispense with the old port and exploitation of the purposes of tourism and fishing and anchoring the port.

The road leading to the central port area (the island area) is in a very poor condition due to the lack of drainage and linking it to the city's special road, which resulted in the difficulty of entry and exit to and from the port, in addition to the fall of bags of direct delivery goods due to lack of paving the road and paving deal with large truck drivers for

refusing to work in the island area for this reason.

The importance of establishing a container terminal in the Port of Benghazi is that container transport regulates the trade of manufactured goods, which constitute the largest proportion of world trade, resulting in a change in transport patterns and practices, with door-to-door transport increasing, container transportation is characterized by positives.

The importance of containers comes from the following:

1 - The use of containers to save a lot of money on the carrier so that the container ship can load and unload the load very quickly, reducing the cost of shipping and unloading, and helps the speed and flexibility of circulation and the transfer of goods to a large number of customers.

2. As a rigid, unbreakable container, it is the safest and safest way to cover the goods. It protects the goods to reduce the risk of damage and damage. Refrigerated containers also allow the preservation of perishables from heat, cold, humidity and all weather fluctuations, and limits the cases of theft as the container closes tightly.

3. The container provided the best solution for the transport system by facilitating the transport from one medium to another and it was packed without unloading or re-categorizing its contents. It enabled the marine carrier to minimize the lost spaces inside the ship without fear of the damage inside the ship, which led to the vessel's fullest investment.

4 - The development of the use of container vessels to develop and increase the capacities of container terminals in ports and provide them with modern equipment for the unloading and shipping of ships, and the establishment of ports specialized container.

5. The length of stay of containers carrying containers in ports has been reduced from 30% to 20% of the time of the voyage, unlike regular vessels that stay 60% of the time, thus reducing the cost of staying in seaports.

In the light of the suffering of the port of Benghazi from the lack of a container terminal, and taking into account the successive increases in the number of containers expected to be transported through the port, a study was needed to re-plan and develop the port of Benghazi and study the possibility of increasing the capacity of the port and

horizons of horizontal expansion currently possible and future and that is through:

- Data collection, classification, tabulation and analysis of current data on trading, handling and physical facilities at the port.
- Study the internal and external influences on the features of expansion plans and development in the port.
- Re-planning the container terminal according to current and future variables and using modern scientific methods.
- To obtain a proposal for the design of the container terminal.

4.3.3. Assessment Results of SWOT Analysis

(1) The significant missing point is lack of container storage and handling facilities. The Libya exports petroleum but imports every type of goods mainly transported in containers. There is no container handling facilities in the old port.

(2) The new port is suitable to establish a container port and this reduces the costs as well as facilitate forthcoming civil works. There is an area next to the old port to be constructed as new port (Juliana) but no facilities is settled on this port area.

(3) The existing new port area is sufficient to meet today's and future requirements for container operations, but if the requirements of the trade connected with Central African countries new area requirements are raised.

(4) Geographical situation, road connections, sea and meteorological conditions are suitable for construction of a mid-size container terminal.

(5) The size and capacity of the container terminal is compatible with MARPORT. It is not possible to make a sensitive calculation for dimensions of wharfing loading and warehousing areas. So we assume the same capacity of MARPORT and our Architecture design study is based on this figures. The study made by Şişlioğlu (2017) has proved that the number of the cranes is suitable for cost effectiveness for a 170 meter

peer/quay, so same number may also be applied for Benghazi.

(6) *The eastern and southern regions of Libya need an outlet for the import of building materials, equipment and machinery* in the post-war and reconstruction period. This requires a port that serves containers and heavy equipment.

(7) *Lack of storage facilities and container handling.* Areas surrounding the storage of materials in large quantities in addition to the warehouses of frozen goods warehouses and storage yards of the port, so the storage facilities must be designed to conform to the specifications of modern equipment.

(8) *Development of new and modern passenger terminal to enjoy Libya and its large tourist areas,* especially in the eastern region, so that it is fully compatible with the standards and all the services crisis. Passenger terminal must include facilities that allow the efficient management and arrival of passengers.

(9) *The urgent need to develop the port to serve the future strategic projects of the state* such as the industrial zone proposed by the Libyan state east of the city of Benghazi in addition to the proposed free zone west of the city (Al-Maresa)

(10) *Proposed future container terminal aims to integrate the port system* in the multimodal transport network in order to improve the market access and service of some Central African countries ease trade and integration in the industry network. In this context, the port must be confronted between the major maritime trade and the economic activities of the port and inland terminals.

4.3.4. Results of Benghazi Port SWOT Analysis and Requirements

In order to define results firstly we take into account the results of SWOT Analysis. This study is shown shortly in the Table 4.19.

Table 4.19. Results of Benghazi Port SWOT Analysis and Requirements

SWOT RESULTS	REQUIREMENTS
(1)The strong need for a container terminal serving the region especially that Libya imports all its needs, it exports only oil.	The container terminal will serve a large area in eastern and southern Libya, especially as Libya imports most of its needs from abroad.
(2)The eastern and southern region of Libya needs an outlet to import construction materials, equipment and machinery in the post-war era	The container terminal will be a dependent port in the importation of building materials and heavy equipment in case Libya enters the post-war reconstruction phase
(3)The significant missing point is lack of container storage and handling facilities.	The new port (Juliana) will be container terminal
(4) The new port is suitable to establish a container port and this reduces the costs as well as facilitate forthcoming civil works	Establishment of a container terminal in new port is cost effective and configuration of the existing port facilitates construction works.
(5)The existing new port area is sufficient to meet today's and future requirements for container operations, but if the requirements of the trade connected with Central African countries new area requirements are raised.	The new container port meets the existing and future requirements of Libya. But further studies require if the requirements of Central African trades. Enhancement of New port for further requirements should be taken into consideration when new urban planning made for Benghazi City.
(6) Geographical situation, road connections, sea and meteorological conditions are suitable for construction of a mid-size container terminal.	Geographical situation, road connections, sea and meteorological conditions are suitable for construction of a mid-size container terminal and it facilitates planning activities.

(7) The size and capacity of the container terminal is compatible with MARPORT	The capacity of MARPORT (Benchmark Port) is taken into account when Initial Configuration of New Port is designed.
(8) The development of the passenger ship station to enjoy Libya with great tourist areas, especially in the eastern region	The development of the passenger ship station is an effective service for the tourism sector, especially as Libya seeks to diversify sources of income.
(9) Near the port of the industrial zone and the free zone in Al-Marisa	Due to the proximity of the port from the industrial zone and the free zone in Al-Marisa, this requires a high-quality container terminal.
(10) The future container terminal serves some Central African countries	The container terminal in the future serves some Central African countries as it shortens the distance, cost and time instead of crossing from West Africa, especially as the cargo terminal comes from Asia.

All this results is taken into consideration during preparation of Architecture Design Study.

4.3.5. Results of Study on Requirements, Result of SWOT Analysis and Comparison of Benchmark Port and Benghazi

Through the analysis and study requirements it appears that Storage capacities affect the efficiency and productivity of clouds from the port ,the port's storage areas do not conform to modern equipment specifications, where the port of Benghazi is characterized by the amount of ground area adjacent to the sidewalks. There are also large areas of Benghazi harbour, which allow for expansion. In addition, Benghazi port is the port of the future in the region for the depth of water and its large areas.

Unfortunately, there is no specialized container terminal in the Libyan coast area. Benghazi port has no equipment for general merchandise or containers.

As for the activation of the movement of transit cargo in the port, the main reasons

for the weak transit trade in the Libyan ports in general and the Benghazi port especially due to the lack of container terminals in addition to the weakness of marketing.

Therefore, the expansion plans for the container terminal should be speedily worked out in order to cope with the continuous increase in foreign trade. The forecast showed that Benghazi port will handle 4 million containers according to the design proposal. The study showed the availability of competitive advantages of the port, especially with regard to the distances of the diffraction and the advantages of storage where the diffraction and depth and the lengths of berths and storage areas. The port is expected to focus on a market segment of container vessels.

The requirements can be summarized in the fact that the growth in world trade over the last decade, together with the increase in the volume of containers, has increased the demand for port energy in the Mediterranean basin. With 80 percent of the world trade volume borne by sea vessels, the importance of ports in the logistics supply chain is critical. However, trade imbalances, overcrowding, low productivity / efficiency and low connectivity in other regions hamper the integration of the Benghazi port into the global trading system. To illustrate the logistic problems facing the port, the total transport time spent by the port (at the time it takes) may be six times the reference port. To address obstacles, the port's infrastructure and services need to be improved. In particular, the following critical areas of action must be addressed:

(1) Regional imbalances, where Benghazi port lacks adequate port facilities. As a result, neighbouring ports have become the main entry points for many landlocked countries in the region.

(2) Capacity. Congestion, delays in expansion plans, the need for rehabilitation, upgrading or new construction are systemic problems affecting the port of Benghazi with the economic downturn and low demand for many primary commodities, congestion problems and delays have now declined.

(3) Size and size of accommodation. Driven by growth in containerized cargo, has expanded the need for ports to increase berth size and modern container handling activity. However, Benghazi port does not have the capacity to handle ships that are not used in ship equipment and equipment, and port equipment is often insufficient or poorly maintained.

(4) Other infrastructure. Longer pavement length, wider circulation rotation, and deeper access channels are needed along with modern shipyards.

(5) Access to land. Access to land, for both roads and railways, is restricted to the Benghazi port as it is generally surrounded by densely populated areas. Delays and congestion in the delivery and removal of shipments to and from the port affect port capacity and increase costs.

The analysis indicates that significant productivity gains can be achieved by improving existing ports. At the same time, it is also necessary to make improvements in the regulatory environment. Improvements may be required to the management of ports.

From the analysis and results of this study, it is recommended that:

- Architectural development is an urgent necessity to improve Benghazi port.
- The establishment of a container terminal of essentials to serve the east and south of Libya, especially at this stage for post-war reconstruction.
- The future container terminal will shorten the road and cost of shipping to Central Africa if it works efficiently.
- Simple and low shipping strategy should continue.
- The capacity of effective and simple port actions should be increased.
- An ongoing effort should be made to further enhance and develop IT applications in order to provide easier automated port and shipping services to our customers.
- Measures should be taken to improve the transport of goods to / from the port from the interior.

The results of comparing the Benghazi port with the port of MARPORT indicate that the area is almost identical and similar to the current configuration of Benghazi port, which is very new. This is easy to study architectural design.

In addition to the need to increase the capacity of Benghazi port in accordance with future requirements, we can consider the same capacity with MARPORT, while the

capacity of handling in the current port of Benghazi is very weak compared to MARPORT in addition to the lack of a container terminal so it should be increased. Not equipped with refrigerated container area. Therefore, a refrigerated container area has been developed. The area of CFS in the current Benghazi port is small compared to Benchmark, so this area should be increased.

In addition, the covered area and the warehouse area in the current port of Benghazi is insufficient to cover the current requirements, whether compared to MARPORT, this area should be increased if the standard level. Also the length of the berth in the current port of Benghazi is appropriate and in the search for the capacity of increasing the possible lengths, Suitable for gate 3 and at least 3 doors for each new and old port.

Finally cranes (bridge cranes, mobile port cranes) and patio equipment are all weak and few and need to be increased to meet the requirements of the design proposal

4.4. Development of an Architectural and Civil Works Side of Benghazi Port

In short term, Libya hopes that Benghazi port after development will contribute to increase volume of international trade between Libya and world, reduce the cost of imports, create jobs for young people, raise country's capacity to store basic materials and launch global navigation lines that enhance competitiveness of the country. It is expected that the port will give a strong impetus to private sector, especially through exploitation of the port and free or economic zones planned by small and medium companies.

In medium term, it looks to country to become an important regional centre. In this context, Libya aspires to turn Benghazi port into a centre to serve needs of Central African countries. It should be noted here that strategic objectives and action strategies can be arranged and implemented only after clearly defining the mission and mission of the port. As global shipping has increased during container shipments more than five times since 1990, this has resulted in a seven-fold growth in the world's container fleet (CÓRDOBA, FERNÁNDEZ & BOUHEY 2008). Over the last two decades, the container transport system has developed steadily, with a growth rate of 7 or 9 % per annum. This increase is expected to increase to around 10 % by 2020, for other shipping modes, to be 2% per year

(Misurata Free Zone, 2013).

Steps of architectural and civil works development can be summarized with clear points:

- 1.Site inventory (Survey).
- 2.Site analysis.
- 3.Development of project program.
- 4.Development of concepts.
- 5.Final design.

4.4.1. Site Inventory (Survey)

Site inventory information collection includes following: case studies, natural physical element, motion system (sight and vehicle) circulation systems, area and shape of the site, adjacent to the project, nearby landmarks and attractions land mark & swot analysis, interview, observation. A site visit has also been conducted.

4.4.2. Site Analysis.

All these factors (information gathered) are analysed from an architectural point of view and we have reached:

1. Opportunities and obstacles.
2. Problems and solutions.

In this way we can come up with recommendations that are taken into consideration in design.

In addition to previous studies and a number of alternatives to the planning of Benghazi city (second alternative - third - fourth), it became clear that is a diagram of the city's radial centre, Benghazi lake, in centre of city.

The State Has Prepared The Following Plans:

1-The first plan (1968-1988): Several foreign consulting companies have been assigned to prepare a set of plans, as follows:

- Whiting Corporation (Tripoli - Benghazi - Sebha).
- Dokasadis (cities in east of Libya).
- Architecture Planting (Zawya - Gharyan).
- Magee Marshall McMullan and Leuka, (Misurata Governorate).

2. The Second Plan (1980-2000): national plan has been prepared by the Municipality Secretariat and Planning and a UN Human Settlements Team. Four consultancy offices were commissioned in preparation of regional plans, sub-regions and urban plans.

- Paulservice (Tripoli).
- Dokasadis establishment (Benghazi region).
- Finmab Corporation. (Sabha Region).
- Finmap and Saber Blanc consortium (Gulf region).

3. Plan III (2000-2025): work is underway in preparing these plans so far, knowing that end of preparation of plan end of 2008, but unfortunately we are at end of 2011, work has not been completed, we do not know how much achievement and what main objectives of study '

- National Advisory Office (Tripoli region)
- Architecture Office for Engineering Consultancy (Benghazi region).
- Engineering Consultant Office for Utilities (Sabha Region).
- University Office for Engineering Consultancy (Gulf region).

With Regard to The Scheme of The City of Benghazi We Note The Following :

a. Plan of Greater Benghazi city which includes second generation plan and following expansions: Koueifia to north until Sidi Khalifa - Benina road, Southward, even road that connects between Bufkhara – Tikka

b. Buatni: in east area between Arabian Gulf road and northern Iraq road, with a total area of 33,414.92 ha.

- c. Industrial zone of Sidi Khalifa.
- d. Free zone is very rude.
- e. Port of Commercial Centre.
- f. Service centres in: Koueifieh - Bouatni - Bouffarth. And. Railway station and city train track.
- g. Suggested routes for city entrances.

Second generation of schemes was prepared by Duxiades and his assistants, which revealed typical planning procedures for years 1980-2000 see Fig 4.14. External and internal conditions during plan period did not allow for smooth implementation of plans. Moreover, unexpected effects emerged which resulted in a great deal of in early 2000s, it was clear that Libya needed a third-generation project plan for more realism and sensitive developments, taking into account global proliferation and changing conditions nationally. New generation of planning is supposed to be treated as a process rather than a procedure and therefore has characteristics of flexibility to adopt in multidimensional development trends, as well as attitudes that respond appropriately to the characteristics of responses in these changing development situations. In short, is designed to be a tool for managing changes that affect social and economic spatial development in its various aspects. It is based on flexibility and responsiveness to planning approach to be used as a tool for managing change. Development plan for Benghazi region is framework for hierarchical system of residential communities. In this context, first regional analyses and results to match the implementation of economic activities and spatial structures have been used as a basis for future development estimates directed at expected tasks to play their actual role in small communities with different potentials. Evaluate local potential to move interaction with other regions and communities that are hierarchical system of functional and spatial groups. Based on these functional and spatial groups extended to sub-region level (DABROWSKA, 2012), development plans prepared for each of following sub-regions "Benghazi, Marj, Green Mountain, Derna and Batnan" are based on specific strategies. These strategies were for development of metropolitan Metropolis in Benghazi sub-region, for sustainable development of sub-regions of Marj and Al-Jabal Al-Akhdar, for the self-sufficiency of the sub-region of Darna and for development of sub-region of Al-Batnan (RABA, 2012).

Principle of sustainability indicated that environmental protection approach of sub-regions of Marj, Jabal al-Akhdar and Derna should be addressed in the middle of regional system in relation to growth approaches in western and eastern remote regions of regional system, which consists of Benghazi and Batnan sub-regions, respectively. One of the most important concepts is that model of regional and sub-regional development enhances growth of present-day Benghazi and Tobruk in each of developing parts in line with main objective of local spatial plan and declares that it provides "balanced and sustainable spatial development".

Regardless of views presented above, third generation project includes planning of major urban centres including Benghazi, Marj, Casablanca, Derna and Tobruk in compliance with regional and sub-regional development policies and strategies with a broader scale of 25,000 and 250,000. This is followed by urban plans with a scale of 1/ 5,000 followed by a miniature measurement of 1/ 1.000 and detailed plans to implement the results.

Integrated natural planning system for third generation project refers to spatial distribution based on interpretative contributions, unlike second generation project of schemes, which was based mainly on descriptive contributions. While second-generation project sought to answer question "what?" Since they are based on a "descriptive" approach and "stalemate" in planning, the 3G project seeks to answer the question "why" And "how" it is based on the "interpretation and discovery" approach to planning, supported by "dynamic and interactive" planning methods. Total variables are first linked with each other and then with basic components of planning in a dynamic way population that forms backbone of all expectations and forecasts, population projections; and low and medium growth rates are linked to development alternatives that have been identified to be centralized, balanced, decentralized in preference policy and urban Largely rural and urban. This is useful for simulating population estimates that may be subject to new operating standards in certain time periods that are usually 5 years. Needs and requirements of housing, employment, infrastructure and social services are also based on the population and age groupings of Benghazi communities, respectively. Natural development and land use schemes on the scale of 1/ 25,000 and 1/ 5,000 with the spatial distribution of tasks to be performed by local citizens with the service scale based on certain criteria. Action plans

are designed for specific purposes in compliance with development alternatives and policy options that monitor achievement of targets and the success of assessments. Monitoring and evaluation is a prerequisite for dynamic performance of development process from skipping

Plan worked on distribution of land uses, and studied current use, and found that:

Residential use is the most widespread use in the city, and it is very diverse in terms of a number of characteristics as a result of its association with the development of the city over years. Residential areas differ in terms of style, organization, condition of buildings and other constructions and density, availability of social facilities and availability of basic infrastructure networks.

Residential use is distributed on the city either alone or mixed with other uses. In old parts of the city, residential areas are characterized by continuous urban fabric, with regularity of most of borders. Land plots are irregular in shape, usually caused by an irregular road network. , and neighbourhoods are made up of residential units with orthogonal and different orientation. Housing balance can be divided into four relative types: villas, apartments located in low-rise residential buildings, apartments in high-rise residential buildings, and an independent house, which is the oldest type of single family dwelling.

By looking at department of Urban Planning plans, department seeks to develop the city's master plan and thus seeks to develop four alternatives to Benghazi city master plan 2025 as in Figs 4.16., 4.17, 4.18. , either through Fig 4.15., it can be observed big difference between present states of city or Doxiades plan.

In addition, through a preliminary study of transport problems in the city of Benghazi, the main traffic lines and the traffic congestion resulting from the movement of trucks to and from the port through the city centre can be seen in Fig 4.19.

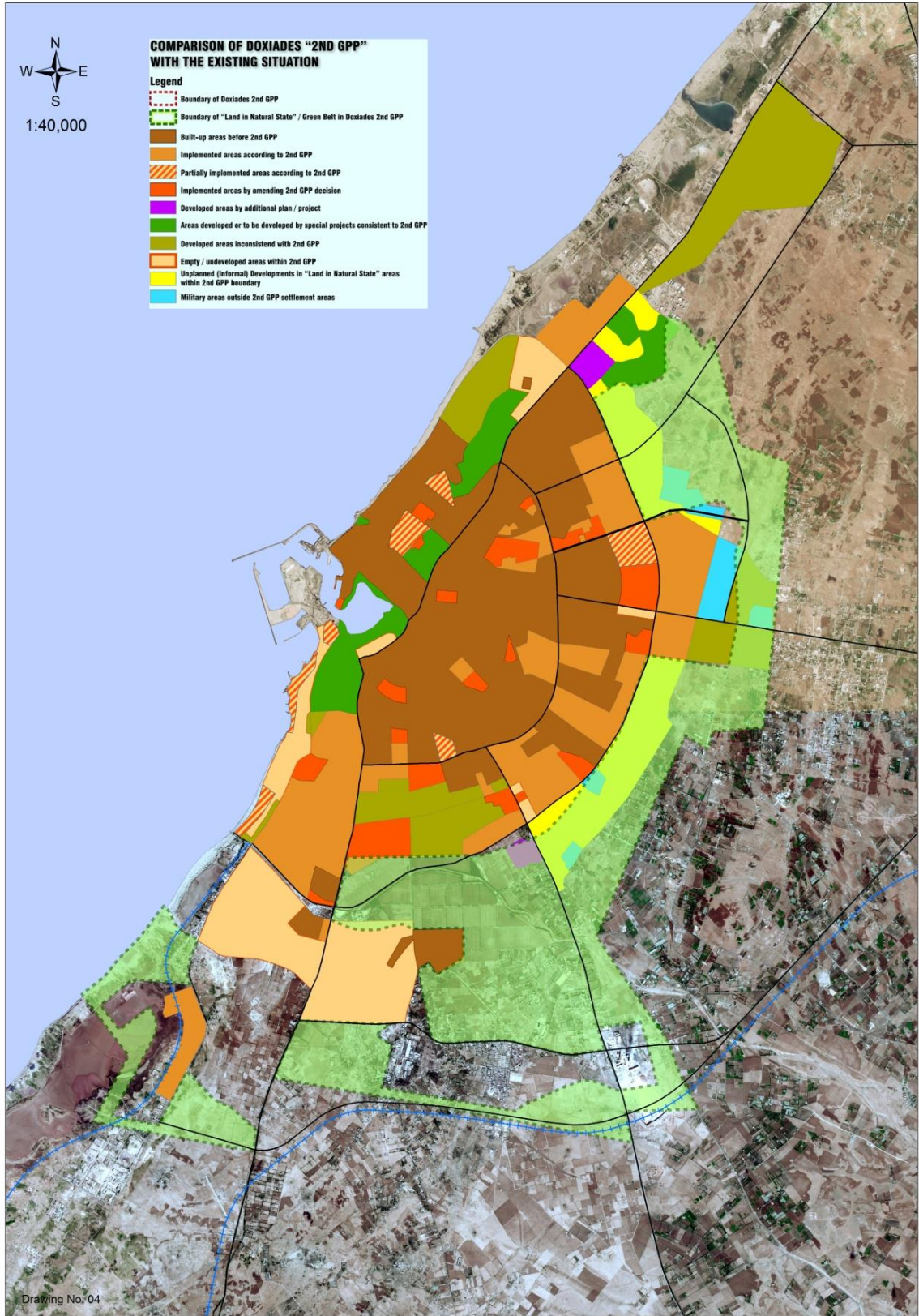


Fig4.15. Compare Doxiades with Current Situation of Benghazi.

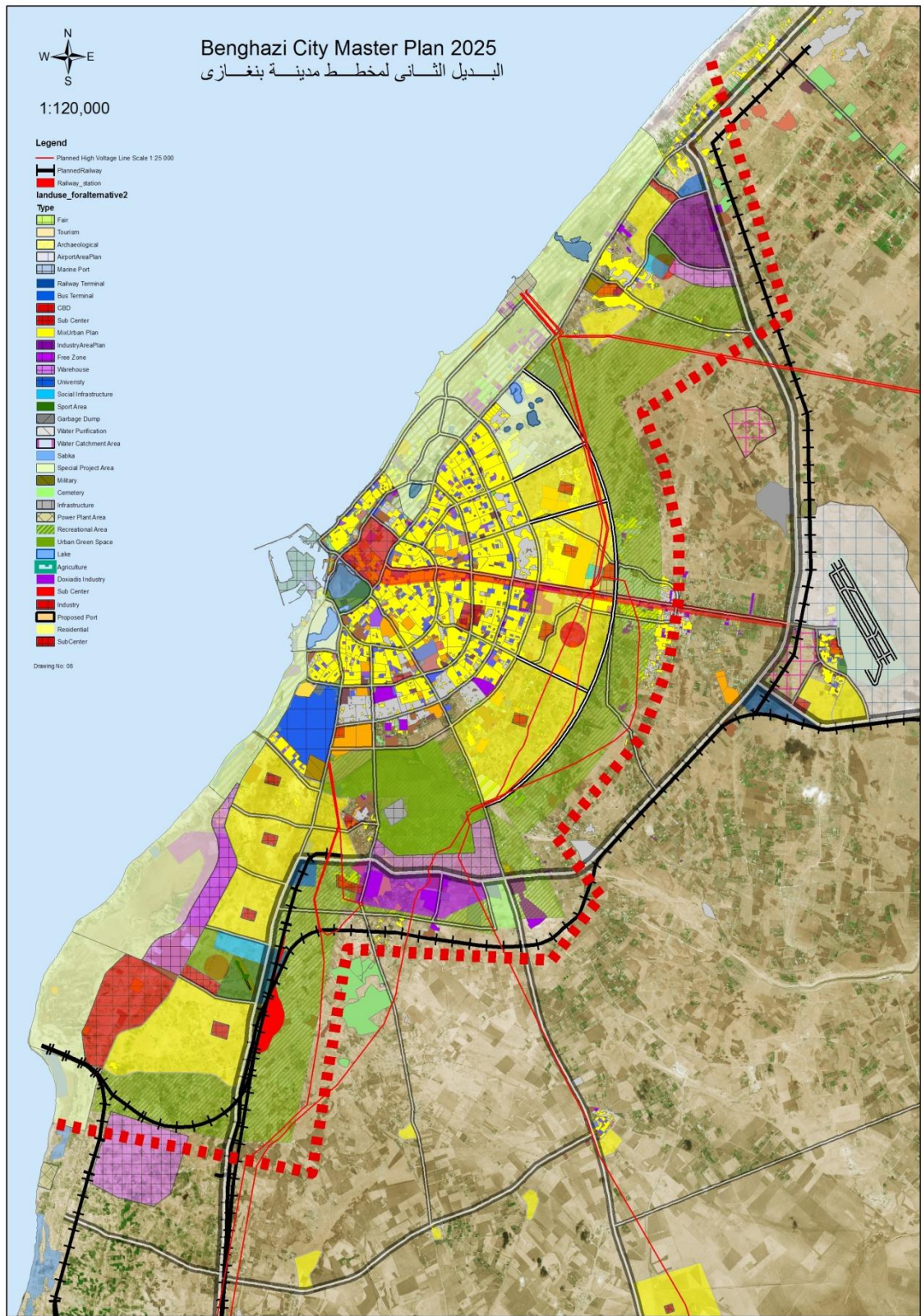


Fig4.16. Second Alternative to Benghazi City Master Plan 2025.

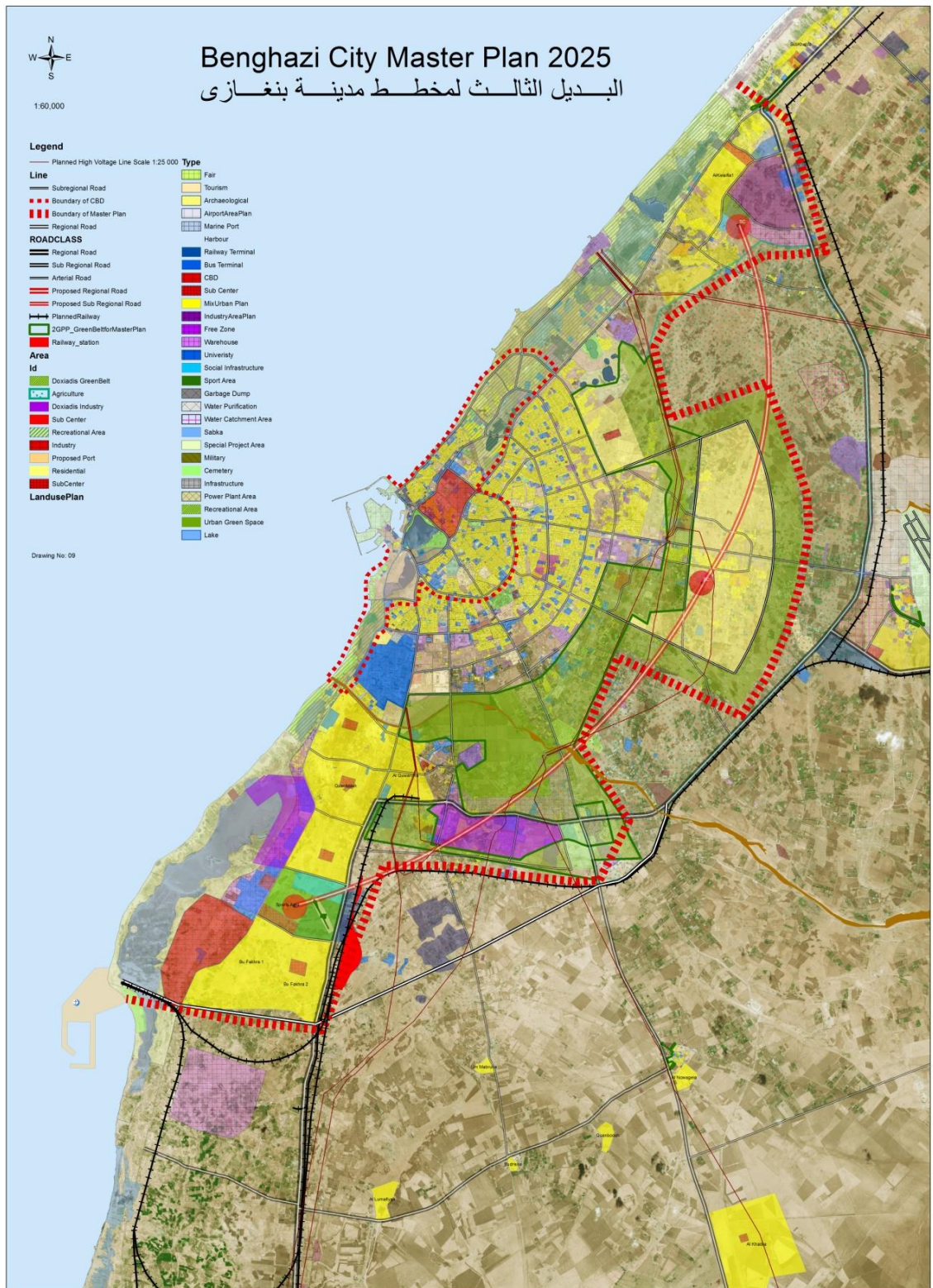


Fig4.17. Third Alternative to Benghazi City Master Plan 2025.

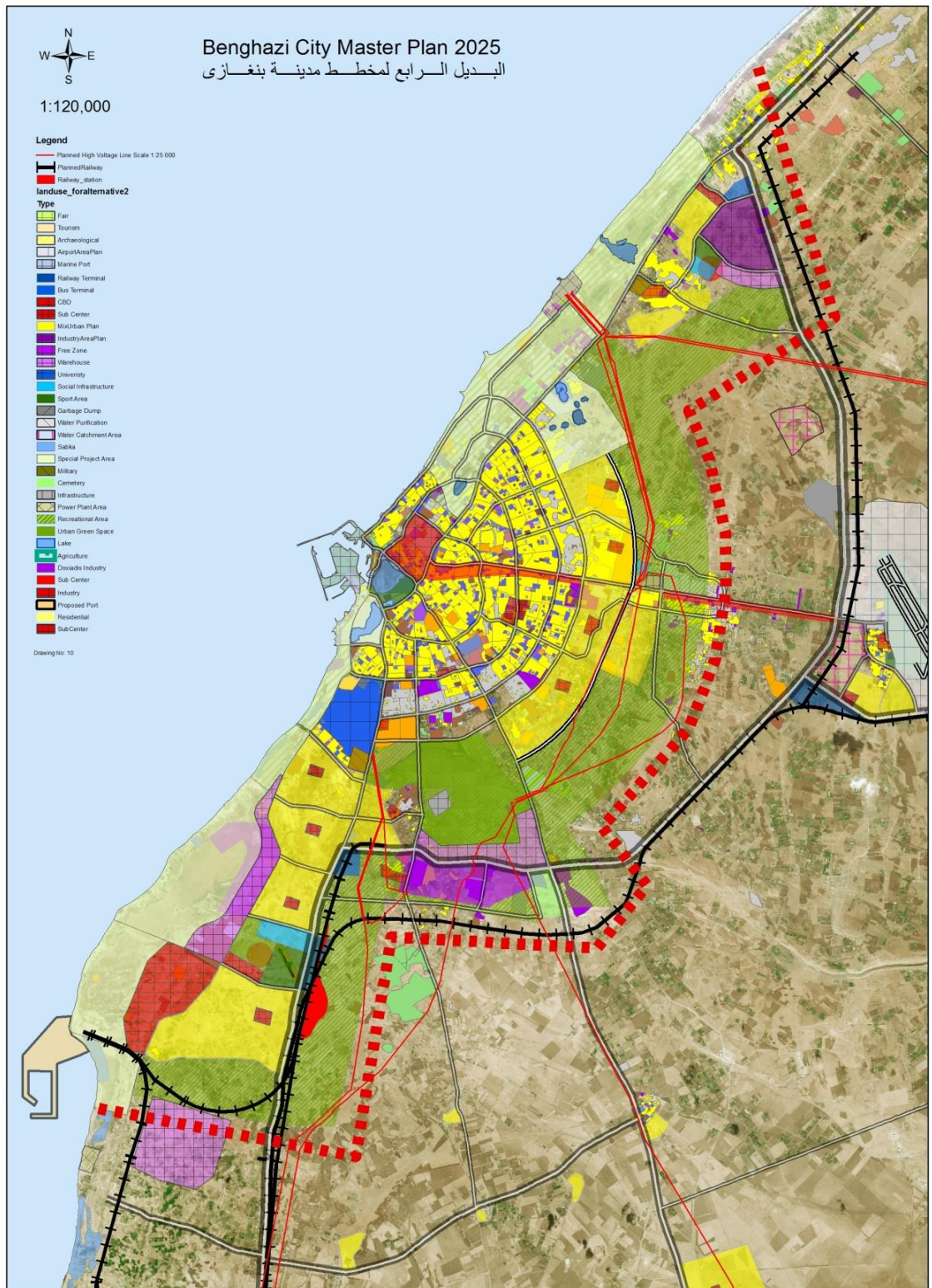


Fig4.18. Fourth Alternative to Benghazi City Master Plan 2025.

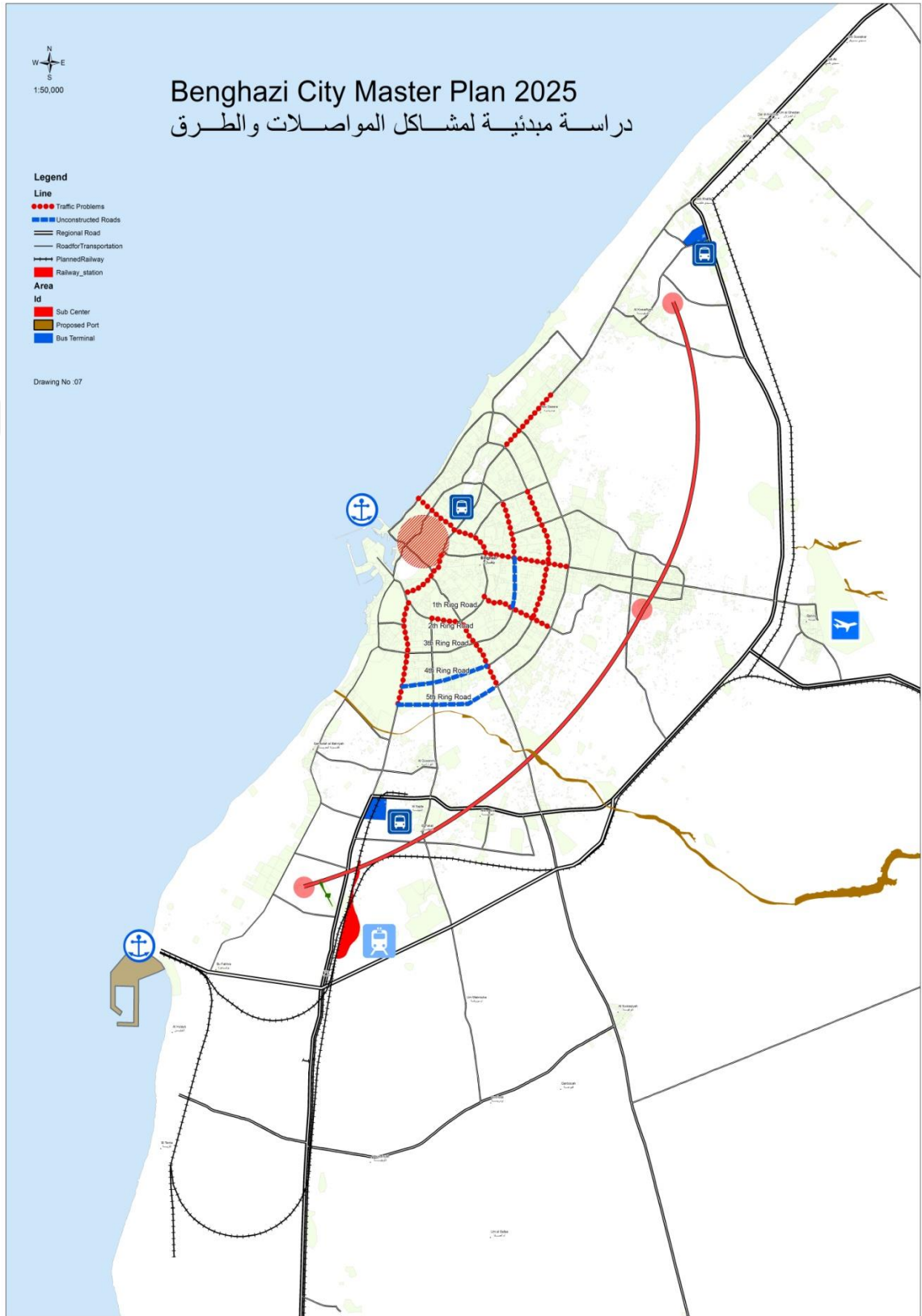


Fig4.19. A Preliminary Study of Problems of Transportation and Roads.

4.4.3. Development of the Project Program

It must be borne in mind that any design contains five elements: function, construction, meaning and aesthetics, therefore must foundations and planning and design criteria for port site to be developed, the port should therefore be located in the urban area of the city and contain a location with attractive attractions such as hotels and restaurants.

In addition, there should be a balance in movement between needs of movement of residents in neighbouring areas with movement of the port.

Moreover area should be well-equipped with a variety of transport stations, like Safety and Security and Observe visual sequences of region and do not interfere with planning and shaping of buildings with sky line of surrounding area also try to control pollution, with possibility of Prospects for future expansion.

Taking into consideration the impact of various climatic factors affecting the site, add to Availability of infrastructure services (sewage network & fresh water supply & power plants).

4.4.4. Conceptual Design

Concepts are generated from images that designer imagines, and it is evident in his mind to varying degrees, and on multiple journeys, crystallizing with his living the design problem, understanding its dimensions, clarity of variables influencing it, and assimilating data and information related to it or solving it and selection of images that agree his thoughts and concepts, and formulation of his design idea, thus, elements of generating design idea are:

1. Summary of architectural program of project.
2. Location of project.
3. Key considerations for project success project idea.
4. Similar examples of functional and architectural trends solutions.
5. Design idea is formed by training.

All these elements will be clarified by:

Summary of architectural program of the project where the good design idea starts

from knowing or identify basic functions contained in project, also set of basic elements and their spaces.

In addition relationship between functions or previous elements is simplified in principle.

Location of project where idea of design appears through topographic characteristics of site and its natural components as well as climatic characteristics in addition to components of urban environment.

There are several considerations for success project idea where lead to direction and control of design ideas, and considerations vary according to type and characteristics of project, of which the most important considerations that need to be addressed in port design to judge to be acceptable, applicable and serves the economy, basic considerations for successful port design are ease of movement., control possibility and dynamic configuration expressed as a gateway to the city.

In addition, study similar examples of functional and architectural trends solutions this is done by looking at similar ports in terms of conditions, area and demand.

Idea of project stems from origin of an original concept, an intellectual orientation that distinguishes project from other similar projects according to cultural, social, environmental or even economic background.

All this is done only by measuring and evaluating current performance of Benghazi port, there are many performance criteria for marine ports, which are closely related to objectives of various port authorities. These standards help to achieve many of desired objectives of Libyan Ports Authority.

It is noted that standards used by Libyan Maritime Ports Authority are good for measuring performance, but they do not adequately reflect the measurement and evaluation of port operations in a way that fully achieves internal objectives of port capacity and is required to achieve objectives of the customers at same time.

In this regard, it can be said that if the Ports Authority cannot measure activities, it will not be able to manage these activities and therefore will not be able to develop them,

which will significantly affect achievement of levels and aspirations of customers and reach them to better performance levels, Hence importance of measuring and evaluating performance of the Libyan Ports Authority.

4.5. Final Design

This study is related to civil engineering, as well as using the studies and rules necessary for the construction of ports and other marine installations, whether in the planning of the port in terms of setting the barriers of the waves and the entrance in the way that includes the desired calm in the water area and in terms of determining the places and directions and measurements of the facilities necessary to serve ships such as berths, Or the implementation of any of the many buildings that must be available in the port such as barriers to waves and walls of sidewalks and lighthouses and dry docks and others. Note that there is a difference in the conditions of offshore installations before starting to design any of the offshore facilities; you should know a lot about the circumstances surrounding the existing installations and the ways in which they were designed

Through multiple visits to the port and to meet the operators of the port and control the movement of the port to enter and exit to and from the old port, condition of all berths varies from bad to good and in general all need maintenance. As for pavement, situation is very bad. In addition, barriers of north and west waves are good and all warehouses are in a bad condition, especially after the war.

Open spaces are between bad and good and disclosure of condition of buildings are old ranging from bad and medium and also see status of network of roads / water / electricity / sanitation / telephone are all bad and need maintenance based on field visits and discussions with port operators, situation on the port is now very poor and it is therefore necessary to seriously consider redesigning the port to meet operational requirements and satisfies aspirations of state (DASGUPTA, 2011).

Therefore, during this study I tried to research architectural design of old and new Benghazi port and transform old port to a passenger ship station. New port became a

container terminal.

To access design, follow these steps:

1. Data Collection briefing stage of preparation of requirements and studies of project includes identifying problem and determining variables (function, location, historical and social dimensions, etc.).

2. Data analysis (wind, solarisation, topography, soil, noise, vision, movement, access, etc.)

3. Generate concept idea (identify elements of project, development of scheme of functional relations).

4. Development of solutions (drawings and shape determination).

As for study of natural effects, the wind affecting Benghazi port is:

- Southeast wind.
- Northwest Winds.
- Southern Wind.

The southern wind is environmental component of site because of characteristics of natural and our own in summer and autumn to reach a climax laden with dust so-called locally Southern winds loaded with dust, as a result of site surrounding the bodies of water, which clearly affect the increase of positive impact of the site.

In terms of planning studies, general idea and planning requirements have been result of development of the port in modern and the middle stage I and II, which led to gradual transfer of integrated port services to this port and the current study is to make the port old port provides tourist services and sea front of the city but up to reach to Benghazi tourist port

This approach requires a study of replacement process required to reach targeted development.

Therefore, existing facilities in old port give advantages to make it an effective tourist

complex near the port from city centre recreation and commercial and Corniche Benghazi, and is a point of transmission in two directions or two sides of the city with required space for establishment of many tourist and recreational facilities in addition to availability of berths of multiple lengths and depths of different reception ships Passengers in addition to receiving yachts and cruise boats.

And this leads to the integration of this proposed compound within the activities of central city so that it can be considered the tourist centre of sea offers all integrated marine services from service of sea terminal and yacht club and supporting tourism services.

According to studies carried out during research and maps of division of Benghazi city as well as the spatial surveying of the port, as in Fig 4.20., a proposal was prepared to design Benghazi port so that it attempts to simulate the proposal of Libyan state so that old port is converted to a special port of passenger ships and new port was designed to be a special container and casting station as in Figs 4.21, and Fig 4.22.

Layout of the port should be designed generally in accordance with the site's environmental conditions and the mode of port operation. it should primarily determine the port layout, as well its overall dimensions by mode of port operation. Subject to required development of the port, layout may take a form of landing stage, a simple wharf or as a combination of wharf, pier(s) and pontoons.

The port overall dimensions should be designed based on number of berths required, as well as the length of vessels to be berthed, during development steps, following factors should be considered, prevailing wind and current directions , wave conditions ,geotechnical conditions, also existing or proposed drainage, water pipelines, power and telecom cables and wastewater pipes , clearance to moored or passing vessels , water depth ,ease of entering and leaving berths, harbour or boundary line restrictions , environmental impact and landside and waterside access.

As for orientation, it must be maritime structures used to moor vessels should be orientated as far as possible such that a moored vessel is headed into direction of prevailing winds, waves or currents. This is to minimise movement of vessel and the magnitude of mooring forces.

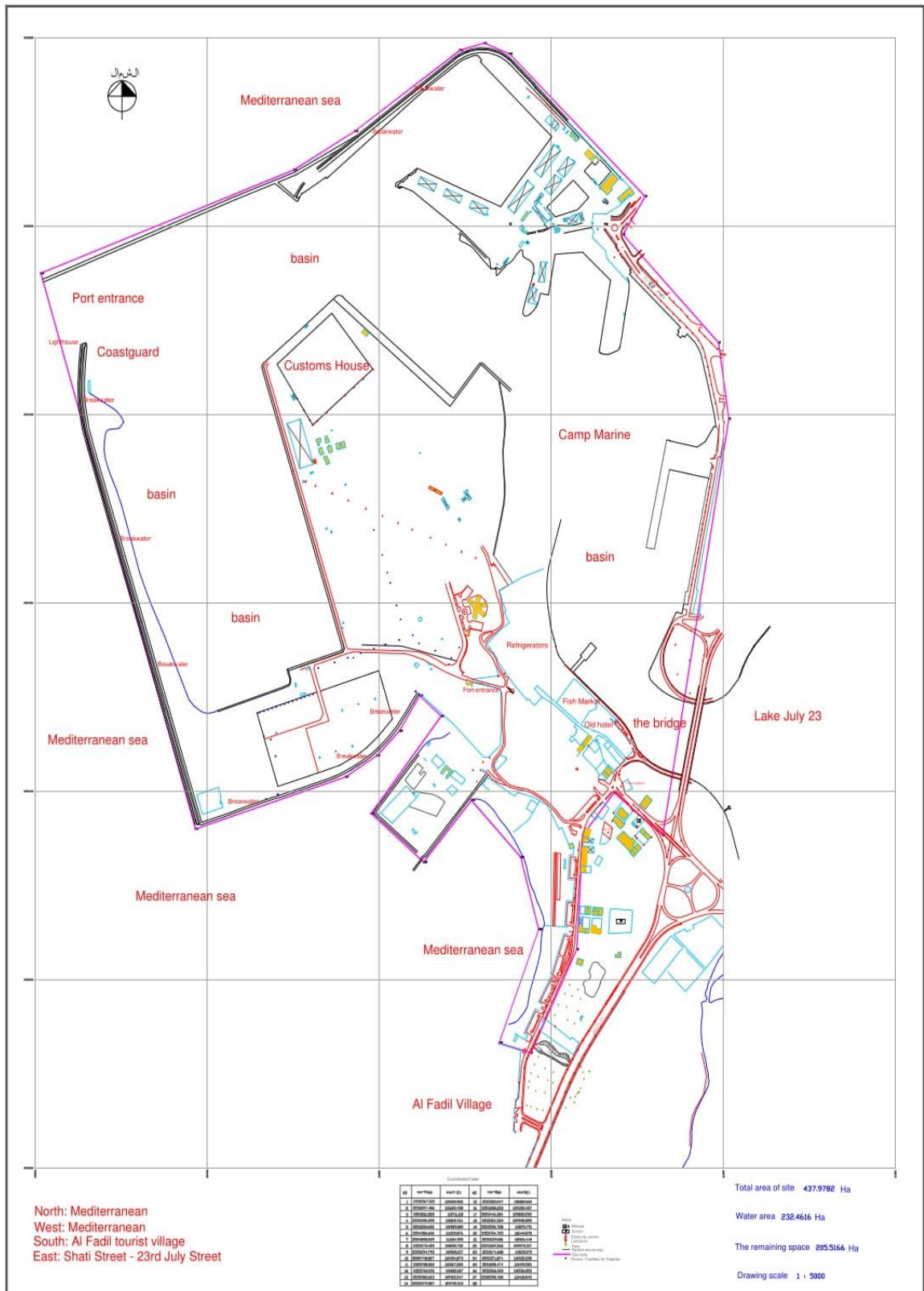


Fig4.20.Survey of Benghazi Port

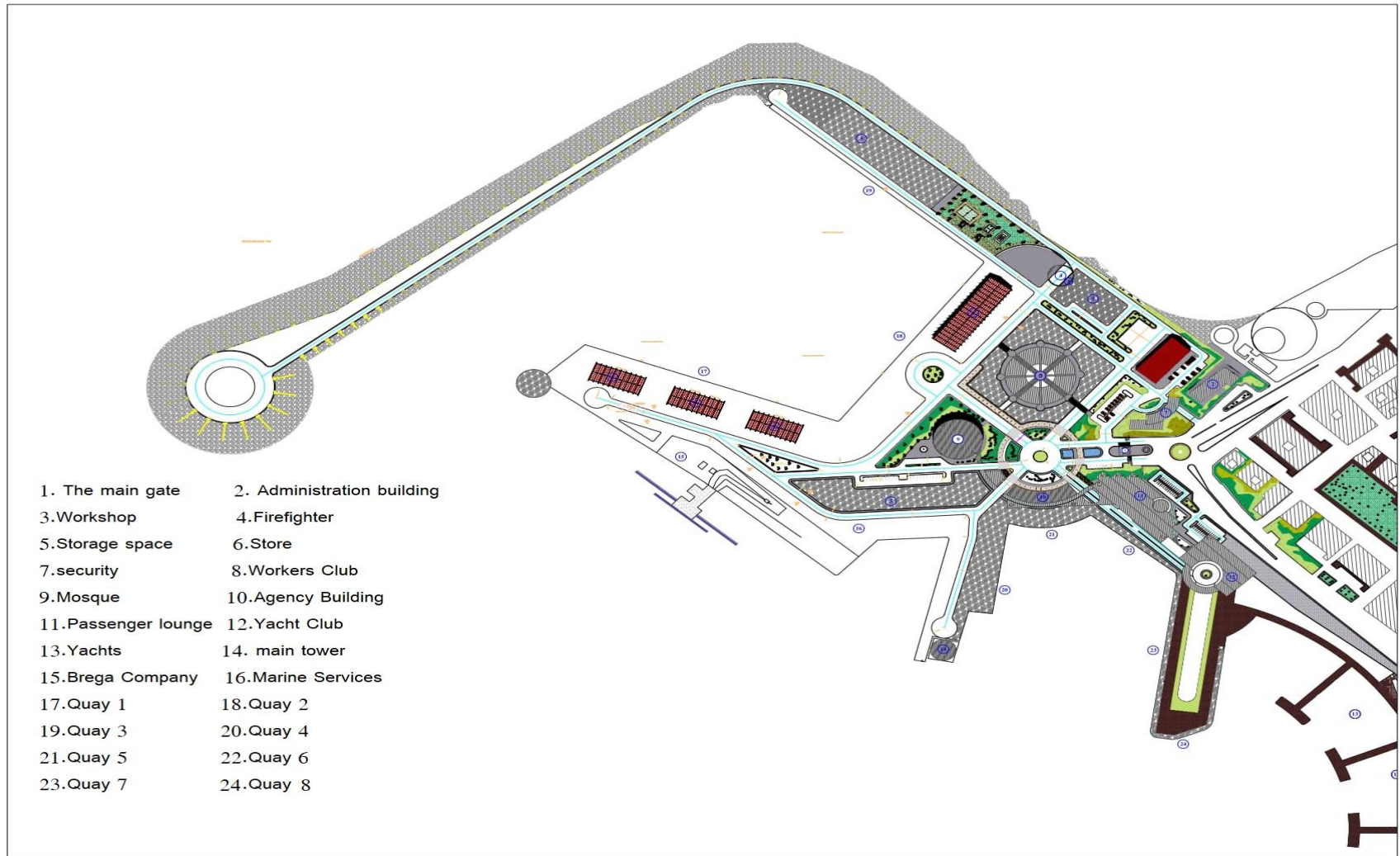


Fig4.21. Plan the Location of Passenger Ships in Benghazi Port.

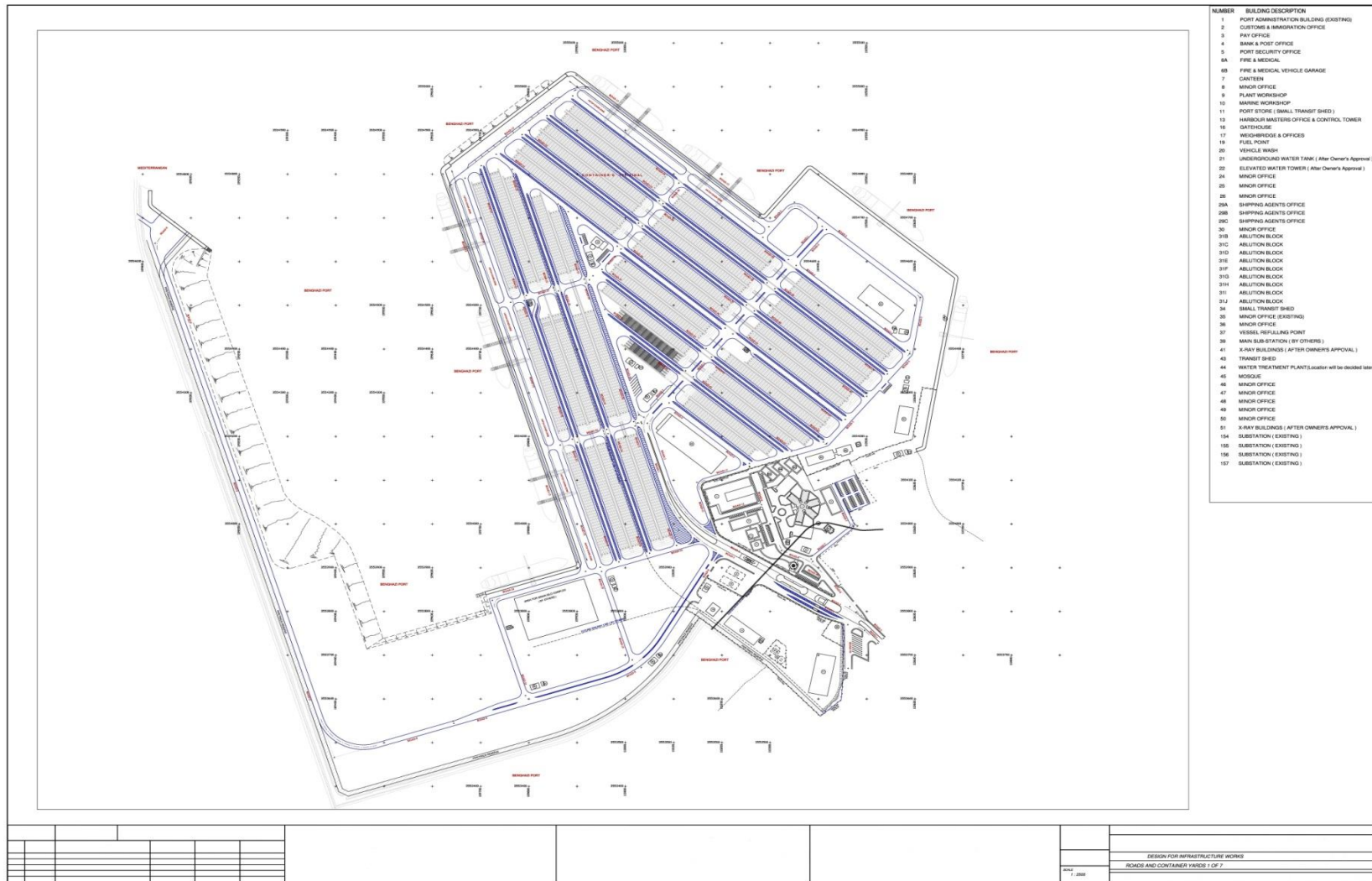


Fig4.22.Proposal Design of Benghazi port

5. CONCLUSION

5.1. Results

Development of Benghazi port is an investigation of dream of people of Libya and is a qualitative leap in modern means of transport for passengers, goods and trucks. It serves east and south-east of Libya, and will play a major role in development of projects and investments implemented and planned. And to achieve integration with project of establishment of advanced industrial zones, for industries and trade east of Benghazi city.

There are many different concerns regarding impact of new port plan on city. The most important concern was fourfold. These environmental impacts were to expand on the port, capacity of the city's road infrastructure to deal with additional road traffic resulting from port development, social and economic impacts, and enhanced conflict of land and city uses in Point-of-Port area.

Hence The Basic Principles That Will Help Move The Port Forward:

- Port needs to expand in a sustainable way for benefit of the city and country.
- Expansion is required to maintain the main port position in the country, which is essential for maintaining and driving economic development in region.
- Capacity should be provided before request to avoid overcrowding and service response Levels.
- Expansion should provide container capacity for priority goods, but the port should maintain diversification in support of Libyan economy.
- Economic, social and environmental dimensions are an essential part of planning.
- Environmental impact assessment to reach a preferred spatial planning.

Busy port and private transport systems with large residential areas and coexistence

have not been without problems in the past. This is related to impacts on neighbouring lands where residents are constantly complaining of operational issues, which stem from the port. Vehicle congestion is often raised and residents complain about amount of noise and light pollution they are exposed to on a daily basis. Air pollution, while relatively small, is a major issue in the region as a result of the weak historical planning of region. This has created health problems for residents and it is not surprising that residents hear about any increase in current levels of pollution that evolution may bring.

Old historic residential areas in basin adjacent to the port are slowly converted from residential accommodation to informal businesses serving port. This has resulted in an increase in number of visits and articulated vehicles using existing residential roads, which were not designed to handle this movement.

On economic side, Libya is suffering from unemployment and the country is constantly looking for ways to promote and develop the number of jobs. Employment-based industries provide an ideal opportunity to create a large number of jobs. In terms of proposed expansion, port is particularly interested in potential growth in labour market and its repercussions in local and Libyan economy. These potential jobs are examined in terms of ship calls, ship repairs and container handling.

Results of study focused on development of site of old port of 4,400,000 m², establishment of a marine terminal with development of a car station, development of truck station and expansion of the cargo yards, establishment of a seawater desalination plant.

Study pointed out that the most important results of development, creation of passenger halls and the expansion of area allocated for trucks and thus lead to increase capacity of trade and volume of goods.

In addition, study included development of new port (Jiliana port) to become a container terminal, which is a vital link between the east and west across Mediterranean Sea, and provides a major local base for goods in Libya.

Development of the port will certainly provide necessary independence, reduce cost of imports and exports, and enhance foreign trade relations away from previous dependence on port of neighbouring countries and land lines. With capacity of port

doubling

According to proposed design, the port will be able to handle 4 million TEUs annually. Main aspiration of the port at present is to meet needs of growing local economy in Libya, reduce import costs, create jobs for young people, increase country's capacity to store essential materials, launch of global navigation lines that enhance competitiveness of country

In long term, Libya aspires to turn country into an important regional centre. In this context, Libya aspires to turn Benghazi port into a centre to serve needs of countries in Central Africa in event of end of internal conflicts and return of country to its former era.

5.2. Proposals

The Benghazi port should be developed, managed and operated with the aim of creating job opportunities, promoting tourism, attracting investment and capital, and establishing development projects that serve the local communities.

The proposal to establish a terminal for passenger and tourist vessels creates a merger between the port and the city and creates an aesthetic environment. The proposed construction of the container terminal is aimed at linking local companies to international markets, facilitating the movement of maritime trade and the movement of goods, equipment and goods. Benghazi port is the main commercial gateway to eastern and southern Libya.

The objective of developing the port of Benghazi is to achieve the objectives of the economic vision of Libya aimed at finding alternative and sustainable economic sources that are not dependent on oil, which will create employment opportunities, activate tourism movement, attract investments and capital and establish development projects that serve the local communities.

As a futuristic vision, it is necessary to study and analyse the competitive elements of the Mediterranean transit ports and to compare them with the ports in the region to identify

their strengths and weaknesses, as well as to identify shipping lines that deal with the Libyan ports, including Benghazi port.

It is also necessary to identify the development methods and plans and promote the transit trade in each of the main Libyan ports, and study and analyse the current situation of value added activities in ports and docks of sea ports. And encourage industries related to the storage of goods and transit containers to increase value added through the development of logistics activities at container terminals in the port.

Libya is seeking to build a strategic plan for the port sector in which all the elements of the appropriate framework for finding solutions to the needs expressed at all levels, including the national, regional, local and sectoral levels. The strategy is based on the adoption of the Libyan ports as an economic crane that keeps pace with the global trend and becomes a basic station of marine road stations.

Benghazi port a station that embodies the strategic choice of Libya where strategic planning is a visionary, comprehensive and coherent framework for harmonious development and common reference among all concerned parties in the ports sector in Libya. It should take into account all sectoral strategies and address the strategic vision and identify the objectives and strategies adopted to achieve them.

Therefore, the study strategy for developing the port should be based on seven axes:

- Look for improved performance by encouraging innovation.
- Improve logistic performance.
- Optimal optimization of port infrastructure.
- Positioning in the national, regional and international context.
- Take advantage of the structured role of ports.
- Integration of environmental and urban objectives since the stage of conceptualization of investment projects.
- The ability to adapt to long-term changes.

The development of Benghazi port necessitates the importation of large, heavy and dangerous goods. There was also a foreseeable need for a base through which to export industrial products at the end, as well as the development of the old port to become a terminal for these passenger vessels and cruise ships as an integral part of the Eastern Province industrialization strategy.



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CIRRICULUM VITAE

Name Surname: MANAL SALEM ALI ABMDAS

Place and Date of Birth: BENGHAZI - 26.04.1971

Address: BENGHAZI / LIBYA

E-Mail: MANAL.ABMDAS@GMAIL.COM

B, SC: Civil Engineering - Benghazi University –
Libya, 1995,

M, SC: Civil Engineering - Benghazi University –
Libya, 2000.



Professional Experience and Rewards:

Graduated from the University Of Benghazi Department Of Civil Engineering and worked for a long time in the State institutions concerned with engineering projects as well as after obtaining the Masters worked in most public and private universities in the field of teaching and supervision of graduation projects.

She has a sufficient background in management and supervision of engineering projects.