

## **LIBYA -**

### **THE CONSTRUCTION INDUSTRY – AN OVERVIEW**

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**ABSTRACT:** In Libya, the construction industry (CI) has played a key role in social and economic development processes since the early 1950s. As a result, the country has experienced a tremendous increase in the scale and volume of construction activities. For instance, during the construction boom of the 1970s, Libya was the world's leading per capita consumer of cement. Furthermore, one of the world's largest civil engineering water projects (The Great Man Made River) has been planned, designed and constructed during the last two decades. Currently, the CI contributes 5.2 per cent of the Libyan Gross Domestic Product (GDP), and it employs around 3.2 per cent of the total workforce. However, in spite of the huge investments in construction activities over the past four decades, the Libyan construction industry is an under-researched and underdeveloped area.

The construction industry in Libya faces serious challenges and difficulties due to fast developments and dependence on foreign experts. The current capacity of the Libyan construction industry is unable to meet national housing supply needs. Recently, the country is witnessing a new construction boom that will bypass all other construction activities of the past decades. New homes, airports, ports, railways, and roads need to be built and upgraded. Hotels, office buildings and resorts are required to meet the needs of an expanding tourism industry. However, construction policies over the past decades, and a lack of managerial, financial and technical capabilities has created the current problematic circumstances of the industry. The new demands for rapid social, economic, political and technological changes will further strain the fragile industry. To meet current and future needs and challenges, new policies, changes and restructuring of the building industry are required.

## **1. INTRODUCTION**

The construction industry in Libya has witnessed several changes over the last fifty years. In the early 1950s, when funds were limited and the country was emerging from the Italian occupation, construction was of limited scale and value. In these early years, construction

was considered a social activity. In addition, construction skills were transferred from one generation to another, and construction products reflected people's values and cultures.

After the revolution of 1969 and during the oil boom that followed in the 1970s, the construction industry played a key role in social and economic development processes. As a result, the country experienced a tremendous increase in the scale and volume of construction activities. For instance, at the end of the 1970s Libya was the world's leading per capita consumer of cement in the world. This trend continued until early 1980s, when the construction industry suffered several setbacks, including the elimination of local private construction companies and their incorporation into the public sector. The construction industry came to a halt in the mid-1980s due to the huge drop in oil revenues. In addition, the political problems facing Libya during the last two decades contributed to economic difficulties that affected the industry greatly. The above considerations reflect the problematic circumstances of the Libyan construction industry, which can be attributed, in general, to several factors, including the consequences of rapid social, economic, political and technological changes, and a lack of local managerial, financial and technical capabilities.

In this paper the construction activities during the last fifty years are summarized, and the current status and future of this industry are examined.

## **2. GEOGRAPHY AND DEMOGRAPHICS**

Libya, which is located in North Africa, extends over 1,759,540 square kilometers and ranks as the 17th largest nation in the world (90% of the country is desert). It has the longest Mediterranean coastline 1770 kilometers (1100 miles), and its climate is mostly dry and desert-like except in the north (Mediterranean climate). In 1922, the highest ever recorded temperature, 57.8 centigrade, was registered in El-Azzizia near Tripoli, Libya's population according to the 2006 census reached 5,673,000 with a population density of 3.2/km<sup>2</sup>. Ninety percent of the people live on 10% of the area along the coast in Tripoli and Benghazi.

Libya's population is growing by 3.5% annually. With half of the population under the age of 20 and more than 85% living in cities, there is an urgent need for new homes, schools, hospitals, and infrastructure facilities. It is estimated that 500,000 homes will be needed in the next decade.

## **3. ECONOMY AND EDUCATION**

### **3.1 Economy**

The Libyan economy is highly dependent on oil revenues. Approximately 80% is the oil sector and 20% non-oil and construction sectors. The country lacks sufficient water resources and is ranked as one of the poorest in water resources. Seventy-five percent of Libya's food is imported. The state has controlled the economy since the early 1970s; only recently has

the country moved toward market-oriented reforms. Applying for the World Trade Organization (WTO), reducing subsidies, plans for privatization, and opening Libya's Stock Market (2006) are only examples of this transformation. The gross domestic product (GDP) of Libya is estimated to reach \$67 billion annually. The per capita income is close to \$11,630, making the country one of the richest in the region.

### **3.2 Education**

Education is financed by the public budget and compulsory up to secondary school. The student body is 1.7 million pupils (about 50% male and 50% female). The literacy rate is the highest in Africa at approximately 88%. Recently there has been a clear trend towards an increase in higher education enrollment (250,000 by 2005). There are nine public universities where 90% of the staff is Libyan, and Arabic is the official language of education up to university level. The English language is used in engineering and medical schools. There are two engineers per 1000 people in the country. This ratio is quite moderate. There is a serious shortage of workers and technicians, especially in the construction industry, which is still unindustrialized. The country is completely dependent on foreign workforce in the building sector.

## **4. THE CONSTRUCTION INDUSTRY (1950-PRESENT)**

In the last four decades, the construction industry in Libya has gone through three stages, which are described below.

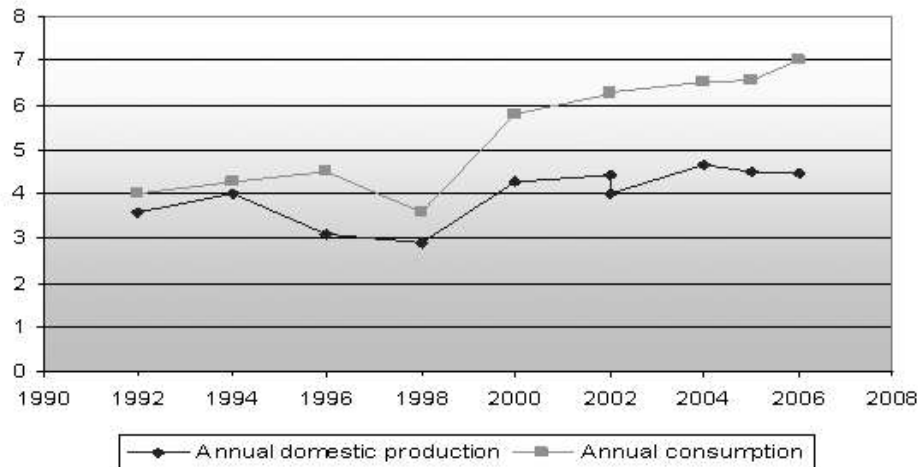
### **4.1 Stage One - 1950-1970**

A limited budget and resources characterized this period at the beginning of independence. Construction was based on indigenous local building materials and local workmanship. Cement production in 1958 was only 60,000 tons. In 1964, cement was used only in 2% of buildings in Libya.

### **4.2 Stage Two - 1970-2000**

The stage that immediately followed the Al-fatah Revolution of 1969 was characterized by high spending on all sectors including the construction industry to meet the urgent needs of the population for houses, roads, schools, and infrastructures. Radical changes occurred in construction processes and operations. The great construction boom that started in the early 1970s transformed the construction industry completely from an indigenous construction practice to a cement based industry. Cement utilization reached 6 million tons annually in the seventies. More than 97% of the construction in Libya used cement-based materials regardless of location, cost, or environmental conditions. Construction activities changed from domestic and indigenous activities based on local and dry construction materials to

an industry structured around formal firms and projects that was guided and controlled by professions, formal construction regulations, and standard materials. **Figure 4.1** shows cement production and consumption in million tons per year; the trend is towards increased consumption in the years to come.



**Figure 4.1.** Cement supply of and demand in the Libyan construction industry.  
Source: The Arabic Company for Cement Libya

A survey at the time of the revolution found that 150,000 families lacked decent shelter, the actual housing shortfall being placed at upward of 180,000 dwellings. Both the public and private sectors were involved in housing construction during the 1970s. Private investment and contracting accounted for a large portion of all construction until new property ownership laws went into effect in 1978 that limited each family to only one dwelling. Despite the decline of privately financed undertakings, the housing sector constituted one of the most notable of the revolution's achievements. By the late 1970s, the hovels and tenements surrounding Benghazi and Tripoli had begun to give way to modern apartment blocks with electricity and running water that stretched ever farther into what had once been groves and fields. In fact, the spread of concrete housing on agricultural land is alarming. These high-rise apartments became characteristic of the skylines of contemporary Benghazi, Tripoli, and other urban areas. The social impact of these dwellings on society is tremendous [1].

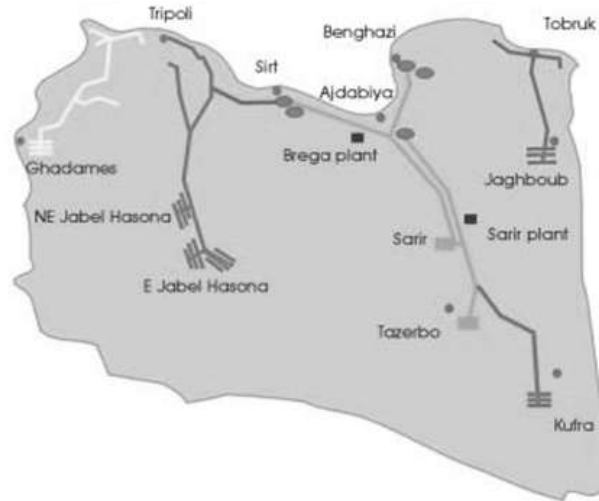
Between 1970 and 1986, the government invested more than 10 billion dollars in housing and infrastructure, which made possible the construction of 277,500 housing units. To reach these targets, Libya drew not only upon Libyan resources but also enlisted firms from France, West Germany, Spain, Italy, Turkey, South Korea, India, East European countries and Cuba. More than 30,000 km of a road network across the country was constructed during this period. Since 1984, budget allocations for housing and other infrastructures have fallen in keeping with a general decline in government spending. Many housing contracts were suspended or canceled as a result. A shortfall in new construction also raised the prospect of overcrowding and the creation of new shantytowns as the country's increasing population threatened to overwhelm the supply of housing. From 1986-2000 the construction industry slowed to a halt. The country faced tremendous economic distress due to the fall in oil prices and international sanctions during the early 1990s [2, 3]. Yet, during this period, the Great Man Made River Project was under construction. The project, which is now almost complete, delivered needed water to the northern cities of the Mediterranean.

#### 4.1.1 The Great Man Made River Project

This is a monumental project to supply Libya's water needs by drawing impeded water from beneath the Sahara and conveying it along a network of huge underground pipes for use in Libya's northern coastal belt to provide for the country's 5.6 million inhabitants. The leader of the revolution, Moammer Qaddafi, who is also the mastermind and the driving force behind this project, called it "the last attempt for survival in the salt oasis of North Africa" [4].

The search for water in Libya dates back to 1953. Oil exploration in the Sahara desert of southern Libya led to the discovery not only of significant oil reserves, but also of vast quantities of fresh water trapped in the underlying strata. The majority of this water was collected between 38,000 and 14,000 years ago, though some pockets are only 7,000 years old. This water is found in four major underground basins. The Kufra basin, lying in the southeast, near the Egyptian border, covers an area of 350,000 km<sup>2</sup>, forming an aquifer layer over 2,000 m deep, with an estimated capacity of 20,000 km<sup>3</sup> in the Libyan sector. The 600 m-deep aquifer in the Sirt basin is estimated to hold more than 10,000 km<sup>3</sup> of water, while the 450,000 km<sup>2</sup> Murzuk basin, south of Jabal Fezzan, is estimated to hold 4,800 km<sup>3</sup>. Further water lies in the Hamadah and Jufrah basins, which extend from the Qargaf Arch and Jabal Sawda to the coast (**Figure 4.2**).

The expanding economy and growing population along the fertile coastal strip of Libya is creating an increasing demand for water for irrigation, for industry, and for domestic and municipal use. At the same time, traditional water resources are becoming increasingly at risk through intensive use, which is resulting in saline intrusion of the coastal aquifer.



**Figure 4.2** The great man made river water pipe network in Libya.

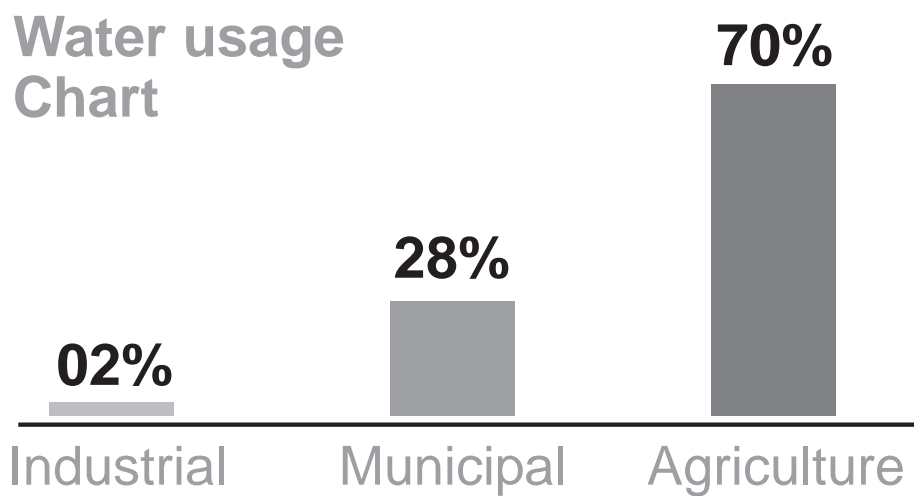
With the realization of the great man made river project, an economic and plentiful new source of fresh water is being made available. This will reduce extraction of water from the coastal aquifer as agriculture ceases to be dependent on existing water wells. The new source of water will, therefore, protect and enhance the fertility of the soil.

A network of pre-stressed concrete pipes 4 m diameter and 7 m long buried underground (**Figure 4.3**) for more than 4000 km from the south to north of Libya transfer water from 1300 wells (500m deep in the Sahara desert) to the Northern region that suffers from water shortage. Approximately 500,000 pre-stressed concrete cylinder pipes (**Figure 4.3**) have been manufactured. The project was designed in five phases. Each one is largely separate in itself but will eventually combine to form an integrated system. This system supplies about 7 million cubic meters of fresh water daily (**Figure 4.4**) for agriculture and human consumption. At an estimated total cost exceeding thirty billion dollars, this project is considered the largest civil engineering water project ever undertaken.

More than 70 per cent of the water delivered by the great man made river is intended for agricultural development, and it is expected that 130,000 hectares of agricultural land will be developed. To optimize the development of agricultural land, a water storage and distribution plan has been adopted. The plan aims to maintain constant supply of water throughout the year using large storage reservoirs, which will meet fluctuating demands. In addition, state of the art irrigation techniques are being used to minimize losses.



**Figure 4.3** Four meter prestressed concrete water pipe used in the great man made river project



**Figure 4.4** Water usage chart for the great man made river prject.

### **4.3 Stage Three – 2000–Present**

Currently, billions of dollars are invested in the oil and gas industry, power generation and water projects. Airports, ports, railways, and roads need to be built and upgraded; new homes, hotels and resorts are required to meet the needs of an expanding tourism industry.

The country is launching a lending program by which credit and loans are being made available on easy terms for small and medium sized businesses and for home building. More than 5 billion dollars were given for private home loans in 2006-2007 alone. A massive privatization program is already under way. Three hundred and sixty state-run and owned companies, ranging from small and medium size firms to major enterprises, are being transferred to the private sector in three phases, due for completion by 2008.

The new five year plan for the country, which articulates economic policy up to 2011, centers on an all-sector development program. The overall objectives of this plan are to free the economy from state control, stimulate the development of private enterprise, and build up the country's infrastructure. This plan is completely dependent on revenues from oil and gas, which account for most of Libya's exports. Due to the insufficient local capabilities to meet these objectives, the country is once again attracting foreign capital and know-how with partnership with locals in the oil and gas sectors as well as non-oil sectors such as tourism, infrastructure, agriculture, construction, health and education.

## **5. THE FUTURE OF THE CONSTRUCTION INDUSTRY**

More recently, due to local as well as global transformations, the construction industry has been moving towards a positive direction. Re-establishment of private construction companies that were abolished in the mid-1970s is one scheme the country is undertaking. However, the lack of local labour, technicians and know-how are still hindering this program and making this industry once again dependent on foreign experts. The huge oil revenues stemming from the recent oil prices increase are giving the country a second chance to build the infrastructure and housing that is urgently needed. In 2007, more than thirty billion dollars were allocated for the infrastructure and housing sectors alone.

Recent trends indicate that a new boom will take place in the next decade in the building industry in Libya. More than 500,000 housing units are planned for the next ten years. Their cost is estimated to be more than 25 billion dollars. In addition, huge investments have been allocated for the railroad project. The Railway Project, an ambitious 4,800 km trans-Africa rail network, is planned to link Tunisia, Egypt, and a southern network linking the Libyan cities of Sirte and Sebha, which possibly may be extended to Chad and Niger. A subway system and city rail are also being planned for Tripoli and Benghazi. More than five billion dollars in loans have been given to individuals to build their own dwellings in 2006-2007 [5].



These investments put a huge burden on the small Libyan economy, and future consequences are difficult to predict. Prices of cement and steel, for example, have increased recently. The cost of labor, which is dominated by foreign workers, has doubled in the last year. The aspirations and hopes are significantly greater than the construction capabilities of the country. This situation is similar to the conditions that existed in the early 1970s when the construction boom led to high construction costs and domination by foreign consulting experts and companies. There is an urgent need to restructure and modernize this industry such that local private construction companies can play the prominent role in order to avoid the problematic circumstances of the last decades.

## **6. SUMMARY AND CONCLUSION**

The construction industry in Libya has experienced several changes over the last fifty years. In the early 1950s, when funds were limited and the country was emerging from the Italian occupation, construction was of limited scale and value. In these early years, construction was considered a social activity. After the great construction boom of the 1970s, the building sector slowed down almost to a halt for nearly two decades.

Recently, the construction industry in Libya has been reemerging after a slowdown for nearly two decades. Billions of dollars are available to rebuild the country and its facilities. This task requires huge investments, materials and a stable economy. Whether the country's economy can sustain such activities remains to be seen. New policies and regulations are urgently needed. Moreover, privatization, modernization and integration of construction activities are needed tasks. Diversification in systems and materials of construction will relieve the industry of its complete dependence on cement-based materials that may be unsuitable for the dry, arid conditions of the Sahara desert of Libya.

## **REFERENCES**

- [1] Libya, GCP (General Council for Planning) (2002). Housing Policies: An Assessment of the Past and Present Conditions, and Suggestions for the Future, Government Printer, Tripoli, Libya.
- [2] Libya, GCP (General Council for Planning) (2003). The Follow-up Report on the Implementation of the Development Budget for the financial year 2002.
- [3] Libya, RCBMC (Research Centre for Building Materials and Construction) (2002). The Annual Report of the Prices of Construction Materials in the Libyan Market. Government Printer, Tripoli, Libya.
- [4] The Great Man Made River Project report 2006
- [5] [www.gpc.gov.ly](http://www.gpc.gov.ly) (Libyan government web site)