

CONSTRUCTION INDUSTRY
AND ITS ROLE IN LEBANESE ECONOMY

by

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"More than ever before, Lebanon stands
ready to face all challenges."

President Amin Gemayel

Baabda Palace

March 25, 1986

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Submitted to the Department of Civil Engineering
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ABSTRACT

The purpose of this study is to investigate the role of the construction sector and its main participants in the Lebanese economy. It comes at a time when the country as a whole is torn into bits and pieces and when, following eleven years of war, the economy is in shambles: the industrial sector is virtually crippled, the wheels of commerce are slowly grinding to a halt, and the national currency is fast becoming worthless.

In this tormented context, the construction sector, as will become apparent in the following pages, has incredibly maintained its resilience.

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TABLE OF CONTENTS

	<u>Page</u>
TITLE PAGE	1
ABSTRACT	3
ACKNOWLEDGEMENTS	4
MAP	5
TABLE OF CONTENTS	6
LIST OF EXHIBITS	9
INTRODUCTION	12
CHAPTER I. GEOGRAPHY	14
CHAPTER II. PEOPLE	17
2.1 Ethnic and Linguistic Groups	17
2.2 Religious Groups	18
2.3 Demography	19
CHAPTER III. ECONOMY	22
3.1 General	22
3.2 Impact of the War on the Lebanese Economy	27
3.3 Industry	31
3.4 Commerce and Services	36
3.5 Banking	39
3.6 Agriculture	41
3.7 Transportation	44
3.8 Work Force	45
3.9 Foreign Firms in Lebanon	47
CHAPTER IV. THE ROLE OF CONSTRUCTION IN ECONOMIC. DEVELOPMENT	51
4.1 The Construction Industry in the Middle-East	51
4.2 Construction's Role in the Economy	53
4.3 Construction's Contribution to Employment	55
4.4 Other Contributions	56
4.5 The Nature of Construction	56
4.6 The Structure of the Construction Sector	58
CHAPTER V. CONSTRUCTION INPUTS	60
5.1 Demand for Resources	61
5.2 Building Materials	63
5.2.1 Contribution of Building Materials to Economic Growth	63
5.2.2 Success Criteria for the Production of Building Materials	64
5.2.3 Types of Material Inputs	65
5.2.3.1 Cement	66
5.2.3.2 The Asbestos-Cement Industry	68

Table of Contents (continued)		<u>Page</u>
	5.2.3.3 Iron, Steel and Aluminium	68
	5.2.3.4 Wood	69
	5.2.3.5 Water	70
	5.2.4 Construction Materials Prices	70
5.3	Labor	71
	5.3.1 Labor Supply	71
	5.3.2 Labor Demand	73
	5.3.3 Labor Wages	73
	5.3.4 Labor Training	74
5.4	Equipment	75
5.5	Finance	77
	5.5.1 Owner's Perspective	77
	5.5.2 Constructor's Financing	78
	5.5.3 Commercial Banks Financing	79
	5.5.4 Public Financing	80
5.6	Land	82
CHAPTER VI. CONSTRUCTION PARTICIPANTS		84
6.1	Overview	84
6.2	The Professional Sector	85
6.3	The Consulting and Contracting Firms	88
	6.3.1 Consulting Firms	89
	6.3.1.1 Dar Al-Handasah Shair and Partners	90
	6.3.1.2 Dar Al-Handasah Nazih Taleb	92
	6.3.1.3 Associated Consulting Engineers	93
	6.3.1.4 Rafik El-Khoury and Partners	93
	6.3.1.5 Typical Roles and Fees of a Lebanese CEDO	94
	6.3.1.5.1 Roles	94
	6.3.1.5.2 Remuneration	96
	6.3.2 Contracting	97
	6.3.2.1 Overview	97
	6.3.2.2 Tendering	100
	6.3.2.2.1 Tendering Methods	100
	6.3.2.2.2 Bonds	102
	6.3.2.2.3 Tender Documents	103
	6.3.2.2.4 Subcontracting	105
	6.3.2.3 Major Contracting Firms	106
	6.3.2.3.1 Contracting and Trading Co. (CAT)	106
	6.3.2.3.2 Consolidated Contractors Co. (CCC)	110
	6.3.2.3.3 Kettaneh Freres	112
	6.3.2.3.4 Fares-Minefa, Hariri-Oger, Mokbel-Wayssand Freitag	113
	6.3.2.3.5 Zakhem International S.A.	115
	6.3.2.3.6 Almbani	118
	6.3.2.3.7 Societe Nationale d'Entreprise (SNE)	120
	6.3.2.3.8 Alfred Matta-Enterprise	120

Table of Contents (continued)

	<u>Page</u>
6.4 Other Participants	121
6.4.1 Technicians	121
6.4.2 Future Professionals	122
CHAPTER VII. CONSTRUCTION DEMAND AND OUTPUTS	124
7.1 Composition of Demand	124
7.1.1 Demand for Construction Type	124
7.1.2 Private Versus Public Demand	126
7.1.3 Geographic Distribution	131
7.1.4 Demand for New Construction Versus Maintenance Work	133
7.2 The Housing Crisis	134
7.2.1 Overview	134
7.2.2 Scope of the Problem	135
7.2.3 Proposed Solutions	137
CHAPTER VIII. THE REGULATORY ENVIRONMENT	140
8.1 Regulating Construction Activity	140
8.1.1 National Planning for Construction	140
8.1.2 The Construction Code and its Limitations	143
8.1.3 Relations Between Main Participants	147
8.1.3.1 Owners and Users	150
8.1.3.2 The Government as Client	151
8.1.4 Controlling Construction Work	153
8.1.4.1 Standards and Codes of Practice	153
8.1.4.2 Contract Documents and Tendering	154
8.2 Regulating Relations Between Participants and the Government	156
8.2.1 Company Formation and Registration	156
8.2.2 Taxations	157
CHAPTER IX. FUTURE PROSPECTS AND THE RECONSTRUCTION	162
EXHIBITS	171
REFERENCES	225

LIST OF EXHIBITS

<u>Exhibit Number</u>	<u>Caption</u>	<u>Page</u>
1.1	Lebanon's Principal Ethnic Groups.	171
2.1	Religious Composition of Lebanon	172
2.2	Projections of the Religious Composition of Lebanon	173
2.3	Evolution of the Lebanese Population	174
3.1	Deficit of the Ministry of Oil	175
3.2	Oil Production and Consumption	175
3.3	Geographical Distribution of Industrial Concerns.	176
3.4	Industrial Production and Export	177
3.5	Transfers of Lebanese Working Abroad	178
3.6	Repartition of the Country's GDP	179
3.7	Evolution of the US Dollar, 1975-84.	180
3.8	Evolution of the US Dollar, 1985	181
4.1	The Construction Sector: Interrelated Systems.	182
5.1	Input Factors for Typical Construction Projects	183
5.2	Typical Consumption Coefficients	184
5.3	Criteria for Building Materials Production . . .	185
5.4	Cement Production and Consumption.	186
5.5	Increase in Materials Price, 1974-77	187
5.6	Increase in Materials Price, 1984-85	188
5.7	Indices for Construction Inputs -- Individual Formulae.	189
5.8	Indices for Construction Inputs -- General Formula.	190
5.9	The Industrial Labor Force	191

List of Exhibits (continued)

6.1	Construction Participants and their Arrival Times	192
6.2	State of the Non-System of Arab Construction	193
6.3	Evolution of the Number of Engineers	194
6.4	Dar Al-Handasah Shair and Partners -- Major Projects	195
6.5	Projects Undertaken by Dar Al-Handasah Taleb	199
6.6	Major Projects Undertaken by Rafik El-Khoury and Partners	200
6.7	Specifications According to US and UK Standards	201
6.8	Profitability of a Contract from the Contractor's Perspective	202
6.9	CAT -- List of Key Staff	203
6.10	CAT -- Schedule of Construction Equipment	204
6.11	Multiplier Factors for Updated Values of Contracts	206
6.12	CAT -- Operation Profile	207
6.13	CAT -- Major Projects	208
6.14	Kettaneh Freres -- Major Projects	210
6.15	Oger Liban -- Manpower Distribution	211
6.16	Oger Liban -- Schedule of Equipment and Major Projects	212
6.17	Zakhem International -- Selected Clients and Financial Performance	213
6.18	Almabani -- Selected Projects and Financial Performance	214
6.19	Societe Nationale d'Entreprise -- Major Projects	215
6.20	Student Enrollment in Schools of Architecture	216

List of Exhibits (continued)

7.1	Model for Disaggregating Construction	217
7.2	Major Public Projects, 1960-1975	218
7.3	Average Prices of Land	219
9.1	Beirut Rehabilitation	220
9.2	The Reconstruction Expenditure Program	221
9.3	The Tunis Pledge	223
9.4	Major Reconstruction Loans, 1977-78	224

INTRODUCTION

The purpose of this study is to investigate the role of the construction sector and its main participants in the Lebanese economy. It comes at a time when the country as a whole is torn into bits and pieces and when, following eleven years of war, the economy is in shambles: the industrial sector is virtually crippled, the wheels of commerce are slowly grinding to a halt, and the national currency is fast becoming worthless.

In this tormented context, the construction sector has maintained its resilience, and all its components are present in Lebanon: local construction materials industries, professionals, contractors, consultants, clients, financing institutions, the legal system, and the specifications and classification systems.

This work is subdivided into nine chapters. The first two chapters constitute an approach to Lebanon and its people. The third chapter covers in detail each sector of the Lebanese economy, including industry. The role of construction in economic development is then reviewed. This is followed by a chapter on construction inputs, including materials, labor, and finance. Chapter VI covers the wide range of construction participants and gives a detailed account of the major Lebanese consulting and contracting firms. Demand and outputs are then examined, with particular attention to the housing problem. Chapter VIII is concerned with such issues as building codes, specifications, and taxation. And the final chapter is devoted to the reconstruction and to future prospects of the construction sector in Lebanon.

"The Lebanese construction industry is a formidable one," noted a

U.S. official. The following pages will hopefully succeed in confirming this statement.

I. GEOGRAPHY

The republic of Lebanon is an independent state located on the eastern shore of the Mediterranean Sea. Consisting of a narrow strip of land about 135 miles long (215 kilometers) from north to south and 20 to 55 miles wide (30 to 90 kilometers) from east to west, it is bounded to the north and east by Syria and to the south by Israel (34).

With an area of 3,950 square miles (10,452 square kilometers), Lebanon is one of the world's smaller sovereign states, and yet its physical geography is extremely complex and varied.

Four different physiographic regions may be distinguished: a narrow coastal plain along the Mediterranean Sea, the Lebanon Mountains (Jabal Loubnan), al Biqa (Beqaa) Valley, and the Anti-Lebanon and Hermon ranges running parallel to the coastal mountains. In parallel, the country encompasses three major types of historic communities: the Mediterranean coastal cities, the villages and towns of the mountains of the Lebanon range, the settlements of the flat farmlands of the eastern Beqaa Valley, and the northern plain of Akkar. The Mediterranean communities have consistently enjoyed close trade relations with other cities along the coast while the mountain villages and towns always provided a myriad of refuges for political and theological dissidents. Writing of the Lebanese mountains, Gilmour (82), quoting a famous historian, remarked that "the steepest places have been at all times the asylum of liberty." The Beqaa and Akkar, in turn, have long maintained close links with the inland cities of Syria as well as with the coastal areas and the mountains. Each of these areas also has tended to attract various types

of peoples. The Phoenicians first made the coastal cities famous. Then the Persians and the Romans, successively, settled in the coastal plain and the Beqaa Valley. As Christianity spread, the local pagan beliefs were gradually overtaken by allegiances to the Patriarchs. The military forces of Islam defeated Byzantine rule in the early 7th century, thereby binding the existing Semitic communities to the Arab world and promoting eastward-looking links which survive to this day. Over the following centuries the coastal cities, whose links with the surrounding Islamic empire were all-important, tended to house the orthodox -- whether the Orthodox Sunnis of Islam or the Orthodox Christians. From the 7th century onward, the mountains attracted both heterodox Muslims of the Shia sect (together with the followers of the closed Druze religion) and the heterodox Maronite Christians. In the 13th century, this latter group was distinguished by its attempts to forge links with Rome and Catholic France, ties which remain today. Today, Lebanon still serves as a refuge. However, this time it was the burgeoning cities of the coast rather than the remote mountain areas which attracted successive waves of political refugees: the Christian Armenians and Assyrians who have now been partially absorbed and granted nationality; the Muslim Kurds; and the Palestinians whose massive presence here has come to constitute a major factor in the country's politics (123).

The areas of concentration of Lebanon's principal ethnic and religious groups are identified in Exhibit 1.1 (132). Now, the country's major cities are (cf. map): the capital, Beirut (population 1.1 million); Tripoli (240,000); Sidon (110,000); Tyre (60,000), and Zahlah (55,000) (157).

Based on these figures, Chaya (46) observed that by the end of the

century the Greater-Beirut would have gained such gigantic proportions as to absorb the totality of the country, ultimately transforming it into what he called a huge "Libanville."

Minister Babikian (13), for his part, realized that the creation of these "belts of misery" around the major cities, and especially around Beirut, provided a huge human reservoir from which most fighters were recruited.

In this context, it is essential to note that Lebanon's geographic location has, nearly always throughout history, constituted a "de-facto" handicap for the country.

Right now it lies between Israel and Syria, and there has always existed a suspicion that Israel, on one hand, coveted the lands of the south and the waters of the Litani River, and that Syria, on the other, wished to maintain whole parts of the country under its sway.

Historically, Lebanon has been shaped by its location as the junction of the desert and the sea, of Asia and the Mediterranean, of Muslim East and Christian West, of Istanbul and the influence of Western powers, of French and British interests. It is not some remote mountaintop deep in an inaccessible jungle: it straddles routes of major persisting mercantile and strategic significance (4, 48).

II. PEOPLE

Lebanon has a heterogeneous society composed of numerous ethnic, religious, regional, and kinship groups. Primordial attachments and local communalism antedate the creation of the present territorial and political entity and continue to survive with remarkable tenacity. To this effect, Gilmour (82) notes that "In Lebanon, a man's loyalty goes first to his community. If he had to choose between that and the state, it is the state that generally loses."

2.1 Ethnic and Linguistic Groups

Ethnically, the Lebanese compose a heterogeneous group in which Phoenician, Greek, Byzantine, Crusader, and Arab elements are discernible. From the 7th century onward, there has been an influx of tribes from the Arabian Desert. While the dominant strain in the mountains is related to the Armenians of Asia Minor and the Caucasus, inhabitants of the coastal towns and the Beqaa Valley are descended from inhabitants of the hinterlands of Syria, Palestine, and Arabia (34). Arabic is the national language, but French and English are widely spoken, and many Lebanese are trilingual. About 5 percent of the population is Armenian-speaking, and the Syriac is used in the liturgies of some of the churches of the Maronites (Roman Catholics following an Eastern rite).

In this context, it is important to note that the literacy in Lebanon

is considered to be the highest in the Arab world, reaching 90 percent in the city of Beirut (69). Since the second half of the 19th century, intensive intellectual activity has flourished in Lebanon. Foreign missionaries established schools throughout the country. Beirut became the center of this renaissance with the American University of Beirut, founded in 1886, and the French St. Joseph's University, founded in 1875. Meanwhile, the formation of an intellectual guild gave a new life to Arabic literature after a period of lethargy under the Ottoman Empire. The new intellectual era was also marked by the appearance of numerous publications and by highly prolific press activity.

2.2 Religious Groups

In those instances where religious representation is institutionalized in the political system, it is of the utmost importance to know the size and other demographic features of the various religious groups (162). Perhaps the most distinctive feature of Lebanon's social structure is its varied religious composition. For many, this characteristic explains much of the country's tormented history. Others, such as Cobban (48), argue that if there were no sects, there would be no Lebanon. Both arguments, paradoxically, seem to hold. Historically, Lebanon has always served as a refuge for persecuted Christian and Muslim sects. From the mid-11th century onwards, five communities (Maronites, Shiites, Druze, Sunni Muslims, and Greek Christians) have been entrenched within the area of present-day Lebanon. Successive outside invaders came and went. Only these five major communities stayed on forever, with their relative strengths rising and falling according to changes in

demographic, social, and regional realities and the geographic boundaries between their spheres of influence shifting with "the winds of history" (48).

During the French Mandate preceding Lebanese independence, the French conducted two censuses, in 1922 and 1932, respectively. Since then, no official census has been conducted by the Lebanese government. The omission has not been an accident. As Murray (124) notes: "A result which exposed the present structure as built upon premises no longer valid could set up irresistible pressure for changes."

As a consequence, the religious composition of the Lebanese population was never ascertained. Indeed, the question of how to define the Lebanese population continues to be unresolved. The possibilities range from counting only those Lebanese citizens who reside permanently in Lebanon to counting all Lebanese citizens and their descendants regardless of place of residence (162). The Lebanese living abroad tend to be disproportionately Maronite and it has been estimated that there are close to 5 million Lebanese living abroad, compared to a maximum of 3 million persons in Lebanon itself (45).

In any case, fragmentary evidence suggests that Muslims now outnumber Christians; several past estimates, together with projections of the future religious composition of Lebanon, are provided in Exhibits 2.1 and 2.2.

2.3 Demography

As stated above, there has been no full census since 1932. Accordingly, the figures below (taken from various editions of the UN

Demography Yearbook (153)), give only an approximate picture of the reality of the Lebanese demography (population living in Lebanon). Note: all population figures are given in millions.

1962 = 2.11	1970 = 2.47	1977 = 2.76
1963 = 2.15	1971 = 2.54	1978 = 2.73
1964 = 2.18	1972 = 2.60	1979 = 2.70
1965 = 2.21	1973 = 2.66	1980 = 2.67
1966 = 2.24	1974 = 2.74	1981 = 2.65
1967 = 2.27	1975 = 2.77	1982 = 2.64
1968 = 2.34	1976 = 2.76	1983 = 2.64
1969 = 2.40		

From 1962 to 1967, the population increased by approximately 30,000 people per year. Between 1967 and 1974, a particularly prosperous period for the country, there was a population increase of about 65,000 persons per annum. Finally, from 1975 (when the war started) onwards, the population has been declining, partly because many Lebanese were killed and partly because many others left the country (the 1983 annual growth rate was approximately -0.3 percent). Although no official figures are available, fragmentary evidence suggests that more than 100,000 Lebanese have been killed and that approximately 600,000 persons have fled the country during the strife. For the sake of illustration, a graph showing the evolution of the population residing in Lebanon between 1975 and 1981 is provided in Exhibit 2.3 (26).

Not surprisingly therefore, an important brain drain has emptied the country of its human resources; this sensitive question will be dealt

with in greater detail in later chapters of this thesis.

Now, one of the most salient demographic features of Lebanon is the uneven distribution of its population. While the country has an overall density of more than 800 persons per square mile (or about 300 per square kilometer), density soars to about 69,000 per square mile (27,000 per square kilometer) in the Greater Beirut (34). Since the 1930s, the population of Beirut has increased ten-fold. By 1970, Beirut was one of the most overcrowded cities in the world, outside eastern Asia (82). This could be explained by the vast internal migration, of which two-thirds had been toward Beirut. Now, if the 1975-76 civil war led to a substantial return of people to their villages, the renewed fighting in the 1980s threw hundreds of thousands of persons out of their homes. As a result, an informed source (17) states that more than one-third of the Lebanese population is being relocated, Christians and Muslims being grouped into distinct zones.

III. ECONOMY

"There is a common belief, even among respected authorities, that the Lebanese economy defies all statistics and forecasts...." (12)

3.1 General

This chapter has two broad aims: the first is to describe the record of postwar economic development in Lebanon up to 1974, i.e., prior to the civil war of 1975-76, outlining some of its basic achievements and flows; and the second is to cast a look at the future in the aftermath of the war. Indeed, the two objectives are closely related, in that past performance should act as a guide for the future.

Until the starting of the clashes in 1975, Lebanon occupied a unique position as the de facto financial and commercial capital of the Middle-East. As briefed by Minister Cassir (41), the Lebanese economy rests on six supports:

1. Freedom of foreign-exchange transactions and secrecy of bank accounts
2. Geographical location of Lebanon
3. Private initiative
4. Friendly and commercial relations with most countries
5. Oriental and Occidental culture of the Lebanese
6. Entrepreneurship and experience of the Lebanese people.

Due to its location, Muslim-Christian population, and Phoenician and

Arab heritage of risk and adventure, Lebanon was once regarded as a bridge between the West and Near-East. At that time, people would describe the country as the Switzerland of the Middle-East and would speak of the Lebanese miracle. Pragmatically, Azhari (12) notes that the miracle wouldn't have occurred had considerable funds not been available due to extraordinary circumstances in the region.

First, World War II left the Middle-Eastern peoples with large amounts of savings due to excessive spending by the Allies. A major part of these savings was either spent in Lebanon or channeled through Lebanese middlemen.

Second, after the Israeli occupation of Palestine in 1948, Lebanon benefited from the shift of activity from the port of Haifa to Beirut and from a newly-acquired role as a petroleum terminal. Also, Lebanon benefited from an inflow of a great number of educated and experienced Palestinians (those were preceded by the Armenians earlier in the century). The Lebanese economy then benefited from the blockade of the Suez Canal from 1967 to 1974 which enhanced the position of Beirut as a transit port for the Middle-Eastern hinterland. In the period from 1963 to 1972, transit traffic already represented nearly nine-tenths of the country's foreign trade.

Third, the breakup in 1950 of the Lebanese-Syrian Custom Union widened the geographical basis and nature of the Lebanese trade from a limited bilateral relation with Syria to a multilateral relation with European and other countries.

Fourth, the expansion of the petroleum industry in the Arab Peninsula at the beginning of the fifties, and the increasing returns to Arab countries, created a large capital inflow which was mainly directed

to Lebanon for saving and investment in real estate, trade, tourism, and other services. The freedom of repatriating capital and profit contributed to place Lebanon in a favorable position vis-a-vis other Arab countries.

Fifth, a series of revolutions in the Arab world started in 1949 and caused a flight of funds out of these countries. The growth of Lebanon's deservedly renowned service sector grew largely out of the country's attractiveness as a safe and financially liberal refuge for capital fleeing political and economic chaos reigning in the Middle-East during the 50s and 60s. In 1954, Lebanon's position in this respect was enhanced by the abrogation of all restrictions on foreign currency operations (Government policy is to permit free exchange of currencies, precious metals, and monetary instruments domestically and in foreign trade). In 1956, a bank secrecy law was enacted which further stimulated the inflow of Arab capital (54, 123).

Finally, it is essential to note that the most important factor in Lebanon's impressive economic expansion remains a large supply of skilled entrepreneurs (see also: Work Force), a tradition embedded in the country's history and manifested among the largely successful Lebanese expatriate communities in many parts of the world (146).

Looking at the period 1950-1974 as a whole, the country's economic performance proves to be admirable. Instead of going out after business, noted the editor of the Engineering-News Record (69), Lebanon is attracting business to itself. More recently (February 1983), US Ambassador Dillon (54) described the country's market as being one of the most liberal in the world.

On the basis of available estimates, it seems that in the 1950s the

rate of growth in real terms averaged over seven percent per annum (82). In the 1960s and 1970s, the financial performance had been more impressive than in the 50s but the average rate of growth in real terms dropped, averaging about five to six percent annually in real terms. Further, Makdisi (106) notes that, viewed in the context of the performance of other developing countries, Lebanon's rates of growth, although decreasing in real terms, are considered highly satisfactory.

Another indicator of the country's prosperity is its high national income per person. It grew from approximately \$250 in 1974 (34) to \$1,200 in 1979 (58). To this effect, Gilmour (82) notes that Lebanon's per capita income was higher than that of every Asian country with the exception of Kuwait, Israel, Singapore, and Japan, and of every African country except South Africa and oil-rich Libya.

This was on the credit side of the picture.

Now, Azhari (12) identifies the two leading "strategies" of the Lebanese economy: the "laissez-faire" under its most archaic form on one side (this was a reflection of the country's traditional political pragmatism and democratic openness to its regional environment (64)), and a bunch of "providential" laws on the other. As a consequence, the Lebanese government, without adequate forecasting or planning policies, was always without strategies when a crisis would appear. Also, it was always blamed for ill-managing its resources and inefficiently using its assets. For example, there are too many government employees by far, notes Azar (11), and few of these really perform. Thus, Lebanon has one teacher for every seven students, a very high ratio. No one knows how many of these teachers teach, however. Some officials (81) went a step further by denouncing the corruption in the country and noting that in

Lebanon liberalism meant anarchy.

As an example, according to one economist, private business was evading three-quarters of its taxes while the men of liberal professions were paying as little as a tenth of the money due from them (92).

Another strain on the finances of the country is the non-collection of custom duties and the non-payment of bills (water, electricity). As far as power is concerned, the State loses 1.25 Lebanese pound per kilowatt produced. In 1985, the production was 3.25 billion kwh, or in other words, a loss of 4 billion Lebanese pounds (61).

Another striking example of the prevailing anarchy: According to the Dean of Engineering at the American University of Beirut, only five percent of the architects putting up the new buildings are properly qualified (83).

A further drawback of the Lebanese economy is that the country's development is marked by widening disparities among income groups, geographical regions, and economic sectors. This uneven pattern of economic development was first highlighted in the IRFED survey (89) conducted in the early sixties.

Thus, according to one source (85), Lebanon's laissez-faire economy brought in a great deal of capital that never reached the poorest elements of society. Slowly, the country became an economic pyramid, with large gaps separating the few wealthy at the top from the many poor at the bottom.

To this effect, Professor P. Khoury (101) noted that in 1970, 50 percent of the GNP was distributed over only 5 percent of the population.

Added to this dismal picture were high inflation in the early 70s (approximately 25 percent (157)) and wages that did not keep pace. After

1973, when oil prices climbed, petro-dollars came pouring into Beirut, adding to the upward pressure on prices. For a poor Lebanese, or one on a fixed salary, the situation became quickly intolerable. In 1974, the disenchantment materialized in labor disputes -- fifty strikes in one thirty-day period (85).

3.2. Impact of the War on the Lebanese Economy

In attempting to assess the economic impact of the war, one major constraint is the non-availability of reliable estimates of the damage which was sustained by the Lebanese economy. Moreover, by the time this paper is read, renewed fighting would have resulted in additional destruction of housing, infrastructure, and industrial and commercial establishments in most areas of the country.

Nonetheless, the drawing up of a meaningful picture of the effects of the war can still be undertaken. These have manifested themselves in many interconnected areas and in various tangible and intangible forms which might be categorized as follows (106):

1. Severe and widespread damages to physical assets, and therefore, existing capacity of production, e.g. damage to factories, farms, business establishments, public utilities, etc. In 1984, US Ambassador Bartholomew (14) estimated the damage at about \$33.2 billion (cf. Reconstruction).
2. Drop in national income owing to (a) damage of physical capacity, (b) disruption of the transportation network of domestic and foreign

trade channels, (c) departure of business firms and capital (cf. Foreign Firms in Lebanon), (d) reduced governmental and private expenditures.

As a result, a World Bank publication (165) gives the following figures:

<u>GDP (Average Annual Real Growth Rate, in Percent)</u>		
<u>1950-60</u>	<u>1960-70</u>	<u>1970-early 80s</u>
2.6	4.6	-5.4

The negative entry in the table is explained by the above factors.

At the eve of civil war (1975), the GDP was about \$3.2 billion (58). In 1977, it dropped to \$2.6 billion (157).

In 1983, a general mood of optimism was enhanced by the unusually assertive Western support for the peace process in Lebanon, which generated greater confidence in the country's future and thus in its economic recovery. As a consequence, the GDP for 1983 again reached \$3 billion (158). However, the GDP, although not accurately quantified, was reckoned to be decreasing ever since (41).

3. Drop in the level of employment and exodus from Lebanon of the labor force (cf. Work Force).

4. Adverse intangibles -- in particular: (a) loss of confidence on the part of the private sector, (b) loss of human resources, and (c) changed distribution of asset holdings as a result of physical destruction and/or pillage.

5. Adverse financial developments manifested in (a) in the reduction of central banking activity to a minimum level, (b) temporary closure of a number of banks, and (c) increased inflationary pressures (discussed below).

6. The rupture of administrative set up, ministries and public bodies ceasing to function as unified organs.

Nonetheless, El-Khazen (64) notes that the economic situation could have been worse were it not for the flexibility of the Lebanese economy to adjust to changing market forces, and, more importantly, to various socio-economic dislocations provoked by the war since 1975. Were it not for that element of economic flexibility, a decade of instability would have resulted in even more devastating consequences than the ones that have already taken place.

However, the picture changed drastically in early 1984 when the war shifted from the political and military fronts to the socio-economic fronts. Today, Lebanon's economy is showing unprecedented signs of strain, and the country's performance in many ways approximates that of a classical Third World country (high unemployment rate, increasing inflation, large deficit, and depressed exports) (64).

The rate of inflation, to start with, was estimated, in late 1985,

to be around 70 percent (before the war it was typically around 2.5 percent (164)). The deficit of the balance of payments, in turn, amounted in 1985 to \$1.5 billion, and many economists suggest this figure be multiplied by a factor of 10. Finally, the "Direction Centrale de la Statistique" blew the whistle when comparing an average salary in Lebanon (7,000 Lebanese pounds or \$400 at November 1985 rate, and \$180 at June 1986 rate) to the \$1,000 an unqualified worker earns in the United States (136).

As it can be seen, the economic situation seems to be deteriorating daily. For the first time since World War I, the population is showing unprecedented signs of strain in coping with the prevailing situation. Thus far, the government's action seems completely crippled by a host of external constraints and internal dissensions.

Corrective measures, when taken at all, would come too late, which magnified the problems and made the task of economic recovery extremely difficult. Among these measures was the decision to lift the fuel price subsidy. To this effect, sources (41) and (78) noted that this unpopular measure was aimed basically at limiting the drain on public foreign exchanges reserves which, in 1985, reached an equivalent of 8 billion Lebanese pounds (Exhibit 3.1). The decision stems from a will to restore real prices and reduce wasteful consumption of fuels, which became all the more imperative after the depreciation of the Lebanese pound which inflated the LL value of the fuel import bill (\$700 million for 1985).

Higher fuel prices were understandably resented by consumers but the measure was meant to reduce fuel imports and domestic consumption. There are two ways of reducing the country's oil bill: an energy-saving policy, or higher prices. In the current circumstances, the state cannot

adopt or enforce an energy-saving policy. Therefore, raising fuel prices seemed the only possible alternative.

Cancelling the fuel price subsidy was an unpopular measure indeed, but the need to rescue the Lebanese economy calls for painful choices. These choices would still have to be made even if the war came to an end; they would then be somehow less painful. If peace were restored, the country would still have to deal with either the economic or the social crisis. Without peace the nation stands to confront both crises simultaneously.

As a consequence, while waiting for better days to come, Lebanese are learning to adapt to a poorer life.

In the following paragraphs, each economic sector will be reviewed separately. However, as noted by Tasso (151), the general picture of the Lebanese economy cannot be obtained by simply combining the "shares" of its various sectors, since there are so many "invisibles" and other side effects that can never be quantified. The analysis that follows should therefore be viewed in that spirit.

3.3. Industry

In most countries, developed or developing, industry performance falls short of the expectations of government and of society in general (63). This fact is particularly true in Lebanon where the safe, fast, and sizeable returns of the commerce and services sectors diverted most funds from the inherently "risky" industrial sector.

The development of industry in Lebanon is fairly recent. The introduction of large quantities of foreign products in the Middle-East

during the 19th century had actually curbed down the activities of a flourishing Lebanese handicraft industry. Thus, only in the past forty years has the country experienced conditions favorable to industrial development.

The creation of an economic union between Lebanon and Syria in 1922 is considered to be the starting point of the Lebanese industry. The outbreak of World War II and the ensuing close of all maritime channels effectively stimulated the Lebanese industrial community. All imports came to a halt, hence the population needs combined with large orders sent by the armies stationed in the country ensured a full capacity of industrial work with substantial gains. These profits contributed to the enlargement of existing industries and the creation of new ones: petroleum refineries, industrial machinery, foodstuff, textile, and glass industries. The growth of the industrial sector continued at a fast rate after the end of the war. Today industry fills the second place in the Lebanese economy, behind the services and trade sector. The most important industries are: foodstuff, textiles, cement, metallic minerals, wood and metal products, and oil refining (111, 123).

But an important gap remains in the field of industrial management. Perhaps the most significant obstacles to long-run economic and social progress are the lack of effective administrative and planning institutions.

Thus far, the government has paid little attention to the industrial sector, and corrective measures, when taken at all, would come too late, magnifying the problems and making the task of economic management in later years extremely difficult.

However, under the sustained pressures of the Association of the

Lebanese Industrialists, in March 1971 a five-year plan was approved by the government. Also, by virtue of decree 2351 dated December 10, 1971, a National Bank for the Industrial and Touristic Development was created. Its main goal was to sustain the development of these two sectors (38). Both these actions remained largely insufficient, and Lebanese industry has literally had to survive by itself. Its role in the economy was always subservient to commerce, partly because of a shortage of raw materials and partly because the free trade policy which suited commercial life effectively prevented many industrial ventures from getting off the ground. The Industrialists' Association fought hard for higher tariffs, but was invariably defeated by the far stronger commercial lobby. If there is a market for something in Lebanon, then it is imported, irrespective of the fact that Lebanese industrialists might be trying to manufacture and market a similar product (82).

The industrial sector is also facing problems related to the population and the size of the country. The small Lebanese population implies a limited domestic market, which means that industrialists cannot take advantage of any economies of scale unless they are primarily export-oriented. The size factor therefore dictates to a large degree what type of economic development is possible, and means that, in the absence of any regional economic integration, heavy industry for example would seldom be a viable proposition. Instead, light industries, with their low overhead costs, appear to be a more appropriate alternative, as the least cost unit of output can be manufactured on a small production run (123).

However, the refining of imported crude oil seems to be the exception to the rule, since it constitutes a major portion of the

Lebanese industry. Because of the country's advantageous geographical location, two pipeline systems connect Lebanon to the oil-rich Arab hinterland: (a) The pipeline system from the Kirkuk fields in Irak via Homs to the terminal at Tripoli in Lebanon (and Banias in Syria) consists of three separate pipelines with a total annual capacity of about 55 million tons. Throughput in 1975, the last full year of operation, amounted to 48.4 million tons to Homs and from there 27 million tons to Banias and 19 million tons to Tripoli. (b) The Trans Arabian Pipeline Company (Tapline) from the Abu Hadriya fields in Saudi Arabia to the terminal at Saida in Lebanon consists of one pipeline with annual capacity of approximately 25 million tons; throughput in 1974, the last full year of operation before the Lebanese civil war, amounted to 11 million tons.

The reduction in local production led, as expected, to substantial oil imports (Exhibit 3.2) at high costs, which created the dramatic crisis discussed above.

In this context, it is worth noting that in April 1975, the Ministry of Industry and Oil announced that commercially workable oil reserves had been discovered in the Akkar plain, the western region of the Al-Beqaa Valley, and in the Mayruba area near the central coast. Bids for concessions were posted pending the end of the war (34).

Typically, between 1960 and 1975, the industry mobilized about 25 percent of the work force:

Industry as % of Work Force (source 165)

<u>1960</u>	<u>1965</u>	<u>1970</u>	<u>1975</u>
23	24.5	25	26.2

As discussed above, the industry was steadily expanding until the start of the clashes in 1975. As naturally expected, the industrial sector was hit very hard by the war. The Lebanese Industrialists' Association estimates that 80 percent of factories and workshops which are still operating -- perhaps more than 3,000 establishments -- have dismissed more than half their employees (14). The combined effect of this huge dismissal and the voluntary exodus of tens of thousands of workers was a drop of about 60 percent in the industrial work force (28). Another source (54) discloses equally alarming figures whereby the number of industrial workers is believed to have dropped from a peak of 125,000 in 1975 to 50,000 by 1978-79.

Now the destruction of most industrial areas, especially in the Greater Beirut where about 70 percent of the industrial concerns are located (Exhibit 3.3) had a dramatic impact on the national economy. In all, production is reported to have dropped by 70 percent (14).

The situation of the Lebanese industry has somewhat changed after late 1984 when the Lebanese pound depreciated drastically vis-a-vis the US dollar and other foreign currencies (see Banking). The only positive effect of this depreciation was, as noted by the Minister of Economy (41), an increase in the industrial exports, since the price of Lebanese products was becoming more and more competitive.

Thus, as noted by Babikian (13), the industry benefited from an indirect and substantial subsidy. This new element had an immediate impact on the share of the industry in the Gross Domestic Product of the country. Until 1983, it was typically around 15 percent (41, 99, 157). Today, due to the above factor and to the erosion of other sectors

(commerce, services, and agriculture), Khayat (99) estimates it at approximately 40 percent and considers that industry in Lebanon is finally about to assume its role as a dynamic and leading sector of the economy. Exhibit 3.4 shows the value of production and effective export between 1974 and 1984.

3.4. Commerce and Services

The country has a centuries-old tradition as a trading nation. At one time it was considered the commercial center of the Arab world. Until 1974, trade continued to reflect the mercantile character of the Lebanese economy. Almost anything for sale anywhere could have been purchased in Beirut. An enormous propensity to consume generated a huge trade deficit (see below), which was covered partly by "invisible" items such as foreign remittances and transit and tourist services.

Also, trade has been encouraged by generally low tariffs, by various facilities offered by foreign (US and European) exporters (2), and by free port area, which accommodates a large volume of duty-free transit trade and provides facilities for the warehousing and processing of imported goods before their shipment to final destination (7). As mentioned above, one major weakness of the Lebanese economy is the permanent deficit of the balance of trade, which was continuously sustained by remittances from Lebanese working abroad, principally in the Arab states. Exhibit 3.5 shows the transfers of Lebanese working abroad up to 1982. Except for the period of the civil war (1975-76) and for the renewed fighting in 1978, the transfers have been increasing steadily. In 1983, Azar (11) estimated that 200,000 Lebanese were working in the

Arab countries, and they remitted to Lebanon approximately \$150-200 million a month. Since then, due to the general slump in the Arab economy on the one hand and loss of confidence in the country's future on the other, this major source of income dried up rapidly (Sarkis (144) estimates that drop to be as serious as 80 percent). As a result, the deficit of the balance of payments (for the second time since independence, the first time being 1984 (41)) amounted in 1985 to \$1.5 billion and many economists suggest this figure to be multiplied by a factor of ten (136).

In the early 70s, the exports "covered" only a third of the imports (112). The gap further widened during the last several years, and recent IMF statistics (88) show that in 1983, the imports amounted to Lebanese pounds 17.7 billion whereas exports amounted to only Lebanese pounds 3.9 billion. In the same context, Lissan-ul Hal (105) published statistics (October 1985) whereby the exchanges between Lebanon and Turkey, for example, are in a ratio of 1 to 100.

The sharp decrease in Lebanese exports is due mainly to a general decline in the economic activity in the country and to the loss of much of Lebanon's traditional market, particularly Saudi Arabia and Irak. US Ambassador Bartholomew (14) notes that exports to Saudi Arabia decreased as a result of the restriction on the import of goods from or via Lebanon for fear that they may have been generated in Israel. Moreover, the Kingdom restricted its imports from Lebanon to the products of only 177 factories, out of a total of more than 4,000 Lebanese industrial concerns.

As far as work force is concerned, various sources (e.g. 7, 41, 112) agree that about one-fourth of the Lebanese work force is involved in

trade.

In the sixties and seventies, trade and services contributed to more than two-thirds of the country's GDP, or in other words generated more than twice the yield of all other economic sectors combined (Exhibit 3.6; sources 7, 41). This situation remained almost unchanged during the war since the country has literally survived from its imports. However, because of the erosion of the Lebanese pound vis-a-vis other currencies and the subsequent major role played by the industry in the Lebanese economy (this zero-sum game between trade and industry was discussed also in previous sections), the share of the trade and services sector in the GDP (1985) was only about 40 percent (41).

In the same context, other factors tend to indicate that the merchant class might lose its dominant position. For example, there is the stiffening opposition that the Lebanese trading middleman is meeting in many Arab countries. The Arab world is finding it can live more and more without Beirut. As a city of commerce and entertainment, it once outclassed on all levels any other center in the region. But its rule in the 60s and early 70s might not be repeated in the 80s. One alternative, Bahrain, is already boasting one of the largest offshore banking centers in the world. The Gulf, as the focal point of oil interests, is learning to serve itself, with accommodation, communications, and commercial services. Even the entertainments are improving there. Business is moving east. Finally, serious efforts are made to divert the import-export and transit trade from the Beirut port to Lattakia in Syria and Akaba in Jordan (123).

A last drawback, as far as internal trade is concerned, was identified by Abi-Saleh (2). More than ever before, competition is

(counter-intuitively) tending to increase prices. This is so because reduced sales and higher fixed costs, given a desired profit margin, naturally dictated higher selling prices.

3.5. Banking

Various factors have combined to make Beirut the financial center of the Middle-East and one of the largest free foreign-exchange markets in the world. Fundamental to Beirut's appeal as a financial center has been the stability and convertibility of the Lebanese pound and the absolute freedom in foreign exchange transactions. Lebanese banks accept deposits in practically any currency, and no problems are involved in moving funds into and out of the country.

The total secrecy of bank accounts is strictly enforced. Theoretically and legally money from the outside can seek refuge in Lebanon regardless of what its sources, be they legitimate or unethical. Another attraction that creates confidence in Lebanese financial transactions is the great extent to which banks live up to the commitments they make to their customers. Added to this are the very few demands made on incoming foreign capital in terms of taxes and other tolls, along with the concurrent high interest rates offered (125).

Until 1964, banks were totally unregulated. There was no special banking law, no central bank, and no restriction whatsoever on the opening of new banks. No rules governed minimum reserve ratios and banks were not even asked to produce regular balance sheets. This situation led to the creation of many small banks (in 1951 there were five banks in Beirut -- fifteen years later there were 93 as well as a large number of

branches of foreign banks (87)).

Together with Hong Kong, Lebanon can claim the largest number of separate banks per capita in the world (7). In October 1966, a banking crisis was precipitated by the collapse of the largest Lebanese-owned bank, the Intra Bank, which accounted for about 40 percent of deposits with Lebanese-owned banks. This crisis led to the adoption of a number of laws designated to deal with the situation and to provide the legal basis for banking reform. As a consequence, the number of registered banks was limited to 92 (94).

The resilience of the Lebanese banking system has, after ten years, amazed many observers. (As an example, the consolidated balance sheet of banks in Lebanon increased eight-fold between 1978 and 1984. Even though the effect of inflation and depreciation is taken into consideration, this increase remains, in real terms, substantial (94). Also, in 1981, the ratio of the consolidated balance sheet of Lebanese banks to the Gross Domestic Product was equal to 231 percent as compared to 40 percent in France, 54 percent in the USA, and 120 percent in Switzerland (22).) Its disintegration today will surprise few. Exhibits 3.7 and 3.8 show the evolution of the US dollar on the Lebanese market between 1975 and 1985. Except for 1982 when a general mood of optimism generated greater confidence in the country's future, the Lebanese pound has been declining and then sharply dropping against all major currencies. The causes of this rapid deterioration in the value of the currency are not difficult to identify. In addition to the chronic political instability and general economic slowdown, one can name: excessive government spending, irresponsible monetary policy, increasing national debt, growing balance-of-payments deficit, widespread speculation (64), impossibility

to obtain a new (or even the already promised) foreign aid, government policy arbitrarily favoring one sector of the economy (commerce and services) to the detriment of others (industry and agriculture), etc.

As stated by Sarkis (144), today should have been better prepared yesterday. Confidence in the national currency was further undercut in reaction to the Central Bank's loss of credibility in the last two years. As explained by its governor (126), the Central Bank's (dualistic) policy is to maintain the parity of the pound on one hand (which means the selling of some of its reserves) and to preserve precisely these reserves for worse days, on the other.

On the credit side of the picture, Chaib (44) notes that continuing instability in Lebanon has created strong incentives for Lebanese bankers to expand abroad. Thus, by 1983, thirty Lebanese banks were established abroad. This helps sustain the profitability of banks, while enhancing general confidence in the banking system. It also facilitates the return of capital from foreign sources to Lebanon once the reconstruction process begins.

3.6. Agriculture

Roughly a quarter of the country's land area of approximately 4,000 square miles is suitable for agriculture (7). Much of this agricultural land consists of man-made terraces on the steep slopes of the Lebanon mountains. About half the farm acreage is located within the Beqaa Province in the semi-arid valley between the Lebanon and Anti-Lebanon mountain ranges. Soils are generally poor, and a long dry summer season makes irrigation imperative for intensive cultivation.

As far as output is concerned, the combination of topography, climate, and irrigation has made possible the production of a wide variety of crops, of which the most important by value are fruits and vegetables. A large portion of this output is exported, primarily to Arab countries.

Aware of the unfavorable situation confronting many farmers and of the need to raise agricultural productivity and output, the government has gradually modified its laissez-faire attitude. Its most important realization is the formulation of a "Green Plan" (1964) to restore neglected land and to promote reforestation. In addition to the aid of international agencies, such as the United Nations Development Program and the Food and Agriculture Organization, Lebanon has undertaken a number of projects involving land reclamation, irrigation, and the introduction of new crops and better farming methods. It has also promoted the formation of farmers' cooperatives, instituted some farm price supports, and helped finance the sale of some products abroad.

As a result, between 1965 and 1985, 22,000 hectares of land were improved, reservoirs with a capacity of 5.5 million cubic meters and roads with a total length of 950 kilometers were constructed (9).

Still, performance falls short of expectations. The share of agriculture in both the work force (WF) and the GDP has been declining steadily.

Agriculture as a % of WF and GDP (sources: 41, 157, 165)

	<u>1960</u>	<u>1965</u>	<u>1970</u>	<u>1975</u>	<u>1980</u>	<u>1983</u>
% WF	38	28.2	20	15	11	10
% GDP	11.5	11.6	9.1	9	8.7	8.5

The main cause behind this phenomenon is that the fast and sizeable returns from trade and services have drained most of the primary and secondary sectors' work force. The second factor is inherent to the war, in that the agricultural sector has been very hard-hit by the occupation of many regions of the country -- notably the south and the Beqaa Valley -- by foreign forces. A large portion of the agricultural production could not be collected and marketed due to the security situation and the continuing occupation in many parts of Lebanon. Numerous hectares in south Lebanon have been destroyed by Israeli forces for "security" purposes, and Israeli products were dumped on the Lebanese market. The closure of the Beirut-Damascus Highway, the major route for Lebanese agricultural exports to the Arab world, further damaged this key sector of the economy. Lebanese farmers have also been hurt by internal transportation problems due to the arbitrary closure of roads by occupation forces.

Transportation difficulties such as these have raised transport costs to farmers by as much as 300 percent.

Finally, the uncontrolled entry of Israeli agricultural products into Lebanon has pushed Saudi Arabia and the Gulf countries to place restrictions on Lebanese agricultural exports to prevent the entry of

Israeli produce into their markets. In early 1984, Saudi Arabia placed a total ban on goods from South Lebanon. The ban was later partially lifted (14).

However, the agricultural situation is bound to improve and the resilience of this essential sector will quickly reassert itself as soon as the military conflict has come to an end.

3.7. Transportation

a. Road Transport

There are two international freeways, the Beirut-Damascus Road and the north-south coastal road. In all, the network is about 7,100 kilometers long (58). The road system dominates Lebanon's transportation demands, carrying more than 97 percent of both passengers and freight.

b. Rail Transport

All Lebanese railroads became state-owned in 1960. The total route length is about 335 kilometers (93), divided into three lines: Beirut-Rayak-Serghaya (88 kms); Nakoura-Beirut-Tripoli (190 kms); and Tripoli-Akkar/Rayak-El Qaa.

The major disadvantage of the Lebanese railways is their division into two systems of different gauges.

c. Air Transport

In normal times, Beirut International Airport constitutes an important junction between the West and the Near-East for both passengers and freight. There are two Lebanese airlines, Trans Mediterranean

Airways (TMA) and Middle-East Airlines (MEA), both based in Beirut. According to its President (143), MEA's losses amount to one-million Lebanese pounds daily. TMA, in turn, has suspended its flights and the chances of a resumption of operations are slim (78).

d. Sea Transport

Beirut was, in the late 60s and early 70s, the most important port in the Middle-East. According to one source (59), the traffic has, in 1974, reached the admirable figure of 4.1 million tons. More recent publications (134) revealed that the daily revenues had fallen to 75,000 Lebanese pounds, as compared to one million Lebanese pounds in normal times. However, the three other ports of Tripoli, Jounieh, and Saida remain relatively busy.

3.8. Work Force

One of Lebanon's most valuable assets is a large supply of skilled entrepreneurs, a tradition embedded in the country's history and manifested among the largely successful Lebanese expatriate communities in many parts of the world (146).

Among the common characteristics of the work force are versatility and a distinct preference for urban occupations. Entrepreneurial and employment opportunities are quickly recognized and, if such opportunities arise, the Lebanese readily change occupation. This may also involve moving from one economic sector to another (7), or even leaving the country if necessary. Professor Moavenzadeh (114) states that "developing nations offer too few incentives for new graduates to

remain in their native lands or return from oil-rich or industrialized nations where they can earn high salaries." Because of the war, this situation became particularly true in Lebanon and an important brain drain has emptied the country. In this context, it is worth noting that emigration has always constituted Lebanon's "instinctive" response to the unemployment problem. Although in peacetime the unemployment rate was comparatively low, Lebanese of all communities shared a positive attitude toward emigration, not only as a way of securing employment for basic survival, but as a quick means of generating wealth (64). The war further depleted Lebanon's work force and, as shown in the following table, the figures are dramatic.

Depletion of Lebanese Work Force

<u>Sector</u>	<u>Total</u>	<u>Emigration (%)</u>
Medicine	3,200	55
Engineering	4,000	48
Law	2,600	45
Industry	65,000	70
Construction	40,000	45

(source: 26)

In all, the Lebanese work force, evaluated at approximately 650,000 (157), has lost almost a third of its potential (11, 41).

Each sector's share of the work force has been reviewed in previous sections of this chapter, and it appeared that during the last several

years about 25 percent of the work force is involved in trade, 10 percent in agriculture, 25 percent in industry, 7 percent in transport and communication, and 33 percent in other sectors of the economy.

Finally, it is important to note that the war generated its own source of employment: militia recruitment, which attracted a large number of those who came of age during the war. It ensured a steady income for those young people who either lacked sufficient working skills or education, or simply were unable to find a job either in Lebanon or abroad (64).

3.9. Foreign Firms in Lebanon

By far the most important factor in attracting foreign firms are the relative stability of the general political, social, and economic conditions and the prospect of earning a profit without relying on special government favors (90).

Lebanon has always been a favorable ground for foreign firms. Already in 1957, nearly 100 American firms had branches or offices in Lebanon (69). The 1974-75 edition of the Middle-East Financial Directory listed some 400 US business concerns with regional offices in Beirut. The 1980 edition showed only 90 such companies. However, according to Chesterman (47), these figures might be misleading.

In 1975, however, the picture changed drastically. "Political events," says Kabin (102), "are more likely than ever before to affect the achievement of the international firm's objectives." Brennen (33), in turn, defines political risk as the possibility of any discriminatory action that results in a financial loss. Therefore, serious risks of

war, expropriation, and currency inconvertibility drove most foreign firms out of the country. Until the end of 1975, about ten US design and construction firms, plus ten American construction equipment manufacturers, maintained offices in Beirut, along with approximately forty such European and Japanese firms. Bechtel, Inc., San Francisco, decided to bail out of Beirut. With 100 employees, it probably had the largest US construction-related office. A chartered truck convoy moved its equipment through the desert to Kuwait. De Lew, Cather International, Inc. (Detroit) told its non-Lebanese workers to go "anywhere they can get an airline ticket to" (70).

In 1977, when things returned to normal, the then-Minister of Public Works, Mr. Amin Bizri, declared that the most likely approach to undertaking major reconstruction projects was through joint ventures made up of Lebanese and foreign companies (71). To this effect, Vernon (160) notes that almost a third of foreign subsidiaries in developing countries have been established through the acquisition of going businesses. In an attempt to attract foreign investors, the government of Lebanon established, under legislative decree number 3 of January 19, 1977, the National Organization for the Guarantee of Investments, to insure new investments against the risk of war and general civil disturbances including civil war, revolution, sedition, and public acts of violence. At a premium of two per thousand, the facility compensates losses exceeding five percent of the total insured amount. The organization is attached to the Ministry of Finance, and its liabilities are guaranteed by the state. Incredibly, it has since 1977 honored every one of its debts and agreements (11, 47).

On the other hand, there are a number of US government agencies that

provide a variety of assistance programs to American companies interested in dealing with developing nations:

- OPIC: The Overseas Private Investment Corporation provides political risk insurance to US investors in new or expanding businesses in developing countries.

- EXIM: The Export-Import Bank is a government agency that receives funding directly from Congress, as opposed to most other agencies which fall under the umbrella of the International Development Corporation Agency (IDCA). EXIM offers its program if there exists a "reasonable assurance of repayment." EXIM and OPIC have opened their programs widely for Lebanon, says Azar (11). There are no ceilings, and there are no limits.

- AID: The Agency for International Development administers most of the foreign assistance programs of the US government.

- TDP: The Trade and Development Program was established in 1980. All TDP-sponsored activities must meet the dual criteria of development benefit to the host country and trade benefit to the US. Chesterman (47) concludes by saying that "as might be expected, it is impossible to obtain any kind of information about ongoing programs for Lebanon."

On the other hand, Azar (11) believes (1983) that there have been twelve American banks represented in one way or another in Lebanon; all but one of these are still there. A partial list was provided by

Ambassador R. Dillon (54) to the US Department of Commerce (November 1982). It includes: Bank of America, Chase-Manhattan Bank, Citibank, Morgan Guarantee Trust Company (through Bank al-Mashrek), Chemical Bank, Continental Development Bank, and Manufacturers Hanover Trust. A number of worldwide insurance companies and auditing/accounting firms also maintain offices in Beirut.

In conclusion, and as was demonstrated throughout this chapter, the Lebanese economy does possess the potential, vitality, and human resources that will ensure a quick recovery once the military conflict has come to an end.

IV. THE ROLE OF CONSTRUCTION IN ECONOMIC DEVELOPMENT

4.1 The Construction Industry in the Middle East

The construction industry in both developed and developing countries may be viewed as that sector of the economy which, through planning, design, construction, maintenance and repair, and operation, transforms various resources into constructed facilities (118).

From ancient times until the Industrial Revolution, construction was universally regarded as a great technological achievement. The Seven Wonders of the Alexandrian era were all products of this technology.

Construction is, of course, one of the oldest of human industries, the origins of which are deeply rooted in the ancient Middle East. The art and science of construction have remained alive in the Arab world through the millenia. Unlike the new sciences of electronics and computers, the technology of construction is directly understood by the population, and its social relevance is fully acknowledged.

Until a few centuries ago, the population of the Arab world enjoyed a mastery of arts and technologies associated with well-known forms of civil works. Terracing, dams, private and public buildings, city planning, city defences, "qanats" for irrigation in arid zones, were all splendidly constructed; the surviving structures still attract serious study and the tourist. But during the past three centuries, enormous technological advances in civil works have been made in the industrial countries. Most of these advances were associated with the revolutions in machinery, transportation, agriculture, waterworks, shipping and

harbors; in the erection of massive and large industrial complexes; and in the improvements of the standard of living; all of which call for improved public health and recreational facilities and urban planning.

The efforts deployed by Muhammad Ali of Egypt (among others) during the first half of the nineteenth century to initiate a similar process failed to induce a take-off. After that, most of the Arab world came under different forms of foreign domination which tended to stifle any national creative efforts and further reduced the ability to close the growing technology gap. It was not until after World War II that the Arab States began to acquire political independence. By then the technology gap in construction, as in other areas, had increased even further. In 1945, for example, very little construction activity was undertaken by Arab engineers, architects, or firms. Roads, dams, harbors, airports, railways, and other substantial public works were generally designed and constructed by foreign firms. French and British firms were responsible for most construction projects in the Arab world.

The seeds of change which had been planted in Egypt, Lebanon, and Syria during the nineteenth century grew with time. The technical schools of the nineteenth century were succeeded in the twentieth century by national universities. Moreover, study in European universities had been pursued by a handful of young Arabs in the nineteenth century. During the inter-war period, increasing numbers of Arab businessmen, entrepreneurs, and national banks dedicated to national reconstruction emerged. Their efforts paved the way for rapid growth once political independence was acquired (167).

4.2 Construction's Role in the Economy

It is fairly normal in discussions on the role of the construction industry to begin by stressing its importance to the general prosperity of the national economy.

However, a quantitative study of the construction industry is rendered difficult by the lack of accurate, detailed, and comparable data.

This is due in large part to the diverse nature of the industry in terms of, for example, its large size; fragmentation; geographic and product-type dispersion; reliance on a labor force, materials, and equipment which are widely used by other industries; and its association with numerous ancillary industries. In developing countries in particular a fluctuating demand market, which may be distorted by single but large projects and construction's sensitivity to political and economic uncertainty, impair statistics, along with the fact that it is difficult to determine the contribution of the non-monetary sector of construction. These difficulties are further compounded by the general lack of statistics on developing countries and the problem of incomparability of data collected. Nonetheless, enough statistics are available to draw tentative conclusions, particularly about the significance of the construction industry and its role in the economy.

In all cases, the construction industry has been recognized as a major economic and technological activity in all countries irrespective of the level of development and the GNP. One source (116) goes a step further by stating that construction is the prerequisite of economic development and growth.

The economic size of the construction industry varies from country to country. In most industrial countries, 40-70 percent of gross fixed capital formation is attributed to construction. In developing countries the World Bank estimates that 70 percent of all development investments end up in construction. In the Arab world, where investments in construction vary enormously from country to country, the share of construction in total investments is generally high and near 60 percent. Construction also accounts for an important proportion of a country's GDP: the more developed the country, the higher the proportional contribution of construction to domestic product (116, 167).

In developing countries, this contribution is typically in the range of 3 to 8 percent (117). In Lebanon, it was 4.5 percent in 1970 (110) and 5 percent in 1972 (57).

Compared to those of developed countries, these figures may seem on the low side. Not surprisingly therefore, Edmonds (62) reveals that the share of the developing nations (comprising two-thirds of the world's population) in the world construction output is in the order of 15 percent.

Fortunately, the situation is less dramatic in the Middle-East where 34 percent of the construction in the world in 1984 occurred. For this portion, about 40 percent of the works have been undertaken by US firms (115). As far as Lebanon is concerned, several sources (e.g., 121) seem to agree that 8 to 12 percent of the country's annual budget is spent for construction purposes. Also, from 1964 to 1972 approximately 60 percent of private fixed investment was channeled into the construction activity (123).

In an attempt to quantify the construction activity in Lebanon, an

informed source (112) recognizes that no accurate figures can be given but rather certain indicators (cement production, imports and production of steel, number of construction permits, etc.) suggest that the building activity developed during the 1960-1970 decade at a rate of 7 to 8 percent per annum. Another source (38), in turn, claims that this increase was around 19 percent between 1970 and 1971. The most striking aspect of these statistics is their variability and their range. To this effect, it was reckoned (118) that the "lack of accurate, detailed and comparable data on almost all aspects of construction activities has been a major difficulty in performing a quantitative analysis of issues facing the industry."

4.3 Construction Contribution to Employment

The construction industry is an important source of employment opportunity in developing countries. On average, this sector accounts for approximately 5 percent of total employment. In Lebanon, it is typically around 6.5 percent (112). "The large numbers of unskilled workers which the industry employs provides empirical support for the claim that construction has great labor absorptive capacity. Also, wage rates in the sector tend to vary commensurate with the skill levels of the bulk of the workforce: as the economy develops, the sector becomes more sophisticated and its skill composition is upgraded" (117).

Typical wage rates and the "mix" labor/equipment in the construction process are covered in a subsequent chapter entitled "Construction Inputs."

4.4 Other Contributions

Construction plays a significant role in the non-monetary sector of developing countries, particularly the least developed ones. This sector, alternately referred to as the "informal" sector, is understood to be the unorganized and unregulated segment of the economy. Omitted from most official national accounting, too little is known about its operation, despite its importance (117).

More than anywhere else, the "informal" sector is very active in Lebanon and its invisible effects remain largely unquantifiable (151) (see "The Regulatory Environment").

4.5 The Nature of Construction

The construction industry is perhaps the only industry in which the responsibility for the design and production of a product is split. Split not only in terms of practical work but also as various legal systems enshrined in documents such as the conditions of contract, the specifications, and bills of quantities.

Construction differs from other industries in several other major ways: production is primarily on site rather than in a plant; there is no possibility to inventory products, thus preventing opportunities for leveling and streamlining production processes; production is often highly seasonal and subjected to climatic uncertainties (117).

Further factors contribute to set construction apart from many other industries, among which are: the characteristics of construction products, including their custom-built nature, immobility, costliness,

complexity, and continuously-changing technology. Most construction activity is initiated by sources outside the industry itself, which enters the picture to begin production only after the customer has determined his need for a facility and has decided to produce it. In this respect construction is very much like a service industry (116, 118).

This "service-like" situation, combined with other factors, has kept the construction activity in Lebanon from sinking with other sectors of the economy. To this effect, construction in Lebanon benefits from favorable circumstances (16), among which are:

- The demand is increasing (especially as far as housing is concerned) in a market where the supply is extremely scarce.
- Because of the nature of the works, project owners do not support any extra costs, including running wages, in the event of work stoppage.
- Construction wages are low as compared to wages in other sectors.
- Because of the war, construction contracts, unlike other contracts, may allow some extension of time for completion.
- Project owners have the latitude of increasing selling prices to account for real costs.

For these reasons, many industrialists started to consider orienting their activities toward construction.

Further, as an extreme case, the same source (16) suggests that old and/or idle industrial firms should themselves undertake construction projects on their own properties.

Nonetheless, after two prosperous pre-war years, construction

endured severe setbacks and is still suffering from the chronic lack of security in the country.

As briefed by sources 121 and 123, the problems faced by construction are the following:

- The severe recession plaguing the country, meaning that funding cannot keep up with the need for infrastructure investment
- The sharp increase in construction input prices (such as land, materials, labor).
- The flight of unskilled and predominantly foreign (Syrian, Egyptian, and Palestinian) manpower out of the country; Lebanese contractors are increasingly having recourse to workers from the Far East, a fact that is causing productivity and communication problems.
- The restriction set up by the Central Bank of Lebanon on the loans granted for undeveloped land purchases, together with the increase in interest rates as of mid-1979; in late 1985, these were typically around 21 percent for construction loans.

Note: The above issues will be discussed in greater detail in subsequent chapters of this thesis.

4.6 The Structure of the Construction Sector

In order to form a comprehensive picture of the construction sector, Riedel and Schultz (140) suggest that first one should conceive the building materials industry as being closely linked to construction activity. Second, the combined construction and building materials industries should not be seen in terms of physical production only, but

also in their connection with and dependencies on planning and decision-making processes which have strategic effects on the scope and orientation of physical output. Third, one should take into consideration the relationships and interests of all those various actors being involved in this sector, such as ministries and other public institutions, foreign and domestic engineering and design consultancies and contractors, the building materials industry, and trade, as well as financing institutions.

From this point of view, the construction sector is understood as a comprehensive system that includes various interrelated subsystems, as presented in Exhibit 4.1. Each of the major subsystems (inputs, outputs, participants, and the regulatory environment) will be dealt with separately in subsequent chapters of this thesis.

V. CONSTRUCTION INPUTS

Construction industries in all developing countries need such basic resource inputs as building materials and supplies, labor of various types and levels of skill, equipment, land, and finance.

The bulk of the direct investment in construction is towards the cost of equipment, materials, and direct labor. Generally, these items consume about 80 percent of project cost (167). Also, the intermediate consumption of materials and supplies ranges from 37 to 55 percent of the total value of construction output while wages and salaries paid to construction labor accounts for another 19 to 27 percent (117).

Indeed, the debate on the proper mix has been ongoing for some time. The manner in which equipment, materials, labor, and land are combined to achieve a specific purpose can take numerous forms.

In any construction project, a large variety of operations must be undertaken. Some of these may be performed either by national workers equipped with relatively simple equipment, or by imported heavy machinery and few workers. Most developing countries suffer from chronic shortages of foreign exchange and from the unemployment of their unskilled manpower. The execution of projects with high equipment intensity (low labor intensity) is thus limiting. Yet many developing countries opt for the utilization of methods of construction that constitute a drain on their foreign reserves and contribute little to the generation of employment. Extreme solutions (maximum labor and maximum equipment intensity) appear to be uneconomical, and the optimal mix of resources in any given construction project will be determined by a wide range of

variables including country, stage of development, the relative prices of labor versus materials, and above all project type (117, 167). To this effect, Cassimatis (40) estimates that, depending on the nature of the project, materials, labor, and equipment account for 32 to 54 percent, 22 to 39 percent, and 1 to 24 percent of construction costs, respectively (Exhibit 5.1).

In the following sections the demand for resources will be analyzed, then a qualitative and quantitative study of the various construction inputs will be presented.

5.1 Demand for Resources

As described by the Science and Engineering Research Council (147), the demand on construction is fickle and defies rational predictions. As with demand for construction itself, accurate figures on the demand for resources, especially in Lebanon, are difficult to obtain.

In order to avoid bottlenecks in the construction activity, the ability to anticipate and plan for fluctuations in demand for construction materials is crucial. As reckoned by sources 117, 119, and 139, several factors influence demand for building materials.

Indirect influences are exerted through the construction sector which purchases the goods. These influences include per capita income, distribution of income, investment patterns, credit policies, funding sources, and political risk and uncertainty.

There are also certain factors which directly affect demand for building materials, among which are: the composition of construction and output (residential, non-residential, and other civil engineering

structures, etc.), the changes in construction technology and/or production technologies of building materials themselves (which affect demand through pricing and product substitution), the competing demand from sectors other than construction, and in some cases, government intervention. (In Egypt and Lebanon, the government controls not only the price but also the supply and distribution of cement. In Lebanon, cement being an important commodity, it has consistently been under government control. On several occasions drastic measures had to be taken, such as the prohibition in June 1977 of all cement exports, in order to satisfy the local demand (39, 123).)

On the other hand, substantial work has been done to estimate consumption or usage coefficients for various construction materials. For example, the brick consumption coefficient was reckoned (119) to be related to that of cement consumption. Booz, Allen and Hamilton, in their 1977 study (32), suggested a coefficient of some 490 bricks per ton of cement.

In Lebanon, coefficients for most materials are generally not available or reliable. For the purpose of quantity surveying, therefore, the Lebanese professionals have to resort to various publications (see, as an illustration, Exhibit 5.2) with the obvious risks for the indices of not being accurate, relevant, and/or comparable.

Lastly, it should be noted that building materials are likely to become a scarce resource since their demand in most developing countries is expected to triple by the Year 2000 (114).

5.2 Building Materials

Building materials are the most essential resource of construction. As the sector's major supplier, they contribute between 50 and 60 percent of construction output (156).

Building materials also predetermine the type of technology and levels of capital and labor which can be employed in construction.

5.2.1 Contribution of Building Materials to Economic Growth

(a) Building materials play an important role in the growth of manufacturing in developing countries. Yet it is difficult, for two reasons, to establish the precise share of manufacturing which building materials contribute. First, manufacturing output is rarely disaggregated in a form suitable to ascertain the precise production levels of materials destined exclusively for building. Second, certain materials appear more than once in production statistics at various stages of processing, such as cement, which is counted as such, and again in concrete pipes (117).

To this effect, Abi Saleh (2) noted that about 70 percent of manufacturing output in Lebanon is related in one way or another to construction.

(b) While in developing countries building materials contribute only 3 to 5 percent to GDP, they account for 5 to 8 percent of the total value of imports. On the export side, some success has been achieved, but still imports far outstrip exports (117).

The disparities between import and export (Lebanese market) shares (1977, source 15) are particularly pronounced for mineral products (import share/export share: 5/1), wood and woodwork, cork and corkworks (8/1), and metals and metal works (5/1).

5.2.2 Success Criteria for the Production of Building Materials

In order to evaluate production problems, a UNIDO publication (156) measures the degree to which a number of selected criteria affect the production of certain building materials.

For this purpose, sixteen criteria have been selected:

1. Distance from source to factory
2. Water requirement
3. Fuel costs
4. Electricity requirement
5. Minimum size of market
6. Reliability of process
7. Adjustability of process to market demand
8. Plant maintenance
9. Supervision/quality control
10. Storage facilities
11. Skilled labor
12. Production per man-hour
13. Packaging cost
14. Value/weight ratio
15. Handling for delivery
16. Cost of delivery

As noted by an informed source (121), criteria 5 to 9 (at least) argue somewhat substantially against the production of building materials in Lebanon. Further, electricity is becoming a major constraint since its supply is irregular and increasingly expensive (24). Finally, the recent lift by the government of the subsidy on the cost of fuels has dramatically overpriced industrial products (2).

Another source, in turn, proposes a second set of criteria, among which are, besides technical, financial and marketing ones (Exhibit 5.3).

Both sets of criteria eventually suggest that Lebanon, with obviously some exceptions (cf. upcoming sections) doesn't gather ideal conditions for the production of building materials.

5.2.3 Types of Material Inputs

Construction involves excavating, moving, handling, mixing, shaping, and arranging large quantities of materials. These materials consist of industrial products such as cement, steel, glass, and paint, as well as non-industrial products such as gravel, sand, water, and stone. A qualitative and quantitative study of these inputs will be presented in this section.

As noted by Zahlan (167), material inputs are of two types: industrial and non-industrial. The industrial products used in construction fall into six major categories:

- metal fabricated products: heating and cooling systems, elevators, other
- non-metallic mineral products: cement, ceramics, tiles and glass are

the main components of this category

- wood: timber products of all kinds are important to construction. In recent years, iron, aluminium, and glass have been displacing wood as materials for window frames and doors. Steel pipes are also displacing wood in scaffoldings.
- metal: steel rods and bars, metal fittings, and pipes
- chemicals: these are used for waterproofing, insulation of walls, paints, and varnishes
- all other

Sand, gravel, water, and stone are examples of non-industrial inputs. Lebanon, as noted by Abi Saleh (2), has an eclectic industry and produces almost the entire spectrum of building materials. This production is supplemented by imports from abroad to satisfy the requirements of the market. In the following paragraphs, several material inputs will be reviewed. Much of the literature hereinafter is based on the work of Murad (123), the most comprehensive analysis of the Lebanese construction industries the author could encounter.

5.2.3.1 Cement

The cement industry is one of the oldest and most important industries in Lebanon. Together with the refining of imported crude oil, cement manufacture is virtually the only significant indigenous heavy industry in the country.

On the other hand, the problems that affected its performance during the past two decades also influenced with slightly different orders of

magnitude several other construction materials industries. As a consequence, this industry proves to have a strong correlation with the construction activity in Lebanon.

The cement industry has greatly succeeded in adapting its production capacity, as regards both quality and quantity, to the requirements of the prosperous construction industry of Lebanon, and it has likewise developed a good export potential. The good quality of the clay and limestone deposits of Chekka (Batroun -- cf. map) used in the Lebanese cement product contributed to establish its deserved reputation.

The "Societe des Ciments Libanais" (SCL) was established in 1929 in Chekka, on the coast between the two major Lebanese towns of Beirut and Tripoli. About twenty years later, the increase in the demand for cement and the success of SCL incited others to follow its example.

The "Cimenterie Nationale" was established in 1953, then in 1961 the "Societe Libanaise des Ciments Blancs" was registered. The latter produces the so-called white Portland cement used primarily by the tiles/marble industry for architectural purposes. Later, in 1974, the "Ciments de Sibline" was registered, but production did not begin until the present day due to political problems.

SCL, the major producer, was established in 1929 by the Maronite Patriarchate and a French group. In 1933, a Swiss group replaced the French group and holds, to the present day, the majority of shares.

Until 1966, the annual production was about 600,000 tons but it later reached 1,800,000 tons when two kilns were added.

Until the end of 1983, 7,000 tons of cement were distributed daily, but this figure has dropped to about 4,500 tons per day.

Typically, 25 percent of the production was exported (mainly to

Syria, Irak, and Jordan), but after 1980 the exports dropped (Exhibit 5.4) when the price of Lebanese cement was no longer competitive due to the sharp increase of energy and labor costs. Indeed, in Lebanon itself at one time, imported cement would be substantially cheaper than local cement (Lebanese pounds 312 per ton versus Lebanese pounds 355 per ton) (3). Also, as suggested by Zahlan (167), the cement industry in Lebanon experienced the severe problem of stockpiling since, because of the war, production (9.7 million tons between 1974 and 1980) far exceeded consumption (6.4 million tons for this same period).

5.2.3.2 The Asbestos-Cement Industry

There is at present one modern mill in Lebanon engaged in the production of asbestos-cement and products therefrom: The "Eternit" Company, established in 1951 and located in Chekka (Batroun). The expansion of this industry on the basis of a highly varied and quality production program has not failed to draw attention abroad, as is evidenced by increasing exports (up to 80 percent of production) to a large number of countries (Syria, Saudi Arabia, and mainly Iraq where 60 percent of the production was sold). As might be expected, the war in Lebanon and that between Iraq and Iran have dramatically affected the firm's situation.

5.2.3.3 Iron, Steel, and Aluminum

These industries supply a large variety of structural elements for construction. The Arab states, including Lebanon, have since the 1950s

been aware of the need to develop an industrial capacity in iron, steel, and aluminum since the early 1950s.

The "National Iron and Steel Manufacturing Company" produces items such as sanitary fittings, pipes, manhole covers, radiators, cement grinding balls, and reinforcing bars. As for "Consolidated Steel Lebanon," it has diversified its products from reinforcing bars initially, to such items as steel wire, welded wire fabric, trellis work, and angles. "O.K. Kassardjian," in turn, has developed the quality and diversification of its products. The company produces high quality cock mixers, joints, plumbing, and sanitary accessories.

As for aluminum works, "Elcir," "Sciale," "Sidem," and "Ajax" enjoy reputations that go beyond the domestic market. These companies benefited from an increased adoption of aluminium in construction (e.g., windows, doors, curtain walls, balustrades, interior partitions, rolling shutters).

All the above products remain in heavy demand, although to a lesser extent, both in Lebanon and abroad.

5.2.3.4 Wood

The wood industry is relatively well developed in Lebanon. Its main products are: panels, particle boards, veneer sheets, and plastified plywood. They are used in several construction subsystems such as doors, windows, frameworks, and kitchen equipment.

5.2.3.5 Water

Lebanon's water resources are substantial and exceptionally large compared to neighboring countries in terms of annual rainwater quantities and distribution of the hydrographic network.

In a brief overview of the Lebanese terrain, one source (112) writes the following: "Calcareous materials occupy two-thirds of the country, which explains both the surface aridity and the huge hydrological reserves that make Lebanon a gigantic reservoir."

5.2.4 Construction Materials Prices

In Lebanon, since 1960, prices of construction materials increased slowly and steadily but were on the eve of 1972 at acceptable levels. The heavy demand necessitated by the construction boom of the 1972-74 period created a substantial jump in prices (123). On the other hand, the rise of oil prices after 1973 caused an increase in transport costs of imported construction materials. Talking about transport, Zahlan (167) notes pertinently that existing information often fails to specify whether the cost of materials includes or excludes delivery to site.

The outbreak of the civil war completely deregulated the pricing of construction materials. Large increases and huge fluctuations characterize the situation for the past eleven years. Some of the changes were caused by the declining purchasing power of the Lebanese pound and increased transport costs and insurance premiums. Imports of construction materials were not regulated by the government and hence were subject to market speculation (123).

As a result, the price of construction materials increased dramatically, and it was estimated that between January 1984 and December 1985 this increase amounted to 142 percent (Exhibits 5.5 and 5.6).

As naturally expected, the contracts for new construction projects contain provisions for the increase in prices. Exhibits 5.7 and 5.8 contain several formulae for the computation of the relevant coefficients and indices.

5.3 Labor

Labor is the second most important input to the construction industry in Lebanon; only building materials represent a greater expenditure.

Manpower inputs occur at two distinctive points in the construction process: in the staffing of the consulting engineering design organization (CEDO) and contractors; and at the construction site (167).

In this section most of the study will be devoted to the latter category, leaving the uncovered topics to a later chapter of this thesis, entitled "Construction Participants."

5.3.1 Labor Supply

Accurate statistics on the total number of workers employed in construction and on their distribution by type of occupation are either unavailable or unreliable. The estimation of Lebanese and non-Lebanese manpower is also difficult and involves numerous inaccuracies.

Prior to 1975, manpower availability and inexpensiveness constituted

a major argument favoring a heavy industrialization of the country. To this effect, the number of persons engaged in the construction activity ranged between 50,000 and 60,000 (or about half the industrial labor force -- Exhibit 5.9), most of which were expatriate Syrians or Palestinians (2). Much has been written and said about negative Lebanese attitudes to manual labor. No meaningful field studies on the subject have so far been undertaken. Zahlan (167) suggests that among the factors that have influenced these attitudes toward manual work are:

- Until recently, manual workers received lower wages than did clerical workers. It stands to reason that an intelligent person would opt for the more profitable career.
- The opportunities available to Arab youth to develop their manual skills are extremely limited and there is therefore a wariness when confronted with simple tools.

As a consequence, ensuring an adequate supply of construction labor is extremely difficult.

Further factors have also contributed to exacerbate the problem (117):

- The minimum full-time staffs carried by most construction firms as a hedge against uncertainty of demand
- A large agricultural sector which demands self-employed and wage labor during a few critical periods -- sowing, transplanting, harvesting
- The migration of construction workers to rapidly developing

oil-producing countries of the Middle-East. This migration has resulted in rising wage levels for those who remained.

As a final pitch, the civil war has depleted Lebanon of its human resources. It is estimated that 150,000 skilled, semi-skilled, and unskilled workers have left the country since 1975, most of whom were engaged in the construction sector (19).

5.3.2 Labor Demand

As with building materials, substantial work has been done to estimate the demand for labor.

Since usage coefficients are generally unavailable in Lebanon, statistics from various sources and countries must be used for the purpose of quantity surveying.

5.3.3 Labor Wages

The share of labor costs is considerably lower in developing than in developed countries, despite the greater number of workers employed in the labor-based construction typical of developing countries where construction wage rates are at times as little as 5 to 10 percent of those offered in the industrialized countries (117). Despite the increase in wages, this fact is becoming particularly true in Lebanon with the decline of the value of the Lebanese pound against major currencies, especially the U.S. dollar.

In this context, it is interesting to note that in the period

1972-74, wages for unqualified workers increased by 90 percent, and by 140 percent for qualified workers. They further increased by 100-300 percent between 1974 and 1977, and by approximately 80-100 percent between 1977 and 1985. Currently, a foreman earns Lebanese pounds 180 per day, which at the June 1986 rate of exchange (Lebanese pounds 45 to one U.S. dollar) corresponds to a daily wage of 4 U.S. dollars.

5.3.4 Labor Training

Manpower training is a critical issue for the construction industry in developing countries. The major means of construction skill acquisition in developing countries is through informal training on the job or through a more traditional form of apprenticeship (117).

Several problems exist with this kind of training program. For instance, the program focuses exclusively on the training of semi-skilled workers, despite the shortage of highly skilled laborers. Furthermore, the program does not adequately cover site management and supervision training; effectually ignored is training for trades foremen, site engineers, and clients representatives on issues of control and supervision (119).

This factor, among others, caused an unprecedented lack of supervisors and foremen on the Lebanese sites (150).

The same source, together with source 117, explained that construction firms are generally reluctant to invest in labor training, fearing that once trained, and having had sufficient experience, newly skilled workers, under no obligation to them, may leave.

It is clear, therefore, that efforts to improve the training

program, currently inadequate, are desperately needed, especially since demand for labor will continue to be high.

5.4 Equipment

Engineering industries manufacture three inputs for construction (167): (a) the equipment utilized in buildings, i.e., air conditioning systems, heating systems, water pumps, elevators; (b) the industrial plants to manufacture inputs, such as cement, iron and steel, glass, ceramic products, pipes, and electrical supplies; (c) the construction plant: the tools and equipment utilized on the construction site such as tower cranes, bulldozers, concrete mixers, trucks, scrapers, etc.

The first type of engineering products is essential to utilizing the structure but is not considered as construction equipment: it is included under materials as "metal fabricated products"; the second type is normally omitted in discussions of the construction industry because the cost of the industrial plants is included in the cost of the materials. The third type of engineering products constitutes the traditional construction equipment.

Equipment is brought into service through one of four channels: (a) it is a product of the local engineering industry; (b) it is directly imported; (c) it is part of the service that the contractor is providing and the equipment is temporarily for local use; or (d) portions of the "construction" are performed outside the country and the prefabricated product imported.

In Lebanon, the domestic manufacture of construction equipment is still limited and accounts for a small share of the site construction

fleet.

Channels (b), (c), and (d), in turn, are very common. Now, since most of the construction equipment is in the hands of the private sector's contractors, a detailed account of the construction fleet will be presented in Chapter VI, titled "Construction Participants." For now, it is important to realize that almost all kinds of equipment are found in Lebanon: earthmoving and excavating, piling, concrete plants, lifting equipment, road making plants, pumping, compressed air, generators, welding, transport equipment, and others.

The levels of equipment needed are extremely difficult to ascertain, yet the costs are extremely high for carrying too much or too little equipment.

While the effects of under-capitalization are apparent in the inability of the sector to execute certain projects, thus forcing either the cancellation of these projects or their contracting to foreign firms, the effects of carrying too much equipment, also, can be detrimental, if in less obvious ways. Thus, equipment supply and utilization (reflected in depreciation expenditures) is a function of the demand for construction, and further, of the project type. In heavy construction, about 18 percent plus-or-minus 6 percent of the cost goes towards equipment; in simple, small-scale residential construction only about one percent of the cost is attributed to equipment (117, 167). See also Exhibit 5.1.

The increase in labor and materials prices, discussed above, stimulated the introduction of new construction techniques with the frequent utilization of huge and cost-effective operating equipments. The acquisition of such equipments will decrease unit construction costs.

It will probably also lead to a multiplication of the number of projects since the amortization of these assets requires a large volume of work (123).

5.5 Finance

5.5.1 Owner's Perspective

The lack of adequate finance from external and domestic sources constitutes a major constraint to the development of the construction sector in developing countries (155).

It is a fact that availability of financial institutions providing adequate funding is a crucial input to construction. In Lebanon, most of the construction activity is undertaken by small- to medium-scale firms of the private sector. Thus according to Azar (11), the problem is that banks have been reluctant to provide credit to the small-scale entrepreneurs because they have never really had the experience in extending that credit. This statement is further confirmed by Anderson (8), who states that small industries in developing countries have little access to the resources of the organized financial sector.

Unlike some Western European countries whose construction activity is dominated by the public sector (e.g., the United Kingdom, France, and Holland), the construction activity in Lebanon has always been the concern of the private sector. Its financing emanates either from personal funds, internal funds, or mortgage loans from commercial banks.

The distribution of real estate/construction investments indicates equally important contributions of personal funds and commercial bank

loans, and reveals the minor role of public investments in this sector.

The major sources of personal financing are Lebanese funds and foreign funds. Lebanese funds represent savings of nationals living at home or abroad. Foreign funds are those remitted by Lebanese emigrants living in the Americas, the Middle-East, and Africa, and other foreigners (1, 123).

5.5.2 Contractor's Financing

In the first part of this section it was pointed out that the owner supplies or secures financing for the construction project. This should not be confused with the contractor's capital itself, which finances the operating deficit created by the shortfall between owner payments and the necessary expenditure on materials, equipment, and payroll. Even in the best of circumstances, contractors are almost universally paid in installments over the period of construction on the basis of work completed, and the percentage of work completed is normally deliberately underestimated by the client. Moreover, a portion of the payments due to the contractor is almost always withheld as a guarantee against poor workmanship, hidden defects, and similar faults which might be discovered only after project completion (117).

In Lebanon, the contractor is normally entitled under FIDIC (79) to the value of the work done up to the end of each month, less a specified retention sum -- usually 10 percent. In addition to the value of work done up to the date of valuation, FIDIC allows payment to be made to the contractor for a portion (usually 75 percent) of the unfixed materials he has brought to the site.

These difficulties are more or less characteristic of the construction industry everywhere, but for small contractors in developing countries they are often compounded. Unlike developed countries where suppliers often extend short-term credit, in Lebanon materials and supplies may have to be paid for on delivery or even in advance. Payment from the client may be unreasonably delayed, even when the client is the government (117). To this effect, the Syndicate of the Lebanese Contractors once threatened to boycott the government, and more particularly the Ministry of Public Works (65). In addition, equipment rentals which would reduce capital requirements are non-existent and equipment purchase and repairs are expensive, especially because spare parts must be imported (117).

Other factors which impose financial difficulties and risks for contractors, including the universal requirements for bonds and insurance, will be dealt with in Chapter VI, "Construction Participants."

5.5.3 Commercial Banks Financing

Commercial banks do not favor loans for construction and industrial purposes because they require more capital investment and are less profitable than are loans to commercial users. Indeed, banks charge the latter higher interest rates (already high for the construction sector where they can reach as high as 22 percent), plus commission for the different services performed by the bank on behalf of commercial users. From the borrower's point of view, it is also impractical to borrow from a commercial bank because of the many restrictions imposed. Commercial banks expect a borrower to refund the amount at the maturity

date, which usually does not exceed two years. Once the amount is refunded, a second loan may be authorized. This revolving credit technique leaves the borrower uncertain about the duration of the loan and hence deprives him of the basic advantage of financing. Furthermore, most Lebanese banks grant facilities to the client and not to the project. In other words, the decision to grant or reject a loan is based on the moral reputation and guarantees of the client and not on the profitability or feasibility of the project. Only a few banks have specialized departments to study and determine the profitability of industrial projects. Also, at the present time, only three private banks specializing in long-term credits are operating in Lebanon (123).

5.5.4 Public Financing

The Lebanese government has participated in the creation of jointly-owned private/public banks specializing in long-term financing. The Societe de Credit Agricole et Industriel du Liban (SCAIL) was founded in 1939 by the Banque de Syrie et du Liban. Unfortunately, bad management caused its liquidation in October 1965. Two other specialized financial institutions jointly owned by the government and private concerns were then created: the Banque du Credit Agricole, Industriel et Foncier (BCAIF) in July 1954, and the Banque Nationale pour le Development Industriel et Touristique (BNDIT) in December 1971. Also in December 1977, the Housing Bank was created to help develop the real estate sector. These institutions were established to provide medium- and long-term credits with low interest rates to the agricultural, construction, and touristic sectors.

As far as multinational institutions are concerned, several were based in Beirut, among which are:

- Banque d'Investissement et de Financement SAL (INFI). Established in 1974. Function: to provide medium- and long-term financing for projects in the Middle East.
- Arab International Finance Company (ARINFI). Established in 1974. Purpose: to provide general corporate finance advice with respect to projects in the Middle East and elsewhere.
- Banque Franco-Arabe d'Investissements Internationaux (Frab-Bank). Established in 1969. Function: to mobilize funds from Arab surplus countries to finance projects in Arab deficit countries and elsewhere.
- Arab Finance Corporation. Established in 1974. Functions: management underwriting and placing of international bond issues; lending operations; foreign exchange operations (159).

Unfortunately, the banking potential described above could not satisfy the totality of the economy's financing needs. Credit, when available, would be largely insufficient (e.g., the largest loan extended by the Housing Bank does not exceed Lebanese pounds 300,000 or about US\$7,000) (23, 123, 128).

Consequently, public and commercial banking institutions should give priority to the industrial and construction sectors commensurate with their strategic importance to the economy.

5.6 Land

Land is an obvious resource in the supply of construction but one that is extremely difficult to manipulate (117).

As a rule of thumb, land in Lebanon constitutes about 30 percent of the construction cost (121) but of course several factors (e.g., zoning; degree of exploitation; location: land prices are almost always highest in primate and coastal cities; extraordinary constraints: sometimes sales made under the pressure of fear were concluded at very low prices, as well as those concluded out of the immediate need for cash) do affect that figure.

As will become apparent in later chapters of this thesis, the politics of land tenure exercise an important influence on construction's ability to satisfy demand.

For now, it is important to note that real estate and undeveloped land speculation, which is very popular in Lebanon, is exacerbating the housing problem to be discussed below.

As noted by Murad (123), the post-war success of this activity originated from various factors. These include:

- the scarcity of alternative investment opportunities,
- the stable value of land in case of political trouble,
- the available capital of Lebanese workmen and businessmen residing in Arab Gulf countries,
- the fast and huge 60 to 100 percent profits expected from the real estate and undeveloped land market,
- the absence of a value-added tax.

These factors contributed to make underdeveloped land, to the detriment of serious housing needs, the main shelter for capital investments against war losses and inflation.

In conclusion, having reviewed the basic resource inputs -- building materials, labor, equipment, land, and finance, it is clear that Lebanon's construction sector does have the potential to face a promising future.

VI. CONSTRUCTION PARTICIPANTS

6.1 Overview

"Lebanon needs assistance and resources, but as far as human resources and the ability to do things, there are few peoples in the world more capable of doing" (11).

This statement is confirmed by an article in the Engineering-News Record (69) whereby the literacy in Lebanon is considered to be the highest in the Arab world, reaching 90 percent in the city of Beirut.

If it is true that almost a third of the Lebanese work force is in the industry (15), it is not less true that only a fifth of this portion (or 6.55 percent in all) (15) is in the construction sector (112).

On the other hand, Moavenzadeh (114) states that developing nations offer too few educational opportunities for people who seek managerial and technical expertise, and too few incentives for the graduates of existing programs to remain in their native lands or return from oil-rich or industrialized nations where they can earn higher salaries. Because of the war, this situation became particularly true in Lebanon and an important brain drain has emptied the country.

In an unclassified report to the U.S. Department of Commerce, Ambassador Dillon (53) wrote, in November 1983, the following: "We have looked at the labor situation in Lebanon as it affects construction projects -- carpenters, equipment, operators, mechanics, electronics, welders, plumbers, etc., are now hard to find." Statistics published by Azar (11) show that, during the period between 1975 and 1977, half the

industrial force and 30 percent of the construction workers left the country.

The major participants in the construction sector are the architects, engineers, management consultants, general contractors, and construction workers along with the owners, operators and users of the construction facility. Building finance and insurance agencies, land developers, real estate brokers, and material and equipment suppliers and manufacturers, among others, are also involved in construction. The government interacts with the industry as a purchaser, financier, regulator and adjudicator (118).

It is important to note that almost all participants in the construction sector are present in Lebanon; they are portrayed in Exhibit 6.1 together with their functions and arrival times. Also, Exhibit 6.2 summarizes the current state of the non-system of Arab construction.

In the following sections, the major participants (except construction workers and financial institutions that were covered in Chapter V, "Construction Inputs," and the government that will be left to Chapter VIII, "Regulatory Background") in the construction sector are studied in detail.

6.2 The Professional Sector

The first step in construction, the conception and planning of the project, originates with the client, usually the owner. The owner, who may be an individual, private firm, or government agency or enterprise (see also "Construction Demand and Outputs"), is responsible for many facets of project initiation. He must determine the need for a new

facility; define its basic functions, size, budgets, and quality standards; secure financing and other required approvals; identify a suitable site; and select the team of participants who will design and construct the project. If the client has no in-house design or construction group (which is usually the case in Lebanon), he enlists and awards contracts to outside groups for the design, and later the construction, of the project (117).

Engineers and architects provide the most widely utilized consulting services. They help the client to conceptualize a wide variety of options and eventually focus on one solution which in some cases goes into implementation. The size of architectural firms varies from one to hundreds of engineers. This section will deal mostly with individuals, leaving the uncovered material to Section 6.3.1, "Consulting Firms."

The Lebanese Syndicate of Engineers maintains a registry of engineers and architects; in order to register, an individual must hold a university degree in architecture or engineering. Most eligible professionals register upon graduation regardless of their future careers. As of October 31, 1985, there were 9,622 professionals registered in Lebanon, divided as follows:

Civil Engineers	4,662
Architects	1,911
Mechanical Engineers	793
Electrical Engineers	1,209
Extracting Engineers	16
Chemical Engineers	141
Petroleum Engineers	50
Agricultural Engineers	581
Others	<u>259</u>
TOTAL	9,622

Exhibit 6.3 shows the evolution of the number of professionals in Lebanon since 1952.

On the other hand, an "Economist" survey (57) in 1972 revealed that there were 28,500 scientists and engineers in Lebanon. In the same context, Zahlan (167) observed that the total number of Arab engineers is doubling every five or six years. To this effect, Bsar (36) blew the whistle by noting that there were too many engineers and architects and that the profession will soon be saturated, even in the extreme scenario where reconstruction would keep them busy for ten to fifteen years (150). The problem is further exacerbated by the presence of numbers of unqualified individuals exerting the profession.

Thus, according to the Dean of Engineering and Architecture at the American University of Beirut, only 5 percent of the architects putting up the new buildings are properly qualified (83). These practices, as expected, led to an indescribable ugliness and anarchy in the architectural environment (130). The prospects of fast and sizeable

returns from construction projects further worked to the detriment of aesthetics. Speaking of returns, the architect/engineer's fee is established by the Syndicate of Engineers. It depends on the size and nature of the project, ranging between 7 and 12 percent, the latter being applicable when the A/E acts as a supervisor and construction manager (30).

6.3 The Consulting and Contracting Firms

The central organizing agencies in construction are the consulting and contracting firms. Some firms combine both of these services. All major public works require a specialized organization to design the structure.

Design also involves surveying, testing of foundations, architectural work, specifications of methods, and standards of materials.

In other words, contracting converts blueprints, drawings, and specifications into the final product: a harbor, a sewerage system, or a hospital. Thus the contractor has to manage a complex process of assembling materials, labor, and equipment on the site, and to transform these inputs into the desired structure. Both the process of designing and constructing are today highly specialized, and only the largest consulting and contracting firms endeavor to handle numerous types of construction. The roles of consulting and contracting firms in the construction industry -- as well as in all other industries -- have been attracting increasing attention because of the critical and strategic place they occupy in the process of economic and technology development.

Much of this section will be devoted to the functions of these firms within the construction industry.

Every aspect of the construction industry involves manpower. Manpower of a variety of skills is essential to the performance of the industry. However, architects, engineers, draftsmen, managers, economists, and information specialists must be integrated into functioning organizations before they can render useful services. Consulting and contracting firms provide essential institutional forms to organize in a productive and functional fashion the large labor force which is essential to the construction industry (167).

Lebanese contractors and consultants (or what Zahlan (167) designates as CEDOs, consulting engineering design organizations) have carried a substantial part of the load of all Arab construction.

Among the largest consulting firms are "Dar al-Handasah Shair and Partners," "Dar al-Handasah Nazih Taleb," "Associated Consulting Engineers," and "Rafik El-Khoury and Partners."

As far as contracting is concerned, several firms have an international standing: "Consolidated Contractors Group" (CCC), "Contracting and Trading Co." (CAT), "Kettaneh Freres," "Oger Liban," "Almabani," "Zakhem International S.A.," "Issam Fares - Minefa," "Societe Nationale d'Entreprise," and "Alfred Matta" (restricted to Lebanon).

6.3.1 Consulting Firms

Consulting services are provided in a variety of forms. Here, an attempt has been made to examine the "design" and "construction" functions separately. The design, or pure consulting, function includes

pre-feasibility and pre-investment studies; the identification of alternative options; engineering designs; supervision of implementation; quantity surveying; cost-analysis; and various related types of activities. The construction function is essentially the execution of the engineering plans generated in the design. The two functions can be separated, as is most common in Lebanon; the consultant is then generally retained to monitor the implementation as well as to undertake any redesigning which may be found necessary during the course of the project.

A second type of service is a combination known as design-construct (or design-build) where the same firm undertakes both functions (167). This practice, however, is not very common in Lebanon. As briefed by Matta (107), the Syndicate of Engineers requested, in 1952, that construction firms be classified either as design firms or as contracting firms.

In the following paragraphs, four typical design firms will be studied in detail.

6.3.1.1 Dar al-Handasah Shair and Partners (50, 123, 167)

The leading Arab CEDO today is the Lebanese firm of Dar al-Handasah Shair and Partners. The company grew out of the original firm of Dar al-Handasah, which was established in 1956, and which eventually fissioned into three separate organizations: Dar al-Handasah (Shair and Partners), Dar al-Handasah (Nazih Taleb), and Associated Consulting Engineers (ACE). During a period of 24 years (1956-1980), this group of three CEDOs handled a total of more than \$30 billion worth of contracts,

completed and in progress. The five original partners of Dar al-Handasah first split in 1959 to form Dar al-Handasah and ACE. Shair and Taleb continued their partnership until 1969.

As for Dar al Handasah Shair and Partners, the total construction cost of projects undertaken is in excess of US\$50 billion, excluding town, regional, and sectoral planning studies. This figure includes several projects over \$1,000 million each.

This admirable performance places Dar al-Handasah Shair and Partners in the Top Five International Design Firms (75). Also, the firm was seeking to set up shop in the US with the acquisition of Perkins and Will, a Chicago-based designer. Officials said the purchase would be a good fit and would give both firms access to new markets (76).

With a permanent staff of over 1,800 (including more than 800 professionally qualified engineers, architects, town planners, economists, financiers, marketing and management specialists, quantity surveyors, and others), Dar al-Handasah is organized into these nine departments:

- Architecture
- Economics
- Electrical Engineering and Telecommunications
- Mechanical Engineering and Industry
- Project and Construction Management
- Resources and Environment
- Structures
- Town Planning and Housing
- Transportation

Each assignment is under the direct supervision of a Project

Director who is responsible for engaging the appropriate team from within the relevant department and for drawing upon the skills of any necessary additional personnel in other departments of the Consultancy.

A Technical Control Board, employing the Consultancy's management control system, is set up for the purpose of planning and controlling performance of work on every assignment. Some of the major tasks undertaken by Dar al-Handasah Shair and Partners are reviewed in Exhibit 6.4.

6.3.1.2 Dar al-Handasah Nazih Taleb

Dar al-Handasah Nazih Taleb Consulting Engineers SARL is an independent Lebanese firm offering engineers and architectural services. Its present staff include many engineers (approximately seventy) and architects who are connected with large development projects in the Arab World.

Dar al-Handasah Nazih Taleb SARL was originally founded in Beirut in 1956 and was reorganized in 1959 and 1970. It has designed projects of an estimated cost of \$3 billion, half of which have been executed under its supervision.

The firm has close connections with highly specialized engineering firms with whom arrangements have been made to handle jointly, if necessary, large and specialized projects.

Since its establishment, the firm has been equally active in Lebanon and in the Arab World, as can be noted from Exhibit 6.5.

Finally, the firm has been and is designing and supervising projects financed by the World Bank, the Saudi Fund for Development, the Lebanese Council for Development and Reconstruction, and others (51).

6.3.1.3 Associated Consulting Engineers (ACE)

As noted above, ACE sprang from Dar al-Handasah in the late 50s. Today the company has a staff of approximately 500, of whom 200 are engineers.

Its areas of activity are in urban planning, public health, transport, water treatment and supply, hydraulic and marine construction, and geotechnics. It is active in approximately ten countries. In the period from 1958 to 1980, ACE designed projects whose value totaled \$1 billion. The total value of contracts in-hand in 1980 was \$1 billion (167).

6.3.1.4 Rafik El-Khoury and Partners

The office of Rafik El-Khoury and Partners was established late in the year 1967, when it was found that the volume of consultancy work carried out by the founder to various clients and design offices in Lebanon and the Middle East had grown to the point that the work could no longer be carried out except with the participation of a group of specialized engineers working under one roof and enjoying all the facilities of a modern office as well as a very well-documented technical reference library (66).

From the outset, as suggested by Exhibit 6.6, the practice has, on the one hand, been involved in the structural design of delicate architectural projects, and on the other its involvement in important civil engineering and structural designs per se is considerable.

The practice has been extensively involved in structural steel

6.3.1.5.2 Remuneration

The remuneration of the works will be the minimum rates called for by the Syndicate of Engineers. They are as follows:

(a) For Building Works

Minimum fee for an average building 7 percent (for a villa up to 12 percent), divided as follows:

1 %	Preliminary Design - To Architect
1 %	Permit - To individual preparing permit
2.5%	Design
0.5%	Bills of Quantities, Specifications, and Conditions of Contracts - Shared between:
	25% - Structural Engineer
	50% - Architect
	25% - Mechanical/Electrical Engineer
2 %	Supervision

(b) For Works in Public Sector -- Design

In this category of works, the fee shall be:

[French Association of Consulting Engineers Fee] x 60% (or about 2% of the value of the works).

(c) For Works in Public Sector -- Supervision

Fee = 2.0-2.5% contingent on project size, with site staff paid separately.

6.3.2 Contracting

6.3.2.1 Overview

Once planned, designed, approved, and contracted, the construction project is in the hands of the construction firm. In most market-economy developed countries, work is carried out mainly by small- and medium-sized enterprises employing between 5 and 200 persons. In less developed countries the construction industry is divided crudely into a modern, formal sector dominated by foreign firms which use advanced technologies responsible for the construction of major infrastructure works, and an informal sector which is comprised of a mass of very small non-industrial enterprises operating in rural areas on the periphery of towns (117). In the same context, one source (142) noted the correlation between the size of firm and the level of technical sophistication required in the construction process, and proposed the following classifications:

<u>Organization</u>	<u>Type of Construction</u>
Large firms (professional management)	International modern
Larger contractors (owner managed)	National modern

Smaller (job) contractors/
Supervision by house owner
Self-help

National conventional

Traditional

International modern would mean construction of a quality which would be comparable to that in developed countries. It includes major civil engineering works, public buildings in the prestige class, and high-quality private building in large urban centers. It is international in that it employs technical knowledge borrowed from the advanced countries. It often requires expatriate organizational and technical inputs along with fairly extensive use of imported materials, plant, and machinery.

The national modern category may be regarded as a watered-down version of the international modern. As will become apparent later, most contracting firms in Lebanon fit into one of these two categories.

The national conventional may be considered a movement towards modernization and away from purely traditional methods. It requires relatively simple techniques and depends upon a few selected modern inputs such as cement, wall blocks, corrugated steel, and asbestos sheets. This is the kind of construction usually found in the poorer urban or rural areas, whereby the works are supervised by the firm's owner himself. In this context, Anderson (8) recognizes that one of the outstanding characteristics of the small firm is the simplicity of its management structure. The typical small firm is directly managed by its owners, who themselves take nearly all important decisions and probably oversee their execution as well.

This direct dependence on the proprietor in every facet of running

the business is the source of most of the strengths, and many of the weaknesses, of small firms. It accounts, for example, for the rapidity with which decisions can be taken. On the other hand, the skills and experience of any one man are necessarily limited.

Of course, the above classification is not neatly compartmentalized and one category would in practice tend to shade into the one above or below it.

In Lebanon, contracting firms are classified into five categories, based on their experience, personnel, equipment, financial strength, etc. Also each ministry has its own classification criteria whereby, for example, the same contractor may fall into Class 1 for housing, Class 2 for roads, Class 3 for water resources, and Class 4 for electricity and power. In other words, depending on the nature of a project only those contractors with a minimum rating are permitted to undertake the works.

Also, according to El-Khazen (65), the number of contractors in Lebanon is remarkable: there are over 1,200 firms registered in the Syndicate of Lebanese Contractors, but this figure is by no means global since registration in the Syndicate is not mandatory.

In that context, Edmonds (63) found that 23 countries with a per capita GNP of \$500 average 17 contractors per million population; by contrast, the average in the 14 most industrialized countries is 777 per million. Lebanon's 600 contractors per million population, which is a fairly reasonable estimate, proves therefore to be admirable.

6.3.2.2 Tendering

6.3.2.2.1 Tendering Methods

As briefed by Moussa (121), there are in Lebanon (and probably elsewhere) two ways of obtaining a number of suitable contractors and the Architect/Engineer should decide which is most appropriate in his client's interest.

(a) Open Tendering

Advertisements stating the client's interest in obtaining offers for his project are placed in suitable publications, and applications are invited from contractors who wish to submit offers.

This is advisable in the case of public authorities, governmental bodies, municipalities, and other bodies, as it obviates the possibility of complaints of unfair selection. The disadvantage of this method is that, by publicly requesting interested contractors to apply to submit offers, interest may well be shown by unexperienced contractors or by those lacking adequate technical and financial resources.

In this respect, it is generally accepted that putting out an open tender might prove to be counter-productive (63).

Tender documents should therefore ensure that the contractors' tenders are accompanied by evidence of:

- satisfactory completion of similar projects;
- financial ability, by certified balance sheets and bank references;

- list of technical staff;
- list of plant and equipment holding.

As an example, one of the first sections in a tender (49) reads as follows: "Only firms belonging to Class 1 and having undertaken, during the past 10 years, works for over Lebanese pounds 50 million, of which 15 million on a single project, are eligible for bidding."

(b) Selective Tendering

The Engineer recommends a list of Contractors, of whom he has personal experience, to the client. This method has the advantage that only persons of proven competence are chosen, but there is the possibility that the chosen Contractors may not be truly interested in the project, yet not wishing to offend the Engineer will not refuse to tender and will therefore submit a "safe" price. The other disadvantage is that the Contractors may be limited to a much smaller group than necessary, by relying only on the Engineer's personal experience.

(c) Tendering by Negotiation

Another form of selecting a contractor may take the form of a single contractor. Occasionally, either due to specific wishes of the client or on the recommendation of the engineer, a contractor will be chosen and a contract negotiated without the benefit of competition. This will normally apply only when the contractor is the only one in a particular specialized field, or when the client has a specific interest in the contractor (usually by way of investment) or has been satisfied by the

services rendered by the latter. In this context it is interesting to note that in Korea, for example, a contractor effectively executing a project is often given the option to negotiate for a second contract, providing his unit prices are within certain limits (163).

6.3.2.2.2 Bonds

The decision to bid is a major financial decision, for two reasons. First, the contractor assumes substantial costs for the preparation of the estimates and the tender at the risk of not recovering them if he is not awarded the job. Second and most important, the contractor commits himself to investment in and construction of the project if he wins the bid (116). For this purpose, bonds are issued to protect the owner (obligee) from default on the part of the contractor (principal). In case of default, a bonding bank or company (surety) is legally bound to offset any damages resulting from such default (86).

The American practice of calling for tenders to be accompanied by a Bid Bond is becoming general throughout the Middle East. That is, the tendering contractors submit a Bank Guarantee, or Bond, with their offer (usually between 2 and 5 percent of the contract value) and if they fail to enter into a contract, when called to do so, the client can seize the Bond which should theoretically cover the additional costs between the lowest and the second tender. In Lebanon, it is not unusual for contractors to obtain, at higher costs, bank guarantees on an amount greater than their bid in order to mislead their competitors (107).

Similarly, on award of the Contract, the successful contractor must produce a Performance Bond (usually 10 percent of contract value)

guaranteeing satisfactory completion of the work. Failure to complete the contract gives the client the right to seize the Bond and to use the sum provided to meet expenses incidental to making other arrangements to have the work completed. It is however doubtful, notes Moussa (121), whether these bonds form any useful purpose, as the cost of their provision is reflected in the cost to the client and careful selection of contractors will obviate the necessity of bonding, but the provision of bonds should in no way reduce the responsibility for careful Contractor selection.

6.3.2.2.3 Tender Documents

To provide a basis for selection, the design team, as noted above, will have to ensure that all the contractors are competing on the same information. This design information may be documented in the form of: drawings, bills of quantities, conditions of contracts, and specifications. In Lebanon, specifications according to US and British practice are widely used (Exhibit 6.7), together with the International Society Organization (ISO) standards. The countries of the Middle East have really only just started to prepare their own standards. The following are in general use:

- Kuwait General Specification 1966
- Some Kuwait Standard Specifications
- Lebanese Standard Specifications
- Saudi Arabian Roads and Airports Specifications, etc.

As far as Contract Conditions are concerned, there are no Lebanese standards per se, but instead, "Federation Internationale des Ingenieurs

Conseil" (FIDIC) standards, with little amendments, are mostly used.

The absence of national standards and adoption of various foreign practices, together with some gaps in the Building Code (see Chapter VIII, "The Regulatory Background"), constitute a major drawback of the construction activity in Lebanon.

In all cases, construction contracts in Lebanon may be grouped into two large divisions. One division constitutes those contracts for which the contractor is selected on the basis of competitive bidding. Competitive contracts are customarily prepared on a fixed-price basis and consist of two types:

- The unit-price contract (drawn on the basis of estimated quantities of specified work items and a unit price for each item).
- Lump sum contract (the contract amount is a fixed sum that covers all aspects of the work described by the contract documents).

The second division of construction contracts consists of those that result from direct owner-contractor negotiation. Negotiated contracts can be on any mutually agreeable basis: lump sum, unit price, or cost-plus-fee. Most negotiated contracts are on a cost-plus-fee basis whereby the owner reimburses the contractor for all construction costs and compensates him for his services. The contractor's fee may be designated as a fixed percentage of all cost of the work, a sliding scale percentage of the cost of the work, a fixed fee, a fixed fee with a guaranteed top price, a fixed fee with a bonus, or a fixed fee with arrangement for sharing any cost saving.

The profitability of a contract, from the constructor's point of view, is represented diagrammatically in Exhibit 6.8.

6.3.2.2.4 Subcontracting

As the production process in the construction industry becomes more complex, the general contractor requires an increasing number of specialists. Contractors tend to restrict themselves to a limited market composed of the types of work best suited to their permanent labor force and equipment, and employ subcontractors for the other work sections. The advantages of subcontracting are that due to a limited specialization, the labor and plant employed should be suitable for the task, and give increased productivity and quality. It may also enable the main contractor to reduce his supervision and administration costs. The main disadvantages are the difficulties in programming and control (121).

Subcontractors enter into a legal contract with the General Contractor, and the subcontracting form is usually prepared on the line of the FIDIC mentioned earlier.

In Lebanon, subcontractors are commonly one of three types: nominated subcontractors (chosen directly by the Client and/or the Engineer), Contractor's own subcontractors (selected by the GC for the specialist work sections), and labor only subcontractors (the work sections common for this policy are those of a high labor content and low on capital expenditure in equipment, for example blockwork, formwork, carpentry, or plastering).

6.3.2.3 Major Contracting Firms

The development of a construction sector in a developing country generally proceeds in five stages. First, foreign firms handle most of the construction of the larger projects, particularly in civil engineering. Next, as a result of subcontract work on the first-stage projects, indigenous subcontracting firms develop. In the third phase, small local contractors execute the smaller projects. This is followed by local contractors taking over most local work, regardless of magnitude, forming joint ventures with foreign firms as necessary. Finally, local contractors may go abroad (117). The Lebanese construction sector has undoubtedly reached the latter stage since, as noted above, several firms have an international standing. In the following sections, a detailed account of the major Lebanese contracting firms will be presented.

6.3.2.3.1 Contracting and Trading Company (CAT)

(a) Overview

CAT began its operations in Haifa in 1937. In 1942, taking the name of the company set up by Emile Bustani in Palestine, the triumvirate (Emile Bustani, Abdallah Khoury, and Shukri Shammās) registered their new enterprise in Beirut as the Contracting and Trading Company.

Since its formation as a Lebanese Limited Partnership, CAT -- with its principal subsidiaries Mothercat and Niger Construction -- has demonstrated its capabilities in civil engineering and industrial

construction works throughout the Middle East, in North and West Africa, in Pakistan, Somalia, and the Sudan. From British pounds 5 million in 1960, the group's turnover increased to around British pounds 160 million in just over two decades (42).

In the 1940s, the main sources of CAT's contracts were the British forces and foreign oil companies, mainly the British-managed Iraq Petroleum Company. At the end of World War II and with the consequent removal of the main bodies of foreign military forces from the area, CAT entered a period of construction work for several oil companies, business organizations, educational institutions, military units, and Arab governments. Thus whereas prior to 1945 most of CAT's work directly involved foreign organizations, either military or business, in the ensuing period a greater proportion of its work was being undertaken in the interest of indigenous concerns. Besides its contracting business, CAT has several additional ramifications of a business and financial nature but this is a situation quite typical of Middle Eastern business as a whole (123).

In 1951, CAT joined forces with Motherwell Bridge Engineering Company of Scotland to form Motherwell Bridge Contracting and Trading Company -- Mothercat -- and the group entered the field of pipeline, tankage, and process plant construction with contracts in Iraq, Kuwait, Qatar, and Syria.

In 1955, CAT undertook its first projects in Pakistan and in 1964 the group expanded its activities into West Africa, winning contracts in Ghana, Guinea, and Nigeria. In 1966, a major program started for the UK Ministry of Public Building and Works for military camps in Sharjah. In 1967, CAT built its first fertilizer complex in Saudi Arabia.

In 1972, the Company started its work in Somalia and in 1975 Mothercat Marine Division was formed to carry out projects in the United Arab Emirates. In 1978, the firm won new contracts in Sudan, and in that same year (three years after the start of the clashes in Lebanon), four subsidiaries were formed: Cycat in Cyprus, Eurocat and Francat in France, Mothercat (Saudi Arabia), and WLL registered in Jeddah. In 1979, new contracts were won in Oman and Saudi Arabia, and in 1980 the 536-kilometer long, 48-inch diameter East-West crude oil pipeline was completed in Saudi Arabia.

In 1983, CAT commissioned an IBM central computer at the group's new Electronic Data Processing bureau in Paris -- with target date for total computerization of world-wide company activities set for 1985. In 1984, Dayacat SDN BMD was registered in Kuala Lumpur to carry out construction work in Malaysia. In parallel, new openings were expected in the Philippines (42, 65).

(b) List of Key Staff

The group's strength lies to a large extent in its highly skilled and dedicated workforce, writes an ENR publication (74), many of whom have been employed by it for 25 years or more. The company's work force (technical and administrative) and equipment, as of the end of 1982, are depicted in Exhibits 6.9 and 6.10.

(c) Operation Profile

This summary represents an operation profile of the CAT group of

companies since its combined operations in 1950. Exhibit 6.11 shows "Multiplier Factors" applied to original contract value in order to ascertain the updated current market equivalent. Exhibit 6.12 is a bar chart representation of original and updated equivalent contract values. Exhibit 6.13 shows a description of the major projects undertaken by the firm.

(i) Civil Works: The group has been responsible for foundations and civil work for power stations, cement plants, desalination plants, petrochemical plants, and other industrial installations and has constructed grain and cement silos with extensive use of slipforming.

It has constructed major hotels, hospitals, and prestige buildings throughout the Middle East, involving the highest standards of finishes and decoration.

CAT has also recently constructed highways in Nigeria, Kuwait, and Somalia, and airfields in the UAE and in Oman.

As a new venture the group has entered the marine field and has been responsible for harbor and jetty work in Oman and Ras-al-Khaimah, UAE.

(ii) Mechanical Works: The group has long experience in mechanical and process plant construction, particularly for the oil industry. It has built power stations in Pakistan, UAE, and in Saudi Arabia, and is able to carry out the full range of mechanical, electrical, and instrumentation work required.

In the industrial field it has built a number of cement plants in

the UAE. Desalination plants have also been built in Kuwait, Oman, and Saudi Arabia.

In the oil industry, the group has been responsible for many field installations such as gas/oil separation plants, gas sweetening and desalting plants, gas compressor stations, and all the associated flowlines and tankage. Down-stream it has carried out refinery construction and fertilizer plants.

The group has a highly skilled workforce, particularly welders qualified to do all types of the highest international standards.

(iii) Pipelines: Last, but not least, the group has a major pipeline construction capacity with large diameter spreads that have carried out some of the largest Middle Eastern pipeline projects, including lines for crude oil, gas, petroleum products, and water. Pipelines have been built in all types of terrain, varying from swamp country in Nigeria to the rocky hills and mountains of Pakistan and Iran and the deserts and sabkha of the Middle-East, together with a considerable number of major river crossings both submerged and suspended.

6.3.2.3.2 Consolidated Contractors Co. (CCC)

Formed as "Consolidated Contractors Co.", CCC sprang from CAT in 1950 and was incorporated in Liberia. CCC consists of eight member companies. Until 1976, the head office of CCC was in Beirut, but it has since moved to Athens. By 1965, the company had a turnover of \$7.5 million, growing to \$358 million (1978), \$392 million (1980), \$376

million (1981), and \$218 million (1982). Since 1977, its work force has exceeded 10,000. Its major activities during the past decade have been centered in Saudi Arabia, Kuwait, the UAE, and Oman. The value of contracts in hand in 1981 exceeded \$2 billion. The activities of CCC have covered: building construction (industrial housing, hotels, hospitals, universities, palaces); heavy civil works (power plants, bridges, harbor and docks, process plants); highways, roads, and airports; water and sewage treatment; mechanical construction (oil terminals, refineries, structural steel construction); pipelines for gas and oil; and underwater engineering and offshore drilling platforms.

CCC has worked with a large number of international CEDOs and in a variety of joint venture arrangements with major constructors. The percentage of contracts which CCC has executed based on design by Arab consulting firms has varied from country to country: 4 percent in Saudi Arabia, 56 percent in Bahrain, 10 percent in the UAE, and 15 percent in Kuwait.

In 1976, CCC and CAT moved respectively to Athens and Larnaca. CCC was attracted by Greece's 1967 statute which offers advantages to foreign companies that use Greece as a base for their foreign operations. But both companies remain "Arab" organizations: they staff mostly northern Arabs from Lebanon, Iraq, and Syria. And they continue to focus on work in Arab countries, where they use workers of many nationalities with a large proportion of Pakistanis and Indians. But CAT and CCC are less directly in competition today since CAT is becoming, as noted above, more heavily involved in pipelining. However, both companies are at present facing a fierce competition on their Arab market from South Korean contractors who unite in consortiums to submit lower bids, as well from

other European and American firms (123, 167).

6.3.2.3.3 Kettaneh Freres (KF)

The Kettaneh brothers established their first business in Lebanon and Syria in the aftermath of World War I as a construction firm active mainly in earthwork, roadwork, and road bridges. It soon extended its activities to other fields and expanded into neighboring countries until it covered virtually all of the Middle and Near East from Egypt to Iran.

Today, companies belonging to Kettaneh Freres (KF) are incorporated in many countries of the world and cover quite a diversified range of activities, including notably: civil engineering and general contracting; real estate; industrial; and general trading and distribution.

The countries involved are: Egypt, France, Greece, Iran, Iraq, Jordan, Liechtenstein, Lebanon, Saudi Arabia, Syria, the UK, and the USA.

The major strength of the KF firms lies in the fact that they are all owned or controlled by members of the Kettaneh family. Thus, as one of them puts it (97), they are able to pool their resources in order to carry out whatever obligations any of them may undertake. The firms of KF that are involved in construction activities are:

- Kettaneh Freres Anstalt, Vaduz, Liechtenstein
- Kettaneh Brohers (Construction Services) Ltd., London, UK
- Kettaneh Brothers-Saudi Arabia, Al Khobar, Saudi Arabia
- F.A. Kettaneh (Kettaneh Freres) S.A., Beirut, Lebanon
- F.A. Kettaneh (Kettaneh Freres), Bagdad, Iraq

- Technomed, Cairo, Egypt
- Esdatic S.A.R.L., Paris, France
- Eastern Distributors and Forwarders Corp., NY, USA

With the in-house expertise of these firms, KF can undertake all aspects of construction projects from inception to the handing over to the owner of a complete turnkey job. They can also restrict themselves, if such is the owner's wish, to any one of the aspects of construction: conception, design, execution of all the works or of only certain trades (such as civil engineering, electrical and/or mechanical works, air-conditioning installations, etc.) or construction management of projects.

This flexibility, together with the geographical distribution of the group's offices and activities, has greatly helped KF in coping with the shock of the Lebanese war. (Some of the major projects undertaken by KF are depicted in Exhibit 6.14.)

As of December 1982, the total assets of the firm amounted to US\$176 million whereas the total group turnover, including tax, amounted to US\$66, 79, and 90 million in 1981, 1982, and 1983, respectively (95, 96).

6.3.2.3.4 Fares-Minefa, Hariri-Oger, and Mokbel-Wayss and Freytag

(a) Concerning Fares, Zaklan (167) writes the following:

"A number of foreign constructors have entered into partnership with Arab businessmen in order to develop their share of the market. The Arab businessman secures the contract, and the firm performs the work. For

example, Mr. Issam Fares, owner of Minefa, a Dutch investment firm, owns 70% of Ballast--Nedam's business in Saudi Arabia. In 1982, the firm won the \$564 million contract for the Bahrain-Saudi Arabia causeway. According to Ballast--Nedam's chairman--Minefa regards its holding as an investment and professes no intention of interfering in the running of the company."

(b) In the same vein, Mokbel and Partners, Lebanon, was nominated as a major subcontractor for the construction of the Salah Al-Deen Al-Ayubi Expressway, Baghdad, after the contract had been awarded to Wayss and Freytag, Germany. This contract is the largest ever received by the latter company in her history. The expressway has a total length of 13 kilometers and carries three lanes in each direction of travel. Of the total length, 5.5 kilometers of the Expressway are constructed as an elevated highway on concrete columns. In all, the construction cost was approximately US\$280 million (161).

As far as Mokbel is concerned, he started his contracting activities late in 1964 with one bulldozer. Today, the firm owns \$200 million in equipment, or about 530 pieces. At one time (early 1980s) Mokbel and Partners counted 3,000 workers, among which 169 were full-time professionals. Between 1979 and 1984, the firm's turnover had been admirable, amounting to an average of \$100 million per year. Because of the war in Lebanon on one hand and that in the Gulf on the other, the company's revenues have been decreasing ever since (120).

(c) As far as Hariri is concerned, he has made similar arrangements with the French firm, Oger. Oger Liban is a limited company organized

and existing under the laws of Lebanon. It was established on March 3, 1980, with a capital of Lebanese pounds 1 million, divided into 1,000 shares, of which Mr. Hariri holds 996. The firm's head office is located in Saida; an additional office was established in the summer of 1982, in Beirut. (Oger Liban's manpower distribution, equipment, and major projects are shown in Exhibits 6.15 and 6.16.)

Most of the firm's projects are located in South Lebanon. Oger Liban later extended the scope of its mission. Following Israel's invasion of Lebanon, the company was called upon to provide such other services as the removal of street rubble and refuse, levelling of collapsing and hazardous buildings, cleaning and asphaltting city streets, and the restoration of many of the war-damaged buildings.

Concurrently, Oger Liban has successfully restored 4 main schools and 65 other primary and secondary schools in the vicinity of the city of Saida, thus giving more than ten-thousand students and school age children the opportunity of resuming their schooling by October 1982.

Finally, Oger Liban has restored the war-damaged public street lighting system, which became operational on Christmas Eve 1982 (52, 133).

6.3.2.3.5 Zakhem International S.A.

(a) Overview

The origin of Zakhem International S.A. dates back to 1963, when Zakhem Engineers was formed and registered in Beirut as a limited partnership with the objective of undertaking civil and mechanical

construction projects in the Middle East. Subsequently, in 1971, it was transformed into a limited company with a fixed capital of Lebanese pounds 1 million.

Throughout this period the company expanded its field of operation to cover an area extending between Sri Lanka and the Bahamas, encompassing Bahrain, Pakistan, Iraq, Jordan, Kuwait, Syria, Abu Dhabi, Libya, Italy, and Lebanon, where a variety of projects were undertaken. These included oil, gas and water pipelines, refineries, tank farms, chemical and petro-chemical projects, buildings, and civil engineering construction.

In view of this expansion and in order to meet further requirements in the field of operation worldwide, a holding company was registered in Luxembourg in 1975 under the name Zakhem International S.A., with a capital of US\$10 million fully paid. A subsidiary operating company was registered in Jersey, Channel Islands, under the name Zakhem International Construction Ltd. Since 1975 the group has extended its work to other countries such as Kenya, Tanzania, the United Kingdom, and the United States. Accordingly, it has established permanent offices in Beirut, London, Nicosia, Nairobi, Sharjah, Dar Es Salaam, and Houston.

The growth was equally rewarding, as by the end of 1982 the group achieved an annual turnover of US\$76 million with total assets of \$US77.9 million. In addition, the group has a turnover of US\$50 million in companies with minority shareholdings. Zakhem International Construction Ltd. has successfully completed major projects in the countries referred to above, the total value of which exceeded US\$50 million.

In 1978, the management decided to diversify its interests and to

invest a certain proportion of the profits into other areas. Since then, the group has participated in real estate development projects in the US, UK, and Lebanon, and has also acquired a major interest in an operating bank in Lebanon. Other investments were channeled into specialized industries as well. The group's total investment at the end of 1982 was approximately US\$23 million.

(b) Projects

Zakhem International Construction has diversified engineering construction experience, covering the fields of pipeline construction (water, oil, gas, and products), industrial and mechanical installations, building, and civil engineering works, and has served clients in eighteen countries throughout the world. A small cross-section of selected clients, together with the firm's financial performance between 1980 and 1983, is shown in Exhibit 6.17.

(c) Manpower and Equipment

Zakhem International Construction Limited owns and operates machinery and construction equipment valued at US\$50 million. Being a contracting firm of international standing, Zakhem International's equipment meets the highest standards of quality, being periodically replaced in order to maintain first-class performance and access to latest technological advances.

As far as manpower is concerned, the group counts 1,000 site workers and about 200 professionals. By melding skills developed through

specialized training, Zakhem International Construction's key personnel provides legal, economic, technical, and environmental expertise (168, 169).

6.3.2.3.6 Almabani

(a) Overview

The Almabani Group of Companies constitutes a core of integrated entities designed to offer to the client as comprehensive a service as possible, mainly in the fields of construction, contracting, and related maintenance activities.

In 1982, the group increased its service capacity through the acquisition of a majority interest in Trans Arabian Rail Contracting Co. (TAR).

Under the leadership of Almabani-General Contractors, the various companies (Almabani GC, International Engineering and Contracting Company, Saudi Commercial and Industrial Company, Saudi Electro-Mechanical Company, Freyssinet Saudi Arabia, Trans Arabian Rail Contracting Company), cooperating closely among each other while maintaining independent and separate identities. Together, they cover the following spectrum of activities:

- Road and bridge construction
- Airport construction (runways, taxiways, aprons, terminals)
- Building construction (high-rise, industrial)
- Heavy pre-cast and pre-fab elements

- Electro-mechanical capability (power generation/distribution, TV networks, street lighting, fuel farms, and central air conditioning)
- Railroad contracting
- All support industries
- Maintenance capability
- Manufacturers representatives

(b) Selected Projects and Financial Performance

The bulk of Almbani's work occurs in Saudi Arabia (that in Lebanon is relatively limited). Not surprisingly, therefore, all of the projects shown in Exhibit 6.18 were undertaken in the Kingdom.

However, it is important to note that Mr. R. Rizk (141), one of Almbani's major partners and owner of National Enterprising Company-Contracting (NECC) has undertaken large projects in Lebanon, among which are the Casino du Liban, the Regie des Tabacs, part of the Litani River Projects, and even has constructed the first expressway in Lebanon.

(c) Manpower and Equipment of Almbani Group

The group's investment in equipment witnessed a spectacular growth during 1982, in order to cope with the sustained growth and the new projects awarded during the same period. It thus grew from Saudi Rials (SR) 32 million in 1975 to SR 180 million seven years later.

In parallel, Almbani's manpower grew from 685 in 1975 to 4,624 in

1982 (6, 141).

6.3.2.3.7 Societe Nationale d'Entreprise (SNE)

Registered in Lebanon in 1965, SNE covers a wide spectrum of contracting activities including buildings, civil works, marine works, and electro-mechanical works. Its major projects have been located in Syria, Saudi Arabia, and Lebanon, where, according to its executives (100), the firm undertakes approximately 20 percent of all contracting activities in the country.

In all, since its establishment in 1965, the firm has won contracts for in excess of Lebanese pounds 3 billion (Exhibit 6.19 shows a list of some of its projects).

Finally, the firm, employing some 600 people, owns and operates a wide variety of equipment ranging from the simplest truck to the most sophisticated flat barge for marine works. At the end of 1985, the equipment was valued at approximately Lebanese pounds 500 million (100).

6.3.2.3.8 Alfred Matta-Enterprise

The firm constitutes one of the oldest and most successful construction companies in the country. Established in 1945 as a design/contracting firm, it limited its activities to contracting after 1952 when the Syndicate of Engineers suggested that construction firms be classified in either of the two categories.

Mr. Matta's firm undertakes all kinds of civil engineering works, with the exception of marine works. Among its most spectacular

realizations are: the Rivoli Theater, the Main Post Office, the Jamhour College, the Ecole Superieure des Ingenieurs de Beyrouth, the Mont La Salle College, the Fouad Chehab Highway, and the rehabilitation of road networks in Achrafieh, Baadba, Furn el-Chebbak, all located in the Greater Beirut.

Outside the capital are: the Bhandoun Synagogue, the Chekka Cement Factory, the Lebanon Chemical Company in Selaata, the Light Metal Product Factory, the Liptex Factory in Amchit, the Lebanese University in Fanar, the Beach-Complex of Rimal, etc.

With its 2,000 laborers and 200 pieces of first-rate equipment, the firm has reached a remarkable speed in the 1980s: in 1985, the contracts executed amounted to Lebanese pounds 170 million (107).

6.4 Other Participants

6.4.1 Technicians

The dramatic shortage of skilled technicians has at all times constituted a major drawback of the construction sector in Lebanon.

In order to encourage the formation of technicians, the shift from the academic field to the technical field in the Lebanese educational system has been permitted to occur at practically every stage of the high school/college education. Nonetheless, the results remain largely insufficient since only 8 percent of Lebanese students graduate from a technical school as compared to 50-60 percent in some developed countries. Further, the academic standards of the future technicians have proved to be so low that a grade as bad as 3 over 20 has been

considered to be a passing grade (60).

In all cases, Berna (31) claims that entry into industry is open to persons of very different social standing and economic position; and further, Anderson (8) notes that people with poor education and having had little or no formal training often succeed in establishing profitable firms. In an attempt to establish some sort of "pyramid" among the construction workers, the Lebanese government recently adopted a five-year plan, the bottom line of which is described by Sebai (148): "The purpose is to form 800 superior technicians, 5,400 bachelors and 22,500 specialized workers. If the first two categories do give for the moment entire satisfaction, the last one, which is the most urgent, falls short of expectations."

6.4.2 Future Professionals

"The field of engineering will soon be saturated." The President of the Syndicate of Engineers (36) blew the whistle by predicting that less and less work will be undertaken by more and more graduates.

For a country of nearly 3 million inhabitants, it is amazing to note that there are five schools of architecture and three schools of engineering.

The 1960s witnessed a sudden development in architectural education that was probably motivated by the international impact of the various movements in architecture in Europe and in the United States. Apart from these stimulating foreign influences, a local economic boom that boosted the construction industry created an unprecedented need for architects.

The total number of engineers in Lebanon at present is 9,622, among

whom are 1,911 architects (35). Exhibit 6.20 (source 103) shows the progression of the student enrollment since 1970 in the schools of architecture, together with the proportion of graduate students from each architectural school in the country.

In this context, it is important to note that despite the state of war in Lebanon, the capabilities of the newly graduating engineers and architects remain excellent and by all means comparable to those of newly graduating US and European professionals (84). In its December 1985 issue, Newsweek on Campus (131) describes, for example, the American University of Beirut as being the best in the Arab world. "Its academic standards remain extremely high," recognizes the magazine, "and supporters call it the best thing the United States can offer Lebanon."

In conclusion, it becomes clear that the various construction participants are present in Lebanon. In addition to the contractors who actually do the construction work, other participants surveyed include: the owner, developer and/or user who defines the need for a facility; the investor or lender who provides the capital; the engineers and architects who design the facility; the labor organizations that supply resources and skills; the manufacturers and suppliers who provide construction materials, products, and equipment; regulatory agencies that prescribe and enforce codes, standards, and regulations; and others involved in research, development, education, and information exchange.

VII. CONSTRUCTION DEMAND AND OUTPUTS

This chapter will analyze some of the major characteristics of the construction demand (and output) in Lebanon. The analysis is divided into two parts. The first section describes the structure of this demand according to its various components, building, non-building, public, private, new, and repair types of products. The second deals primarily with the severe housing crisis plaguing the country.

7.1 Composition of Demand

In order to analyze the demand structure, we must consider its breakdown in terms of the various construction categories, private versus public sector ownership, new construction versus maintenance, and its geographical distribution.

7.1.1 Demand for Construction Types

Construction projects can be grouped under two main headings: building construction and non-building construction. Building construction can be further subdivided into: residential buildings, industrial buildings, and other buildings (which include buildings intended for commercial, health, and educational purposes, for example). Non-building construction encompasses: road construction and other non-building construction such as power stations, canal work, utilities works, and so forth (119). A model has been sketched (Exhibit 7.1) which

may serve as a guideline for disaggregating construction.

It is interesting to note that construction in the Arab World has for some time been a high-growth industry. The value of current output, according to available data, is conservatively set at in excess of \$100 billion per annum. This makes the Arab construction market the third-largest in the world, exceeding that of France, Germany, and the UK. The US and Japan occupy the top two positions.

Also, during the past twenty years, Arab Gross Fixed Capital Formation (GFCF) has grown 27-fold: the output of the construction industry has grown accordingly (167). It is believed (121) that 8 to 12 percent of the country's annual budget is spent for construction purposes. In an attempt to quantify the construction activity in Lebanon, one source (112) recognizes that no accurate figures can be given but rather certain indicators (e.g., cement production, imports and production of steel, number of construction permits) suggest that the building activity has developed between 1960 and 1970 at a rate of 7 to 8 percent per annum. Another source (38), in turn, claims that this increase was approximately 19 percent between 1970 and 1971. The most striking aspect of these statistics is their variability and their range. To this effect, Moavenzadeh (118) reckoned that the lack of accurate, detailed, and comparable data on almost all aspects of construction activities in the developing and even in the developed countries has been a major difficulty in performing a quantitative analysis of issues facing the sector.

On the other hand, as described by the Science and Engineering Research Council (147), the demand on the construction industry is fickle and defies rational predictions. Not surprisingly, this statement has

been fully confirmed in Lebanon during the past decade since, as suggested by Moavenzadeh (114), construction activity depends upon, among other factors, political risk and uncertainty.

Statistics on the distribution of construction output by type of facility in Lebanon are virtually non-existent, although it is widely accepted that residential building construction comes very near the top of the list. Various sources (e.g. 65, 121) have concurred that in Lebanon, the output of construction is approximately 40 percent in residential building, 25 percent in non-residential building, and 35 percent in infrastructural construction. This distribution and emphasis between sectors will be investigated further in the following sections.

7.1.2 Private Versus Public Demand

The government, until recently, did not contribute much to the level of construction activity in Lebanon. During the 50s and 60s the government tried to finance a limited number of projects that were within the limits of the annual budget. This period witnessed the construction of a major dam (Qaraoun Dam, 1969, source 166) and the execution of the Litani River project, both backed by funds from the World Bank (68). The funding, however, remained largely insufficient. As a result, several important projects were delayed or simply cancelled.

Strikingly enough, these projects were lacking funds at a time when the monetary situation of the country was at its peak. For example, the Lebanese pound 170 million Saida-Tripoli coastal freeway project approved in the late 50s lacked the necessary funds and had to be constructed in segments over a period of twenty years.

As of 1983, this project was not yet complete, but it is well known that it exceeded its initial budget several times. Similarly, in the early 60s, an LL 80 million project ensuring the construction and maintenance of 1,700 kms of road network was reduced to 200 kms of penetration roads. This project would have established communications with and promoted the development of several remote and poor rural areas (37, 123).

To this effect, government public works suffer from a notorious administrative incapacity resulting in the following vicious circle: No adequate planning is done before construction, no supervision is performed during construction, and no maintenance is undertaken after construction. Consequently, the structure built does not fully satisfy the requirements of the society, suffers from poor quality, and usually has to be reconstructed prematurely (see Section 7.1.4, "Demand for New Construction Versus Maintenance Work") (123).

Also, several sources (e.g. 65, 107) complain about the unsteady flow of work over time and suggest that the government establish five-year plans to flatten the public sector demand curve. At present, the situation is as follows: Contractors who today undertake works for billions of pounds are to no extent guaranteed being active tomorrow. In fact, numerous contracting firms were caught with idle labor and equipment they had mobilized for a large project they have undertaken. (A detailed account of the upcoming public projects is presented in Chapter IX. Exhibit 7.2 lists past projects, undertaken between 1960 and 1975.)

As for the private sector demand, the requirements of modern construction and demographic growth are the major elements influencing

the construction activity. Some real estate speculation entered this market in the late 60s and has continued to the present time to play an important role. It is generally accepted that the yearly number of construction permits granted, the total floor area, and the total number of stories are the best indicators of private sector demand. However, these indicators should be handled with care since, for instance: the construction permits delivered are not always used, and often land promoters ask for building permits only in order to revalue their lands. Also, some juridical factors might influence the number of building permits. As an example, in the early 1980s, in an attempt to increase the government's revenues from construction permits, landlords were entitled to add a supplementary floor to their building.

Inversely, the numbers published by the Syndicate of Engineers tend to be underestimated since they do not account for illegal and/or informal construction. In all cases, these numbers are as follows (35):

<u>Year</u>	<u>Permit Granted for - M2</u>	<u>Number of Engineers</u>
1964	4,243,393	1,624
1974	4,027,397	4,291
1980	5,478,892	5,808
1981	6,437,622	6,351
1983	8,065,875	7,885
1984	4,103,657	8,793

Private sector demand can be divided into three periods. The first period, from 1960 to 1966, was one of undisturbed prosperity for Lebanon.

It was characterized by a sizeable development of the construction activity caused by an impressive demographic growth and by growing tourism and trade activity. The instability of several Arab countries caused huge amounts of foreign capital to be invested in the Lebanese construction activity. The total floor area constructed in Beirut reached and exceeded, for the first time in 1955 and 1956, one million square meters. However, the construction activity was badly affected in 1965 by a governmental decree restricting financial institutions from recovering in nature the important funds invested in mortgages on over 50 percent of Beirut properties. As a result, this decree contracted the number of loans granted to construction contractors. Equally important was the application of a progressive tax system over real estate revenue which made real estate less profitable.

The second period, from 1967 to 1974, can be subdivided into two sub-periods. The years from 1967 to 1971 witnessed a decrease in local construction activity as a result of the Intra Bank crisis, the Israeli-Arab conflict in 1967, and the sharp increase in interest rates on the world market. The latter event diverted local funds from the construction activity. As a result of the Intra Bank crisis, local banks insisted on keeping a high liquidity ratio and restraining themselves from financing long-term projects. Capital fled out of the country and huge construction projects were cut off from their financing sources. Consequently, the number of construction permits granted in 1968 decreased by 50 percent with respect to the 1966 level.

The second sub-period, from 1972 to 1974, was characterized by an important construction boom resulting from the country's political stability and liberal banking policy. As worldwide interest rates went

down, these factors contributed to bring to Lebanon a huge inflow of foreign capital. The flourishing economies of the petroleum-producing countries of the Arab Gulf invested huge sums in Lebanon, which enabled the banking sector to grant medium- and long-term loans to the construction sector. A high housing demand and a large inflow of tourists increased the level of construction as well as land speculation and real estate investments. Another positive element was the adoption by the government in 1971 of several laws easing construction restraints.

The third period, from 1975 to 1986, was characterized by political, military, and social unrest. The statistics on cement production (which, as noted above, gives an idea of the construction activity) for this period are not reliable mainly because of the presence of black market and cement smuggling activities. Production declined sharply in 1975-76 (see also "Construction Inputs"). Fortunately, the civil war did not directly affect the cement industry. This is due to the location of the firms in relatively safe areas and to their dependence on locally produced or supplied materials. However, postwar production volumes remained highly affected by the country's security conditions. (The 1978 production volume was lower than that of 1977 because of the military situation; the 1982 volume was low due to the Israeli invasion of Lebanon.) The country remained also afflicted by a high level of emigration of the specialized manpower, the decreasing purchasing power of the Lebanese pound, and a sharp increase in land and construction materials prices.

However, efforts to rebuild the country began in early 1977. The construction activity was slow to resume in war-torn Beirut, but it went back to its normal level in most other locations. Local demand was

boosted upwards. Yet it was only in 1979 that the production volume exceeded that of 1974, which is considered the most prosperous pre-war year. However, despite periods of heavy shelling -- or maybe because of them -- the construction activity was quick to resume, and reached in 1981 its pre-war level. This was caused by a large housing demand and an incredible rush on the real estate and undeveloped land speculation market (77, 123).

In 1983, a general mood of optimism was enhanced by the unusually assertive Western support for the peace process in Lebanon, which generated greater confidence in the country's future and thus in its economic recovery. As a consequence, permits were granted for the unprecedented constructed area of 8 million m² (35). In 1984, however, the military situation, the recession, and the inflation reduced this figure by as much as 51 percent (27). The situation was so dramatic that in Beirut, on average, one single permit would be applied for during an entire week (127).

7.1.3 Geographic Distribution

As far as public projects are concerned, Nammar (127) estimates that 15 to 18 percent of these are concentrated in the city of Beirut and an even greater share in its immediate suburbs. This is not surprising when one remembers that 1.8 (out of 3) million people live in the Greater Beirut.

As for the private sector, construction figures indicate that Beirut is significantly losing its important pre-war share of the construction market mainly to Mount Lebanon. Construction is actually concentrated in

the areas surrounding the capital between sea level and an altitude of 700 meters, and sensibly on the north of the capital than on its south (see below). The share of the five principal Lebanese cities (Beirut, Tripoli, Saida, Zahle, Baabda) with respect to the total floor area of construction permits went down from 40 percent in 1971 to 20 percent in 1981 (20). The post-war geographical redistribution of the construction activity is caused mainly by a redistribution of the Lebanese population at the aftermath of the civil war and a reverse migration of a large number of Lebanese from Beirut to the countryside. Overall, 415,000 persons were displaced in 1975-76, 265,000 in 1978, 250,000 in 1979, and 600,000 in 1982 (109). Other sources disclose even more dramatic figures whereby 35 percent of the population was exposed to migration in one way or another (121) and whereby one-third of the Lebanese need to be relocated (17).

This forced decentralization of the population strengthened the construction activity in several remote places in Lebanon. The postwar distribution of construction resides in the following locations:

- The northern coast of Mount Lebanon: The Lebanese war led to the division of the capital into an eastern and a western part in which most recreational facilities happened to be included. As a result, huge beach constructions were developed on the coasts of the Metn and Kesrouan districts, and the country's poor security conditions incited several families to use these units as temporary residences. In all, the coastal region between Antelias and Jbeil included 38 projects offering more than 40,000 units.
- The regions near the capital, especially between sea level and an altitude of 700 meters. These areas have a mild climate during the

whole year and are likely to attract those people who prefer to leave the congested and expensive capital but nevertheless be close enough to keep commuting times at an acceptable level (123).

In this context, Exhibit 7.3 shows the average price of land in various places of the country.

7.1.4 Demand for New Construction Versus Maintenance Work

It was determined, in 1969, that the share of construction output devoted to the repair and maintenance of the existing stock of constructed facilities ranged from 10 to 15 percent in developing countries, as opposed to 25 to 35 percent in industrialized countries (152). A later study of 34 developing countries found that repair and maintenance accounted for a lower figure of only 6 percent of total construction activities (140).

Available figures on construction output in Lebanon show it to be largely composed of new facilities; repair and maintenance activities, according to many (e.g., 37, 65) have not exceeded 10 percent of the total output for the last two to three decades. This is to be expected in developing countries which, in their march toward development, are faced with the necessity of providing new facilities. Also, as noted by Moavenzadeh (118), this relatively modest share of maintenance work in total construction demand in developing countries can be attributed in part to the relatively younger age of a limited stock of construction facilities.

Also, fragmentary evidence suggests that, in Lebanon, the importance of maintenance is declining steadily. Despite the fact that the price of

maintenance has increased at a lower rate than the price of new construction, it can still be seen that the government has preferred to direct resources to horizontal expansion rather than to the maintenance of previous investments. Further, because of the war, defaulting on maintenance has become a national phenomenon and the only activities still being undertaken are restricted to regular wear and tear (121, 123).

7.2 The Housing Crisis

7.2.1 Overview

As noted above, because of the military situation in the country, tens of thousands of people left their homes to take refuge in safer areas. To cope with this serious social problem, thousands of habitation units (including beach constructions) were hurriedly constructed. Nonetheless, the demand still exceeds the supply, and by far. According to Sassine (145), the housing problem is gaining today such huge proportions that the social stability of the country might be seriously threatened. As a result of the war, Sassine's figures reveal that more than 150,000 lodgings were destroyed, and an ENR article (72) discloses that 145 hotels were damaged throughout the country. On the other hand, Bsar (36) believes that Lebanon is in need of 20,000 units of habitation each year as from now until the turn of the century. In an attempt to estimate the funds needed every year, Sassine (145) made the following simple calculation: 20,000 x 100 sq. m at 2,000 LL/sq. m, which amounts to LL 4 billion, or approximately half the budget of the state for 1985.

In that context, it is interesting to note that the UN Economic Commission for Africa (154) suggested that, to meet the present and future needs for housing, developing countries should aim at an annual production rate of 10 units per 1,000 population. In other words, the minimum desirable rate for Lebanon would be 30,000 units per year, a fact that further exacerbates the problem discussed above.

7.2.2 Scope of the Problem

Actually, the roots of the housing crisis in Lebanon can be traced to the early sixties where a strong emigration from the countryside to the cities began to create serious socio-economic problems in Beirut. Before that, the Armenian emigration during World War I, the emigration of peasants from the south of Syria, and the installation of Palestinian refugees around cities had begun to put unexpected strains on the country's facilities (123).

Quite apart from all this, and from the forced displacements of population discussed earlier, the rise in the price of houses and in rental or leasing charges, and the increasing unwillingness of many landlords to rent out apartments and houses, have accentuated the housing shortage further, to the extent that it has been practically impossible for many low- and middle-income families to find suitable dwellings. Where available, for example, the rental cost of a two-bedroom apartment in Beirut reached as high as LL 50,000 to LL 70,000 in 1982-83, which is beyond the means of at least 65 percent of the population (56). In addition, landlords have tended in recent years to demand payment of the yearly rent rather than accepting the customary monthly or quarterly mode

of payment.

A number of factors explain these trends, particularly the preference for selling rather than renting houses. These include:

- The lack of an adequate rental law to protect landlords from the effects of inflation.
- The situation of insecurity and political instability, which made landlords uncertain that they would be able to collect rental charges.
- The rise in construction costs and the high cost of protecting property from squatters. Various types of construction material are imported, and their cost was pushed upwards by the gradual depreciation of the Lebanese pound.
- Population displacements and the movement towards safer areas, whether in Beirut or in its surroundings, which increased demand for housing in these areas, thus creating a seller's market.
- The rise in the price of land. According to a study prepared by the Ministry of Housing in 1983, the ratio of the cost of land to the total cost of an apartment building has increased in the past few years to between 30 and 60 percent, depending on the area, compared to between 20 and 40 percent in the mid-60s.

The relatively sharp increase in the price of land resulted from real estate speculation, limited investment alternatives, and the higher rate of inflation (91).

According to a survey conducted by the Central Directory of Statistics of the Ministry of Planning, the total number of dwellings in Lebanon in 1970 was estimated at 484,000 of which 396,000 (81.8 percent)

were permanently inhabited, 51,000 (10.6 percent) temporarily inhabited, and 37,000 (7.6 percent) empty.

In addition to these findings, a study by the United Nations Commission for Western Asia indicates the extent of the housing problem in Lebanon. It was found that:

- 8,000 families lived in slums.
- 60,000 families with an average family size of four persons lived in single-room dwellings.
- 69,000 families with an average family size of five persons or more lived in double-room dwellings.

This meant that 42 percent of Lebanese families lived in overcrowded dwellings, not to mention unacceptable sanitary facilities. This phenomenon is even worse in Beirut and its suburbs where 64 percent of the population lives in overcrowded lodgings (123). Further, Lebanon's additional housing needs were estimated at 400,000 units by the year 2000.

7.2.3 Proposed Solutions

Most of the blame about the present housing crisis is to be placed on the government's shoulders. It allowed the problem to reach such gigantic proportions while it could have been easily controlled in the early 70s. At that time, public and private financial institutions were in a state of excess liquidity and a few intelligent decisions made at an appropriate level would have prevented the housing situation from getting

out of control. The Lebanese civil war obviously worsened the picture by dismantling the government structures and paralyzing its economic role.

Few measures were indeed taken by the government, such as the organization in 1962 of a Housing Council whose role was to plan and regulate housing activities. A General Directory of Housing was then created in 1973 and followed in 1975 by the enactment of a housing law and the creation of a Ministry of Housing and Cooperatives. In 1977, the Housing Bank was created in order to finance housing projects, especially long-term ones, and manage public and private funds invested in the housing sector. But, as noted by Murad (123), the adoption of governmental measures, as it happens in Lebanon, is often followed by a wave of renewed optimism, but their application is a totally different story. The Housing Bank for instance, to function properly, is in need of LL 500 million per year, but the average yearly funding it has received since 1977 did not exceed LL 25 million (5).

How should then a viable solution be approached? The housing needs of Lebanon have reached a very serious level due to the convergence of several factors: A demographic growth, a large number of dwellings damaged or destroyed, a disequilibrium between the construction of new dwellings and that of recreational and commercial centers for sale, a drain of qualified construction workers, and an unfavorable rent law that is handicapping real estate developers in the construction of dwellings for rent (123).

As can be noted then, the problems in Lebanon dwarf any one has ever seen. As a consequence, several foreign commissions (U.S., Germany, etc.) did not succeed in their attempt to find viable solutions to the housing problem plaguing the country (56).

In all cases, a local source (123) suggests that the production of the needed dwellings requires the action of the government in the following three directions: to produce and put at the disposal of constructors sufficient areas of underdeveloped land suitable for construction purposes; to put in place financing systems that help both the constructors and the buyers of new constructions face soaring prices; and finally, to act directly on prices by promoting some kind of adaptation of the Lebanese industrial and commercial potential to the housing demand.

Finally, as noted by Minister Babikian (13), whatever action is done should take into account the multi-dimensional aspect of the problem: i.e., equal importance should be given to the social, economic, and juridical implications of the housing problem.

VIII. THE REGULATORY ENVIRONMENT

8.1 Regulating Construction Activity

The government plays two roles in the construction industry in Lebanon, participant and overseer. This is apparent through numerous financial and technical laws, regulations, decrees, and codes that affect directly and indirectly the construction industry.

Indeed, the government regulates various sectors of activity in the Lebanese economy, and construction and building are no exception. Because construction represents a significant share of investment in other sectors (agriculture and irrigation, industry, mining, electricity, housing and utilities, commerce and finance, transportation and communication, and services), regulations affecting these sectors ultimately affect construction as well (119).

8.1.1 National Planning for Construction

As briefed by Murad (123), a program for the period 1958-59 constituted the first attempt at economic planning in Lebanon. This was shortly replaced by a shorter and more detailed plan for 1960/61 - 1964/65. The revised version proved to be too ambitious, and expenditures fell short of desired goals. A third plan was then proposed for the period 1965-69 at an envisioned total cost of LL 1.08 billion. It focused on general infrastructure development, with little or no governmental role in the private sectors of the national economy.

A fourth plan then focused on social and economic development in the

period 1972-77. This LL 1.74 billion proposal was more realistic than any of its predecessors. It was based on a 7 percent overall rate of growth and implied individual sectoral rates of growth that were feasible (6 percent for the construction activity, 9-10 percent for the industrial sector, and 11-12 percent for industrial exports). The Ministry of Planning hoped that this plan would lead to a more equitable distribution of income among the various classes and geographical areas. However, the plan underestimated the amount of investment that was needed to achieve its major goals and exacerbated the already glaring inequalities in income distribution. Government activities were limited to the provision of needed infrastructure; irrigation, electricity, roads, education and communications constituted together about 60 percent of the total allocations. As is often the case in Lebanon measures, when at all taken, would remain far beyond expectations.

In late 1976, it began to appear that the violence which characterized the previous two years might be nearing its end. Consequently on January 31, 1977, the government issued Decree Law (DL) Number 5 which formed the Council for Development and Reconstruction (CDR). The decree granted the CDR unprecedented powers for a governmental unit in Lebanon, particularly in the financial field. The CDR is empowered to finance any project or program assigned to it by contracting internal and external loans. The government guarantees these loans up to the level of 15 percent of its total budget. In turn, the CDR is able to create and finance credit facilities for the stimulation of both private and public sector activities.

The Ministry of Planning was abolished by the same decree and the CDR was made responsible for preparing a general plan and program for

development and reconstruction. The CDR is also responsible for international agreements in the areas of economic and technical assistances.

In some cases, the CDR is requested to undertake the execution of projects, although wherever feasible it prefers to leave project implementation to existing agencies. In all such cases, the CDR attempts to strengthen or create new administration mechanisms and to transfer responsibility to them as soon as feasible.

The CDR is thus a key institution in the reconstruction process, its scope of action extending from public sector infrastructure creation to private sector credit generation. Security and political conditions in the country since 1977 have prevented the acquisition of the senior staff required to exercise fully the powers granted to the CDR in DL No. 5. Rather than expand staff rapidly regardless of quality, the CDR has chosen to remain small and to refrain from filling several senior positions until qualified talent could be found.

DL No. 16, dated 25 March 1983, amended DL No. 5. The new structure of CDR consists of a board of Directors and executive departments, plus an advisory board.

The Board of Directors consists of the President of CDR as chairman and five members acting as department heads with one of them as vice president. All board members are full-timers and are appointed for four years. The advisory board members are appointed on a part-time basis for two years and their number ranges between at least eight and a maximum of twelve.

Decree No. 383, dated 25 March 1983, lists the five CDR departments: programs, projects, financing, legal affairs, and information.

In the coming months, however, if national authority and security can be established throughout the country, the special powers of the CDR, its experience in using them, and the existence of ongoing projects and programs initiated since 1977, combine to create conditions favorably for a rapid massive acceleration of reconstruction activity (43).

Since its creation in 1977, the CDR has been the most active government body as far as public works are concerned, outstripping the Ministry of Public Works and the "Counseil Executif des Grands Projects." Also, its powers, unprecedented for a governmental unit in Lebanon, have been viewed by many as exaggerated, overriding in some instances those of the Lebanese Parliament (13).

8.1.2 The Construction Code and its Limitations

It is generally accepted that there are serious deficiencies in the laws of the Lebanese Construction Code. And, when these laws exist, there is no effective government body to take charge of their application.

In 1971, 1978, and 1983, new laws and regulations were passed to improve construction quality and quantity. They give the engineer more freedom in designing the buildings and encourage higher buildings to appear. But despite this attempt to regulate the construction activity, legislative actions in this sector have always been half-measures (123):

- First, the construction law does not cover Lebanon in its entirety. Residential, industrial, recreational, and agricultural zoning is only limited to those areas that are densely populated. Areas that have

not been surveyed fall under the jurisprudence of the old construction laws or are subject to temporary regulations.

- Second, the clauses of the construction law are sometimes incoherent. Some regulations differ from one region to another for no apparent reason. Residential and heavy industrial zones are put back-to-back without hesitation, especially in the suburbs of Beirut.
- Third, while most countries in the world allow construction in few and specific areas, Lebanon allows construction over its entire territory except for few locations. This situation puts tremendous pressure on public utilities companies that have to connect remote areas to water, waste water, electricity, and telephone networks. The problem is further exacerbated by construction activity on illegal sites such as that in the perimeter of the Beirut International Airport, posing a threat to civil aviation. In 1983, a survey of 1,000 housing units in buildings located in areas that are considered extensions of the airport's eastern and western runways showed that about 120 buildings were dangerous to civil aviation (91).
- Fourth, the allowable coefficients of exploitation are inadequate and do not match the transformations of the socio-economic requirements of the country. (There are two coefficients of exploitation, horizontal and total, set differently for each zone in the country.) For instance, these coefficients do not exceed 22 percent in some areas of Beirut.
- Fifth, the 1971 construction law revoked a regulation of the previous law regarding a maximum allowable height of 26 meters, but it still restrains height since it leaves it a function of the street width and the area left in front of the entrance. Under the law, tall buildings

could only be constructed over large areas of land. This was quite impossible to achieve on the small and expensive terrains of Beirut. As a result, Beirut quickly became a town with almost no green parks and gardens.

- Sixth, the four year validity of construction permits is inadequate in case of large projects necessitating a longer period of time. Owners of such projects were stuck with the possibility of paying twice the construction fee until 1978 when a new law extended the validity of construction permits by four more years subject to minor restraints.

Talking about permits, these have to be requested (and are usually obtained within 15 days) by an Engineer/Architect registered in either Syndicate of Beirut or Tripoli. The application for the permit must be accompanied by the following set of drawings (30): mass plan (1/1000), implantation plan (1/100), foundations plan (1/100), two sections (1/100), and two front views (1/100). In this context, several sources noted that the government is more interested in height, coefficients of exploitation, and recesses from streets and from other buildings, than in the structure of the building per se (121).

The solutions to the above problems lie in the adoption of new construction laws that have, among other things, fewer restrictions on the height of buildings. Tall buildings and sky-scrapers have obvious advantages: They require relatively smaller coefficients of exploitation and improve the distribution of free space areas in congested cities like Beirut. Note that the rocky grounds of Beirut would not pose any foundations problems in this regard. Tall buildings also bring to the serious housing shortage in Lebanon a new solution in

the form of extensive housing facilities over a small area of land. And finally, the use of smaller coefficients of exploitation will not result in higher land prices in the case of tall buildings since the small base area used is offset by a larger total floor area.

As for zoning, the government has to undertake a complete survey of Lebanese regions using a stricter definition of residential, industrial, recreational, and agricultural areas. All forms of construction should be forbidden over recreational areas. On the other hand, the coefficients of exploitation of residential areas have to be increased. These measures will have two significant and positive effects: They will enhance the profitability of construction over those areas of land that had previously low coefficients of exploitation. This will offset the effect of high land, materials and labor cost and will encourage the construction of cost-effective popular dwellings. The above steps will also put an end to the disorderly construction that led to an urban disaster in Beirut and its suburbs and in other regions of the country. In that same context, sources 18 and 30 underline the necessity to revise various coefficients, but not to the detriment of aesthetics. Murad (123), in turn, notes that such factors as aeration and space between neighboring buildings should be studied carefully in order to avoid unattractive areas which are quickly converted into slums.

In a spectacular attempt to increase the coefficients of exploitation (and indeed benefit from the proceeds of new permit applications) the government has, in 1980, authorized the addition of an extra floor to all buildings (156). This measure, however, did not contribute much in the solving of the aforementioned problem.

On the other hand, and to avoid any excessive expansion of the

capital at the expense of the rest of the country, the government has to encourage construction in other urban zones. (In this context, Chaya (46) observed that by the turn of the century, the Greater Beirut would have gained such gigantic proportions as to absorb a substantial part of the country, transforming it ultimately into what he called a huge "Libanville".) This can be achieved by adopting less stringent construction regulations in the major cities, improving the road network, and applying an administrative, industrial, and cultural decentralization policy.

Also, the government should require the construction of specific building subsystems (e.g., underground parking facilities to reduce traffic congestion). Building owners should no longer be given the choice between constructing a parking facility or paying a fee. While most owners choose to pay a fee, the total amount received by the government is not sufficient to build parking lots due to soaring land prices (123).

As can be seen, much remains to be done in order to improve the current Construction Code which concentrates more on the shape than on the structure of the building. These revisions become all the more important when one knows that there are almost no provisions for fire, emergency exits and stairways, etc.

8.1.3 Relations Between Main Participants

In Lebanon, contracting is governed mainly by the "Cahier des Clauses et Conditions Generales" (and indeed by FIDIC conditions), prepared by the Ministry of Public Works in 1941. It defines the broad

responsibilities of the client and the professional as well as the contractor. It is similar to that of several countries (e.g., Civil Law 131 in Egypt (119)) and specifies, among other things, the following:

The contractor may supply both labor and materials or only the latter. He must perform the work according to accepted practice, and the owner has the right to ask him to rectify the work according to the contract (in this instance, the extra costs are paid back to the contractor at the rates specified in the contract, and at higher rates if the changes exceed 20 percent of the value of the works). If the contractor does not comply within the specified time, the owner may correct the mistakes at the expense of the contractor. The contractor may subcontract, after having consulted with the client, parts of the job, but he remains responsible for all work.

Upon completion of construction, the client must take delivery of the facility and pay the contractor as much as 90 percent of the value of the works, retaining the remaining 10 percent for no more than a year to ensure maintenance and/or reparation of eventual defects. If the contract is on a unit cost basis, the contractor must inform the client of any anticipated price increase above the budget. Where the increase is considerable, the client has the right to cancel the contract, and compensate the contractor for the work he has completed according to the contract. If the contract is lump sum, based on a particular design, the contractor cannot claim any increase in payments.

The legislation also allows the client to terminate the contract at any time provided he compensates the contractor for his work and for what he would have earned had he completed the project. The contract may also be terminated if it becomes impossible to execute the work. If the

contractor shall become bankrupt or shall go into liquidation, the client may after giving 14 days notice in writing to the contractor expel the latter without thereby avoiding the contract or releasing the contractor from any of his obligations or liability under the contract.

However, the contractor is under no liability to pay any amount for any damages incurred from "special" risks (invasion, rebellion, revolution, insurrection, civil war, etc.) and he is entitled to be paid by the client for any works done by him to make good any damaged works. In this context, the contractor is to insure in joint names (of him and the client): the works, workmen, and third party. However the contractor may cover himself by a comprehensive insurance. In case of the contractor's failure to insure, the client may take insurance himself and deduct from any money due or which may become due to the contractor all amount paid by him to the insurance company. (As a rule of thumb, premiums are about 3 percent of construction cost.)

Now, under the "Federation Internationale des Ingenieurs-Conseil" (FIDIC) and the Lebanese legislation, any dispute that occurs between the client and the contractor must be settled by the engineer within 90 days.

However, any of the parties who feel that no justice is done may take the matter to arbitration or take legal action in court. In this context, the contractor is deemed to have satisfied himself of all matters that might affect his tender and allow for them. Then, during the works, only those extra costs due to reasonably unforeseen physical conditions and artificial obstructions are reimbursed to the contractor.

8.1.3.1 Owners and Users

Until now, "owners" and "users" have been treated as one and the same. In practice, of course, owners lease to users in rental markets. In Lebanon, however, there is a preference for selling rather than renting houses. A number of factors explain this trend. Those include (91):

- The lack of an adequate rental law to protect landlords from the effect of inflation.
- The situation of insecurity and political instability, which made landlords uncertain that they would be able to collect rental charges.
- The rise in construction costs, and the high cost of protecting property from squatters. Various types of construction materials are imported, and their cost was pushed upwards by the gradual depreciation of the Lebanese pound.
- Population displacements and the movement towards safer areas, whether in Beirut or elsewhere, which increased demand for housing in these areas, thus creating a sellers market.
- The rise in the price of land. According to a study prepared by the Ministry of Housing in 1983, the ratio of the cost of land to the total cost of an apartment building has increased in the past few years to between 30 and 60 percent, compared to between 20 and 40 percent in the mid-60s. The relatively sharp increase in the price of land resulted from real estate speculation, limited investment alternative, and the higher rate of inflation.

Also, Lebanon's rental law, which was amended in 1983, has favored tenants in that it did not allow landlords to increase rental charges for unfurnished apartments and houses. Accordingly, landlords have justifiably complained that tenants eventually became permanent residents of rented property rejecting any increases in rental charges that are not justified by law and demanding large sums in compensation for the evacuation of such property. In this respect, many cases have been cited where landlords have incurred losses on rented apartments because of the rise in maintenance costs. To overcome this problem, many landlords have tended in recent years to prefer selling rented apartments and houses to their tenants. All this explains why landlords have become increasingly reluctant to enter into rental agreements. Moreover, and where such agreements have been concluded, the rental charge has been twice or even three times what may be considered as the reasonable market price, and this to allow landlords to hedge against inflation.

8.1.3.2 The Government as Client

The government as client is regulated by laws, regulations, and decrees. Only those contractors with certain credentials are eligible for governmental work (cf. Chapter VI). Also, when bidding, contractors are required to submit a detailed list of their past experience with government and public sector companies. If they have none, they must prove they have experience in activities similar to the one for which they are bidding. While such prequalification is important and necessary, it is not always enforced rigorously in Lebanon. Also, any bid submitted to a government agency must be accompanied by a guarantee

of 2 to 5 percent of the total value of the bid. This guarantee may take the form of cash or of a bank guarantee drawn on an approved local bank.

Under the general conditions of contracts with the government, the contractor must commence the works within the period named in the tender, after the receipt of a written order. Certain general constraints are, at the same time, imposed on the contractor, whereby he cannot relinquish the contract or his dues to any other party without the written consent of the client agency. By the same token, the contractor is not entitled to sublet any part or the whole of the works. Even with the client's consent, the contractor is held fully responsible for any defaults or neglects of any subcontractor, his agents' servants, or of workmen, as long as they are his. The contractor bears all costs associated with following various laws and regulations, such as fees for building permits. He bears also the cost of samples and tests as stated on the contract. The contractor is responsible for checking all drawings and specifications, and for notifying the agency as to their adequacy, for which he is then also responsible. In case of error, the agency reserves the right to rectify it without further compensation to the contractor. Also, it has full power and authority to supply the contractor from time to time any instructions or further drawings when necessary for the proper execution of the works. And further, the administration reserves the right to alter the contract by 20 percent, up or down, without having to compensate the contractor.

The contractor is usually paid in installments according to the progress of the work. Those comprise 90 percent of the work executed according to the unit costs of the contract, and 70 percent of the value of the unfixed material stored by the contractor.

The contractor must execute the works within the time of completion stated in the tender. In the case of extra or additional work, the agency determines and grants eventual extension of time. If the contractor fails to finish on time, he must pay liquidated damages, the amount of which is stated in the tender.

When the works have been substantially completed (95 percent), and have passed any final test that may be prescribed by contract, the agency issues a Certificate of Completion. The Period of Maintenance (one year) then commences from the date of such certificate (25, 79, 113, 119, 121).

8.1.4 Controlling Construction Work

8.1.4.1 Standards and Codes of Practice

As noted above, the government concentrates more on the shape than on the structure of the building. The legislation deals mainly with such issues as coefficients of exploitation, recesses from streets and neighboring structures, building height, ceiling height, lighting, ventilation, stairways, sanitary services, and so forth.

As explained by Moussa (121), there is virtually no inspection by the government during construction. Therefore, from the obtention of the permit until the handing over of the building, the government is in effect absent, a situation that does not encourage close adherence to building codes. It all starts with a person obtaining a permit (when even bothering to do so) and not complying with it, hoping that the compensations it will have to pay would be substantially less than the benefit it draws from that infraction. Later, during construction, the

Syndicate of Engineers requires that a form be completed at every concrete pouring, but this does not prevent numbers from circumventing the law once more. Finally, before awarding the occupation permit (usually within one month of completion of the works), the government checks on such items as the layout of the mechanical room, height of steps, balustrades and windows, and sanitary services. As urged by many, the government should look more closely into ways of throttling the anarchy prevailing in the field of construction.

8.1.4.2 Contract Documents and Tendering

Much has been said in Chapter VI regarding these topics. What is essential to note is the absence of any standard set of documents for construction works in Lebanon. The normal documents comprise, besides drawings, conditions of contracts, specifications, and bills of quantities.

(a) Conditions of Contracts

There are no Lebanese standards per se. Instead, FIDIC (79) international standards, with little amendment, are the most widely used. It is generally said that in Lebanon (and indeed in other countries, e.g. Egypt (119)) the conditions of contracts generally favor the client. They fail to assign fairly the rights, liabilities, or responsibilities between client and contractor. As a simple example, while penalties for delays are established, there exist no bonuses for early completion. In the same vein, undue operating deficits are created by the shortfall

between (late and arbitrary) owner repayments and the contractor's necessary expenditures on materials, equipment, and payrolls.

(b) Specifications and Bills of Quantities

In Lebanon, specifications according to U.S. and British practice are widely used (cf. Chapter VI), together with the International Society Organization (ISO) standards. The countries of the Middle-East have really only just started to prepare their own standards. Nevertheless, the Lebanese construction uses a standard specifications format for substructure, plain and reinforced concrete, bricks and masonry, plastering, tiling and flooring, stains, marble works, finishes, joinery, metalwork and iron mongery, painting, sanitary work, air-conditioning, and lifts. Details vary from job to job, but the basis for a new project is usually the specification from a similar old one, a practice that leads to wide discrepancies in the context of specifications.

As briefed by Moussa (121), the absence of national standards and the arbitrary adoption of various foreign practices constitute a major drawback of the construction activity in Lebanon.

(c) Tendering Procedures

Although negotiations as a means for tendering is common procedure in Lebanon, competition is greatly encouraged. It can be either open or selective. The selective method is widely used, whereby a selected list of contractors considered appropriate by the client is invited to bid on a project. To properly apply this method, the "prequalification" of

contractors must be complete (119). This procedure would be improved considerably if contractors were truly registered according to their capabilities (see also Chapter VI).

8.2 Regulating Relations Between Participants and the Government

In Lebanon, various laws governing company formation, foreign investment, company registration, capital markets, and taxes directly affect the operation of any company.

8.2.1 Company Formation and Registration

Business law in Lebanon recognizes several forms of firm organization: proprietorships, partnerships, and corporations (which may be in the form of sole proprietorships, general partnerships, or limited partnerships). As noted by Murad (123), corporations are not very popular in Lebanon. They represent 3 percent of the total number of industrial firms in the country (149). Nassif (129) indicates that there are two reasons behind the rejection by the general public of corporations. First, the controls applied on corporations by the government are lax. The only information that a corporation discloses is a yearly balance sheet and income statement. This leaves the small investor in the dark. Second, tax legislation in Lebanon, in its present form, gives a more favorable treatment for partnerships and single proprietorships. While the profits of a partnership are divided by the number of partners, and the tax bracket is determined for every partner individually, the corporation is taxed as a whole entity. Thus, even if

two companies earn the same amount of profit, the corporation will always pay a much higher tax. To offset this, controlling shareholders appoint themselves as officers of the company and thereby increase their personal salaries and reduce corporation profits. These two factors, lack of control and disadvantageous tax legislation, and the resulting behavior of controlling shareholders, have frightened many small investors. Simonian (149), in a study of Lebanese corporations, concluded that "the corporate firm was not conceived of as a means to raise capital but as a means of engaging into business with limited liability."

A final word concerning the registration of construction firms is in place. Architects and engineers should register, as individuals, in either Syndicate of Beirut or Tripoli. Firms, on the other hand, were in 1952 requested by the Syndicate of Engineers to be classified as either design firms or as contracting firms (107). The registration in the Syndicate of Contractors is not required for those firms not working for the public sector. The obtention of a commercial registration number is, however, mandatory.

8.2.2 Taxation

There are basically two kinds of taxes in Lebanon:

- Income taxes, levied on income from moveable capital, commercial and industrial activities, wages and salaries, professional activities, and real estate, and the general income tax, levied on the net income of all individuals.
- Capital or wealth taxes levied mainly on inheritances, and a real estate transactions tax.

All contractors, suppliers, developers, and stock companies engaged in public and private construction are subject to the commercial and industrial tax for income earned in Lebanon. Activities abroad are taxed when they are being administered from within Lebanon.

Unless a company is registered under a "personal name" (in which case the amount of taxes is contractual), its taxable income is based on its "real" profits, compensating for any eventual losses (107).

Having this in mind, all construction participants are subject to the regular income tax. The latest modifications were brought to the income tax law in 1985. They have modified, both qualitatively and quantitatively, the stipulations of this law for all income brackets and categories of taxpayers: businessmen, traders, industrialists, workers and employees, public servants, daily workers, and all other wage earners.

(1) Modifications of Income Tax on Salaries and Wages

(a) Modifications Affecting Fiscal Exemptions

Rebates constitute the criterion on which any evaluation of fiscal policy should be made. The larger they are, the lower are taxes levied, and vice-versa. Rebates were modified by the law to the benefit of the taxpayer, especially through family rebates. These were set at LL 1,200 per annum for the wife and LL 1,000 per annum for every child (up to five children). The new law stipulated the adoption of ratios to compute the rebates (30 percent for the wife and 10 percent for every child). This mode of computation saves the effort of a periodical re-evaluation of

exemptions to account for inflation, and provides the taxpayer with a wider margin of untaxable income. This is justified by many social and humanitarian factors rooted deeply in the difficult economic conditions prevailing in the country. The exemption applies not only to children under age 18 years, but also to those under 25 years provided they are enrolled in a university or handicapped and with no paid job. A certificate issued by the Medical Committee of the Ministry of Health is needed to confirm that a person is handicapped.

(b) Modifications of Tax Rates

The tax rate is always fixed and is computed on the basis of income brackets. However, these brackets were doubled as a direct result of inflation. For example, the first bracket which included salaries not exceeding LL 4,800 with a tax rate of 2 percent, has been widened to include salaries up to LL 9,000 to be taxed at the same rate.

As a result of inflation, a new bracket had to be included, namely that of taxable incomes exceeding LL 330,000 per annum with a tax rate of 32 percent. The maximum rate under the previous tax law was 28 percent.

(c) Numerical Example for the Computation of Income Tax

Consider the case of a wage earner whose annual income is LL 50,000. He is married, has a 16-year-old daughter and two sons: the elder, aged 30, is handicapped, and the younger, aged 23, is a university student.

Annual tax exemptions in this case are as follow:

One exemption applies to all wage earners:

LL 1,475 (actual minimum salary) x 12 = LL 17,700.

- Exemption for the wife: $(17,700 \times 30)/100 = \text{LL } 5,310$

- Exemption for 3 children: $(17,700 \times 10)/100 = \text{LL } 1,770$
x 3 sons = LL 5,310

Taxable income is therefore: $\text{LL } 50,000 - 17,000 + 5,310 + 5,310 = \text{LL } 21,680$

The tax due amounts to:

2% of LL 9,000 = LL 180

3% of (LL 15,000 - LL 9,000) = LL 180

4% of (LL 24,000 - LL 15,000) = LL 267

up to LL 21,680

The income tax for the year will be $\text{LL } 180 + 180 + 267 = \text{LL } 627$. The rebate to the wife is not applicable if she is working.

(2) Modification of Income Tax for Daily Workers and Those with a Lump-Sum Remuneration

(a) Daily Workers

The rebate, regardless of family status, has been increased from LL 27 to LL 70 per day. This considerable concession aims at favoring this

category of "underprivileged" workers because of the irregular nature of their employment, especially these days when factories are frequently closed and public works jobs are scarce.

(b) The Lump-Sum Remunerations

These remunerations are taxed on the basis of the lowest rate (2 percent) and with no rebate. The applicable tax rate has been set at 6 percent. This increase enables the Treasury to benefit more adequately from taxing these high remunerations. Yet one question remains: Is the government able to control these incomes? This task appears difficult, at least for the time being (78).

IX. FUTURE PROSPECTS AND THE RECONSTRUCTION

"There is so much to be done. Besides the reconstruction of the destroyed or damaged areas, the whole infrastructure of the country should be updated: highways, road networks, ports, industries. If the reconstruction of Lebanon were to start today, all our professionals would be busy for at least ten years" (36).

As might be expected, Lebanon is facing today a monumental reconstruction task, and only the implementation of a "Marshall Plan" can still put the country back on its feet. According to U.S. Ambassador Bartholemew (14), the reconstruction bill amounts to (summer 1984) \$33.2 billion (as a comparison, the budget of the State for 1986 is approximately \$1 billion at December 1985 rates). The World Bank, in turn, estimates damage to housing (1983) at over \$1 billion; to the Beirut Port at \$18 million; to the Beirut Airport at \$22 million; to roads \$22 million; to the water supply \$82 million; and to the power \$60 million. The damage to the center city, which resembles in some areas Stalingrad, is reckoned at \$1.8 billion (11).

And doubtless, by the time this study is read, renewed fighting would have resulted in additional destruction of housing, infrastructure, and of industrial and commercial establishments in vast areas of the country. Sassine (145) reported in September 1985 that 150,000 units of habitation were destroyed. In Tripoli (northern Lebanon) the fighting of October 1985 alone resulted in the destruction of 3,675 lodgings. Moreover, Tripoli's additional reconstruction cost amounts to Lebanese pounds 4 billion,

or approximately one-fourth of the State's budget for 1986 (135).

Early in 1977, when the "civil war" came to an end, the Lebanese government contracted the "Atelier Parisien d'Urbanisme" (APUR) for the restoration of the 345-acre city center (73) where most of the country's commercial concerns and hotels were located (145 hotels throughout Lebanon were destroyed (72)). Based on the APUR's conclusions, the Lebanese government, through the Municipality of Beirut, prepared a plan of the government's major spendings for the rehabilitation of the capital (Exhibit 9.1) (122). However, due to the combined effect of inflation, decline of the exchange value of the Lebanese pound, and additional destruction between 1978 and 1986, Beirut Administrator Nammar (127) suggested that Exhibit 9.1's figures be multiplied by a factor of 10, or even 15.

In this context, Murad (123) notes that the government should take advantage of the complete destruction of the old commercial center of Beirut to reconstruct this area from scratch and implement an effective urban planning policy. Indeed, unfavorable rent laws have since the mid-50s prevented the execution of several modernization operations in downtown Beirut, and have contributed to its chaotic arrangement. Also, as is often the case in Lebanon, the aforementioned project was criticized to a large extent and its execution consequently delayed. As further noted by Murad, this may have several negative effects:

- Reconstruction operations could lead to chaos if they are not controlled by the government.
- Any land speculation in the Beirut commercial center will increase

future costs of governmental expropriation as well as the number of claims against the government.

- A set-up of new plans will delay the reconstruction of downtown Beirut and increase construction costs. For example, reconstruction of the Beirut commercial center, which would in 1977 have cost LL 700 million, would by 1983 have increased to cost LL 2 billion. Furthermore, the construction of huge structures (e.g., underground tunnels) must take place as soon as possible, before the start of other above-ground construction works.

Finally, the government should in the long-run construct new administrative buildings concentrated in specific areas. This would improve coordination among the various administrative branches and reduce drastically the enormous rents that the government is actually paying for leased buildings (123).

In late 1976, it began to appear that the civil violence which characterized the previous two years might be nearing an end, and officials started considering reconstruction perspectives.

The then-Minister of Public Works, Mr. Amin Bizri, declared that the most likely approach to undertaking major reconstruction projects was through joint ventures made up of Lebanese and foreign companies (71). To this effect, Vernon (160) notes that almost a third of foreign subsidiaries in developing countries have been established through the acquisition of going businesses. In an attempt to attract foreign investors, the government of Lebanon established, under legislative decree No. 3 of January 19, 1977, the National

Organization for the Guarantee of Investments, which insures new investments against the risk of war and general civil disturbances including civil war, revolution, sedition, and public acts of violence. At a premium of two per thousand, the facility compensates losses exceeding 5 percent of the total insured amount. The organization is attached to the Ministry of Finance and its liabilities are guaranteed by the state. Incredibly, since 1977 (11, 47), it has honored every one of its debts and agreements.

A few days later, on January 31, 1977, the government issued Decree Law No. 5, which formed the Council for Development and Reconstruction (CDR). The decree granted the CDR unprecedented powers for a governmental unit in Lebanon, particularly in the financial field. The CDR is thus a key institution in the reconstruction process, its scope of action extending from public sector infrastructure to private sector credit generation (43). These exaggerated powers granted to the CDR were criticized by many, among which is the President of the Parliament's Commission for the Reconstruction himself (13) who decried the non-association of the Parliament in the CDR's decisions regarding reconstruction as being a constitutional aberration.

Late in 1982, the CDR prepared a reconstruction expenditure program that runs from 1983 to 1991 (Exhibit 9.2). Once again, the given figures might not be applicable anymore.

The first question to arise is: Who is going to handle the gigantic reconstruction task? Khalaf (98), cited by Murad (123), suggests that the reconstruction requires the following manpower:

<u>Labor Category</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Year 6</u>
Supervision	2,568	2,569	2,235	1,148	1,134	946
Staff						
Skilled Labor	5,695	5,824	5,105	2,593	2,880	2,328
Semiskilled/ Unskilled	18,487	17,878	16,286	8,151	8,190	5,274
Professionals	3,909	3,728	3,297	1,639	1,849	1,018
Draftsmen	7,856	7,530	6,461	3,299	4,011	2,182
TOTAL	38,515	37,522	33,384	16,830	18,244	11,748

In this context, U.S. Ambassador Dillon (55) wrote, in November 1983, the following: "We have looked at the labor situation in Lebanon as it affects reconstruction and find that some of the key-workers needed for major construction projects -- carpenters, equipment operators, mechanics, electronics, welders, plumbers, etc., are now hard to find." Azar (11), in turn, notes that 30 percent of construction workers and half the industrial force of Lebanon emigrated during the 1975-77 period. Another source (26) presents a darker picture of the situation whereby it appears that 45 percent of the construction workers, 48 percent of the engineers, and 70 percent of the industrial work force have left the country.

On the other hand, it is interesting to note that the private sector will be very active in the reconstruction of the country and in fact may

end up doing the lion's share of the work because it has better personnel, more resources, and a highly entrepreneurial tradition.

The second and most crucial question is: where the money will come from, for reconstruction and development? A brief retrospect might be appropriate. Contribution from Arab oil-producing nations has been coming in bits and pieces. To this effect, although Arab aid is theoretically given for "oil deficits, for general balance of payments supports, for postwar reconstruction," Lebanon has received, in all, 3.8 percent from the total aid given by the Arab Fund Assistance. From the Abu Dhabi Fund for Arab Economic Development, Lebanon received (1977) 41 million dirhams for the reconstruction of the port and 27 million dirhams for the electricity network. From the Arab Fund for Economic and Social Development, the country received (1977) 6 million Kuwaiti dinars for the electricity network and 5.5 million dinars for the port's fourth basin (104). In all, between 1976 and 1978, Lebanon received \$46 million in aid, or \$16 per person (58).

In 1979, the Arab League Summit pledged \$2 billion to Lebanon (\$400 million per annum to be given over the next five years), but only \$384 million has been received, and that is mostly from the United Arab Emirates, Kuwait, and Saudi Arabia, the only countries to honor their pledge (Exhibit 9.3). Most of the payments were cut off in 1983, but the October 31, 1985 issue of Lissan Ul-Hal (105) noted that there were strong reasons to believe that Kuwait and Saudi Arabia were about to pay the remaining of their shares.

The European Economic Commission, in turn, has committed itself to a \$23 million package beginning 1979 (47). Exhibit 9.4 shows the major reconstruction loans granted in 1977-78.

Azar (11) notes that part of the total reconstruction money can be raised from within Lebanon itself. Private banks holding in Lebanon (1983) are about \$4 billion. That is separate from what the Lebanese government holds, which is approximately \$5 billion in the form of reserves and gold. But if it draws on that money, it will soon go bankrupt, and Lebanon is the only country in the Middle East that has not throughout the decade of 1970s or 1980s borrowed substantial money from outside sources. The Lebanese abroad, quite consistent with their extraordinary resourcefulness, hold \$12 billion in assets, and when they begin to feel some sense of security in the country, that money may start to roll toward Lebanon. (A more recent study (138) reveals that Lebanese holdings in off-shore banks amount to \$30 billion.) Indeed, the debate has been ongoing for some time on who should finance the reconstruction. Atallah (10) believes that the Lebanese government should provide at least 25 percent of the total amount. Murad (123), citing Lebanese sources, suggests that the bill be split as follows: 33 percent supplied by Lebanon, 33 percent by Arab countries (mainly Saudi Arabia), 17 percent by International institutions, and 17 percent by the U.S. In this context, one measure of U.S. concern and involvement has been an expanding program of relief and rehabilitation assistance which, since 1977, has totaled more than \$200 million. In addition, the U.S. provides support to the Council of Development and Reconstruction, created in early 1977.

Also, the Agency for International Development (AID) has assisted in, if not directly been involved in, establishing or looking to recommendations from such organizations as the Preston Commission, which is a U.S. businessmen's commission specifically dedicated to the

reconstruction of Lebanon. AID has also been involved in the coordination of the American Lebanese Private Sector Corporation, Inc. (ALPSCI), a volunteer organization.

It is interesting to note, in this context, that many foreign countries and/or investors showed great interest in the reconstruction of Lebanon. "Big businessmen have flown in from Europe and even Hong Kong," noted a MEED article (108) in November 1982. United States missions, however, were the most spectacular. In October 1982, for example, executives from fifteen major U.S. construction and engineering firms were invited by the Lebanese Contractors Association and the Beirut Chamber of Commerce and Industry. The visit was organized by the U.S. Overseas Private Investment Corporation (OPIC). Companies represented on the mission were the Bechtel Group, Blount International, Boring and Tunneling Company of America (Bortunco), Brown and Root, Dames and Moore, Fischbach and Moore International, Green Construction, Paul N. Howard, Morrison-Knudsen, Pepper Construction International, Perini Corporation, Ransome, Raymond International Builders, M.M. Sundt International, and H.B. Zachry.

OPIC President Craig Nalen summarized the mission's overall impression: "The Lebanese construction industry is a formidable one" (108). And indeed it is. Despite eleven years of war and the lagging world recession, the construction sector in Lebanon has remained incredibly resilient. Moreover, as noted by Murad (123), all the elements are available for still a further advance in that sector: "There is no shortage of engineers, even though most are recent graduates. The local construction materials industries are flourishing and, (if properly controlled, managed and equipped with better

technicians (137)), are doomed to eliminate much of the cost fluctuations and other bottlenecks that plagued that industry for years. Private sector demand for housing and small- and medium-sized commercial projects is high, complementing the government reconstruction schemes. An army of local consultants and contractors is ready to rally the enormous challenge before them. Lebanon is strongly committed to a free enterprise system and is open to foreign firms that could assist in the reconstruction of the country. Several countries and multinational institutions are offering their services at extremely attractive financing terms. Commercial banks in Lebanon will have to get in line with the movement and provide local financing."

The only black spot at the present time is the political uncertainty, affecting not only construction but the economy, if not the country, as a whole.

"More than ever before," noted President Gemayel (80), "Lebanon stands ready to face all challenges."

E X H I B I T 1 - 1
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The Areas of Concentration of Lebanon's Principal
Ethnic and Religious Groups

PIECES OF POWER		Lebanon's principal ethnic and religious groups, their role in Government and territorial strongholds		
GROUP	Estimated Population	Seats in Parliament	Areas of Concentration	
SHIITE MOSLEMS	1,000,000	19	Beirut's southern suburbs, south Lebanon and Hermel-Baalbeck area	
MARONITE CHRISTIANS	600,000	30	East Beirut, Kesrouan, Al Batroun Zgharta and Al Maten	
SUNNI MOSLEMS	600,000	20	West Beirut, Tripoli, Sidon, Akkar and Sheheam	
GREEK ORTHODOX	400,000	11	Al Koura, East and West Beirut	
DRUSE	300,000	6	Shuf Mountains, Aley and Hasbaya	
MELCHITES	250,000	6	East Beirut and Christian distric	
ARMENIANS	250,000	5	East and West Beirut and Anjar	
PROTESTANTS	100,000	2	West Beirut and Tripoli	
PALESTINIANS	500,000	0	West Beirut, South Lebanon, North Lebanon and the Bekaa	

SOURCE : THE NEW YORK TIMES
February 10, 1983.

E X H I B I T 2 - 1
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Religious Composition of Lebanon (%)

Year	Other		Orthodox	Other Christians			Druze	Total Christian	Total Muslims
	Maronites	Catholics		Christians	Sunni	Shia			
1932	28.9	5.9	13.1	2.4	22.6	20.3	6.8	50.3	49.3
1943	30.4	8.0	10.2	3.5	21.3	19.2	6.9	52.1	47.4
1951	29.0	8.2	15.5	1.0	20.8	18.2	4.8	53.7	43.8
1956	30.1	8.1	15.4	1.0	20.3	17.8	6.3	54.6	44.4
1970	26.5	5.3	10.2	2.2	23.8	26.3	5.7	44.2	55.8
1975	25.8	5.2	9.6	2.0	24.1	27.6	5.7	42.6	57.4

Totals do not always equal 100 because of the presence of "Jews" and "Other religions" in the population. Such a presence is minimal in size.

SOURCE : ROBERT H. WELLER
 "The Political Implications of the Changing Religious Composition of Lebanon"
 Florida State University
 1985

E X H I B I T 2 - 2
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Projections of the Religious
Composition of Lebanon
1985-2000

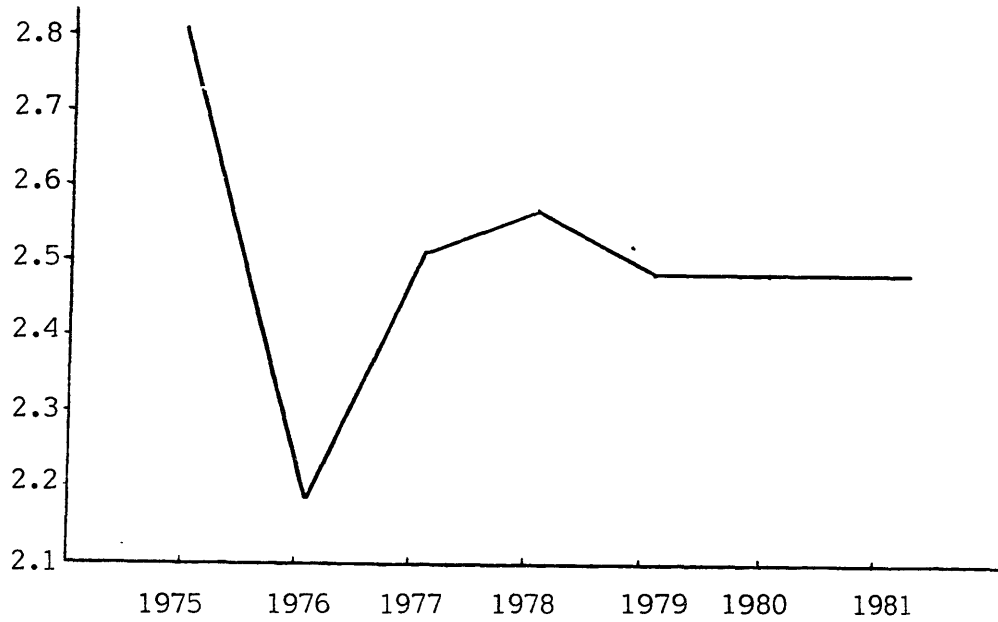
	<u>1985</u>		/	<u>1990</u>	
	Number	%		Number	%
Maronite	664,877	23.3	/	614,610	22.2
Other Catholic	134,007	4.7	/	123,876	4.5
Orthodox	235,072	8.2	/	211,945	7.7
Other Christian	48,973	1.7	/	44,155	1.6
Sunni	730,137	25.6	/	725,035	26.2
Shiia	879,059	30.6	/	895,889	32.3
Druze	<u>160,938</u>	<u>5.6</u>	/	<u>154,213</u>	<u>5.6</u>
Total	2,853,057	100.0	/	2,769,723	100.0

	<u>1995</u>		/	<u>2000</u>	
	Number	%		Number	%
Maronite	585,670	21.8	/	558,092	21.5
Other Catholic	118,043	4.4	/	112,485	4.3
Orthodox	197,018	7.3	/	183,143	7.0
Other Christian	41,045	1.5	/	38,155	1.5
Sunni	705,315	26.3	/	686,131	26.4
Shiia	886,077	33.0	/	876,373	33.7
Druze	<u>149,266</u>	<u>5.6</u>	/	<u>144,477</u>	<u>5.6</u>
Total	2,682,434	100.0	/	2,598,856	100.0

SOURCE : ROBERT H. WELLER
"The Political Implications of the Changing
Religious Composition of Lebanon"
Florida State University
1985.

EXHIBIT 2 - 3

Evolution of the Lebanese Population
Residing in Lebanon
(in millions)



SOURCE : BEIRUT CHAMBER OF COMMERCE AND INDUSTRY
"Le Commerce du Levant"
Beirut, Lebanon
August 13, 1984.

E X H I B I T 3 - 1

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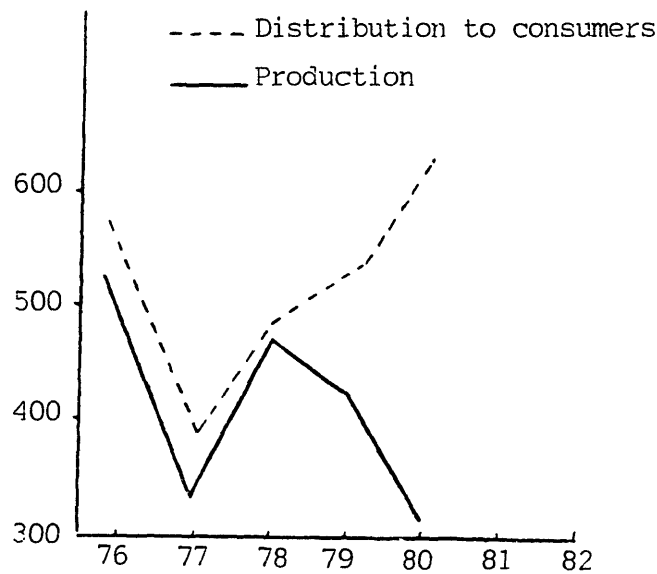
Deficit of the Ministry of Oil

SPOT \$-LL	VALUE OF PURCHASES (thousand LL)	DEFICIT
8	5,543,100	233,036
9	6,235,988	925,924
10	6,928,875	1,618,811
11	7,621,763	2,311,699
12	8,314,650	3,004,586
13	9,007,538	3,697,474
14	9,700,425	4,390,361
15	10,393,312	5,083,248
16	11,086,200	5,776,136
17	11,779,087	6,469,023
18	12,471,975	7,161,911
19	13,164,862	7,854,798
20	13,857,750	8,547,686

E X H I B I T 3 - 2

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Oil Production and Consumption

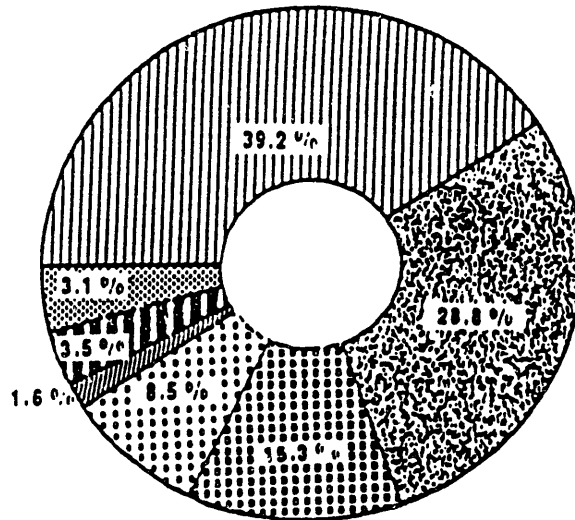


SOURCE : LA REVUE DU LIBAN
Beirut, Lebanon
N. 1355. November 16, 1985.

E X H I B I T 3 - 3

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Geographical Distribution of
Industrial Concerns



REGIONS

|||| Beirut

⊗ Beirut Suburbs

⊠ Mount Lebanon

⊞ Tripoli and Suburbs

⊙ North Lebanon, except
Tripoli and suburbs

● Beqaa

⊘ South Lebanon

SOURCE : DIRECTION CENTRALE DE LA STATISTIQUE
Recueil de Statistiques Libanaises N. 8 -
Année 1972 - Ministère du Plan -
Beyrouth, Liban.

E X H I B I T 3 - 4
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The Value of Industrial Production
and Effective Export

(in thousand L.L.)

YEAR	PRODUCTION VALUE	VALUE OF LOCAL SALES	VALUE OF EXPORTS	SALES AND EXPORTS
1974	1234016	567951	314410	882091
1977	861182	491178	301793	792971
1980	1987273	1159738	754028	1913766
1982	2364834	1388292	950698	2338990
1983	2226741	1550552	690290	2240842
1984	2143658	1803056	610685	2413741
TOTAL	10817704	6960767	3621634	10582401

SOURCE : ETUDES ET CONSULTATIONS ECONOMIQUES SARL
"Lebanese Economic Report"
Beirut, Lebanon
December 1985.

E X H I B I T 3 - 5
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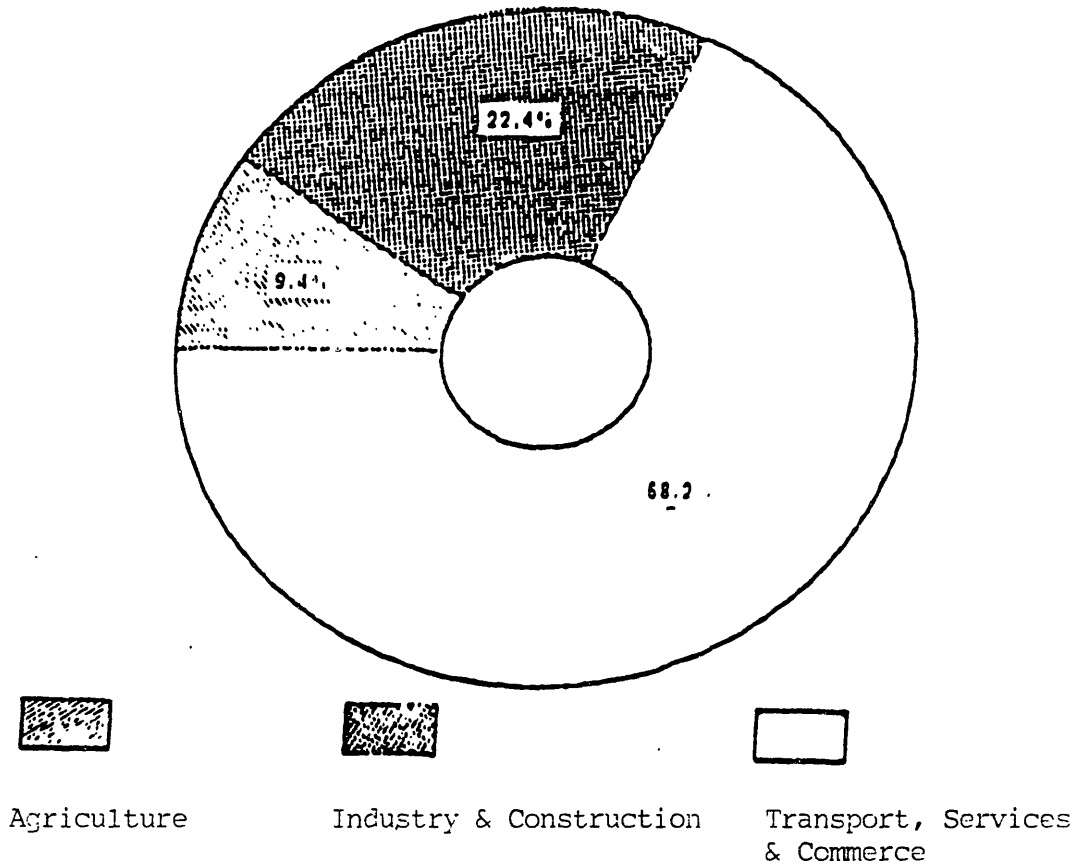
Transfers of Lebanese Working Abroad

YEAR -----	IN MILLION LL -----	IN MILLION US \$ -----
1970	800	251
1971	884	273
1972	935	307
1973	943	361
1974	2125	912
1975	1178	515
1976	78	27
1977	3420	1114
1978	2027	685
1979	5742	1772
1980	7664	2252
1981	8640	1920
1982	9000	2100

SOURCE : ETUDES ET CONSULTATIONS ECONOMIQUES SARL
 "Lebanese Economic Report"
 Beirut, Lebanon
 November 1985.

E X H I B I T 3 - 6

Repartition of Lebanon's Gross Domestic Product
(1971)



SOURCE : DIRECTION CENTRALE DE LA STATISTIQUE,
Ministère du Plan,
Recueil de Statistiques Libanaises,
N. 8, 1972, Beyrouth, Liban.

E X H I B I T 3 - 7

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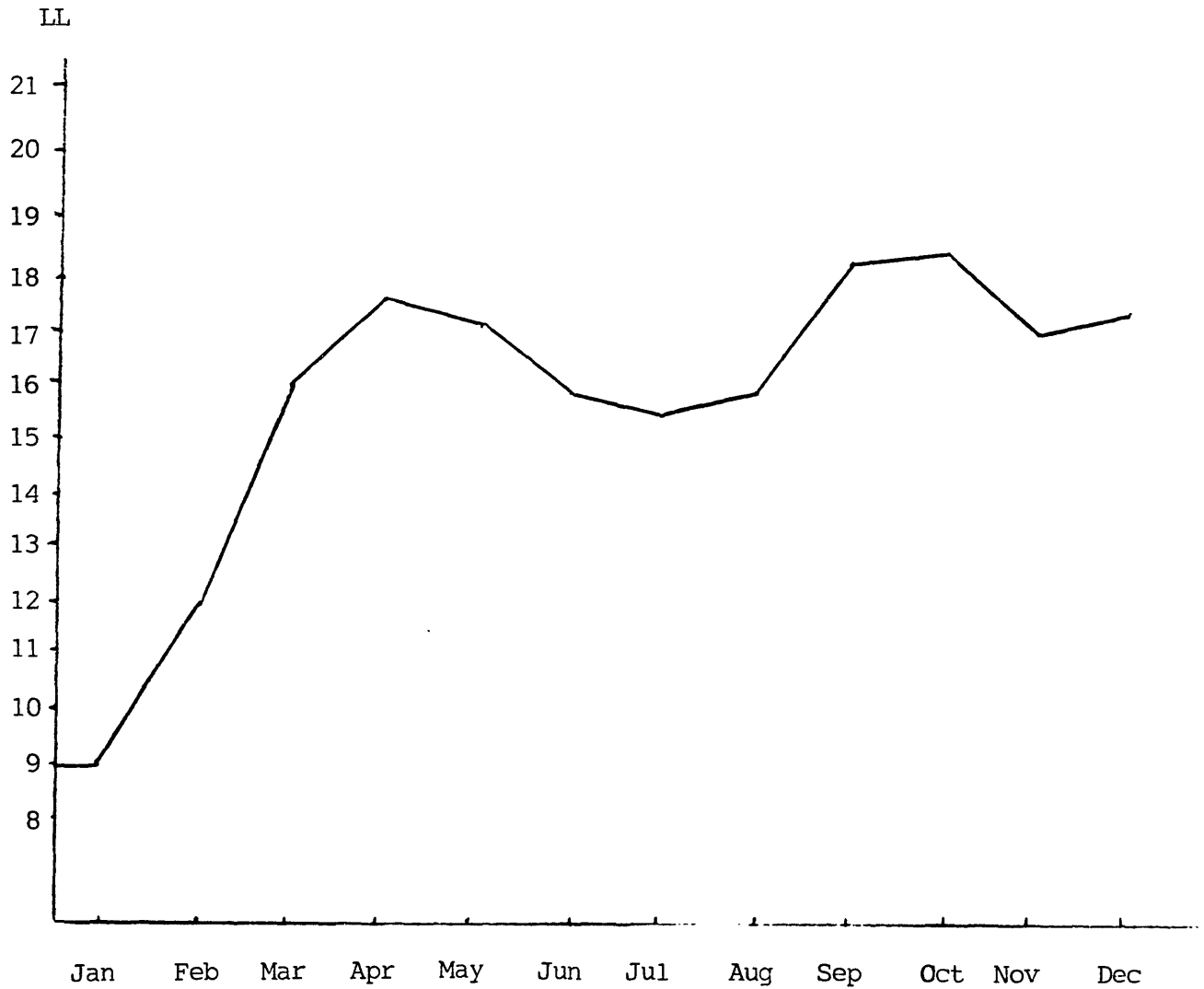
Evolution of the US Dollar
on the Lebanese Market
1975 - 1984

YEAR	1 DOLLAR = P.L.	REVALUATION OF THE US DOLLAR
End 1975	225.-	
" 1976	260.-	+ 15.-- %
" 1977	300.-	+ 33.33 %
" 1978	320.-	+ 42.88 %
" 1979	326.-	+ 44.88 %
" 1980	360.-	+ 60.-- %
" 1981	460.-	+ 104.44 %
" 1982	368.-	+ 63.55 %
" 1983	545.-	+ 142.22 %
" Jan. 1984	555.-	+ 146.66 %
" Feb. 1984	565.-	+ 151.11 %
" Mar. 1984	570.-	+ 153.11 %
" Apr. 1984	560.-	+ 148.88 %
" May 1984	590.-	+ 162.22 %
" Jun. 1984	610.-	+ 171.11 %
" Jul. 1984	615.-	+ 173.33 %
" Aug. 1984	665.-	+ 195.55 %
" Sep. 1984	705.-	+ 213.33 %
" Oct. 1984	785.-	+ 248.88 %
" Nov. 1984	795.-	+ 253.33 %
" Dec. 1984	890.-	+ 295.55 %

SOURCE : RONALD SARKIS
Conference, "L'Erosion de la Livre Libanaise"
Beirut, Lebanon
January 22, 1985.

EXHIBIT 3 - 8

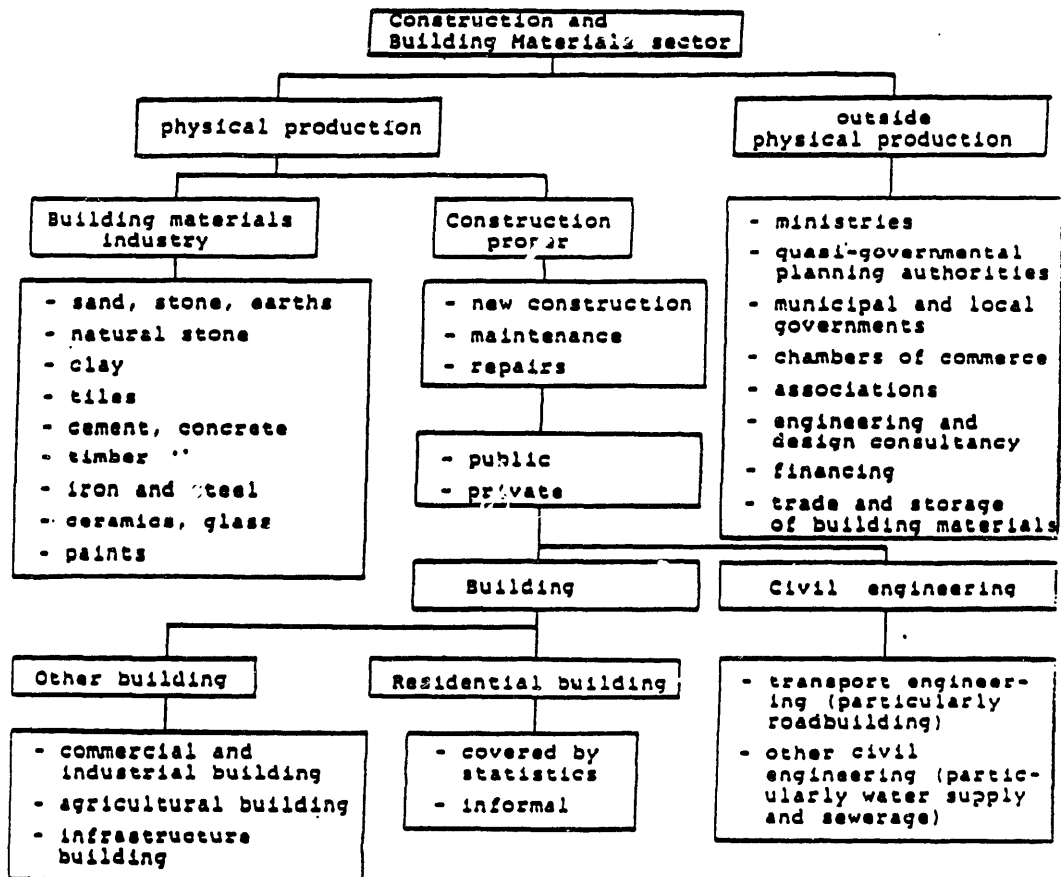
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Evolution of the US Dollar
on the Lebanese Market
1985



SOURCE : BEIRUT CHAMBER OF COMMERCE AND INDUSTRY
"Le Commerce du Levant"
Beirut, Lebanon
January 6, 1986.

EXHIBIT 4 - 1

The Construction Sector :
Interrelated Systems



SOURCE : J. RIEDEL, S. SCHULTZ
Bauwirtschaft und Baustoffindustrie
in Entwicklungslandern
Munchen . 1978.

E X H I B I T 5 - 1
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Input Factors for Typical
Construction Projects

(per cent distribution)

TYPE OF PROJECTS	MATERIALS	LABOR	DEPRECIATION ALLOWANCE ON EQUIPMENT	OVERHEAD AND PROFIT
Single Family Houses	47.0	25.7	1.0	26.3
Public Housing	45.0	39.2	2.5	13.3
College Housing	52.6	32.7	1.6	13.1
Industrial Buildings	53.0	25.0	5.0	17.0
Commercial Buildings	54.0	28.0	3.0	15.0
Schools	54.0	29.8	1.4	14.8
Hospitals	53.3	32.6	1.2	12.9
Public Buildings	51.3	32.0	1.9	14.8
Highways	50.6	25.2	12.0	12.2
Sewer Systems	47.0	27.0	10.0	16.0
Civil Works	35.0	26.2	20.0	18.8
Dams	32.0	22.0	24.0	22.0

SOURCE : PETER CASSIMATIS
"The Performance of the Construction Industry 1964-65"
Ph.D. Dissertation, New School for Social Research
1967.

E X H I B I T 5 - 2

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Typical Consumption Coefficients

/ Unit/	/ Houses & / Low Flats / High Flats /		/ Factories /		/ Schools /		/ Offices /	
	/ Bungalows/(3 stories)/(1 story)	/ (12 stories)/(1 story)	/ (1 story)	/ (1-2 stories)/(1-2 stories)	/ (1-2 stories)	/ (3 stories)	/ (3 stories)	/ (3 stories)
/	/ (1)/(2)	/ (1)/(2)	/ (1)/(2)	/ (1)/(2)	/ (1)/(2)	/ (1)/(2)	/ (1)/(2)	/ (1)/(2)
<u>ROOF</u>	/	/	/	/	/	/	/	/
<u>(a) Cover & Finish</u>	/	/	/	/	/	/	/	/
Asphalt	/m2 /70.5/ - /34.5/	8 / 8.5 /	55 /100/	17 /66.5/	45 /	40 /	38 /	
Roofing felt	/m2 /70.5/ - /34.5/	7 / 8.5 /	44 / 95 /	28 /66.5/	30 /	40 /	56 /	
Aluminium	/m2 /70.5/ - /36 /	5 / 8.5 /	- / 95 /	- /66.5/	- /	40 /	- /	
Asbestos Cement	/m2 / 86 / - /36 /	- / - /	- / 95 /	52 /66.5/	- /	40 /	5 /	
Concrete tiles	/m2 / 86 / 78 /39.5/	60 / - /	- / - /	- / 79 /	20 /	47.5 /	- /	
Clay tiles	/m2 / 86 / 13 /39.5/	9 / - /	- / - /	- / 79 /	- /	47.5 /	- /	
<u>(b) Cover Support</u>	/	/	/	/	/	/	/	/
Sawnwood	/m3 /0.25/ 96 /0.12/	75 / - /	- /3.5/	18 / 2.7 /	25 /	1.1 /	40 /	
Asbestos Cement	/m2 / - / - / - /	- / - /	- / 95 /	52 /66.5/	5 /	40 /	10 /	
Metal decking	/m2 / - / - / - /	- / - /	- / 95 /	- /66.5/	5 /	40 /	10 /	
Strawboard	/m2 /82.5/ - /36 /	8 / - /	- / 95 /	5 /66.5/	20 /	40 /	10 /	
Concrete	/m3 / 9.5/ - / 4.3/	15 / - /	100 / 12 /	22 / 6.7 /	45 /	4.3 /	25 /	
<u>(c) Structure</u>	/	/	/	/	/	/	/	/
Sawnwood	/m3 / 2.1/ 100 / 0.9/	90 / - /	- / - /	- / 3.5 /	25 /	0.45 /	40 /	
Steel	/t / - / - / - /	- / - /	- / 1.1 /	82 / 1.1 /	60 /	1.1 /	45 /	
Concrete	/m3 / - / - / - /	10 / - /	100 / - /	16 / 5.8 /	15 /	4.3 /	15 /	
<u>(d) Insulation</u>	/	/	/	/	/	/	/	/
25mm Glasswool	/m2 / 60 / 70 /34.5/	65 / - /	- / 95 /	45 /66.5/	45 /	40 /	67 /	
12mm Sibreboard	/m2 / 60 / - /34.5/	- / - /	- / 95 /	40 /66.5/	5 /	40 /	5 /	
Light Screenshot	/m3 /5.3 / - / 1.7/	15 / 0.3 /	100 / 9.6 /	8 / 7 /	47 /	3.5 /	7.5 /	
Woodwool Slabs	/m2 / 60 / - / - /	- / - /	- / 95 /	8 / - /	- /	40 /	7.5 /	

Note: Column (1)- Estimated measure per 100 m2 of gross floor area
 Column (2)- Estimated percentage use in 1964

SOURCE : JURGEN RIEDEL, "Long-Term Forecasting and Planning of the Construction and Building Materials Industries". UNIDO. Vienna, Austria. September 1984.

E X H I B I T 5 - 3

Criteria for Building Materials Production

CRITERIA	SCORE			
	-2	-1	+1	+2
<u>Financial</u>	/	/	/	/
-Return on investment	/ less than 20%	/ 20-25%	/ 25-30%	/ more than 30%
-Estimated annual sales	/ less than \$100,000	/\$100,000 - / 1 million	/ \$ 1 million - / \$ 5 million	/ more than \$ 5 million
-Time to estimate volume	/ more than 5 years	/ 3-5 years	/ 1-3 years	/ less than 1 year
<u>R & D</u>	/	/	/	/
-Research payout time	/ more than 3 years	/ 2-3 years	/ 1-2 years	/ less than 1 year
-Research know-how	/ no experience	/ partly new	/ some experience	/ considerable experience
-Patent status	/ unsettled patent situation	/ open field many licences	/ restricted to few licences	/ patent or exclusive licence
-Promotional requirements	/ extensive advertising	/ appreciable requirements	/ moderate requirements	/ little promotion needed
-Product competition	/ several direct comp. product	/ several comp. to some extent	/ 1 or 2 somewhat competitive	/ no competitive product
-Product advantage	/ higher price same quality	/ higher price and quality	/ same price better quality	/ both price and quality advantage
-Length of product life	/ 1-3 years (probably)	/ 3-5 years (probably)	/ 5-10 years (probably)	/ more than 10 years (probably)
<u>PROD. & ENG.</u>	/	/	/	/
-Raw materials	/ limited supply of suppliers	/ limited avail. inside firm	/ readily avail. outside firm	/ readily available from inside
-Equipment	/ new plant needed	/ mostly new equipment	/ some new equipment	/ recent idle plant usable
-Process familiarity	/ new process	/ partly new	/ familiar process	/ routine process
<u>MARKETING</u>	/	/	/	/
-Similarity to present line	/ entirely new	/ somewhat different	/ slightly different	/ fits perfectly
-Effects on present prod.	/ will replace directly	/ increase other sales	/ slight effects	/ increase other sales
-Market. to present cust.	/ entirely different cust.	/ some present customers	/ mostly present customers	/ all present customers
-Sales force	/ entire new group needed	/ some additions necessary	/ few additions necessary	/ no changes necessary
-Market trend	/ increasing	/ static, mature	/ growing	/ new potential
-Technical service	/ extensive service required	/ moderate	/ slight	/ negligible

SOURCE : HARRIS
 Chemical engineering News
 April 17, 1961.

Cement Production and Consumption

	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
<u>Total Lebanon</u>												
Production	1,499,000	1,626,000	1,659,000	1,746,000	1,885,000	643,000	1,594,837	1,354,928	2,016,867	2,143,592	2,224,788	1,980,187
Export	557,000	418,000	319,000	473,000			645,629	764,684	920,259	1,524,408	814,165	433,038
Domestic Consumption	930,000	1,208,000	1,340,000	1,271,000			949,208	590,244	1,096,608	619,184	1,410,623	1,547,149
<u>"Societe des Ciments Libanais"</u>												
Production	1,074,256	1,133,319	1,183,688	1,303,104	1,316,624	446,084	1,167,344	1,069,536	1,586,239	1,538,465	1,644,306	1,384,134
Export	385,625	360,430	280,461	334,627	375,468	114,634	462,698	549,784	513,097	933,632	463,442	75,939
Domestic Consumption	688,631	772,889	903,227	968,477	941,156	331,450	704,646	519,752	1,073,142	604,833	1,180,864	1,308,195
<u>"Cimenterie Nationale"</u>												
Production							427,493	285,392	430,628	605,127	580,482	596,053
Export							102,931	214,900	407,162	590,776	350,723	357,099
Domestic Consumption							244,562	70,492	23,466	14,351	229,759	238,954

SOURCE : RUWAYN MURAD

The Construction Materials Industry and the Construction Activity in Lebanon,
MS Thesis, M.I.T., July 1983.

E X H I B I T 5 - 5

Increase in Construction Materials Price
1974 - 1977
(L.L.)

MATERIALS	Unit	1974	1977
Aluminium	m2	100	175
False Ceiling	m2	20	50
Cement	ton	56.5	150
Ceramic	m2	18	60
Glass 4 mm. th.	m2	9	35
Glass 6 mm. th.	m2	18	50
Gravel	m3	10	20
Central Heating	m2	26	90
Lath 1.5 cm. th.	m3	35	100
Marble Mosaic	m2	8	25
Ordinary Mosaic	m2	6.5	12
White Marble 2 cm. th.	m2	40	56
European Paint	m2	1	3
Oil Paint	m2	4	8
Whitewash Paint	m2	0.5	1
Plywood	m3	950	1,600
Colored Porcelain	m2	10-18	22-35
White Porcelain	m2	9	17
Sand	m3	8	15
Rolling Shutters	m2	40	125
Venetian Shutters	m2	10	25
Sill	10 cm	0.2	0.5
Steel	ton	400	900
Canadian Timber	m3	900	1,300
Popular Timber	m3	450	750
Swedish White Timber	m3	550	900

SOURCES : - RUWAYN MURAD
"The Construction Materials Industry and the
Construction Activity in Lebanon"
MS Thesis, MIT
July 1983.

- L'ORIENT- LE JOUR
Beirut, Lebanon
April 23, 1977.

E X H I B I T 5 - 6
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Increase in Construction Materials Price 1984-85

FACTORS	SPECS	UNIT	UNIT PRICE, LL		VARIATION, %
			JAN. '84	DEC., '85	
Structure					
-Portland Cement	BSS 12-58	T	405	715	76.54
-Steel Bars	10-32 mm	T	1550	5200	235.48
-Gravel	3/8-7/8	M3	35	58	65.71
-Sand	3/8 & less	M3	33	55	66.67
Wooden Works					
-Mahogany Door	80X205 cm	U	820	2475	201.83
-Cupboard		M2	700	1235	76.43
-Shutters		M2	230	737	220.43
Floor and Walls					
-Mosaic Marble	20X20 cm	M2	22	37	68.18
-Carrara Marble	th: 13 mm	M2	135	350	159.26
-Ceramic	20X20 cm	M2	42	70	66.67
Paint					
-Oil Paint		Gal	72	196	172.22
-European Paint		Gal	24	76	216.67
Sanitary Devices					
-Bathroom		U	843	2065	144.96
HVAC					
-Aluminium Radiator	170 Kc	Sect.	42	135	221.43
-Boiler	26500-63200 Kc	U	1200	3150	162.50
Elevator					
-Regular Speed	0.70 m/s	U	60000	106000	76.67
TOTAL INCREASE					142.74 %

SOURCE : ISTICHARAT (Consultants for the Middle East)
Bulletin de la Construction du Batiment et Travaux Publics N.18
Beirut, Lebanon
December 1985.

E X H I B I T 5 - 7

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Coefficients and Indices
for Construction Inputs-
Individual Formulae

- 1- Excavation and Earth Works
 $C = 0.15 + 0.31 L/Lo + (0.16 + 0.15 E/Eo) + 0.23 F/Fo$
- 2- Aggregate Base Course and Sand Fill
 $C = 0.15 + 0.47 G/Go + (0.08 + 0.07 E/Eo) + 0.11 L/Lo + 0.12 F/Fo$
- 3- Bituminous Base Course
 $C = 0.15 + 0.39 B/Bo + (0.07 + 0.09 E/Eo) + 0.18 L/Lo + 0.12 F/Fo$
- 4- Bituminous Wearing Course
 $C = 0.15 + 0.43 B/Bo + (0.06 + 0.08 E/Eo) + 0.16 L/Lo + 0.12 F/Fo$
- 5- Concrete Class K (for culverts and walls)
 $C = 0.15 + 0.21 C/Co + (0.02 + 0.02 E/Eo) + 0.21 W/Wo + 0.35 L/Lo + 0.04 F/Fo$
- 6- Concrete Class K (for curbs)
 $C = 0.15 + 0.18 C/Co + (0.03 + 0.03 E/Eo) + 0.17 W/Wo + 0.42 L/Lo + 0.02 F/Fo$
- 7- Concrete Class A
 $C = 0.15 + 0.23 C/Co + (0.03 + 0.03 E/Eo) + 0.09 W/Wo + 0.43 L/Lo + 0.04 F/Fo$
- 8- Reinforced Concrete Pipe
 $C = 0.15 + 0.55 CP/CPo + (0.04 + 0.04 E/Eo) + 0.17 L/Lo + 0.05 F/Fo$
- 9- Reinforcing Steel
 $C = 0.15 + 0.55 S/So + 0.30 L/Lo$
- 10- Plastic Pipes
 $C = 0.15 + 0.55 PP/PPo + (0.04 + 0.04 E/Eo) + 0.17 L/Lo + 0.05 F/Fo$
- 11- Galvanised Steel Pipes
 $C = 0.15 + 0.45 SP/SPO + 0.40 L/Lo$

Lo, LLabor	Eo, EEquipment
Fo, FFuel	Go, GGravel
So, SSteel	Co, CCement
Bo, BBitumen	Wo, WWood
CPo,CP.....Concrete Pipe	PPo,PP.....Plastic Pipe
SPO,SP.....Steel Pipe	

C : Coefficient for Individual Inputs

Subscript "0" refers to the time at which contract was signed

SOURCE : COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION
 Decree N. 85/203
 Beirut, Lebanon
 July 1985.

E X H I B I T 5 - 8

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Coefficients and Indices
for Construction Inputs-
General Formula

$$J = 0.15 + 0.30 S/S_0 + 0.15 E/E_0 + 0.15 C/C_0 + 0.15 M/M_0 + 0.10 A/A_0$$

In Which :

S_0 = Initial Salary

E_0 = Price of the Kwh H.T.

C_0 = Price of the Ton of Cement at Chekka Factory

M_0 = Price of the Ton of Fuel

A_0 = Price of the Ton of Steel

as of June 30, 1983.

S , E , C , M and A represent the above parameters at any future period.

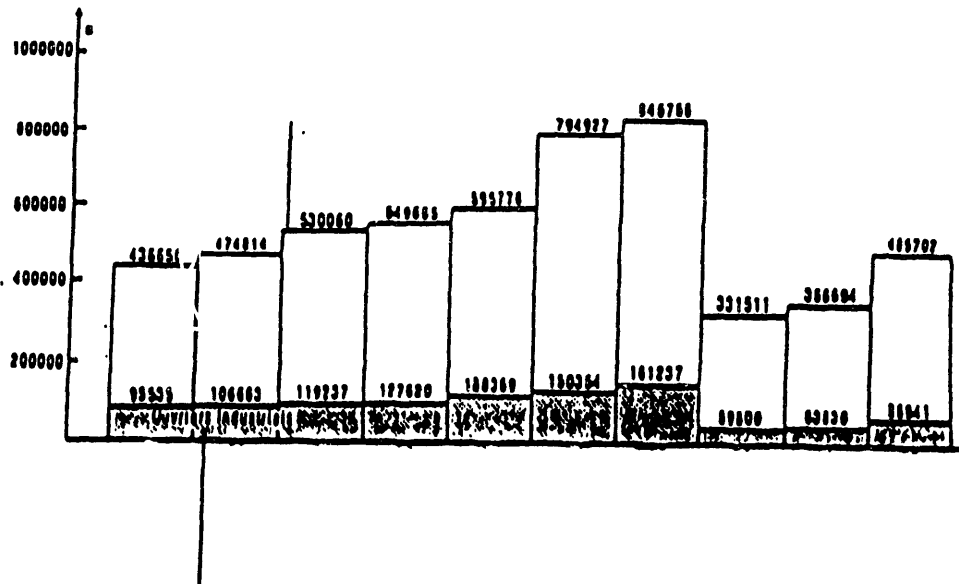
If J is between 0.9 and 1.10, the contract value remains unchanged.

If J is greater than 1.10, all the contract rates are multiplied by the factor : $K = J - 0.10$

SOURCE : CONSEIL EXECUTIF DES GRANDS PROJETS
"Cahier des Clauses et Conditions Juridiques et
Administratives- Faculte des Sciences II"
Fonar, Lebanon
1983.

EXHIBIT 5 - 9

The Industrial Labor Force



SOURCE : BEIRUT CHAMBER OF COMMERCE AND INDUSTRY
 " Le Commerce du Levant- Eco-Chiffres"
 Beirut, Lebanon
 1982.

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Construction Participants and their Arrival Times

Life Cycle Phase Participant	Conception and Planning	Design	Construction	Operation and Maintenance
OWNER	<u>Inputs:</u> Analysis of Needs. Analysis of Feasibility/ Economics, Site Evaluation, Selection, etc. <u>Outputs:</u> Preliminary Studies, Schedule, Plans, Funds.	Monitoring, Reviewing, Approving (This may be delegated to a consultant or be done by the participant.)		Start-up Planning & Implementation. Maintenance.
INVESTOR			Funding the Project	
ARCHITECT, ENGINEER	+	<u>Inputs:</u> Preliminary studies. <u>Outputs:</u> Plans, Specifications, Contracts.	Monitoring, Reviewing, Approving Progress & Changes.	Resolving Operating Problems. Modernization.
GENERAL CONTRACTOR, SUBCONTRACTOR, SUPPLIER	+	+	<u>Inputs:</u> Resources, Mgmt., Supplies, etc <u>Outputs:</u> Facility	Corrections, Repairs, Alterations.
OPERATOR, USER	+	+	+	<u>Inputs:</u> Operation & Maintenance. <u>Outputs:</u> Operating Facility
GOVERNMENT LOCAL/CENTRAL	<u>Inputs:</u> Preliminary Studies and Plans. <u>Outputs:</u> Project Approval.	<u>Inputs:</u> Design, Specifications, Contract Documents. <u>Outputs:</u> Permits for Construction, Materials, Importing, etc.		<u>Inputs:</u> Changes, Specifications. <u>Outputs:</u> Permits.

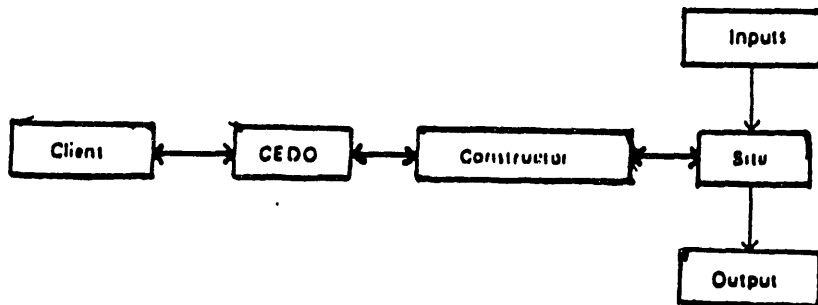
+ Indicates participant has not yet entered the process.

SOURCE : FRED MOAVENZADEH AND TAREK SELIM

"The Construction Industry in Egypt". TAP-MIT. June 1984.

E X H I B I T 6 - 2
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State of the Non-System of
Arab Construction



INTERPRETATION :

This Exhibit summarizes the current state of the non-system of Arab Construction. The components appear in series and exhibit limited interaction between each other. Because of the absence of a boundary the selection of CEDOs (Consulting Engineering Design Organizations) and constructors is not restricted by any technology policy.

SOURCE : ANTOINE B. ZAHLAN
"The Arab Construction Industry"
Croom Helm, London and St. Martin's Press, New York
1983.

E X H I B I T 6 - 3
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Evolution of the Number of Engineers

YEAR	Registered in Beirut	Total Beirut	Registered in Tripoli	Total Tripoli	Grand Total Beirut & Tripoli
1952	235	235	7	7	242
1953	80	315	3	10	325
1954	62	377	2	12	389
1955	69	446	5	17	463
1956	101	547	5	22	569
1957	55	602	-	22	624
1958	82	684	3	25	709
1959	91	775	5	30	805
1960	88	863	2	32	895
1961	147	1010	10	42	1052
1962	89	1099	14	56	1155
1963	184	1283	23	79	1362
1964	217	1500	45	124	1624
1965	269	1769	49	173	1942
1966	185	1954	40	213	2167
1967	179	2133	32	245	2378
1968	173	2306	39	284	2590
1969	160	2466	43	327	2793
1970	240	2706	56	383	3089
1971	221	2927	59	442	3369
1972	312	3239	56	498	3737
1973	215	3454	58	556	4010
1974	217	3671	64	620	4291
1975	227	3898	30	650	4548
1976	9	3907	2	652	4559
1977	148	4055	49	701	4756
1978	178	4233	45	746	4979
1979	220	4453	45	791	5244
1980	483	4936	81	872	5808
1981	473	5409	70	942	6351
1982	321	5730	90	1032	6762
1983	969	6699	154	1186	7885
1984	654	7353	244	1430	8783
1985	696	8049	143	1573	9622

SOURCE : BAHAEDDINE BSAT
L'Orient- Le-Jour
Beirut, Lebanon
September 24, 1984.

E X H I B I T 6 - 4
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Dar al-Handasah Shair and Partners-
Major Projects

a- Town Planning and Housing

The scope of the planning assignments ranges from the establishment of a general physical development plan for an entire region or town to detailed parcellation plans, engineering designs and architectural drawing for a specific town or neighbourhood. The firm's Planning and Housing Department has fulfilled contracts in west and North Africa, the Gulf Area and throughout the Middle East.

Master Plans for Existing Towns and Future Expansion:

Location	Number of Towns	Population of Towns		
		To 10,000	10,000 to 100,000	Over 100,000
<hr/>				
BAHRAIN				
Muharraq Island	1	-	1	-
MOROCCO				
Fetouan	1	-	-	1
NIGERIA				
Rivers State	34	6	27	1
Kwara State	27	5	17	5
Benue State	17	7	9	1
Gongola State	5	-	4	1
Sonkoto State	7	-	2	5
Bauchi State	1	-	1	-
Bendel State	12	2	10	-
SAUDI ARABIA				
Makkah	1	-	-	1
UNITED ARAB EMIRATES				
Ras al-Khaimah	2	-	2	-
<hr/>				
TOTALS	108	20	73	15

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(Continued)

b- Architecture

The duties performed cover the full spectrum of consultancy services related to design and supervision of construction. The tasks involved range from the initial surveys, preliminary investigations and feasibility studies to the final handover of completed structures and grounds to the owners.

The overall size of the projects undertaken runs in excess of one billion square meters of built-up area, and the cumulative cost surpasses 5 billion US Dollars. Among these projects are:

<u>Project</u>	<u>Date</u>	<u>Construction Cost</u> (in million US \$)
- Sokoto Teaching Hospital, Nigeria	1972	80
- Irbid Military Hospital, Jordan	1979	28
- Bello University Master Plan, Nigeria	1980	
- Jos University Master Plan, Nigeria	1981	600
- Mutah University Master Plan, Jordan	1981	160
- Rivers State University, Nigeria	1973	160
- Telecommunications Center, Saudi Arabia	1971	18
- Institute of Petroleum, Algeria	1974	35
- Karachi Sheraton Hotel, Pakistan	1977	45
- Arab Bank, Jordan	1977	16
- Shmaisani Center, Jordan	1977	40
- Government Secretariat, Nigeria	1970	35
- Power Station, Kuwait	1958	20
- Shabsough Project, Jordan	1978	8

c- Electrical Engineering and Telecommunications

Since its establishment in 1956, the firm's Electrical Engineering and Telecommunications Department has completed a large number of projects in the following fields: power, street and area lighting, telecommunications, electrical services in buildings. Among the se projects are:

<u>Project</u>	<u>Start/Completion</u>	<u>Cost (million US \$)</u>
- Power Station "C", Kuwait	1957/62	20
- Gebel Gas Power Plant, Libya		
- Muna Valley Lighting, Saudi Arabia	1957/77	70
- Electrification of 28 Towns, Nigeria	1975/77	27
- Damascus Bypass Lighting, Syria	1975/77	13
- Power station, Jordan	1971	12

E X H I B I T 6 - 4
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(Continued)

d- Transportation

The projects undertaken range from feasibility studies for feeder roads and junction analysis to national planning studies and airport design.

<u>Project</u>	<u>Date</u>	<u>Cost (million US \$)</u>
- North East Syria Highway Development	1979	150
- Jeddah-Mecca Expressway, Saudi Arabia	1976	500
- Potiskum-Gashua Road, Nigeria	1980	80
- Yemen Feeder Roads	1976	360
- Yaounde-Gabon Border Road, Cameroun	1983	80
- Makka Inner Ring Road, Saudi Arabia	1980	110
- Igyad Kudai Road, Saudi Arabia	1983	53
- Jeddah Bypass, Saudi Arabia	1974	300
- Mekkah Inner Ring Tunnels, Saudi Arabia	1980	256
- Queen Alia International Airport, Jordan	1980	220
- Sanaa International Airport, Yemen	1980	62
- Oman Highway Master Plan	1978	
- Highway Master Plan, Yemen	1983	
- Tetouan Master Plan, Morocco	1982	

e- Resources and Environment

The firm's Resources and Environment Department counts about 130 engineers, specialists and supporting staff. It has handled over 180 projects in the developing countries of the Middle East and Africa. Among these projects are:

<u>Project</u>	<u>Start/Completion</u>	<u>Cost (million US \$)</u>
- Song Dam and Irrigation, Nigeria	1979/81	40
- Pankshin Dam and Water Supply, Nigeria	1981/82	45
- Muna Reservoir II, Saudi Arabia	1978/83	50
- Jordan Valley Irrigation, Jordan	1976/81	60
- Jeddah Water Networks, Saudi Arabia	1980/82	2100
- Amman Stormwater Drainage, Jordan	1981/in progress	
- Ras al-Khaimah Water Supply, U.A.E.	1975/81	
- Abyan Delta Irrigation, Yemen (PDR)	1971/in progress	

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(Continued)

f- Mechanical Engineering

The firm's Mechanical department undertakes design and supervision of industrial projects and mechanical installation in buildings and civil engineering works.

<u>Project</u>	<u>Start/Completion</u>	<u>Cost (million US \$)</u>
- Feasibility Study Marble Prod., Oman	1979/80	6
- Feasibility Study Plastic Manuf., UAE	1976/77	2
- Feasibility Study Foundry Prod., UAE	1976/77	2
- Lime Plant, UAE	1977/79	20
- Salt-Chlorine Plants, Koweit	1958/60	5
- Carpet Factory, Iraq	1966/69	15
- Fish Complex and Harbor, Yemen (PDR)	1974/82	40
- Panelboard Plant, Saudi Arabia	1981/83	12
- Frosst Pharmaceutical, Lebanon	1973/77	3
- Clorox Factory, Saudi Arabia	1971/73	2
- Cold Stores, Yemen	1977/80	7
- Bus Maintenance Complex, Algeria	1973/79	42

g- Economics

Since the firm's establishment in 1956, there has been a continuing need for economic inputs into a variety of engineering studies, notably in the Transportation and Water Resources Departments, and in project evaluation related to industrial development. In 1975, a decision was made to establish a separate Economics Department to provide expertise both within the company and also directly to clients.

<u>Project</u>	<u>Start/Completion</u>	<u>Cost (million US \$)</u>
- Hypermarket in Amman	1980/81	36
- Real Estate Complex, Kuwait	1980	43
- Aqaba Free Zone, Jordan	1977/78	24
- Ceramic Products, Oman	1979/80	5
- Marble Products, Oman		6
- Cement Industry, Yemen	1974/76	60
- Tourism Master Plan, Nigeria	1981/82	280

SOURCE : DAR AL-HANDASAH CONSULTANTS (SHAIR AND PARTNERS)
 Beirut, Lebanon
 August 1984.

E X H I B I T 6 - 5
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Projects Undertaken by Dar Al Handasah
Nazih Taleb

PROJECT	COST (U.S. DOLLARS)	DATE OF COMPLETION
BEIRUT EASTERN APPROACH BRIDGE	200,000	—
POWER STATION .C. KUWAIT	15,000,000	1982
SALT, CHLORINE, & CAUSTIC SODA PLANT, KUWAIT	4,000,000	1966
MINISTRY OF ELECTRICITY AND WATER, KUWAIT	5,000,000	—
STRAND COMMERCIAL CENTRE, BEIRUT	2,000,000	1963
AL MULLA RESIDENTIAL CENTRE, KUWAIT	1,000,000	1964
RIYADH WATER SUPPLY SCHEME, SAUDI ARABIA	3,000,000	1964
AJLUN TRANSMISSION LINE, JORDAN	1,000,000	1965
ARAMCO SCHOOLS, SAUDI ARABIA	5,000,000	1967
KHALED AL ISSA DEPARTMENT STORE, KUWAIT	500,000	1964
TRIPOLI OUARANTINE & SLAUGHTER HOUSE, LEBANON	500,000	1965
SHERATON HOTEL, KUWAIT	2,000,000	1965
KUWAIT NATIONAL PETROLEUM CO. BUILDING, KUWAIT	1,000,000	1965
OFFICE BUILDING, THE MINISTRY OF COMMERCE & INDUSTRY, KUWAIT	1,000,000	1965
HOFUF-MUBARRAZ WATER & SEWAGE SCHEME, SAUDI ARABIA	20,000,000	—
A.U.B. CENTRAL LAUNDRY, BEIRUT	500,000	1965
MINISTRY OF EDUCATION BUILDING, KUWAIT	1,500,000	1966
TAEF-HAWIYAH HIGHWAY, SAUDI ARABIA	2,250,000	1965
CHAMBER OF COMMERCE BUILDING, KUWAIT	1,500,000	1966
ARAB BANK BUILDING, BEIRUT	3,000,000	1967
INTERSECTION BECHARA EL KHOURY AVENUE AND MAZRAA BOULEVARD, BEIRUT	300,000	1966
MINISTRY OF DEFENSE BUILDING, LEBANON (Review of Drawings & Documents)	3,000,000	1968
TRIPOLI INTERNATIONAL FAIR, LEBANON	5,000,000	1974
CEMENT FACTORY JETTY, LEBANON	300,000	—
SEWAGE SCHEME FOR NABATIYAH, BAA'BD A, MAJDALAYA, LEBANON	2,000,000	—
St. NICOLAS SQUARE, BEIRUT	100,000	1968
JERUSALEM HOTEL, JERUSALEM	3,000,000	—
JEITA GROTTO PROJECTS, LEBANON	2,500,000	1968
SAMSOUNIEH PROJECT, JERUSALEM	1,500,000	—
CENTRAL BANK BUILDING, AMMAN	1,000,000	1967
JORDAN VALLEY DEVELOPMENT	30,000,000	1970
TRIPOLI GRAIN SILOS SUPERVISION, LEBANON	500,000	1970
MEDINAH AND MECCA P.T.T. BUILDING, SAUDI ARABIA	6,000,000	1974
ROAD NETWORK, SOUTHERN YEMEN	45,000,000	1977 ..
UNDERGROUND TELEPHONE EXCHANGE CENTRE, HAMRA, BEIRUT	350,000	1970
FOUAD CHEHAB AVENUE-BRIDGES & TUNNELS, BEIRUT	3,000,000	1970
FISHERIES HARBOUR AND FACILITIES, REPUBLIC OF SOUTHERN YEMEN	300,000	1970
KUWAIT AIRWAYS BUILDING, KUWAIT	1,500,000	1971
YANBU' ROAD, SAUDI ARABIA	90,000,000	1974
AMMAN MULTI-STOREY GARAGE, JORDAN	1,000,000	1971
A.U.B. MEDICAL CENTER, BEIRUT	30,000,000	1970-1974
LITANI REGION SEWERAGE, LEBANON	20,000,000	—
JEDDAH TELECOMMUNICATION TRAINING CENTER	8,000,000	1976
BASRAH CANAL, RAILWAY AND HIGHWAY CROSSINGS	8,000,000	1970
SARRAF BUILDING, BEIRUT	1,500,000	1975
SOLID WASTE TREATMENT PLANT, BEIRUT	7,000,000	1974
AL THAWRA STREET TUNNELS & BRIDGES, DAMASCUS	8,000,000	1976
CEMENT PLANT, ALGERIA	8,000,000	1974
22 TELEPHONE BUILDINGS, SAUDI ARABIA	16,000,000	1967-1974
350 CAR UNDERGROUND PARKING, LEBANON ELECTRICITY	1,000,000	1975
EDEN ROCK TOURISTIC PROJECT, BEIRUT	8,000,000	—
MOSQUE AT JEDDAH	2,000,000	1976
SOFIL 40 STOREY OFFICE BUILDING, BEIRUT	10,000,000	1977
TOURISTIC COMPLEX AT MORETTI, ALGERIA	10,000,000	1975
HADITHA RAWA AL QA'IM HIGHWAY, IRAQ	40,000,000	1977
KIRKUK MOSUL ROAD	40,000,000	1978
ADMINISTRATION CITY, ALGERIA	15,000,000	1978
FEILAKA ISLAND TOURISTIC PROJECT, KUWAIT	8,000,000	1977
SAFWA SEWAGE AND STORM WATER, SAUDI ARABIA	20,000,000	1978
ZURU DAM & WATER SUPPLY, NIGERIA	20,000,000	1978
HAJJ ROADS AND BRIDGES, MECCA	60,000,000	1977

E X H I B I T 6 - 6

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Major Projects Undertaken by
Rafik El-Khoury and Partners

<u>Project</u>	<u>Cost</u>
-Central Archives Building, Saudi Arabia	Saudi Rials 200 million
-3 major sport stadiums, Saudi Arabia	Saudi Rials 200 million
-63 schools, Lebanon	Leb. Pounds 65 million
-25 Kindergarten schools, U.A.E.	UAE Dirhams 5 million
-1200 Apartments Iskan, Jordan	Jord. Dinar 5 million
-Defense work, Jordan	Leb. Pounds 15 million
-Multistory buildings, Gulf Area	Leb. Pounds 40 million
-Ministry of Finance, Abu Dhabi, U.A.E.	UAE Dirhams 40 million
-Various projects, Lebanon	Leb. Pounds 60 million
-Port hangars, Lebanon	Leb. Pounds 40 million
-3 interchanges, Beirut, Lebanon	Leb. Pounds 23 million
-3 interchanges, Beirut suburbs, Lebanon	Leb. Pounds 12 million
-Nahr-el-Mott-Dbayeh Motorway, Lebanon	Leb. Pounds 50 million
-5 interchanges, Downtown Beirut, Lebanon	Leb. Pounds 30 million
-Steel Bridges, Khaldeh, Lebanon	Leb. Pounds 15 million
-South Entrance to Beirut, Lebanon	Leb. Pounds 63 million
-Desalination Plant, Oman	Oman Dinars 40 million
-Yarmouk University Auditorium, Jordan	Jor. Dinars 6 million
-Sheds for Beirut Port, Lebanon	Leb. Pounds 50 million
-Borj Ghazal Building, Lebanon	Leb. Pounds 40 million
-Beirut-Saida Roadway, Lebanon	Leb. Pounds 28 million
-Fuel Tanks, Beirut Airport, Lebanon	Leb. Pounds 60 million

SOURCE : RAFIK EL-KHOURY
"Statement of Capability"
Beirut, Lebanon
1984.

E X H I B I T 6 - 7
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Specifications According to
US and British Standards

US and UK Specifications are widely used in Lebanon.

The major divisions into which all US Construction Specifications are written are in accordance with the following CSI Format:

Building Requirements
Contract Forms
General Conditions (and Supplementary Conditions)
Specifications

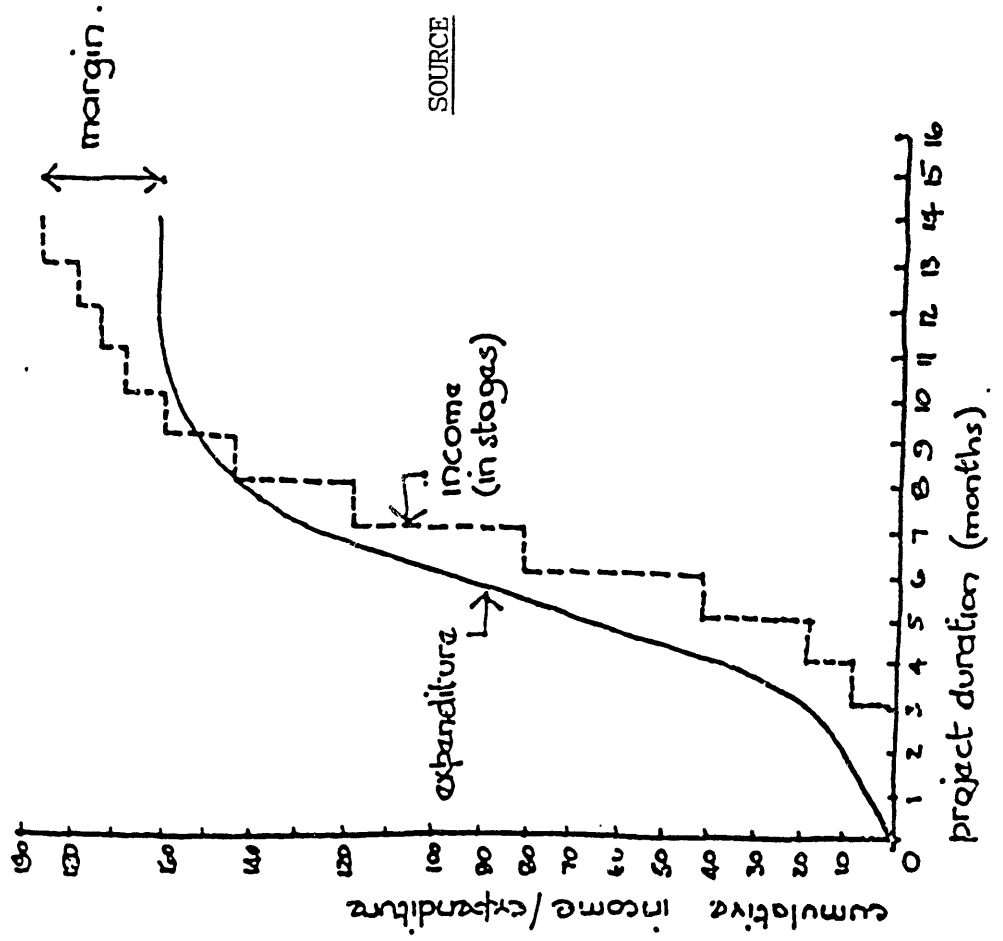
- Division 1 - General Requirements
- Division 2 - Site Work
- Division 3 - Concrete
- Division 4 - Masonry
- Division 5 - Metals: Structure and Miscellaneous
- Division 6 - Carpentry
- Division 7 - Moisture and Thermal Protection
- Division 8 - Doors, Windows and Glass
- Division 9 - Finishes
- Division 10 - Specialities
- Division 11 - Equipment
- Division 12 - Furnishings
- Division 13 - Special Construction
- Division 14 - Conveying Systems
- Division 15 - Mechanical
- Division 16 - Electrical

Most Specifications prepared by UK Consultants still follow the old-established trade classification which would generally follow the order given below:

- Section A - General
- Section B - Excavation and Earthwork
- Section C - Concrete Work
- Section D - Brickwork / Blockwork
- Section E - Roofing and Waterproofing
- Section F - Joinery and Ironmongery
- Section G - Metalwork
- Section H - Plasterwork
- Section I - Tile, Block and Slab Finishings
- Section J - Suspended Ceilings
- Section K - Glazing
- Section L - Painting and Decorating
- Section M - Sanitary Installation
- Section N - Heating, Air Conditioning and Ventilation
- Section O - Lift Installation
- Section P - Electrical Installation

SOURCES :- CONSTRUCTION SPECIFICATIONS INSTITUTE (CSI)
Washington, D.C. Various Years
- NATIONAL BUILDING SPECIFICATIONS
London, England. 1973

Profitability of a Contract from the
Constructor's Perspective



SOURCE : Curve developed by
Professor Pierre
Moussa (121) and
the Author
Broumana, Lebanon
January 1986.

E X H I B I T 6 - 9
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Contracting and Trading Co. (CAT)
List of Key Staff

Administrative Personnel

- Management Board : 3
- Chief and Senior Executives : 6
- Executives : 19
- Legal Department : 3
- Area Managers and Representatives : 4

Civil Operations Technical Staff

- Senior Field Engineers : 19
- Engineers (Civil) : 40
- Estimators and Quantity Surveyors : 8
- Supervisors and Land Surveyors : 15
- Foremen : 85

Pipeline and Mechanical Operations Technical Staff

- Senior Field Engineers : 10
- Engineers : 23
- Estimators and Quantity Surveyors : 4
- Supervisors : 19
- Foremen : 35

Plant and Machinery Technical Staff

- Senior Field Engineers : 4
- Others : 42

SOURCE : -CONTRACTING AND TRADING CO. (CAT)
"At Work in the World's Toughest Terrain"
Beirut, Lebanon.
April 1985

-ENGINEERING NEWS-RECORD
"1983-84 Directory"

E X H I B I T 6 - 10

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Contracting and Trading Co. (CAT)
Schedule of Construction Equipment-1981

<u>Type</u>	<u>Quantity</u>
1- Air Compressors	92
2- Wagon Drills	10
3- Dual Drills	11
4- Air Winches	3
5- Piling Hammers	6
6- Asphalt Plant	8
7- Asphalt Finisher	16
8- Tarboilers	4
9- Tar Tanks	7
10- Heater Tanks	1
11- Hy-Way Heat System	5
12- Tar Distributor	22
13- Asphalt Machinery Road Broom	1
14- Concrete Mixers	90
15- Concrete Batching Plant	13
16- Transit Mixers	24
17- Chipping Spreader	4
18- Cranes (Crawler)	12
19- Backhoes (Crawler)	25
20- Cranes (Mobile)	61
21- Cranes (Tower)	7
22- Dumpers	127
23- Forklift	7
24- Generators	266
25- Portable Belt Loaders	24
26- Winches Tower and Platform	7
27- Excavating and Trenching Plant	7
28- Pipeline Machinery	8
29- Cleaning and Priming Machines	3
30- Coat and Wrap Machines	8
31- Pipe Bending Machines	6
32- Sand Blast Units	11
33- Pipelayer tractors	48
34- Mobile Centrifugal Pumps	33
35- Test Pumps	6
36- Dewatering Pumps	7
37- Road Rollers	29
38- Pneumatic Towed Rollers	5
39- Road Rollers (Steel Wheels)	53
40- Compaction Plant	3
41- Sheep Foot Roller	2
42- Soil Stabilizer	14

E X H I B I T 6 - 10

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(continued)

43- Stone Crashing Equipment	5
44- Gravel Washing Machines	2
45- Kurbmaster	1
46- Sand Washing Machines	2
47- Vibrating Rollers/Compactors	29
48- Screen Loaders	2
49- Water Chiller	1
50- Distillation Plants	2
51- Ice Making Machines	5
52- Tar Heater Decanter	1
53- Tractors (Tracked Type)	78
54- Tractors (Wheeled)	2
55- Tractors Shovel (Tracked)	26
56- Tractors Shovels (Wheeled)	102
57- Welding Tractors	6
58- Motor Graders	91
59- Scrapers	40
60- Welding Machines	234
61- Welding Bullets	64
62- Welding Transformers	6
63- Girthwelder	1
64- Welding Wagons	8
65- Tractor Skidder	2
66- Steam Generator	1
67- Servicing/Cleaning Equipment Trailer	30
68- Lubricating Unit Truck	1

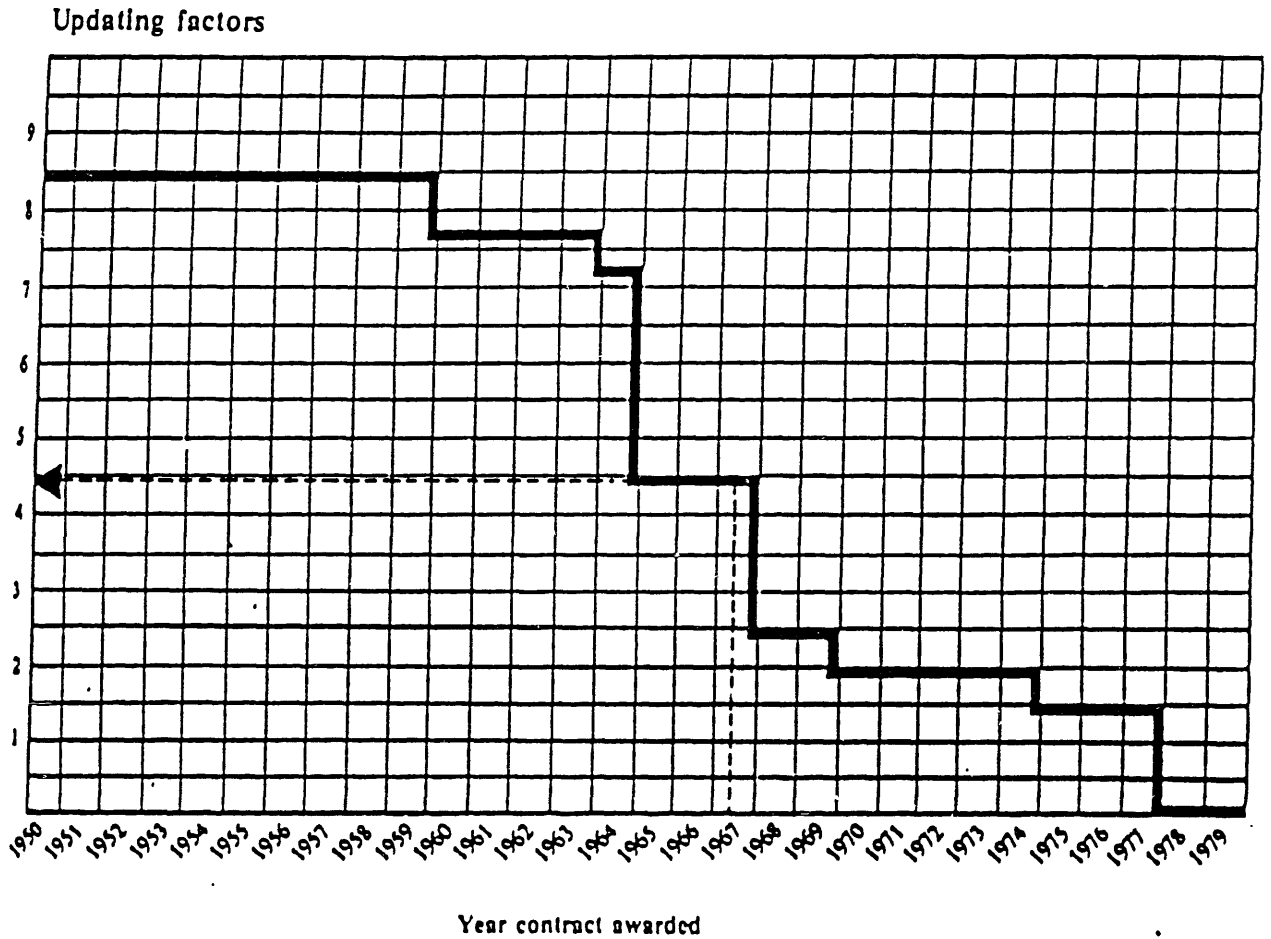
Motor Transport

1- Tippers	320
2- Trucks	53
3- Tractive Units	103
4- Water Tanks	95
5- Fuel Tankers	12
6- Trailers, Bitumen Tank	26
7- Semi-Trailers	112
8- Marine Equipment	9

SOURCE : CONTRACTING AND TRADING CO. (CAT)
Prequalification Documents. 1981.

Multiplier Factors for Updated Values of Contracts

Contract value updating factors



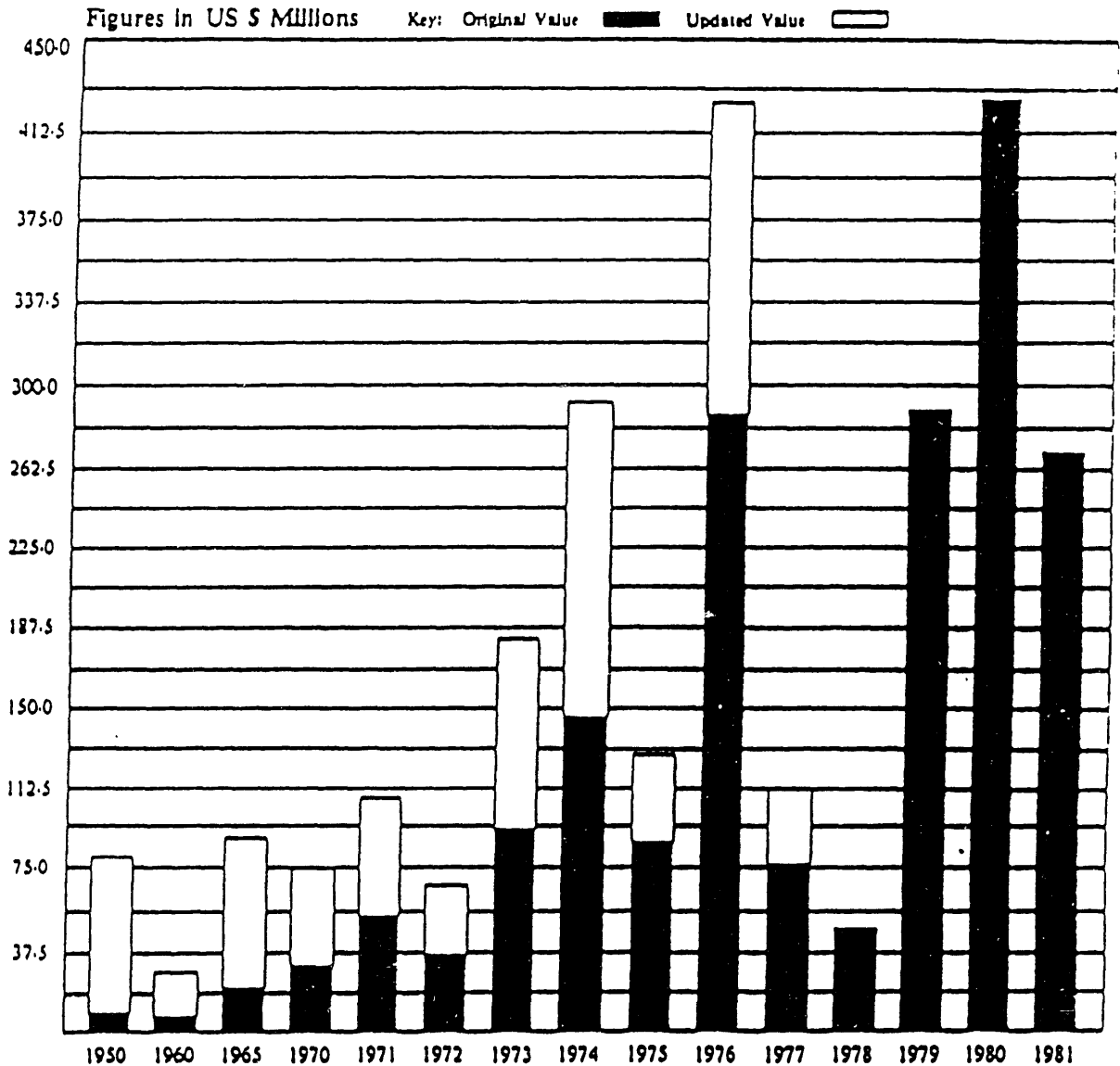
This chart shows the 'Updating Factor' applied to original contract values in order to ascertain the updated current market equivalent.

The above factors are based on the outcome of yearly market surveys of actual values of comparable projects.

Example: For contract awarded in 1967 the 'Updating Factor' is 4.5

SOURCE : THE CAT GROUP
Beirut, Lebanon, 1983

Chart representation of original and updated equivalent annual contract values



Total contracts awarded in the year

Year of Award	Original Value Million US \$	Updated Value Million US \$	Year of Award	Original Value Million US \$	Updated Value Million US \$
1950	9.2	78.5	1966	35.2	158.2
1951	16.0	136.2	1967	36.2	162.9
1952	3.6	30.3	1968	34.5	86.6
1953	3.5	29.8	1969	105.6	264.0
1954	11.3	95.8	1970	29.6	74.1
1955	15.3	129.7	1971	53.3	106.6
1956	26.8	227.5	1972	34.7	69.7
1957	6.9	58.9	1973	91.32	182.4
1958	18.4	156.5	1974	147.0	294.0
1959	3.8	32.0	1975	85.5	128.3
1960	3.3	25.6	1976	285.3	427.9
1961	26.5	205.5	1977	74.3	111.4
1962	24.9	192.8	1978	46.0	46.0
1963	8.3	64.5	1979	284.3	284.3
1964	38.4	278.3	1980	429.1	429.1
1965	19.6	88.1	1981	363.7	363.7

SOURCE : THE CAT GROUP
 Beirut, Lebanon, 1983

E X H I B I T 6 - 13

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The CAT Group-
Major Projects

a- Buildings

<u>Project</u>	<u>Date</u>	Value (million US \$)	
		<u>Original</u>	<u>Updated(1978)</u>
- Building Program Um Said, Qatar	1950	8.4	71.4
- Presidential Palace, Iraq	1955	9.4	71.4
- As-Sabah Hospital, Kuwait	1958	9.8	83.3
- Sharjah Development, UAE	1966	12.0	54.0
- Al-Falaj Hotel-Muscat, Oman	1973	6.2	11.8
- Sharjah Sports Centre, UAE	1975	9.1	13.6
- Dahran Camp, Saudi Arabia	1976	18.0	27.0
- Artillery Camp, Al Ain, Abu Dhabi	1980	14.5	14.5
- Field Engineers Camp, Suweihan	1980	15.6	15.6
- S & T Regt. Camps I & II, Suweihan	1980	40.0	40.0
- Exhibition Centre Hotel, Seeb, Oman	1981	16.4	16.4
- SOLF Thumrait Improvements, Oman	1981	50.0	50.0

b- Civil Works

- Amman Airport, Jordan	1953	2.1	17.8
- Road Works, Kuwait	1954	2.8	23.8
- Kirkuk-Tasloojah Road, Iraq	1956	7.0	59.0
- Doha Airport, Qatar	1961	3.9	30.4
- Roads in Saudi Arabia	1967	10.5	47.2
- Roads in Nigeria	1974	38.1	76.2
- Amukpe-Uromi Road, Nigeria	1976	20.1	30.2
- Site Development, Camp 10, Jbail	1979	32.0	32.0
- Road Projects, Nigeria	1979	113.0	113.0
- Road Projects, Nigeria	1981	222.0	222.0
- Road projects, Nigeria	1982	130.0	130.0

c- Mechanical Works

- Gas Separators, Kuwait	1951	7.6	64.5
- Pumping Stations, Iraq	1961	3.7	28.4
- Fertilizer Complex, Kuwait	1964	7.9	57.6
- Fertilizer Complex, Saudi Arabia	1967	10.4	46.7
- Mechanical Works, Saudi Arabia	1974	11.4	22.8
- Miscellaneous Utilities, Saudi Arabia	1976	27.6	41.4
- Fire Fighting Facilities, UAE	1980	6.5	6.5
- Jbail Desalination Plant	1980	16.0	16.0
- Shah Development Project, UAE	1981	14.0	14.0

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E X H I B I T 6 - 13
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(Continued)

d- Pipelines

<u>Project</u>	<u>Date</u>	Value (million US \$)	
		<u>Original</u>	<u>Updated (1978)</u>
- Oil Pipelines, Kuwait	1951	4.2	35.7
- Gas Feeder Lines, Pakistan	1955	3.2	27.4
- Water Pipeline, Guinea	1962	5.6	43.4
- Water Line, Ghana	1964	5.0	36.6
- Oil Line, Libya	1965	16.8	75.6
- Oil Pipeline, Saudi Arabia	1971	13.5	27.2
- Berri Area Gases, Saudi Arabia	1976	16.4	24.6
- East-West 43" Pipeline, Saudi Arabia	1978	55.0	55.0
- Improve Flow Lines, Saudi Arabia	1982	24.1	24.1
- Riyadh Water Pipeline, Saudi Arabia	1982	52.5	52.5
- Water Supply, Amman, Jordan	1982	42.8	42.8
- Assir Water System, Saudi Arabia	1982	142.0	142.0

e- Power Stations and Electricity Supply

- Multan Gas Station, Pakistan	1957	3.4	28.6
- Shuaiba Power Station, Kuwait	1963	3.6	27.5
- Steam Power Plant, UAE	1976	6.3	9.5
- Galilah 2 Power Station, UAE	1977	9.6	14.3
- Riyadh 7 Power Station, Saudi Arabia	1979	32.0	32.0
- Sub-stations, Zakher and Jbail	1981	3.8	3.8

f- Water Works, Distillation and Sewerage

- Concrete Reservoirs, Kuwait	1952	3.4	28.6
- Nassiryah Control Structures, Iraq	1954	2.2	18.4
- Drainage Scheme, Crater, Aden	1962	1.1	8.3
- Derna Scheme, Libya	1966	6.3	28.4
- Musandam Scheme, Oman	1978	19.4	29.0
- Desalination Plant, Jbail, Saudi Arabia	1980	14.3	14.3

g- Marine Construction

- Oil Loading Jetty, Bandar Mashur, Iran	1956	1.6	13.3
- Repairs, Ahmadi Jetty, Kuwait	1968	3.5	8.8
- New Port, Ras al-Khaimah, UAE	1975	20.3	30.4
- Khassab Port, Oman	1981	10.3	10.3

h- Tankage and Ancillary Works

- Various Tanks, Kuwait	1951	2.8	23.8
- Kent Refinery Scheme, England	1958	2.8	18.4
- Marsa al-Hariga Tankage, Libya	1964	1.7	12.2
- Tank Farms, Oman	1974	4.7	

E X H I B I T 6 - 14

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Major Projects Undertaken by
Kettaneh Freres

<u>Project</u>	<u>Completion Date</u>	<u>Cost (US \$)</u>
-Work at Fallouja Cement Factory, Iraq	1974	0.6 million
-Extension to 2 Cement Factories, Iraq	1972	2 million
-Eight Silos at Kufa Factory, Iraq	1973	0.5 million
-Chimneys at Badoush Factories, Iraq	1973	0.4 million
-Water Reservoirs in Jeddah, Saudi Arabia	1974	2 million
-The Abu Dhabi Air Terminal, U.A.E.	1970	8 million
-Two Bridges over the Tigris, Iraq	1957	9 million
-Muqta' Bridge, Abu Dhabi, U.A.E.	1968	2.7 million
-Highway Bridge in Ba'quba, Iraq	1959	1.8 million
-Highway Bridge at Abbassujat, Iraq	1960	1.2 million
-Four Wharves in Basra Port, Iraq	1961	5 million
-Harbour at Um-Qasr, Iraq	1965	20 million
-University of Bagdad, Stage II	1968	3.5 million
-Chemistry Building, American University of Beirut	1967	1 million
-Lebanese Broadcasting Station	1960	3.2 million
-Bared Hydro-Electric Scheme, Lebanon	1954	4.7 million
-Sewage Treatment Plants, Saudi Arabia	1972	17 million
-Grain Silos in 3 Cities, Iraq	1959	5.3 million
-Civil Works, Yamama Factory	1971	3.5 million
-Al Khobar Desalting Project, Saudi Arabia	1972	14 million
-Works at Hammam al-Alil Factory, Iraq	1977	14 million
-Grain Silos at Flour Mills, Saudi Arabia	1979	70 million
-Grain Silos Extension, Beirut Harbour	1978	7 million

- SOURCES :
- KETTANEH BROTHERS
"Construction Activities"
Beirut, Lebanon
1984.
 - KETTANEH FRERES
"Slipform Construction"
London, England
1978.

E X H I B I T 6 - 15
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Oger Liban-
Manpower Distribution

At January 24, 1986, there were 683 employees distributed as follows:

- Top Management	: 2 + Board
- Senior Management	: 3
- Middle Management	: 14 Heads of Departments
- Engineers studies and support	
+ Engineers	: 50
+ Technicians	: 30
+ Draftsmen	: 13
- Construction	
+ Engineers	: 65
+ Supervisors	: 15
+ Foremen	: 11
+ Operators	: 45
+ Technicians	: 43
+ Purchasers	: 8
+ Store Keepers	: 10
+ Skilled Labor	: 120 daily basis, variable
+ Unskilled Labor	: 100 daily basis, variable
- Security	: 35
- Administration and Finance	: 119

- SOURCES : - KAMAL DARGOUS
Letter to the Author
Beirut, Lebanon
January 24, 1986.
- OGER- LIBAN
"Oger-Liban Sal. 1983"
Beirut, Lebanon
1983.

E X H I B I T 6 - 16

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Oger- Liban-
Schedule of Equipment and Major Projects

Civil Work Equipment

- Tower Cranes	: 12
- Mobile Cranes	: 4
- Generators	: 21
- Steam Boilers	: 7
- Batching Plants	: 5
- Concrete Mixers	: 11
- Mortar Pumps	: 4
- Cement Bag Openers	: 5
- Excavators	: 28
- Hydraulic Jack-Hammers	: 13
- Loaders	: 8
- Dumpers	: 32
- Air Compressors	: 29
- Forklifts	: 6
- Bulldozers	: 9
- Drills	: 3
- Compactors	: 6

Transportation Equipment

- Trucks	: 114
- Trailers	: 4
- Buses	: 10
- Cars	: 50
- Pick-ups	: 25
- Ambulances	: 2

Camp Equipment

-Bungalows	: 30
-Workshcps	: 10

Projects Completed or Under Construction

- University of Saida Studies Centre (October 1981)
- Hariri Medical Centre (Summer 1982)
- Nursing School (September 1982)
- Nursery School (October 1982)
- Primary school
- Professional School
- University of Saida Studies Centre (Phase II)

All the above projects are located in South Lebanon. Oger-Liban later extended the scope of its mission. Following Israel's invasion of Lebanon, the company was called upon to provide such services as the removal of street rubbles and refuses, levelling of collapsing and hazardous buildings, and the restoration of many of the war damaged buildings.

SOURCES : - KAMAL DARGOUS
Letter to the Author
Beirut, Lebanon
January 24, 1986

- OGER- LIBAN
"Oger-Liban Sal. 1983"
Beirut, Lebanon
1983.

E X H I B I T 6 - 17
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Zakhem International S.A.
Selected Clients and Financial Performance

A small cross-section of selected clients is as follows

- Ministry of Oil : Qatar
- Ministry of Water Resources : Kenya
- Kenya Pipeline Company : Kenya
- Water and Sewerage Department, Nairobi : Kenya
- Nippon Kokan K.K. : Japan
- S.C.O.P. : Iraq
- Scotra : Syria
- Tazama : Tanzania
- B.P. Tanzania Limited : Tanzania

In terms of finance, the above client projects and others showed an annual participation (by country) as follows: (Figures in million US \$)

	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>
Kenya	14.0	8.0	22.0	13.3
Qatar	15.0	34.0	46.0	3.0
U.A.E.	4.0	1.3	4.0	1.0
Tanzania	6.0	3.8		0.4
Libya	20.0	55.4	18.0	16.5
U.S.A.	1.5			6.5
Saudi Arabia		5.0	24.0	2.0
	<u>60.0</u>	<u>107.5</u>	<u>114.0</u>	<u>42.7</u>

SOURCE : ZAKHEM INTERNATIONAL CONSTRUCTION LIMITED
"Prequalification Document"
London, England
1984.

E X H I B I T 6 - 18
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Almabani-
Selected Projects and Financial Performance

The bulk of "Almabani's" work occurs in Saudi Arabia (that in Lebanon is relatively limited). Not surprisingly therefore, all of the following projects were undertaken in the Kingdom.

<u>Project</u>	<u>Amount (in million Saudi Rials)</u>
- PTT Head Quarters, Riyadh	210
- Mecca-Medina Highway (Section 5)	205
- Works at King Abdul Aziz Military Academy, Riyadh	793
- Works at King Abdel Aziz Port, Dammam	100
- Street Asphaltting, Jeddah	132
- Al Ahsa Airport	156
- Broadcasting station, Buraidah-Medina	354
- Hafuf-Riyadh Railroad	454
- Runway, King Abdel Aziz Airport, Jeddah	250
- Works at Dhahran Airport	146
- Works at King Saud University, Riyadh	79

Consolidated Group Results

<u>Year</u>	<u>Net Profits</u> (in million S.R.)	<u>Cumulated Turnover</u>
1978	52.722	641.922
1979	65.603	678.310
1980	74.086	1,042.586
1981	111.110	1,575.364
1982	104.436	2,410.116

- SOURCES : - ALMABANI GROUP
"Almabani Annual Report 1982"
Beirut, Lebanon
May 1983.
- RIAD RIZK
Interview with the Author
Beirut, Lebanon
January 23, 1986.

E X H I B I T 6 - 19

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Societe Nationale d'Entreprise-
Major Projects

Since its establishment in 1965, the firm has won contracts for over Lebanese Pounds 3 billion. Following is a list of some of its projects:

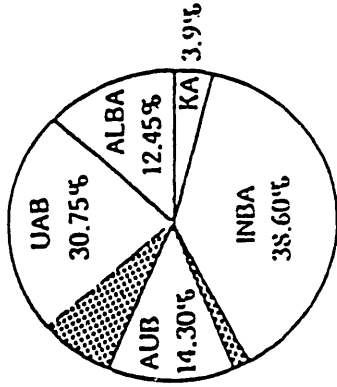
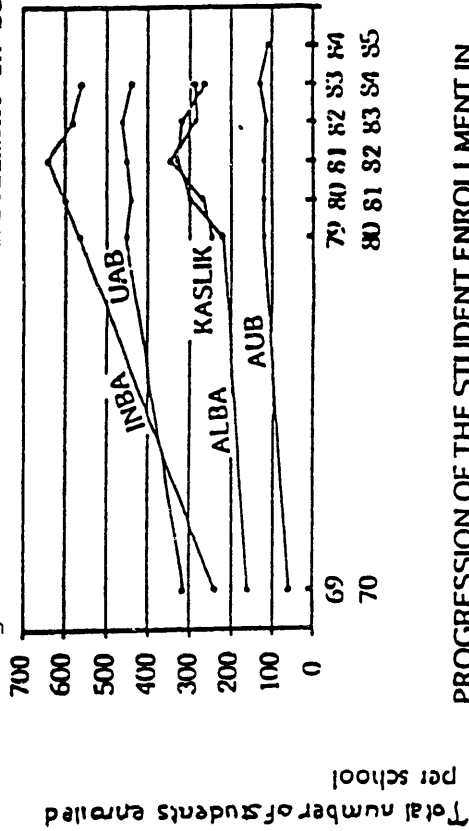
<u>Project</u>	<u>Start/Completion</u>	<u>Value (million L</u>
- Beirut Port's 4th Basin, Lebanon	1980/85	140
- Beirut-Metn Sewage System, Lebanon (involving the laying of pipes extending 1.8 km into the sea at a depth of 65 m)	1983/85	130
- Zouk Mikayel Power Plant, Lebanon	1985	60
- Dbayeh-Nahr el-Kalb Road, Lebanon (including the construction of 3 bridges)	1984/85	40
- 3 ports on the Northern Shore, Lebanon	1980/85	60
- Byblos-Saint Georges Road Network, Lebanon	1984/interrupted	500
- Dbayeh-Achrafieh Water Network, Lebanon	1985	25
- Marine Works on the Northern Shore, Lebanon	1985/in prog.	3500
- Burayda Sewage System, Saudi Arabia	1983	
- Tartous Port Extension, Syria	1980/82	

The last two projects were valued at 160 million Saudi rials and 150 million Syrian Pounds respectively. The firm has also constructed/ extended ports in Jounieh, Selaata, Chekka and tripoli (lebanon) and a petroleum port near Tartous (Syria).

SOURCE : JOSEPH KHOURY AND FAWZI BOUERI
(Societe Nationale d'Entreprise)
Interview with the Author
Beirut, Lebanon
January 7, 1986.

E X H I B I T 6 - 20

Progression of the Student Enrollment in Schools of Architecture



Foreign Graduates

PROGRESSION OF THE STUDENT ENROLLMENT IN SCHOOLS OF ARCHITECTURE IN LEBANON SINCE 1970

PROPORTION OF GRADUATE STUDENTS FROM EACH ARCHITECTURAL SCHOOL.

SOURCE : SIMONE KOSREMELLI
 Architecture au Liban, Alphamedia,
 Beirut, Lebanon, 1985.

Volume of Construction

Building

Civil Engineering

Other Civil Engineering

Residential Building

- One or two storey buildings built from:
 - mud, fibres and similar materials
 - bricks
 - concrete blocks
 - prefabricated

- Multi-storey buildings built from:
 - bricks
 - concrete blocks
 - steel-reinforced structures
 - prefabricated

Non-Residential Building

- Industrial buildings
- Commercial buildings
- Educational buildings
- Health buildings
- Other buildings

Each category subdivided by:

- one or two storey buildings
- building materials used
 - bricks
 - concrete blocks
 - steel-reinforced structures
 - prefabricated

Road Construction

- Paved roads by major pavement standards
- Gravel roads by type of gravel
- Earth roads
- Bridges

- Other transport works (railway tracks, bridges, tunnels, stations, etc.)
- Water supply and sewage works, dams, canals, ports, coast protection etc.
- Energy production and supply (oil and electricity) and telecommunication works

SOURCE : JURGEN RIEDEL
Long-Term Forecasting and Planning of the Construction and Building Materials Industry -
UNIDO, Vienna, Austria, 1984

E X H I B I T 7 - 2

Major Public Projects
1960-1975

<u>Project</u>	<u>Start/Completion</u>	<u>Cost (million L.L.)</u>
- Beirut Port's 3rd Dock	1962/1967	35
- Beirut Port's Grain Silo	1968/1970	20
- Jounieh Port's Basins	1963/1967	8
- Central Bank of Lebanon	1963/1964	9
- Tripoli International Fair	1963/1968	30
- Coastal freeway	1964/1975	114
- Improvement of Highway Network	1965/1967	93
- Modern Slaughterhouses, Beirut	1963/1966	8
- Thermal Plant at Jieh	1966/1969	100
- Exploitation of Litani River	1964/1974	400
- Electrification	1965/1966	32
- 50,000 Telephone Lines	1966/1969	57
- Underwater Cable to France	1969/1970	26
- Regulation of Abu Ali River	1967/1969	16
- Beirut River Canal	1968/1971	18
- Works at the Lebanese University	1968/1970	100
- Public Works in Beirut	1967/1970	60
- Miscellaneous	1962/1974	50

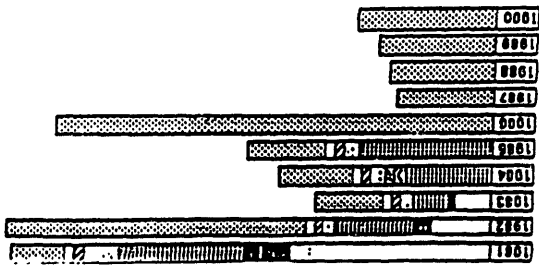
SOURCE : RUWAYN MURAD
 "The Construction Materials Industry and the
 Construction Activity in Lebanon".
 MS Thesis, MIT
 Cambridge, MA
 July 1983.

E X H I B I T 9 - 1

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Beirut Rehabilitation
(expenses in thousands LL)

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Highway network														
Metro	7057	85721	99572	49875	14182	8281								
Public Parking	1150	4125	12584	12100	5110	1771								
Marine Works	2300	1698	22859	30550	19804	9886	21594	32175						
Public Parks	3008	6508					5310							
Public Areas	103328			8677	2570	3320	3540	3600						
Rehabilitation Works	38728													
	25400	1507	1658	1822	2000	2206	2425	2691						
Total:	155327	218571	136883	103067	43596	25074	32853	38766						
Water Network	1840	1282	1410	1549	1781	1878	2082	2282						
Telecommunications														
	11000	12100	13300	73000	16100	17700	19500	107000	107000	23500	25900	28500	31400	
Total:	1840	1282	13510	14849	74781	17978	19782	21782	107000	23800	25900	28500	31400	
Grand Total:	157167	229753	150193	117916	118887	43659	52631	60548	107000	23800	25900	28500	31400	
Cumulative Grand Total:	157167	386420	536613	654529	773328	818776	889907	929455	1036455	1060055	1086955	1114455	1145255	



SOURCE : MUNICIPALITE DE BEYROUTH
"Plan de Rehabilitation du Centre de Beyrouth". 1977.

E X H I B I T 9 - 2 : The Reconstruction Expenditure Program (1983-91)

Sectors and Projects	Total Cost	1983	1984	1985	1986	1987	1988	1989	1990	1991
1- Housing										
- Repair and Reconstruction	2,400	150	350	300	300	300	300	300	400	
- Housing for the displaced	600	300	300							
- Easy Credit Programs (BB/HF)	2,700	300	300	300	300	300	300	300	300	308
- Low Cost Housing	16,170*	924	1078	1232	1386	1540	1694	1848	2002	2156
	21,870	1674	2028	1832	1986	2140	2294	2448	2702	2656
2- Education										
- General Education	1,680.5*	130	412	526	293	300				
- Vocational/Technical	343	16	65	100	75	97				
- Technical Assistance	7.1	0.9	3.7	2.5						
	2,030.6	146.9	480.7	628.5	368	337				
3- Transportation										
- National Plan for Transport	4		2	1						
- Road Rehabilitation	3,160*	187	195	340	243	153	153	3	153	250
- Expressways	6,283*	269	404	340	669	1171	895	945	981	664
- Ports	1,314.4	52.9	230.1	324.4	143.9	150.5	163.4	164.2	85	
- Airport (Beirut International)	1,243*	256	177.6	193.4	121.2	110.3	174.5	84	52	52
- Railroad	127	17	20				12.5	15.5	29	33
- Beirut Public Transport	113	8		1.9		7.1	35.9	20.8	18.5	19.8
	12,249.4	789.9	1028.7	1199.8	1195	1591.9	1436.3	1232.5	1318.5	818.8
4- Water Supply and Irrigation										
- Reconstruction and Urgent Projects	376	75.7	124.6	151.7	12	12				
- The Wall Project										
. Auali-Beirut (Inc. Damour)	732	117	213	162	90	90	60			
. Auali South/Iklim Kharroub	545	11.3	128.2	106.5	94	155	50			
- Development Projects										
. Water Supply	1067	2	4	87	67	290.5	187	180.5	149	120
. Lakes and Dams	840			54.8	226.7	216	241	71.5	21	
. Irrigation	2395*		32	67.2	190.2	314.4	406.3	214.5	183.3	194.5
	5955	206	510.8	629.2	659.9	1077.9	944.9	466.5	353.3	314.5
5- The National Waste Management Plan										
- Studies	12	2.5	5	4.5						
- Urgent Works	593	241	230.2*	113.8						
- Stage 1	2,301.4				354.6	571	425.2	331	330.5	789.1
- Stage 2	262.8							22	43	197.8
	3,169.2	243.5	243.2	118.3	354.6	571	425.2	353	373.5	786.9

E X H I B I T 9 - 2 (Continued)

Sectors and Projects	Total Cost	1983	1984	1985	1986	1987	1988	1989	1990	1991
6- Telecommunications										
- Rehabilitation of 70,000 lines	410	120	160	130						
- Connection of 200,000 lines	350	50	110	190						
- Expansion by 250,000 lines	3,000		20	200	430	450	450	450	500	500
- Expansion by 250,000 lines	2,600*						200	200	400	600
- Equipment	800		100	100	300	300				
	<u>7,160</u>	<u>170</u>	<u>390</u>	<u>620</u>	<u>730</u>	<u>750</u>	<u>650</u>	<u>650</u>	<u>900</u>	<u>1100</u>
7- Electricity										
- Zouk Power Plant	1,876	160	284	400	250	250	230			
- North Power Plant	1,000			100	100	200	200	200	100	100
- Transmission	550	23	80	100	97	125	125			
- Transportation and Distribution	550	90	75	84	96	100	105			
	<u>3,976*</u>	<u>273</u>	<u>439</u>	<u>684</u>	<u>543</u>	<u>675</u>	<u>660</u>	<u>200</u>	<u>100</u>	<u>100</u>
8- Health	1,113	47	57	146	283	310	210	60		
9- Agriculture	192	—	1.7	41.7	63.6	60	20	5		
10- The Beirut Central District										
- Execution	1,575	106	304	470	435	170	90			
- Expropriations	253.5	129	92.1	25.3	7.1					
	<u>1,828.5</u>	<u>235</u>	<u>396.1</u>	<u>495.3</u>	<u>442.1</u>	<u>170</u>	<u>90</u>			
11- Credit to the Private Sector										
- Agriculture	500	100	100	100	100	100	100	100	70	50
- Industry	1,000	160	160	160	100	100	100	100	70	50
- Tourism	1,200	300	300	300	300					
	<u>2,700</u>	<u>560</u>	<u>560</u>	<u>560</u>	<u>500</u>	<u>200</u>	<u>100</u>	<u>100</u>	<u>70</u>	<u>50</u>
GRAND TOTAL	<u>62,263.7</u>	<u>4,345.3</u>	<u>6,135.2</u>	<u>6,954.8</u>	<u>7,115.2</u>	<u>7,932.8</u>	<u>6,828.4</u>	<u>5,515</u>	<u>5,817.3</u>	<u>5,326.2</u>

SOURCE : COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION
 "The Reconstruction Project". Beirut, Lebanon. April 1983.

E X H I B I T 9 - 3
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The Tunis Pledge
(in US \$)

NAME OF STATE	COMMITMENTS IN %	5 YEAR COMMITMENTS	YEARLY COMMITMENTS	ACTUAL PAYMENTS
Arab Emirates	11.43	228,600,000	45,720,000	1980 45,720,000 1981 45,720,000 1982 13,000,000
Algeria (1)	7.14	142,800,000	28,560,000	1980 None 1981 None
Saudi Arabia	28.58	571,600,000	114,320,000	1980 38,107,000 1981 76,213,333
Iraq	14.86	297,200,000	59,440,000	1980 59,440,000 1981 None
Kuwait	15.71	314,200,000	62,840,000	1980 25,000,000 1981 67,840,000
Qatar	6.57	131,400,000	26,280,000	1980 None 1981 13,143,500
Libya (2)	15.71	314,200,000	62,840,000	1980 None 1981 None
	----- 100.00 =====	----- 2,000,000,000 =====	----- 400,000,000 =====	----- 384,183,833 =====

(1) Algeria excused itself from payments at the Summit Meeting due to financial difficulties and the other contributors agreed to jointly pick up the difference.

(2) Libya did not participate in the vote.

SOURCE : COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION
"The Reconstruction Project"
Beirut, Lebanon
April 1983.

E X H I B I T 9 - 4
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Major Reconstruction Loans
1977-78

FINANCIAL INSTITUTION	USE OF LOAN	AMOUNT (in million LL)
-B.I.R.D.	Technical formation for adults	19.8
-B.I.R.D.	Renovation of highway network	99.0
-Kreditanstalt Wiederaufbau	Expansion of drinking water network	32.0
-B.I.R.D.	Reconstruction of Beirut Port Expansion of telecommunications, water and wastewater networks.	150.0
-Arab Fund for Economic and Social Development	Expansion of electricity network Reconstruction of Beirut Port	121.0
-Koweit and Arab Fund for Economic Develop.	Renovation of Beirut Airport	88.0
-Abu Dhabi Fund for Economic Development	Expansion of electricity network Reconstruction of Beirut Port.	53.2
-European Economic Community	Water Distillation	72.0
-European and American Bank Group	Beirut Commercial Center and Airport. Expansion of electricity and highway network.	450.0
-French Government	Credit to suppliers for purchases of buses	44.0
-US AID	Guarantee for housing loans	90.0
-French Government	Purchase of telecommunication equipment	168.0
<hr/>		
TOTAL		1,387.0

SOURCES : - RUWAYN MURAD
"The Construction Materials Industry and the Construction
Activity in Lebanon". MS Thesis, MIT.
July 1983.

- BANQUE DU LIBAN
"Rapport sur les Annees 1975-78"
Beirut, Lebanon.

REFERENCES

1. Abi Saleh Fouad, "Les Conditions de la Survie." Le Commerce du Levant. Beirut, Lebanon. February 7, 1983.
2. Abi Saleh Fouad (President of the Association of the Lebanese Industrialists), Interview with the Author. Beirut, Lebanon. January 8, 1986.
3. Ach-Chou'oun As- Sina'iya (Industrial Affairs). Beirut, Lebanon. February 1983.
4. Ajami Fouad, "Lebanon and its Inheritors." Foreign Affairs. Spring 1985.
5. Al Bayane, "The Housing Problem is Getting Worse." Beirut, Lebanon. November 1985.
6. Almagani Group, Almagani Annual Report 1982. Beirut, Lebanon. May 1983.
7. American University, Area Handbook for Lebanon. Washington, D.C. 1974.
8. Anderson Dennis, "Small Industry in Developing Countries -- Some Issues." World Bank Staff Working Papers. Number 518.
9. Andraos Laurent, La Revue du Liban. Number 1355. Beirut, Lebanon. November 16, 1985.
10. Atallah Mohammed (Former President of the Council for Development and Reconstruction). Al-Idari. Beirut, Lebanon. June 1984.
11. Azar Edward E., Paul A. Jureidini, Charles Malik, R.D. McLaurin, Robert J. Pranger, Kate Shnayerson, Lewis W. Snider, Lebanon and the World in the 1980s. The Center for International Development, University of Maryland. 1983.
12. Azhari Naaman, L'Evolution du Systeme Economique Libanais ou la Fin du Laisser-Faire. Paris, France. February 1970.
13. Babikian Khatchig (Former Minister, President of the Parliament's Commission for the Reconstruction), Interview with the Author. Beirut, Lebanon. January 13, 1986.
14. Bartholomew Reginald (Former U.S. Ambassador to Lebanon), Periodic Economic Review of Lebanon. Unpublished Incoming Telegram to the U.S. State Department. July 1984.
15. Beirut Chamber of Commerce and Industry, Le Commerce Du Levant, Beirut, Lebanon. Records, 1977.
16. Beirut Chamber of Commerce and Industry, Le Commerce Du Levant,

- Beirut, Lebanon. June 8, 1981.
17. Beirut Chamber of Commerce and Industry, Le Commerce Du Levant, Beirut, Lebanon. June 15, 1981.
 18. Beirut Chamber of Commerce and Industry, Le Commerce Du Levant, Beirut, Lebanon. June 29, 1981.
 19. Beirut Chamber of Commerce and Industry, Le Commerce Du Levant, Beirut, Lebanon. March 15, 1982.
 20. Beirut Chamber of Commerce and Industry, Le Commerce Du Levant, Beirut, Lebanon. May 17, 1982.
 21. Beirut Chamber of Commerce and Industry, Le Commerce Du Levant, Beirut, Lebanon. June 15, 1982.
 22. Beirut Chamber of Commerce and Industry, Le Commerce Du Levant, Beirut, Lebanon. December 27, 1982.
 23. Beirut Chamber of Commerce and Industry, Le Commerce Du Levant, Beirut, Lebanon. February 7, 1983.
 24. Beirut Chamber of Commerce and Industry, Le Commerce Du Levant, Beirut, Lebanon. February 21, 1983.
 25. Beirut Chamber of Commerce and Industry, Le Commerce Du Levant, Beirut, Lebanon. January 23, 1984.
 26. Beirut Chamber of Commerce and Industry, Le Commerce Du Levant, Beirut, Lebanon. August 13, 1984.
 27. Beirut Chamber of Commerce and Industry, Le Commerce Du Levant, Beirut, Lebanon. March 18, 1985.
 28. Beirut Chamber of Commerce and Industry, Le Commerce Du Levant, Beirut, Lebanon. September 3, 1985.
 29. Beirut Chamber of Commerce and Industry, Le Commerce Du Levant, Beirut, Lebanon. Records, Various Years.
 30. Bekhazi Andre (Architect), Interview with the Author. Beirut, Lebanon. March 28, 1986.
 31. Berna J.J., Industrial Entrepreneurship in Madras State. Stanford Research Institute, California, and Asia Printing House, New Delhi. 1960.
 32. Booz, Allen, Hamilton, Strategic Study for Building Materials and Ceramics, Volumes 1 to 5. General Organization for Industrialization. Cairo, Egypt. June 1977.
 33. Brennen Lynn, How to Insure Against Political Risk. Unpublished Paper. April 1980.

34. Britannica (Encyclopediadia). Volume 10, 15th Edition.
35. Bsata Bahaeddine (Former Minister, President of the Lebanese Syndicate of Engineers), Personal Communication. Beirut, Lebanon. January 1986.
36. Bsata Bahaeddine, "La Profession d'Ingenieur Sera Bientot Sursaturee." L'Orient - Le Jour. September 24, 1984.
37. Bureau des Documentations Libanaises et Arabes, L'Argus des Documents Libanais -- Etude Annuelle sur l'Economie Libanaise. Beirut, Lebanon. 1964.
38. Bureau des Documentations Libanaises et Arabes, L'Argus des Documents Libanais -- Etude Annuelle sur l'Economie Libanaise. Beirut, Lebanon. 1971.
39. Cairo University/M.I.T, The Joint Research Team on the Housing and Construction Industry, "The Housing and Construction Industry in Egypt," Interim Report Working Papers. Technology and Development Program -- M.I.T., Cambridge, Massachusetts. Spring 1978.
40. Cassimatis Peter, The Performance of the Construction Industry, 1964-1965. Ph.D. Dissertation, New School for Social Research. 1967.
41. Cassir Victor (Minister of Economy and Commerce, Industry and Petroleum), Interview with the Author. Beirut, Lebanon. December 27, 1985.
42. CAT (Contracting and Trading Company), At Work in the World's Toughest Terrain. Beirut, Lebanon. April 1985.
43. CDR (Council for Development and Reconstruction), The Reconstruction Project. Beirut, Lebanon. April 1983.
44. Chaib Andre, "Banking in Lebanon: Adjusting to a Changing Economy." Panorama of Events. Beirut, Lebanon. Spring 1984.
45. Chamie Joseph, "The Lebanese Civil War: An Investigation into the Causes." World Affairs, No. 139.
46. Chaya Elie, "Circular Librement a Libanville." Conference. Beirut, Lebanon. September 1980.
47. Chesterman David, Trading with Lebanon: A Guide to U.S. Firms. Unpublished Paper. February 1982.
48. Cobban Helena, "Thinking About Lebanon." American-Arab Affairs. Spring 1985.
49. Conseil Executif des Grands Projets, Cahier des Clauses et Conditions Juridiques et Administratives, Universite Libanaise, Faculte des Sciences II, Fanar. Beirut, Lebanon. 1984.

50. Dar al-Handasah Consultants (Shair and Partners). Beirut, Lebanon. August 1984.
51. Dar al-Handasah Nazih Taleb. Beirut, Lebanon. March 1985.
52. Dargous Kamal ("Oger-Liban"), Personal Communication. Beirut, Lebanon. January 24, 1986.
53. Dillon Robert (Former U.S. Ambassador to Lebanon), Periodic Review of Lebanon. Unclassified Incoming Telegram, U.S. Department of Commerce. November 1983.
54. Dillon Robert, Periodic Review of Lebanon. Unclassified Incoming Telegram, U.S. State Department. December 1982.
55. Dillon Robert, Periodic Review of Lebanon, 1983. Unclassified Incoming Telegram, U.S. State Department. 1983.
56. Dirassat Lubnaniya (Lebanese Studies), "Al Azama al-Sakaniya fi Loubnan" (The Housing Crisis in Lebanon). Beirut, Lebanon. 1980.
57. Economist, "The World in Figures." 1981.
58. Economist, "The World in Figures." 1983.
59. Editions Orientales, Le Nouveau Magazine. Beirut, Lebanon. September 15, 1984.
60. Editions Orientales, Le Nouveau Magazine. Beirut, Lebanon. November 15, 1985.
61. Editions Orientales, Le Nouveau Magazine. Beirut, Lebanon. January 11, 1986.
62. Edmonds G.A., "The Construction Industry in Developing Countries." International Labor Review. May-June 1979.
63. Edmonds G.A., "Institutional Aspects of the Construction Industry in Developing Countries." World Employment Programme Research -- Working Papers. International Labor Office. Geneva, Switzerland. October 1980.
64. El-Khazen Farid, The Lebanese Economy After a Decade of Turmoil 1975-85. The Johns Hopkins University. Washington, D.C. 1985.
65. El-Khazen Fouad (President of the Syndicate of the Lebanese Contractors, and Executive Commercial Director, the CAT Group), Interview with the Author. Beirut, Lebanon. January 20, 1986.
66. El-Khoury Rafik, Statement of Capability. Beirut, Lebanon. 1984.
67. El-Khoury Rafik (Consultant, Engineer), Interview with the Author. Beirut, Lebanon. January 22, 1986.

68. Engineering News-Record. September 29, 1955.
69. Engineering News-Record. November 21, 1957.
70. Engineering News-Record. November 6, 1975.
71. Engineering News-Record. January 27, 1977.
72. Engineering News-Record. May 26, 1977.
73. Engineering News-Record. November 10, 1977.
74. Engineering News-Record. 1983/84 Directory.
75. Engineering News-Record. August 2, 1984.
76. Engineering News-Record. June 13, 1985.
77. Etudes et Consultations Economiques Sarl, Rapport Economique Libanais. Beirut, Lebanon. November 1985.
78. Etudes et Consultations Economiques Sarl, Rapport Economique Libanais. Beirut, Lebanon. December 1985.
79. Federation Internationale des Ingenieurs-Conseil (FIDIC), Conditions of Contract-International. Paris, France. Various Years.
80. Gemayel Amin (President of the Republic of Lebanon), Interview with the Author. Baabda Palace, Lebanon. March 25, 1986.
81. Gemayel Bachir (Late President of the Republic of Lebanon), in Liberte et Securite, Beirut, Lebanon. 1980; and in Le Monde, Paris, France. May 22, 1979.
82. Gilmour David, Lebanon, the Fractured Country. St. Martin's Press Inc., New York. 1984.
83. Gordon D.C., Lebanon: The Fragmented Nation. Croom Helm, London. 1980.
84. Haddad Georges (Dean, "Academie Libanaise des Beaux Arts"), Interview with the Author. Beirut, Lebanon. January 25, 1986.
85. Haddad William, "Divided Lebanon." Current History, A World Affairs Journal. June 1982.
86. Halpin, D.W. et al., Construction Management. John Wiley, New York. 1980.
87. Hudson Michael, The Precarious Republic: Modernization in Lebanon. Random House, New York. 1968.
88. International Monetary Fund, International Financial Statistics. 1985.

89. IRFED (Institut International de Recherche et de Formation en Vue du Developpement), Besoins et Possibilites du Liban: Etude Preliminaires. Beirut, Lebanon. 1964.
90. Isaiah Frank, Foreign Enterprise in Developing Countries. The Johns Hopkins University Press. Baltimore and London.
91. Iskandar Marwan, Elias Baroudi, The Lebanese Economy in 1982-83 (Middle-East Economic Consultants). Beirut, Lebanon. 1984.
92. Issawi Charles, Economic Development and Political Liberalism in Lebanon. Cited in Leonard Binder, Politics in Lebanon. John Wiley and Sons, New York. 1966.
93. Janes, World Railways. London, England. 1985.
94. Kassar Adnan, "L'Augmentation du Nombre des Etablissements du Credit a Ete Nefaste...". La Revue du Liban. Number 1355. Beirut, Lebanon. November 16, 1985.
95. Kettaneh Brothers, Construction Activities. Beirut, Lebanon. 1984.
96. Kettaneh Freres, Slipform Construction. London, England. 1978.
97. Kettaneh Nabil ("Kettaneh Freres"), Interview with the Author. Beirut, Lebanon. January 21, 1986.
98. Khalaf Nadim, "Manpower Requirements of Lebanon's Reconstruction Plan." Bulletin Trimestriel de la Banque du Liban. Beirut, Lebanon. First Quarter 1982.
99. Khayat Roger, "L'Industrie est en Pleine Mutation." La Revue du Liban. Number 1355. Beirut, Lebanon. November 16, 1985.
100. Khoury Joseph, Fawzi Boueri ("Societe Nationale d'Entreprise"), Interview with the Author. Beirut, Lebanon. January 7, 1986.
101. Khoury Philip, "Lebanon: Fractured Country." M.I.T. Conference. Cambridge, Massachusetts. December 2, 1985.
102. Kobin Stephen, "Assessing Political Risk Overseas." The Wharton Magazine. Volume 6, Number 2. Winter 1981-82.
103. Kosremelli Simone, "Some Facts about Architectural Education in Lebanon." Architectures au Liban. Alphamedia. Beirut, Lebanon. 1985.
104. Law John, Arab Aid: Who Gets It, For What and How. Chase World Information Corporation. 1980.
105. Lissan ul-Hal, "Arab Aid." Beirut, Lebanon. October 31, 1985.
106. Makdisi Samir, "An Appraisal of Lebanon's Postwar Development and a Look to the Future." The Middle East Journal. Summer 1977.

107. Matta Alfred (General Contractor), Interview with the Author. Beirut, Lebanon. January 9, 1986.
108. MEED, "U.S. Mission Examines Investment Prospects." November 19, 1982.
109. Middle East Yearbook. London, England. 1980.
110. Ministere du Plan, Direction Centrale de la Statistique, Les Comptes Economiques 1965-70. Beirut, Lebanon. 1971.
111. Ministere du Plan, Possibilites d'Investissement Industriel au Liban. Beirut, Lebanon. 1969.
112. Ministere du Plan, Direction Centrale de la Statistique, Recueil de Statistiques Libanaises, Numero 8. Beirut, Lebanon. 1972.
113. Ministere des Travaux Publics, Cahier des Clauses et Conditions Generales Imposees aux Entrepreneurs des Travaux Publics. Beirut, Lebanon. 1941.
114. Moavenzadeh Fred, The Building Materials Industry in Developing Countries. An Analytical Appraisal. Technology and Development Program, M.I.T. Cambridge, Massachusetts. January 1985.
115. Moavenzadeh Fred, "Construction Seminar." M.I.T. Cambridge, Massachusetts, September 24, 1985.
116. Moavenzadeh Fred, Alexander Demacopoulos, International Construction Financing. Technology and Development Program, M.I.T. Cambridge, Massachusetts. June 1985.
117. Moavenzadeh Fred, Frances Hagopian, Construction and Building Materials Industries in Developing Countries. Technology and Development Program, M.I.T. Cambridge, Massachusetts. August 1983.
118. Moavenzadeh Fred, Janet Ann Koch Rossow, The Construction Industry in Developing Countries. Technology and Development Program, M.I.T. Cambridge, Massachusetts. Spring 1975.
119. Moavenzadeh Fred, Tarek Selim, The Construction Industry in Egypt. Technology and Development Program, M.I.T. Cambridge, Massachusetts June 1984.
120. Mokbel Samir ("Mokbel and Partners"), Interview with the Author. Beirut, Lebanon. January 27, 1986.
121. Moussa Pierre (Quantity Surveyor and Civil Engineering Senior Lecturer at the American University of Beirut), Interview with the Author. Broummana, Lebanon. January 10, 1986.
122. Municipalite de Beyrouth, Plan de Rehabilitation du Centre de Beyrouth. Beirut, Lebanon. 1977.

123. Murad Ruwayn, The Construction Materials Industry and the Construction Activity in Lebanon. Master's Thesis, M.I.T. Cambridge, Massachusetts. July 1983.
124. Murray George, Lebanon: The New Future. Beirut, Lebanon. 1974.
125. Naim Edmond, "Review of the Lebanese Economy." The Prow. American University of Beirut. Beirut, Lebanon. December 1985.
126. Naim Edmond, "Parite de la Livre Libanaise." Rapport Economique Libanais. Etudes et Consultations Economiques Sarl. Beirut, Lebanon. November 1985.
127. Nammur Mitri (Administrator of the City of Beirut), Interview with the Author. Beirut, Lebanon. January 6, 1986.
128. Nasr Samir, "Quel Financement Pour l'Industrie." Le Commerce du Levant. Beirut, Lebanon. February 7, 1983.
129. Nassif Nadim, The Government Role in Encouraging and Supporting the Industrial Sector in Lebanon. Unpublished Master's Thesis, American University of Beirut. Beirut, Lebanon. 1971.
130. Nehme Pierre (Dean of Architecture of the "Academie Libanaise des Beaux-Arts"). La Revue du Liban. Number 1355. Beirut, Lebanon. November 16, 1985.
131. Newsweek on Campus, "A University Under the Gun." December 1985.
132. New York Times. February 10, 1983.
133. Oger-Liban, Oger Liban Sal. 1983. Beirut, Lebanon, 1983.
134. L'Orient-Le Jour. Beirut, Lebanon. September 13, 1985.
135. L'Orient-Le Jour. Beirut, Lebanon. September 26, 1985.
136. L'Orient-Le Jour. Beirut, Lebanon. November 30, 1985.
137. Papazian Hratch (Geotechnical Consultant and Civil Engineering Senior Lecturer at the American Univeristy of Beirut), Interview with the Author. Beirut, Lebanon. January 6, 1986.
138. La Revue du Liban. Number 1355. Beirut, Lebanon. November 16, 1985.
139. Riedel Jurgen, Long-Term Forecasting and Planning of the Construction and Building Materials Industries. UNIDO. Vienna, Austria. September 1984.
140. Riedel Jurgen, Siegfried Schultz, Bauwirtschaft und Baustoffindustrie in Entwicklungslandern. Weltforum Verlaz. Munich and London. 1978.
141. Rizk Riad ("National Enterprising and Contracting Company" and

- "Almabani"), Interview with the Author. Beirut, Lebanon. January 23, 1986.
142. Role of the Construction Sector in the Socio-Economic Developing Countries, A Pakistan Case Study, Volume II. July 1980.
 143. Salam Selim ("Middle East Airlines") Rapport Economique Libanais. Etudes et Consultations Economiques Sarl. Beirut, Lebanon. November 1985.
 144. Sarkis Ronald, "L'Erosion de la Livre Libanaise." Conference. Beirut, Lebanon. January 22, 1985.
 145. Sassine Joseph ("The Housing Bank"), "Toute Solution de l'Habitat Exige un Concours Entre l'Etat et le Secteur Prive." L'Orient-Le Jour. Beirut, Lebanon. September 27, 1985.
 146. Sayigh Youssef, Entrepreneurs of Lebanon. The Harvard University Press. Cambridge, Massachusetts. 1962.
 147. Science and Engineering Research Council and the Departments of Environment and Transport, Long-Term Research and Development Requirements in Civil Engineering. London, England. 1981.
 148. Sebai Souheil, Enseignement Technique, Plan Quinquennal Pour Couvrir nos Besoins. Direction Generale de l'Enseignement Technique et Professionnel. Beirut, Lebanon. November 1984.
 149. Simonian Annie, The Role of Legal and Financial Factors in Formation of the Lebanese Corporation. Unpublished Master's Thesis, American University of Beirut. Beirut, Lebanon. 1969.
 150. Tabet Louis (Architect), Interview with the Author. Beirut, Lebanon. January 24, 1986.
 151. Tasso Michel (Former Director at the Central Bank of Lebanon), Interview with the Author. Beirut, Lebanon. January 2, 1986.
 152. Turin D.A., The Construction Industry, its Economic Significance and its Role in Development. University College Environmental Research Group. London, England. 1960.
 153. UN Demographic Yearbook. Various Years.
 154. UN Economic Commission for Africa, Survey of Economic Conditions in Africa 1971. New York. 1972.
 155. UNIDO, First Consultation on the Building Materials Industry. Athens, Greece. March 26-30, 1985.
 156. UNIDO Monographs on Industrial Development, "Industrialization of Developing Countries: Problems and Prospects." Monograph Number 3, Building Materials Industry. United Nations, New York. 1969.

157. US Department of State, Bureau of Public Affairs, Background Notes on Lebanon. July 1982.
158. US Department of State, Bureau of Public Affairs, Background Notes on Lebanon. 1984.
159. US Department of Treasury, Middle Eastern Multinational Financial Institutions.
160. Vernon Raymond, Storm over the Multinationals: The Real Issues. Harvard University Press. Cambridge, Massachusetts. 1977.
161. Wayss and Freytag, Salah Al-Din Al Ayubi Expressway, Bagdad. Frankfurt, West Germany. 1983.
162. Weller Robert, The Political Implication of the Changing Religious Composition of Lebanon. Florida State University. 1985.
163. World Bank, "A Framework for the Promotion of Construction Industries in Developing Countries." Staff Working Paper. Number 168. November 1973.
164. World Bank, World Development Report. 1985.
165. World Bank, World Tables -- Economic Data. 3rd Edition. Volumes I and II.
166. World Register of Dams. Paris, France. 1976.
167. Zahlan Antoine Benjamin, The Arab Construction Industry. Croom Helm, London and St. Martin's Press, New York. 1983.
168. Zakhem Albert ("Zakhem Engineers Sal."). Personal Communication. Beirut, Lebanon. February 1986.
169. Zakhem International Construction Limited, Prequalification Document. London, England. 1984.